Overview

Important Note: Features and Supported Configurations will differ between the Z4 G4 Workstations with Intel® Xeon®W Processors and the Z4 G4 Workstation with Intel® Core™ X Processors. Where different - features are shown side by side. Supported configurations are indicated by the CPU Support references.

HP Z4 G4 Workstation

Front view

1. Front I/O module options
   - Premium (optional): power button, 2 USB 3.1 G1 Type-A, 2 USB 3.1 G2 Type-C™, Headset audio, SD Card Reader (optional) (Left-most Type-A port has charging capability)
   - Standard (shown here): power button, 4 USB 3.1 G1 Type-A (left-most Type-A port has charging capability), Headset audio, SD Card Reader (optional)
2. Front handle
3. 2 x 5.25"? external drive bays

Overview

Intel® Xeon® W Processors

Intel® Core™ X-series Processors

Internal view

	Intel® Xeon® W Processors	Intel® Core™ X-series Processors
4.	Intel® Xeon® Processors: W-2100 family	Intel® Core ™ i7-X-series processors Intel® Core ™ i9-X Series processors Intel® Core ™ i9 Extreme Edition processor
5.	2 PCIe G3 x16, 2 PCIe G3 x4, 1 PCIe G3 x8	Core i9-X configs/Core i7 9800X: 2 PCIe G3 x16, 2 PCIe G3 x4, 1 PCIe G3 x8 Other Core i7-X configs: 1 PCIe G3 x16, 1 PCIe G3 x16 (x8 electrical), 2 PCIe G3 x4, 1 PCIe G3 x8 (mechanical only)
6.	2 PCIe G3 x4 M.2 for SSDs	1 PCIe G3 x4 M.2 for SSDs
7.	8 DIMM slots; DDR4-2666 ECC Registered RAM	8 DIMM slots: DDR4-2666 Non-ECC Unbuffered RAM
8.	PSU options: - 465W 90% efficient with 0 graphics power adapters - 750W 90% efficient with 2 graphics power adapters - 1000W 90% efficient with up to 4 graphics power Adapters	PSU: - 1000W 90% efficient with up to 4 graphics power Adapters
9.	2 x 5.25"? external drive bays	
10.	2 x 2.5"?/3.5"? internal drive bays	
11.	Front card guide and fan (select configurations)	
12.	6 x 6Gb/s SATA ports	

Overview

Intel® Xeon® W Processors

Intel® Core™ X-series Processors

Rear view

	Intel® Xeon® W Processors	Intel® Core™ X-series Processors
13.		Rear power button
14.		Rear handle
15.		Padlock loop
16.		Kensington lock slot
17.	Rear I/O (top to bottom):	Rear I/O (top to bottom):
	- Audio in/out,	- Audio in/out,
	- Keyboard/Mouse PS/2	- Keyboard/Mouse PS/2
	- USB: 6 USB 3.1 G1 Type-A	USB: 5 USB 3.1 G1 Type-A
	- 2x 1GbE ports	- 1x 1GbE port
18.		Side panel barrel keylock (optional)

Supported Components

Overview

Form Factor Minitower

Operating Systems

Intel® Xeon® W Processors

Preinstalled:

- Windows 10 Pro 64 for Workstations*
- Windows 10 Pro 64 Downgrade to Windows 7 64/ 64 Plus **
- 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:

- Red Hat® Enterprise Linux® Desktop 7.4
- SUSE Linux® Enterprise Desktop 12 SP3
- Ubuntu 16.04.3 LTS

Intel® Core™ X-series Processors

Preinstalled:

- Windows 10 Pro 64*
- Windows 10 Pro High End
- 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:

- Red Hat® Enterprise Linux® Desktop 7.4
- SUSE Linux® Enterprise Desktop 12 SP3
- Ubuntu 16.04 LTS

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

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

Note: In accordance with Microsoft's support policy, HP does not support the Windows® 8 or Windows® 7 operating system on products configured with Intel® and AMD 7th Generation and forward processors or provide any Windows® 8 or Windows® 7 drivers on http://www.support.hp.com

**only available in China through June 2019.

Available Processors

Name	Cores	Clock Speed (GHz)	Cache (MB)	Memory Speed (MT/s)	ECC memory support	Max memory support	Hyper-Threading	Featuring Intel® vPro™ Technology	Intel® Turbo Boost Technology 2.0 (GHz)[1]	Intel® Turbo Boost Max Technology 3.0 (GHz)[2]	TDP (W)
Intel® Xeon® W Processors											
Intel® Xeon® W-2195 processor	18	2.3	24.75	2666	YES	512GB	YES	YES	3.2, 4.3	N/A	140
Intel® Xeon® W-2175 processor	14	2.5	19.25	2666	YES	512GB	YES	YES	3.3, 4.3	N/A	140
Intel® Xeon® W-2155 processor	10	3.3	13.75	2666	YES	512GB	YES	YES	4.0, 4.5	N/A	140
Intel® Xeon® W-2145 processor	8	3.7	11.00	2666	YES	512GB	YES	YES	4.3, 4.5	N/A	140
Intel® Xeon® W-2135 processor	6	3.7	8.25	2666	YES	512GB	YES	YES	4.4, 4.5	N/A	140

Supported Components

Intel® Xeon® W-2133 processor	6	3.6	8.25	2666	YES	512GB	YES	YES	3.8, 3.9	N/A	140
Intel® Xeon® W-2125 processor	4	4.0	8.25	2666	YES	512GB	YES	YES	4.4, 4.5	N/A	120
Intel® Xeon® W-2123 processor	4	3.6	8.25	2666	YES	512GB	YES	YES	3.7, 3.9	N/A	120
Intel® Xeon® W-2104 processor	4	3.2	8.25	2400	YES	512GB	NO	YES	N/A	N/A	120
Intel® Xeon® W-2102 processor	4	2.9	8.25	2400	YES	512GB	NO	YES	N/A	N/A	120
Intel® Core™ X-Series Processors											
Intel® Core™ i9-9980XE processor	18	3.0	24.75	2666	NO	128GB	YES	NO	4.4	4.5	165
Intel® Core™ i9-9920X processor	12	3.5	19.25	2666	NO	128GB	YES	NO	4.4	4.5	165
Intel® Core™ i9-9820X processor	10	3.3	16.5	2666	NO	128GB	YES	NO	4.1	4.2	165
Intel® Core™ i7-9800X processor	8	3.8	16.5	2666	NO	128GB	YES	NO	4.4	4.5	165
Intel® Core™ i9-7980XE processor	18	2.6	24.75	2666	NO	128GB	YES	NO	4.2	4.4	165
Intel® Core™ i9-7960X processor	16	2.8	22.0	2666	NO	128GB	YES	NO	4.2	4.4	165
Intel® Core™ i9-7940X processor	14	3.1	19.25	2666	NO	128GB	YES	NO	4.3	4.4	165
Intel® Core™ i9-7920X processor	12	2.9	16.5	2666	NO	128GB	YES	NO	4.3	4.4	140
Intel® Core™ i9-7900X processor	10	3.3	13.75	2666	NO	128GB	YES	NO	4.3	4.5	140
Intel® Core™ i7-7820X processor	8	3.6	11.0	2666	NO	128GB	YES	NO	4.3	4.5	140
Intel® Core™ i7-7800X processor	6	3.5	8.25	2400	NO	128GB	YES	NO	4.0	N/A	140
	[1]For Intel ® Xeon® W processors, the specifications shown in this column represent the following: all core maximum turbo frequency, single core maximum turbo frequency). For Intel® Core™ processors, the specifications shown in this column refer to single core maximum turbo frequency. [2]Intel Turbo Boost Max Technology 3.0 identifies the best performing core(s) on a processor and provides increased performance on those cores by taking advantage of power and thermal headroom. Intel® Turbo Boost Max Technology 3.0 frequency is the clock frequency of the CPU when running in this mode. **NOTE:** Processors that do not have certain turbo functionality are denoted as N/A.										

Available Processors

Supported Components

Disclaimers	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
Expansion Slots (see system board section for more details)	**Intel® Xeon® W Processors** / **Intel® Core™ X-series Processors** **Slot 0:** Mechanical-only, for use with devices that require only rear bulkhead mounting **Slot 1:** PCI Express Gen3 x16 (from CPU) **Slot 2:** PCI Express Gen3 x4 (from PCH) with open-ended connector* **Slot 3:** PCI Express Gen3 x16 (from CPU) / **Slot 3:** Core i9-X and Core i7-9800X configs: PCI Express Gen3 x16 (from CPU). Other Core i7-X configs: PCI Express Gen3 x16(mechanical) x8(electrical) (from CPU) **Slot 4:** PCI Express Gen3 x4 (from PCH) with open-ended connector* **Slot 5:** PCI Express Gen3 x8 (from CPU) with open-ended connector* / **Slot 5:** - Core i9-X and Core i7-9800X configs: PCI Express Gen3 x8 (from CPU) with open-ended connector* - Other Core i7-X configs: PCI Express Gen3 x8 (mechanical-only, no data) with open-ended connector* **M.2 Slot 1:** M.2 PCIe Gen 3 x4 (from CPU) up to 80mm storage devices **M.2 Slot 2:** M.2 PCIe Gen 3 x4 (from CPU) up to 80mm storage devices / **M.2 Slot 2:** No 2nd M.2 connector/slot available * 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 drive carriers pre-installed). Optional 2.5"? adapter available. 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
Front I/O	• Base: Power button with power/fault LED, 1 Headset audio port, 4 USB 3.1 G1 Type A (1 charging) • Premium (optional): Power button with power/fault LED, Drive activity LED, 1 Headset audio port, 2 USB 3.1 G1 Type-A (1 charging), 2 USB 3.1 G2 Type-C™ • Optional: SD reader
Internal I/O	1 USB 3.1 G1 single-port header, 1 USB 2.0 single-port header and 1 USB 2.0 dual-port header
Rear I/O	**Intel® Xeon® W Processor Family** 6x USB 3.1 G1 Type-A 2x 1GbE LAN ports (1x supporting Intel AMT) **Intel® Core™ X- Series Processor Family** 5x USB 3.1 G1 Type-A 1x 1GbE LAN ports

Supported Components

	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), 2 Thunderbolt 3
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) Thunderbolt 3 (optional) 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 Configuration SATA RAID 1 Mirrored Array Configuration SATA RAID 5 Striped/Parity Configuration SATA RAID 10 Striped/Mirrored Configuration
Chassis Dimensions (H x W x D)	H: 15.2" (386mm) W: 6.65" (169mm) D: 17.5" (445mm)
Packaged Dimensions	H: 22.5" (572mm) W: 12.4" (314mm) D: 22.2" (563mm)
Rack Dimensions	4U
Weight	Exact weights depend upon configuration (System weight only). Minimum: 10.2 kg (22.4 lbs.) Standard: 11.3 kg (24.9 lbs.) Maximum: 17.3 kg (38.2 lbs.)
Temperature	Non-operating: -40° to 60° C (-40° to 140° F) Operating: 5° to 35° C (40° to 95° F) Above 1524 m (5,000 feet) altitude, the maximum operating temperature is reduced by 1° C (1.8° F) for every 305 m (1,000 feet) increase in elevation Maximum rate of change: 10 °C/hr No direct sustained sunlight
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 (with Rotational Hard Drives): 3,048 m (10,000 feet) Operating (with only Solid-State Drives): 5,000 m (16,404 feet) Non-operating: 12,192 m (40,000 feet) Maximum operating temperature is reduced as altitude increases. See Temperature for details.
Power Supply	**Processor Support** **XW** **ENTRY** 465 watts wide-ranging, active Power Factor Correction, 90% Efficient, with no 6-pin graphics power cables. The Z4 G4 465W power supply efficiency report can be found at this link: https://plugloadsolutions.com/psu_reports/HP%20INC_DPS-465AB-3%20A_465W_ECOS%204939_Report.pdf **XW** **MID_RANGE** 750 watts wide-ranging, active Power Factor Correction, 90% Efficient, with 2x 6-pin graphics power cables. The Z4 G4 750W power supply efficiency report can be found at this link: https://plugloadsolutions.com/psu_reports/HP%20INC_DPS-750AB-36%20A_750W_ECOS%204938_Report.pdf **HIGH-END**

Supported Components

XW, CX (i9)	1000 watts wide-ranging, active Power Factor Correction, 90% Efficient. Includes 4x 6+2-pin graphics power cables: also includes a Front Fan and Card Guide kit to enable support for dual high end graphics solutions.
CX (i7)	1000 watts wide-ranging, active Power Factor Correction, 90% Efficient. Includes 2x 6+2-pin graphics power cables.

The Z4 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

NOTE: 1000 W internal power supply, up to 90% efficiency, active PFC available the first half of 2018

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

Processors

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Intel® Xeon® W-2100 Series CPU				
Intel® Xeon® W-2195 2.3 2666 18C CPU	Y	N		
Intel® Xeon® W-2175 2.5 2666 14C CPU	Y	N		
Intel® Xeon® W-2155 3.3 2666 10C CPU	Y	N		
Intel® Xeon® W-2145 3.7 2666 8C CPU	Y	N		
Intel® Xeon® W-2135 3.7 2666 6C CPU	Y	N		
Intel® Xeon® W-2133 3.6 2666 6C CPU	Y	N		
Intel® Xeon® W-2125 4.0 2666 4C CPU	Y	N		
Intel® Xeon® W-2123 3.6 2666 4C CPU	Y	N		
Intel® Xeon® W-2104 3.2 2400 4C CPU	Y	N		
Intel® Xeon® W-2102 2.9 2400 4C CPU	Y	N		
Intel® Core™ X-Series CPU				
Intel® Core™ i9-9980XE 3.0 2666 18C CPU	Y	N		
Intel® Core™ i9-9920X 3.5 2666 12C CPU	Y	N		
Intel® Core™ i9-9820X 3.3 2666 10C CPU	Y	N		
Intel® Core™ i7-9800X 3.8 2666 8C CPU	Y	N		
Intel® Core™ i9-7980XE 2.6 2666 18C CPU	Y	N		
Intel® Core™ i9-7960X 2.8 2666 16C CPU	Y	N		
Intel® Core™ i9-7940X 3.1 2666 14C CPU	Y	N		
Intel® Core™ i9-7920X 2.9 2666 12C CPU	Y	N		
Intel® Core™ i9-7900X 3.3 2666 10C CPU	Y	N		
Intel® Core™ i7-7820X 3.6 2666 8C CPU	Y	N		
Intel® Core™ i7-7800X 3.5 2400 6C CPU	Y	N		

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.

Monitors / Displays

	Processor Supports	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP Z Display Z22n G2	XW, CX		Y	1JS05AA	
HP Z Display Z23n G2	XW, CX		Y	1JS06AA	
HP Z Display Z24i G2	XW, CX		Y	1JS08AA	
HP Z Display Z24n G2	XW, CX		Y	1JS09AA	
HP Z Display Z24nf G2	XW, CX		Y	1JS07AA	
HP Z Display Z27n G2	XW, CX		Y	1JS10AA	
HP Z Display Z27s (4K display)	XW, CX		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	Processor Supports	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP 300GB 15k SAS SFF	XW	Y	Y	L5B74AA	

NOTE: Only available on Xeon W configs SAS controller add-in card required

*For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity may be less. Up to 32GB (for Windows 10) is reserved for system recovery software.

SATA Hard Drives

SATA (Serial ATA) Hard Drives for HP Workstations	Processor Supports	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
500GB SATA 7200RPM 6Gb/s 3.5"? HDD	XW, CX	Y	Y	LQ036AA	
500GB SATA 7200RPM 6Gb/s OPAL2 SFF 3.5"? HDD	XW, CX	Y	Y	D8N29AA	
1TB SATA 7200RPM 3.5"? HDD	XW, CX	Y	Y	LQ037AA	
1TB SATA 7200RPM Ent 3.5"? HDD	XW, CX	Y	Y	W0R10AA	
2TB SATA 7200RPM 3.5"? HDD	XW, CX	Y	Y	QB576AA	
4TB SATA 7200RPM Ent 3.5"? HDD	XW, CX	Y	Y	K4T76AA	
6TB SATA 7200RPM Ent 3.3"? HDD	XW, CX	Y	Y	3DH90AA	

NOTES: Up to (4) 3.5-inch 7200 rpm SATA drives: 500 GB, 1.0, 2.0, 4.0, 16TB max total

Supported Components

SATA Solid State Drives

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

PCIe Solid State Drives

	Processor Supports	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
PCIe SSDs for HP Workstations					
HP Z Turbo Drive 256GB MLC Z4/Z6 G4 SSD Kit	XW, CX	Y	Y	1PD56AA	
HP Z Turbo Drive 512GB MLC Z4/Z6 G4 SSD Kit	XW, CX	Y	Y	1PD57AA/AT	
HP Z Turbo Drive 1TB MLC Z4/Z6 G4 SSD Kit	XW, CX	Y	Y	1PD58AA	
HP Z Turbo Drive 256GB TLC Z4/Z6 G4 SSD Kit	XW, CX	Y	Y	1PD59AA/AT	
HP Z Turbo Drive 512GB TLC Z4/Z6 G4 SSD Kit	XW, CX	Y	Y	1PD60AA	
HP Z Turbo Drive 1TB TLC Z4/Z6 G4 SSD Kit	XW, CX	Y	Y	1PD61AA	
HP Z Turbo Drive 2TB TLC Z4/Z6 G4 SSD Kit	XW, CX	Y	Y	3KP39AA	
HP Z Turbo Drive 256GB Z4/Z6 G4 SED Kit	XW, CX	Y	Y	4YZ41AA	
HP Z Turbo Drive 512GB Z4/Z6 G4 SED Kit	XW, CX	Y	Y	4YZ44AA/AT	
HP Z Turbo Drive 1TB SED TLC Z4/Z6 G4 SSD Kit	XW, CX	Y	Y	TBD	
HP Z Turbo Drive 1TB SED TLC Z4/Z6 G4 SSD Module	XW, CX	Y	Y	TBD	
HP Z Turbo Drive Quad Pro					
HP Z Turbo Drive Quad Pro 2x256GB TLC PCIe® SSD	XW, CX (i9)	Y	Y	4YZ38AA	1, 4
HP Z Turbo Drive Quad Pro 2x512GB TLC PCIe® SSD	XW, CX (i9)	Y	Y	4YZ39AA/AT	1, 4
HP Z Turbo Drive Quad Pro 2x1TB TLC PCIe® SSD	XW, CX (i9)	Y	Y	4YZ40AA	1, 4
HP Z Turbo Drive Quad Pro 2x2TB PCIe® SSD	XW, CX (i9	Y	Y	3KP42AA	
HP Z Turbo Drive Quad Pro 256GB TLC SSD module	XW, CX (i9)	N	Y	4YZ35AA	1, 3, 4
HP Z Turbo Drive Quad Pro 512GB TLC SSD module	XW, CX (i9)	N	Y	4YZ36AA/AT	1, 3, 4
HP Z Turbo Drive Quad Pro 1TB TLC SSD module	XW, CX (i9)	N	Y	4YZ37AA	1, 3, 4
HP Z Turbo Drive Quad Pro 2TB TLC SSD module	XW, CX (i9	N	Y	3KP43AA	
HP Z Turbo Drive Dual Pro					
HP Z Turbo Drive Dual Pro 256GB TLC SSD		Y	Y	4YF60AA	
HP Z Turbo Drive Dual Pro 512GB TLC SSD		Y	Y	4YF61AA	
HP Z Turbo Drive Dual Pro 1TB TLC SSD		Y	Y	4YF62AA	
HP Z Turbo Drive Dual Pro 2TB TLC SSD		Y	Y	4YF63AA	

Supported Components

Intel® 905p Series SSD (Opatane SSD)				
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 PCIe Dual	Y	Y	6LA63AA	1
Intel® Optane SSD 905P 2x380GB M.2 PCIe Quad	Y	Y	6LA65AA	1
Intel® Optane SSD 905P 380GB M.2 SSD Module	Y	Y	6LA66AA	3, 4

Note 1: All HP Z Turbo Drive Quad Pro modules require the Z4 G4 Fan & Front Card Kit, available as CTO (1MY89AV) and AMO (1XM33AA)

Note 3: M.2 SSD module only, designed to be installed into the Z Turbo Drive Quad Pro or Dual Pro carrier

Note 4: Z Turbo Drive Quad Pro is not supported on Core i7-X configurations

** PCIe card installed in standard PCIe x4 slot

Intel® Virtual RAID on CPU (Intel ® VROC) for NVMe	Processor Supports	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Intel® VROC NVMe SSD Standard Controller Module		N	Y	3FJ80AA	1,3
Intel® VROC NVMe SSD Premium Controller Module		N	Y	3FJ81AA	2,3

NOTE 1: Enables RAID 0, 1 & 10

NOTE 2: Enables RAID 0, 1 & 10 plus RAID 5 with write hole closure options.

NOTE 3: Xeon processor required

Hard Drive Controllers	Processor Supports	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
SAS Controller					
MicroSemi SmartHBA2100-4i4e SAS Controller	XW	Y	Y	1FV90AA	

NOTE: Only available on Xeon W configurations

Graphics

	Processor Supports	Factory Configured	Option Kit	Option Kit Part Number	Support Notes	Supported # of cards
Graphics Cable Adapters						
HP DisplayPort to HDMI Adapter	XW, CX	Y	Y	K2K92AA		
HP DisplayPort to Dual Link DVI Adapter	XW, CX	Y	Y	NR078AA		
HP DisplayPort to DVI-D Adapter	XW, CX	Y	Y	FH973AA		

Supported Components

HP DisplayPort to DVI-D Adapter (2-pack)	XW, CX	Y	N			
HP DisplayPort to DVI-D Adapter (4-pack)	XW, CX	Y	N			
HP DisplayPort to DVI-D Adapter (6-pack)	XW, CX	Y	N			
HP miniDP-to-DP Adapter	XW, CX	Y	Y	2MY05AA		
HP miniDP-to-DP Adapter (2-pack)	XW, CX	Y	N			
HP miniDP-to-DP Adapter (4-pack)	XW, CX	Y	N			
HP miniDP-to-DP Adapter (8-pack)	XW, CX	Y	N			
Graphics Card Connectors						
NVIDIA® SLI 2-slot Graphics Connector	XW, CX	Y	Y	2YY84AA		
Quadro® RTX NVLink 2-slot Bridge (RTX 5000)	XW, CX	N	Y	6FY12AA		
Quadro® RTX NVLink High-Bandwidth 2-slot Bridge (RTX 6000 & 8000)	XW, CX	N	Y	6FY11AA		
Entry 3D						
NVIDIA® Quadro® P400 2GB Graphics	XW, CX	Y	Y	1ME43AA	4	2
NVIDIA® Quadro® P620 2GB Graphics	XW, CX	Y	Y	3ME25AA	4	2
Mid-range 3D						
NVIDIA® Quadro® P1000 4GB Graphics	XW, CX	Y	Y	1ME01AA	3, 4	2
NVIDIA® Quadro® P2000 5GB Graphics	XW, CX	Y	Y	1ME41AA	3, 4	2
AMD Radeon™ Pro WX 3100 4GB Graphics	XW, CX	Y	Y	2TF08AA	3, 4	2
AMD Radeon™ Pro WX 4100 4GB Graphics	XW, CX	N	Y	Z0B15AA	3, 4	2
High End 3D						
NVIDIA® Quadro® P4000 8GB Graphics	XW, CX	Y	Y	1ME40AA	1, 2, 5	2
NVIDIA® Quadro® P5000 16GB Graphics	XW, CX	Y	Y	Z0B13AA	1, 2, 5	2
NVIDIA® Quadro® P6000 24GB Graphics	XW, CX	Y	Y	Z0B12AA	1, 2, 5	2
NVIDIA® Quadro® GP100 16GB Graphics	XW, CX	Y		1ZE81AA	1, 2, 5	2
NVIDIA® Quadro® GV100 32GB Graphics	XW, CX	Y		3ME26AA	1, 2, 5	2
NVIDIA® Quadro® RTX 4000 8GB Graphics	XW, CX	Y	Y	5JV89AA	1, 2	2
NVIDIA® Quadro® RTX 5000 16GB Graphics	XW, CX	Y	Y	5JH81AA	1, 2	2
NVIDIA® Quadro® RTX6000 24GB Graphics	XW, CX	Y	Y	5JH80AA	1, 2	2
NVIDIA® Quadro® RTX 8000 48 GB Graphics	XW, CX	Y	Y	6NB51AA	1, 2	2
AMD Radeon™ Pro WX 7100 8GB Graphics	XW, CX	Y	Y	Z0B14AA	1, 2	2
AMD Radeon™ Pro WX 9100 16GB Graphics	XW, CX	Y		2TF01AA	1, 2	1
NVIDIA® Quadro® Sync II	XW, CX	Y	Y	1WT20AA		

NOTE 1: Single graphics configuration requires the HP Z4 G4 Fan and Front Card Guide Kit, which is available both CTO (1MY89AV) and AMO (1XM33AA).
NOTE 2: Single graphics configuration requires the 750W chassis or 1000W chassis.
NOTE 3: Dual graphics configuration requires the HP Z4 G4 Fan and Front Card Guide Kit, which is available both CTO (1MY89AV) and AMO (1XM33AA).
NOTE 4: Dual graphics configuration requires the 750W chassis or 1000W chassis.
NOTE 5: Dual graphics configuration requires the 1000W chassis.

Supported Components

Memory	CTO	Processor Supports	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
	DDR4-2666 ECC Registered DIMMs					
	HP 8GB (1x8GB) DDR4-2666 ECC Reg RAM	XW	Y	Y	1XD84AA/AT	1
	HP 16GB (2x8GB) DDR4-2666 ECC Reg RAM	XW	Y			1
	HP 24GB (3x8GB) DDR4-2666 ECC Reg RAM	XW	Y			1
	32GB (4x8GB) DDR4-2666 ECC Reg RAM	XW	Y			1
	64GB (8x8GB) DDR4-2666 ECC Reg RAM	XW	Y			1
	16GB (1x16GB) DDR4-2666 ECC Reg RAM	XW	Y	Y	1XD85AA/AT	1
	32GB (2x16GB) DDR4-2666 ECC Reg RAM	XW	Y			1
	64GB (4x16GB) DDR4-2666 ECC Reg RAM	XW	Y			1
	128GB (8x16GB) DDR4-2666 ECC Reg RAM	XW	Y			1
	32GB (1x32GB) DDR4-2666 ECC Reg RAM	XW	N	Y	1XD86AA/AT	1, 2
	64GB (2x32GB) DDR4-2666 ECC Reg RAM	XW	Y			1, 2
	128GB (4x32GB) DDR4-2666 ECC Reg RAM	XW	Y			1, 2
	256GB (8x32GB) DDR4-2666 ECC Reg RAM	XW	Y			1, 2
	HP 8GB (1x8GB) DDR4-2666 nECC RAM	CX	Y	Y	3PL81AA	1
	HP 16GB (2x8GB) DDR4-2666 nECC RAM	CX	Y			1
	HP 32GB (4x8GB) DDR4-2666 nECC RAM	CX	Y			1
	HP 64GB (8x8GB) DDR4-2666 nECC RAM	CX	Y			1
	HP 16GB (1x16GB) DDR4-2666 nECC RAM	CX	Y	Y	3PL82AA	1
	HP 32GB (2x16GB) DDR4-2666 nECC RAM	CX	Y			1
	HP 64GB (4x16GB) DDR4-2666 nECC RAM	CX	Y			1
	HP 128GB (8x16GB) DDR4-2666 nECC RAM	CX	Y			1

NOTES:

For details on the supported memory configurations on the HP Z4 G4 Workstation, please refer to the System Technical Specifications - System Board section of this document.

Each processor supports up to 4 channels of DDR4 memory. To realize full performance at least 1 DIMM must be inserted into each channel.

The CPUs determine the speed at which the memory is clocked. If an 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.

NOTE 1: ONLY DDR4 DIMMs are supported.

NOTE 2 Memory configurations using 32GB DIMMs require the HP Z4 Memory Cooling Solution, which is available both CTO (1MY90AV) and AMO (1XM34AA).

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.

Multimedia and Audio Devices

	Processor Supports	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Integrated Realtek HD ALC221 Audio	XW, CX	Y	N		

Supported Components

Optical and Removable Storage

	Processor Supports	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP SlimTray Optical Drives					
HP 9.5mm Slim Blu Ray Disc Writer	XW, CX	Y	Y	K3R65AA	1
HP 9.5mm Slim DVD ROM	XW, CX	Y	Y	K3R63AA	1
HP 9.5mm Slim DVD Writer*	XW, CX	Y	Y	K3R64AA	1
HP HH DVD Writer (16x RW DVD-R)	XW, CX	Y	Y	4AR67AA	
HP SD Card Reader					
HP SD 4 Card Reader	XW, CX	Y	Y	2VK54AA	

NOTE 1: Installing an optical drive into Z4 G4 requires a 5.25"? external bay adapter (Option Kit Part number NQ099A).

*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

	Processor Supports	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Intel® i350-T2 PCIe Dual Port Gigabit NIC	XW, CX	Y	Y	V4A91AA	
Intel® i350-T4 PCIe 4-Port Gigabit NIC	XW, CX	N	Y	W8X25AA	
Intel® Ethernet I210-T1 PCIe x1 Gb NIC	XW, CX	Y	Y	E0X95AA	
Aquantia® AQN-108 Single-Port 5GbE NIC	XW, CX	N	Y	1PM63AA	
Intel® X550-T2 10GbE Dual Port NIC	XW, CX	Y	Y	1QL46AA	
Intel® X710-DA2 10GbE SFP+ Dual Port NIC	XW, CX	Y	Y	1QL47AA	1
HP 10GbE SFP+ SR Transceiver	XW, CX	Y	Y	C3N53AA	
Intel 8265 802.11 a/b/g/n/ac + BT PCIe WLAN	XW, CX	N	Y	1QL48AA	
Intel® Wi-Fi 6 AX200 & BT PCIe	XW, CX	Y	Y	7CE01AA	

Note 1: Windows 7 is NOT supported

Racking and Physical Security

Supported Components

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

Input Devices

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

Other Hardware

	Processor Supports	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP ENERGY STAR® Certified Configuration	XW, CX	Y			
HP Z Premium Front I/O 2xUSB-A 2xUSB-C	XW, CX	Y	Y	1XM32AA	
HP Thunderbolt 3 PCIe 2 Port I/O Card	XW, CX	Y	Y	3UU05AA	
HP Z4 G4 Memory Cooling Solution	XW, CX	Y	Y	1XM34AA	Note 1
HP Z4 G4 Fan and Front Card Guide Kit	XW, CX	Y	Y	1XM33AA	Note 2
HP Internal USB Port Kit	XW, CX	N	Y	EM165AA	Note 3
HP eSATA 2 port PCIe Bulkhead Kit	XW, CX	Y	Y	GM110AA	
HP Serial Port Adapter	XW, CX	Y	Y	PA716A	
HP Workstation Mouse Pad	XW, CX	Y			

Note 1: The HP Z4 G4 Memory Cooling Solution is available to add to any configuration for improved system cooling, but is required for memory configurations using 32GB DIMMs.

Note 2: Fan and Front Card Guide required with the following components:
- Specific graphics configurations (see Graphics section above)
- Any HP Z Turbo Quad Pro configuration

Note 3: The HP Internal USB Port kit has a single USB 2.0 type A connector.

Supported Components

Software

	Processor Supports	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Sobey Video Editing SW	XW, CX	Y	N		China only
SW HP RGS for Z	XW, CX	Y	N		
HP Sure Start Gen3	XW, CX	Y	N		1

Note 1: Available on products equipped with Intel® 7th generation processors.

Operating Systems

	Processor Supports	Support Notes
Windows 10 Pro 64 for Workstations	XW	Note 1
Windows 10 Pro 64	CX (i7)	Note 2
Windows 10 Pro High End	CX (i9)	
Windows 7 Professional 64-bit	XW	Note 3
Windows 10 Downgrade to Windows 7*	XW	
HP Linux® Ready	XW, CX	Note 4
Red Hat® Enterprise Linux® (RHEL) Workstation - Paper License (1yr)	XW, CX	Note 5

*only available in China through June 2019.

NOTE 1: Only applicable to Xeon W configurations

NOTE 2: Only applicable to Core i7 X configurations

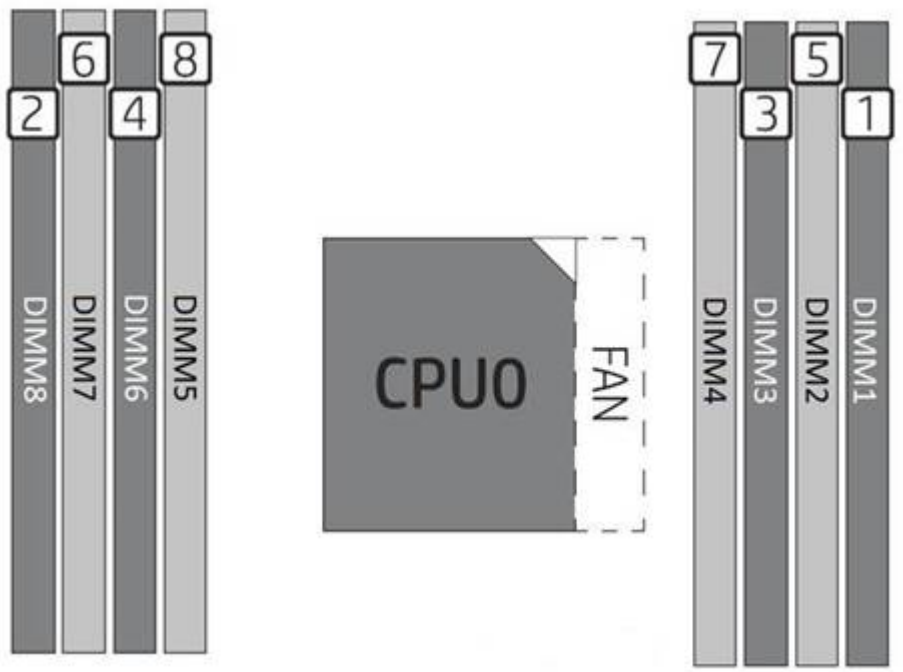
NOTE 3: Not supported or available for Core X configurations. For detailed Windows 7 OS hardware support information see http://h10032.www1.hp.com/ctg/Manual/c05857891.pdf.

NOTE 4: 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

NOTE 5: This second OS must be ordered with the HP Linux® Installer Kit as the first OS.

System Board

System Board Form Factor	Main System Board: 27.7 x 28.0 cm 10.9 x 11.0 inches	
Processor Socket	Single LGA2066 R4	
Chipset	**Intel® Xeon® W Processor Family** Intel® C422 Chipset	**Intel® Core™ X-series Processors** Intel® X299 chipset
Super I/O Controller	Nuvoton NPCD315HA0DX (SIO-15)	
Memory Expansion Slots	8 DDR4 memory slots	
Memory Type Supported	DDR4, RDIMM (Registered), ECC: 8GB, 16GB and 32GB	DDR4, UDIMM, non-ECC: 8GB and 16GB
Memory Modes	Channel Interleaved	
Memory Speed Supported	2666MT/s, 2400MT/s, and 2133MT/s	
Memory Protection	ECC available on data, parity on address and command	N/A
Maximum Memory	Supports up to 256GB	Supports up to 128GB
Memory Configuration (Supported)	Only Registered DIMMs are supported.	Only non-ECC unbuffered DIMMs are supporte
Memory Load Order		



Note on Maximum Memory	Maximum memory capacities assume 64-bit operating systems such as Windows 10 Pro 64-bit, Windows 7 Pr 64-bit. For systems installed with Microsoft Windows 7 (Ultimate, Enterprise or Pro), the maximum accessible system is 192GB

System Technical Specifications

PCI Express Connectors

Intel® Xeon® W Processor Family	Intel® Core™ X-series Processors

Slot 1 (top): PCI Express Gen3 x16 supplied by CPU.

Slot 2 (PCH): PCI Express Gen3 x4 supplied by PCH with open-ended connector. **

Slot 3:	Slot 3:
PCI Express Gen3 x16 supplied by CPU	Core i9-X and Core i7-9800X configs: PCI Express Ge supplied by CPU Core i7-X configs: PCI Express Gen3 x16 (mechanica (electrical)supplied by CPU

Slot 4 (PCH): PCI Express Gen3 x4 supplied by PCH with open-ended connector**

Slot 5:	Slot 5:
PCI Express Gen3 x8 supplied by CPU with open-ended connector**	- Core i9-X and Core i7-9800X configs: PCI Expres x8 supplied by CPU with open-ended connect - Other Core i7-X configs: PCI Express Gen3 x (mechanical-only, no data) with open-ended conr

NOTE: Slots 1 through 5 support full-height, full-length cards (with extender)

M.2 Slot 1: PCI Express Gen3 x4 supplied by CPU
Socket Type 3, Key M, H4.2, sizes 2260-D5-M, 2280-D5-M, 22110-D5-M

M.2 Slot 2:	M.2 Slot 2:
PCI Express Gen3 x4 supplied by CPU Socket Type 3, Key M, H4.2, sizes 2260-D5-M, 2280-D5-M, 22110-D5-M	No 2nd M.2 connector/slot available

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

Supported Drive Interfaces

SATA
6 SATA @6Gb/s, supports RAID 0,1, 5, and 10
Factory integrated Intel® SATA RAID is Microsoft Windows only

Serial Attached SCSI

Intel® Xeon® W Processor Family	Intel® Core™ X-series Processors
Requires Optional PCIe card	not supported

Factory Configured RAID
- RAID 0 striped array
- RAID 1 mirrored array
- RAID 10 striped and mirrored array

*HW RAID functionality not supported by Linux®. Use SW RAID functionality provided in the Red Hat® Operating system instead.

Integrated Graphics
No

Network Controller

Intel® Xeon® W Processor Family	Intel® Core™ X-series Processors
Intel® I219-LM PCIe GbE LAN Intel® I210-AT PCIe GbE LAN Supports the following management functionalities: Intel AMT11.1x, TXT, DASH 1.1, WOL, VLAN, Teaming and PXE 2.1	Intel® I219-V PCIe GbE LAN Supports the following management functionalities: WOL and PXE 2.1

External SATA (eSATA)
Supported on all SATA ports configurable with optional eSATA* cable kit
* hot plug / hot swap not supported with eSATA

IDE connector
No

System Technical Specifications

Floppy connector	No
Serial	1 internal header
2nd Serial	No
Parallel	No
AUX IN (audio)	No
IEEE 1394 Connector(s)	
Front	None
Rear	None
Internal	None
USB Connector(s)	
Front	Front USB depends on which FIO module is selected: - Standard: 4 USB 3.1 G1 Type A (1 charging) - Premium: 2 USB 3.1 G2 Type C™, 2 USB 3.1 G1 Type A (1 charging)

	Intel® Xeon® W Processor Family	**Intel® Core™ X-series Processors**
Rear	6 USB 3.1 G1 Type A	5 USB 3.1 G1 Type-A
Internal	1 USB 3.1 G1 single-port header 1 USB 2.0 single-port header 1x USB 2.0 dual-port header	

HD Integrated Audio	Realtek ALC221
Flash ROM	Yes
CPU Fan Header	Yes
Rear Chassis Fan Header	Yes
Front PCI Fan Header	Yes
Front Control Panel/Speaker Header	Yes
CMOS Battery Holder - Lithium	Yes
Integrated Trusted Platform Module	Trusted Platform Module (TPM) 2.0 (Infineon SLB 9670) Common Criteria EAL4+ Certified Convertible to FIPS 140-2 Certified mode through firmware v7.80 TPM Certified products list: https://trustedcomputinggroup.org/membership/certification/tpm-certified-products/
Power Supply Headers	Yes

System Technical Specifications

Power Switch, Power LED & Hard Drive LED Header	Yes
Clear Password Jumper	Yes
Serial Port	1 internal header
Parallel Port	No
Keyboard/Mouse	USB or PS/2
Hood Lock Header	Yes
Hood Sensor Header	Yes
Memory Fan	1 Memory Fan Header
AUX IN (audio)	No

Power Supply

	750W 90% Efficient, Custom PSU (Wide-Ranging, Active PFC)		465W 90% Efficient, Custom PSU (Wide-Ranging, Active PFC)	
Power Supply				
Operating Voltage Range	90-269 VAC		90-269 VAC	
Rated Voltage Range	100-240 VAC	118 VAC	100-240 VAC	118 VAC
Rated Line Frequency	50-60 Hz	400 Hz	50-60 Hz	400 Hz
Operating Line Frequency Range	47-66 Hz	393-407 Hz	47-66 Hz	393-407 Hz
Rated Input Current	100-240V @ 10A	118V @ 10A	100-240V @ 6A	118V @ 6A
Heat Dissipation (Configuration and software dependent)	Typical = 1850 btu/hr Max = 3084 btu/hr		Typical = 1147 btu/hr Max = 1912 btu/hr	
Power Supply Fan	80x25 mm variable speed		80x25 mm variable speed	
ENERGY STAR® Certified (Configuration dependent)	Yes		Yes	
	90% Efficient		90% Efficient	
80 PLUS® Compliant	The Z4 G4 750W power supply efficiency report can be found at this link: https://plugloadsolutions.com/psu_reports/HP%20INC_DPS-750AB-36%20A_750W_ECOS%204938_Report.pdf		The Z4 G4 465W power supply efficiency report can found at this link: https://plugloadsolutions.com/psu_reports/HP%20INC_465AB-3%20A_465W_ECOS%204939_Report.pd	

System Technical Specifications

Power Supply	1000W 90% Efficient, Custom PSU (Wide-Ranging, Active PFC)		
Operating Voltage Range	90-269 VAC		
Rated Voltage Range	100-127 VAC 200-240 VAC		118 VAC
Rated Line Frequency	50-60 Hz		400 Hz
Operating Line Frequency Range	47-66 Hz		393-407 Hz
Rated Input Current	12A @100-127 VAC 6.3A @ 200-240 VAC		12A @ 118VAC
Heat Dissipation (Configuration and software dependent)	Typical = 2467 btu/hr Max = 4112 btu/hr		
Power Supply Fan	80x25 mm variable speed		
ENERGY STAR® Certified (Configuration dependent)	Yes		
80 PLUS® Compliant	90% Efficient The Z4 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		
FEMP Standby Power Compliant @115V <1W in S5 - Power Off)	Yes		Yes
EuP Compliant @ 230V (<0.5 W in S5 - Power Off)	Yes		Yes
CECP Compliant @ 220V (<4W in S3 - Suspend to RAM)	Yes; Configuration dependent		Yes; Configuration dependent
Power Consumption in sleep mode (as defined by ENERGY STAR®) - Suspend to RAM (S3) (Instantly	TBD		TBD

System Technical Specifications

Available PC)		
Built-in Self Test LED	Yes	Yes
Surge Tolerant Full Ranging Power Supply (withstands power surges up to 2000V)	Yes	Yes

NOTE: 1000 W internal power supply, up to 90% efficiency, active PFC available the first half of 2018

System Configuration

Example Z4 G4 Workstation Configuration #1 ENERGY STAR® Certified	Processor	1x Intel Xeon W-2102 4C 2.9GHz					
	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	465W 90% custom PSU					
	Other	N/A					
Energy Consumption		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)	42.323		41.338		42.585	
	Windows Busy Typ(S0)	TBD		TBD		TBD	
	Windows Busy Max (S0)	90.231		92.323		90.786	
	Sleep (S3)	3.449	3.440	3.566	3.558	3.530	3.410
	Off (S5)	1.041	1.014	1.242	1.231	1.310	1.180
	Zero Power Mode (ErP)	0.187		0.43		0.174	
Heat Dissipation **(Btu/hr)**		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Enabled	LAN Disabled	LAN Enabled
	Windows Idle (S0)	144.406		141.045		145.301	
	Windows Busy Typ(S0)	TBD		TBD		TBD	
	Windows Busy Max (S0)	307.868		315.006		309.761	
	Sleep (S3)	11.767	11.737	12.167	12.140	12.044	11.634
	Off (S5)	3.551	3.459	4.237	4.200	4.469	4.026
	Zero Power Mode (ErP)	0.638		1.467		0.594	

System Technical Specifications

Example Z4 G4 Workstation Configuration #2 ENERGY STAR® Certified	Processor	1x Intel Xeon W-2123 4C 3.6GHz					
	Memory	2x 8GB DDR4-2666 (Registered DIMM)					
	Graphics	1x NVIDIA QuadroP1000					
	Disks / Optical	1x 500GB SATA 7200 ; 1x Slim DVD-ROM SATA					
	Power Supply	750W 90% custom PSU					
	Other	N/A					
Energy Consumption (Watts)		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)	39.947		39.569		40.956	
	Windows Busy Typ(S0)	TBD		TBD		TBD	
	Windows Busy Max (S0)	149.543		150.789		147.845	
	Sleep (S3)	3.615	3.566	3.801	3.798	3.634	3.621
	Off (S5)	1.079	1.016	1.440	1.238	1.320	1.170
	Zero Power Mode (ErP)	0.204		0.430		0.191	
Heat Dissipation (Btu/hr)		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Enabled	LAN Disabled	LAN Enabled
	Windows Idle (S0)	136.299		135.009		139.741	
	Windows Busy Typ(S0)	TBD		TBD		TBD	
	Windows Busy Max (S0)	510.241		514.492		504.447	
	Sleep (S3)	12.338	12.167	12.969	12.959	12.399	12.355
	Off (S5)	3.681	3.466	4.913	4.224	4.504	3.992
	Zero Power Mode (ErP)	0.696		1.467		0.651	

Example Z4 G4 Workstation Configuration #3	Processor	1x Intel Xeon W-2133 6C 3.6GHz					
	Memory	4x 8GB DDR4-2666 (Registered DIMM)					
	Graphics	1x NVIDIA QuadroP2000					
	Disks/Optical	2x 1TB SATA7200 ; 1x Slim SuperMulti DVDRW SATA					
	Power Supply	750W 90% custom PSU					
	Other	N/A					
Energy Consumption (Watts)		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)	48.759		46.321		46.578	
	Windows Busy Typ(S0)	TBD		199.56		206.055	
	Windows Busy Max (S0)	209.60		208.66		198.82	
	Sleep (S3)	4.360	4.351	4.538	4.508	4.299	4.277
	Off (S5)	1.039	1.017	1.42	1.219	1.015	0.997
	Zero Power Mode (ErP)	0.203		0.399		0.191	
		115 VAC		230 VAC		100 VAC	

System Technical Specifications

Heat Dissipation (Btu/hr)		LAN Enabled	LAN Disabled	LAN Enabled	LAN Enabled	LAN Disabled	LAN Enabled
	Windows Idle (S0)	166.366		258.047		158.924	
	Windows Busy Typ(S0)	TBD		TBD		TBD	
	Windows Busy Max (S0)	715.155		711.947		678.373	
	Sleep (S3)	14.876	14.845	15.483	15.381	14.668	14.593
	Off (S5)	3.544	3.470	4.845	4.179	3.463	3.402
	Zero Power Mode (ErP)	0.692		1.361		0.651	

Example Z4 G4 Workstation Configuration #4	Processor	1x Intel Xeon W-2155 10C 3.3GHz					
	Memory	8x 32GB DDR4-2666 (Registered DIMM)					
	Graphics	1x NVIDIA QuadroP6000					
	Disks / Optical	4x 2TB SATA 7200 ; 0x ODD					
	Power Supply	750W 90% custom PSU					
	Other	N/A					
Energy Consumption (Watts)		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)	65.959		69.321		68.635	
	Windows Busy Typ(S0)	TBD		TBD		TBD	
	Windows Busy Max (S0)	463.23		456.95		503.125	
	Sleep (S3)	6.336	6.102	6.971	6.189	6.266	6.264
	Off (S5)	1.047	1.036	1.254	1.222	1.014	0.995
	Zero Power Mode (ErP)	0.203		0.399		0.191	
Heat Dissipation (Btu/hr)		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Enabled	LAN Disabled	LAN Enabled
	Windows Idle (S0)	225.052		236.523		234.183	
	Windows Busy Typ(S0)	TBD		TBD		TBD	
	Windows Busy Max (S0)	1580.541		1559.113		1716.663	
	Sleep (S3)	21.618	20.821	23.785	21.117	21.379	21.372
	Off (S5)	3.572	3.534	4.278	4.169	3.459	3.394
	Zero Power Mode (ErP)	0.692		1.361		0.652	

System Technical Specifications

Example Z4 G4 Workstation Configuration #5	Processor	1x Intel Core i7-7800X 3.5GHz 6C					
	Memory	2x 8GB DDR4-2666 (non-ECC DIMM)					
	Graphics	1x NVIDIA Quadro P1000					
	Disks / Optical	1x 1TB SATA 7200 : 1x Slim DVD-ROM SATA					
	Power Supply	1000W 90% custom PSU					
	Other	N/A					
Energy Consumption (Watts)		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)	46.909		47.175		46.909	
	Windows Busy Typ(S0)	TBD		TBD		TBD	
	Windows Busy Max (S0)	201.83		199.97		203.41	
	Sleep (S3)	3.041	2.971	3.165	3.041	2.971	3.165
	Off (S5)	0.978	0.898	1.159	0.978	0.898	1.159
	Zero Power Mode (ErP)	0.199		0.379		0.187	
Heat Dissipation (Btu/hr)		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Enabled	LAN Disabled	LAN Enabled
	Windows Idle (S0)	160.053		160.961		160.053	
	Windows Busy Typ(S0)	TBD		TBD		TBD	
	Windows Busy Max (S0)	688.644		682.297		694.035	
	Sleep (S3)	10.376	10.137	10.799	10.376	10.137	10.799
	Off (S5)	3.337	3.064	3.954	3.337	3.064	3.954
	Zero Power Mode (ErP)	0.678		1.293		0.638	

Example Z4 G4 Workstation Configuration #6	Processor	1x Intel Core i7-7920X 2.9GHz 12C					
	Memory	4x 16GB DDR4-2666 (non-ECC DIMM)					
	Graphics	1x NVIDIA Quadro P4000					
	Disks / Optical	2x 2TB SATA 7200 : 1x Slim DVD-ROM SATA					
	Power Supply	1000W 90% custom PSU					
	Other	N/A					
Energy Consumption (Watts)		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)	53.392		51.332		53.367	
	Windows Busy Typ(S0)	TBD		TBD		TBD	
	Windows Busy Max (S0)	318.58		307.82		319.71	
	Sleep (S3)	3.558	3.486	3.694	3.558	3.486	3.694
	Off (S5)	0.972	0.895	1.160	0.972	0.895	1.160
	Zero Power Mode (ErP)	0.201		0.391		0.186	
		115 VAC		230 VAC		100 VAC	

System Technical Specifications

Heat Dissipation (Btu/hr)		LAN Enabled	LAN Disabled	LAN Enabled	LAN Enabled	LAN Disabled	LAN Enabled
	Windows Idle (S0)	182.174		175.144		182.088	
	Windows Busy Typ(S0)	TBD		TBD		TBD	
	Windows Busy Max (S0)	1086.994		1050.281		1090.851	
	Sleep (S3)	12.139	11.894	12.604	12.139	11.894	12.604
	Off (S5)	3.316	3.054	3.957	3.316	3.054	3.957
	Zero Power Mode (ErP)	0.685		1.334		0.634	

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

Declared Noise Emissions (Entry-level and High-end configurations)		
System Configuration (Entry level)	**Processor Info**	Intel® Xeon® W-2125 4.0 2666 4C CPU
	Memory Info	32GB (4x8GB) DDR4-2666 ECC Reg RAM
	Graphics Info	1-NVIDIA® Quadro® P400 2GB
	Disks/Optical	1-500GB SATA 7200RPM 3.5"? HDD / 1-HP 9.5mm Slim Blu Ray Disc Writer
	Power Supply	465 W

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)		**Sound Power** (LWAd, bels)	**Deskside Sound Pressure** (LpAm, decibels)
	Idle	3.2	13
	Hard drive Operating (random reads)	3.4	15

System Configuration (High end)	**Processor Info**	Intel® Xeon® W-2155 3.3 2666 10C
	Memory Info	128GB (8x16GB) DDR4-2666 ECC Reg RAM
	Graphics Info	1-NVIDIA® Quadro® P6000 24GB
	Disks/Optical	2-4TB SATA 7200RPM Ent 3.5"? / 1-HP 9.5mm Slim Blu Ray Disc Writer
	Power Supply	750 W

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)		**Sound Power** (LWAd, bels)	**Deskside Sound Pressure** (LpAm, decibels)
	Idle	3.5	22
	Hard drive Operating (random reads)	3.7	23

System Configuration (Entry Level 2)	**Processor Info**	Intel® Core i9-7900X 3.3 2666 10C
	Memory Info	32GB (4x8GB) DDR4-2666 nECC RAM
	Graphics Info	1-NVIDIA® Quadro® P400 2GB
	Disks/Optical	1-500GB SATA 7200RPM Ent 3.5"? / 1-HP 9.5mm Slim Blu Ray Disc Writer
	Power Supply	1000 W

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)		**Sound Power** (LWAd, bels)	**Deskside Sound Pressure** (LpAm, decibels)
	Idle	3.4	16
	Hard drive Operating (random reads)	3.5	17

System Configuration (High end 2)	**Processor Info**	Intel®Core i9-7980XE 2.6 2666 18C
	Memory Info	128GB (8x16GB) DDR4-2666 nECC RAM
	Graphics Info	1-NVIDIA® Quadro® P6000 24GB
	Disks/Optical	2-4TB SATA 7200RPM Ent 3.5"? / 1-HP 9.5mm Slim Blu Ray Disc Writer
	Power Supply	1000 W

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)		**Sound Power** (LWAd, bels)	**Deskside Sound Pressure** (LpAm, decibels)
	Idle	3.5	20
	Hard drive Operating (random reads)	3.7	21

NOTE: Higher noise levels may be experienced with non-HP approved graphic card(s). Some consumer graphics cards have side blowing fans that may heat up thermal sensor(s) on the mother board causing fans to ramp.

Environmental Data

Environmental Requirements	**Temperature**	Non-operating: -40° to 60° C (-40° to 140° F) Operating: 5° to 35° C (40° to 95° F) Above 1524 m (5,000 feet) altitude, the maximum operating temperature is reduced by 1° C (1.8° F) for every 305 m (1,000 feet) increase in elevation Maximum rate of change: 10 °C/hr No direct sustained sunlight
	Humidity	Operating: 10% to 85% RH, non-condensing, 35° C maximum wet bulb Non-operating: 10% to 90% RH, non-condensing, 35° C maximum wet bulb
	Maximum Altitude	Operating (with Rotational Hard Drives): 3,048 m (10,000 feet) Operating (with only Solid-State Drives): 5,000 m (16,404 feet) Non-operating: 12,192 m (40,000 feet) Maximum operating temperature is reduced as altitude increases. See Temperature for details.
	Shock (non-repetitive)	Operating: ½-sine: 40g, 2-3ms (~62 cm/sec) Non-operating: ½-sine: 160 cm/s, 2-3ms (~105g) Non-operating square: 422 cm/s, 20g
	Vibration	Operating random: 0.5g (rms), 5-300 Hz, up to 0.0025g²/Hz Non-operating random: 2.0g (rms), 5-500 Hz, up to 0.0150 g²/Hz

Physical Security and Serviceability

Access Panel	Tool-less Includes system board and memory information.
Hard Drives	Tool-less
Expansion Cards	Tool-less
Processor Socket	Tool-less
Blue User Touch Points	Yes, on primary serviceable components.
Color-coordinated Cables and Connectors	Yes
Memory	Tool-less
System Board	Screw-In
Dual Color Power/Failure LED	Yes
HDD Activity LED	Yes Note: HDD Activity LED is not dual-color
Configuration Record SW	Yes
Over-Temp Warning on Screen	Yes, at POST screen on reboot
Restore CD/DVD Set	Restores the computer to its original factory shipping image; can be obtained via HP Support.
Dual Function Front Power Switch	Yes, causes a fail-safe power off when held for 4 seconds
Padlock Support	Yes (optional): Locks side cover and secures chassis from theft 7.0 mm (0.2756 in) diameter padlock loop at rear of system

System Technical Specifications

Cable Lock Support	Yes, Kensington Cable Lock (optional): Locks side cover and secures chassis from theft 3 mm x 7 mm slot at rear of system
Universal Chassis Clamp Lock Support	Yes (optional): Locks side cover and locks cables to chassis. Secures chassis from theft and allows multiple u chained together when used with optional cable Threaded feature at rear of system
Solenoid Lock and Hood Sensor	Yes (optional) The Solenoid Hood Lock eliminates the need for a physical key by making the chassis lockable through softwa password. You can also lock and unlock the chassis remotely over the network. The Sensor Kit detects when access panel has been removed
Serial, Parallel, USB, Audio, Network, Enable/Disable Port Control	Yes, enables or disables serial, USB, audio, and network ports
Removable Media Write/Boot Control	Yes, prevents ability to boot from removable media on supported devices (and can disable writes to media)
Power-On Password	Yes, prevents an unauthorized person from booting up the workstation
Setup Password	Yes, prevents an unauthorized person from changing the workstation configuration
3.3V Aux Power LED on System PCA	Yes
NIC LEDs (integrated) (Green & Amber)	Yes
CPUs and Heatsinks	A T-15 Torx or flat blade screwdriver is needed to remove the CPU heatsink before the CPU can be removed. (removal is tool-less
Power Supply Diagnostic LED	Yes
Front Power Button	Yes, ACPI multi-function
Rear Power Button	Yes
Front Power LED	Yes, white (normal), red (fault)
Front Hard Drive Activity LED	Yes, white
Front ODD Activity LED	Yes, on device
Internal Speaker	Yes
System/Emergency ROM Flash Recovery	Recovers corrupted system BIOS.
Cooling Solutions	Air cooled forced convection heatsinks
Power Supply Fans	80 mm x 80 mm x 25 mm (non-serviceable)

CPU Heatsink Fan	**Intel® Xeon® W Processor Family**	**Intel® Core™ X-series Processors**
	92 mm x 92 mm x 25 mm, 5-wire, PWM	Core i7-X configs: 92 mm x 92 mm x 25 mm, 5-wire Core i9-X 165W CPU configs: 92 mm x 92 mm x 25 wire, PWM (includes 6-to-5pin cable adapter) **NOTE:** Core i9X 140W use the same Heatsink as Cor and Xeon
Chassis Fan	Front: (Optional) 92 mm x 92mm x 25 mm, 4-wire, PWM Rear: 120 mm x 120mm x 25 mm, 4-wire, PWM	
Memory Heatsink Fan	Dual 60 mm x 60 mm x 25 mm, 6-wire, PWM, Blindmate (optional based on configuration)	
HP PC Hardware Diagnostics UEFI	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 download from HP Support.	

System Technical Specifications

Access Panel Key Lock	Yes, side panel barrel keylock (optional from the factory only)
ACPI-Ready Hardware	Advanced Configuration and Power Management Interface (ACPI). • Allows the system to wake from a low-power mode. • Controls system power consumption, making it possible to place individual cards and peripherals in a l power or powered-off state without affecting other elements of the system
Trusted Platform Module Chip	Infineon TPM 2.0 Certified
Integrated Chassis Handles	Yes, Front handle and dedicated rear recess
Power Supply	Requires T15 Torx or flat blade screwdriver
PCIe Card Retention	Yes, rear (all), middle (all), front (full-length cards with extender, using HP Z4 G4 Fan and Front Card Guide Kit)
Flash ROM	Yes
Diagnostic Power Switch LED on board	Yes
Clear Password Jumper	Yes
Clear CMOS Button	Yes
CMOS Battery Holder	Yes
DIMM Connectors	Yes

BIOS

BIOS 32-bit Services	Standard BIOS 32-bit Service Directory Proposal v0.4
PCI 3.0 Support	Full BIOS support for PCI Express through industry standard interfaces.
ATAPI	ATAPI Removable Media Device BIOS Specification Version 1.0.
BBS	BIOS Boot Specification v1.01.
WMI Support	WMI is Microsoft's implementation of Web-Based Enterprise Management (WBEM) for Windows. WMI is fully c with the Distributed Management Task Force (DMTF) Common Information Model (CIM) and WBEM specificatic
BIOS Boot Spec 1.01+	Provides more control over how and from what devices the workstation will boot.
BIOS Power On	Users can define a specific date and time for the system to power on.
ROM Based Computer Setup Utility (F10)	Review and customize system configuration settings controlled by the BIOS.
System/Emergency ROM Flash Recovery with Video	Recovers system BIOS in corrupted Flash ROM.
Replicated Setup	Saves BIOS settings to USB flash device in human readable file (HpSetup.txt). BiosConfigUtility.exe utility can replicate these settings on machines being deployed without entering Computer Configuration Utility (F10 Se
SMBIOS	System Management BIOS 2.8, for system management information.
Boot Control	Disables the ability to boot from removable media on supported devices.
Memory Change Alert	Alerts management console if memory is removed or changed.
Thermal Alert	Monitors the temperature state within the chassis. Three modes: • NORMAL - normal temperature ranges. • ALERTED - excessive temperatures are detected. Raises a flag so action can be taker to avoid shutdown or provide for a smoother system shutdown. • SHUTDOWN - excessive temperatures are encountered. Automatically shuts down the computer without warning before hardware component damage occurs.
Remote ROM Flash	Provides secure, fail-safe ROM image management from a central network console.

System Technical Specifications

ACPI (Advanced Configuration and Power Management Interface)	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 affec elements of the system. Supports ACPI 5.0 for full compatibility with 64-bit operating systems.
Ownership Tag	A user-defined string stored in non-volatile memory that is displayed in the BIOS splash screen.
Remote Wakeup/Remote Shutdown	System administrators can power on, restart, and power off a client computer from a remote location with Ir W Processors. For systems with Intel Core X-Series Processors, Wake on LAN is supported, however to remo restart or shutdown a system, a remote desktop application must be used to manually Restart or Shutdown.
Instantly Available PC (Suspend to RAM - ACPI sleep state S3)	Allows for very low power consumption with quick resume time.
Remote System Installation via F12 (PXE 2.1) (Remote Boot from Server)	Allows a new or existing system to boot over the network and download software, including the operating s
ROM revision levels	Reports the system BIOS revision level in Computer Configuration Utility (F10 Setup). Version is available thr industry standard interface (SMBIOS and WMI) so that management SW applications can use and report this information.
System board revision level	Allows management SW to read revision level of the system board. Revision level is digitally encoded into the HW and cannot be modified.
Start-up Diagnostics (Power-on Self-Test)	Assesses system health at boot time with selectable levels of testing.
Auto Setup when new hardware installed	System automatically detects addition of new hardware.
Keyboard-less Operation	The system can be booted without a keyboard.
Localized ROM Setup	Common BIOS image supports System Configuration Utility (F10 Setup) menus in 14 languages with local ke mappings.
Asset Tag	The user or MIS to set a unique tag string in non-volatile memory.
Per-slot Control	Allows I/O slot parameters (option ROM enable/disable, bus latency) to be configured individually.
Adaptive Cooling	Control parameters are set according to detected hardware configuration for optimal acoustics.
Pre-boot Diagnostics	(Pre-video) critical errors are reported via beeps and blinks on the power LED.
Industry Standard Specification Support	
Industry Standard	Revision Supported by the BIOS
UEFI Specification Revision	2.5
ACPI	Advanced Configuration and Power Management Interface, Version 5.0
ATA (IDE)	AT Attachment 6 with Packet Interface (ATA/ATAPI-6), Revision 3b
CD Boot	"El Torito" Bootable CD-ROM Format Specification Version 1.0
EDD	- Enhanced Disk Drive Specification Version 1.1 - BIOS Enhanced Disk Drive Specification Version 3.0
EHCI	Enhanced Host Controller Interface for Universal Serial Bus, Revision 1.0
PCI	PCI Local Bus Specification, Revision 2.3 PCI Power Management Specification, Revision 1.1 PCI Firmware Specification, Revision 3.0, Draft .7
PCI Express	PCI Express Base Specification, Revision 2.0 PCI Express Base Specification, Revision 3.0
PMM	POST Memory Manager Specification, Version 1.01
SATA	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

System Technical Specifications

SPD	PC SDRAM Serial Presence Detect (SPD) Specification, Revision 1.2B
TPM	Trusted Platform Module (TPM) 2.0 (Infineon SLB 9670) Common Criteria EAL4+ Certified FIPS 140-2 Certified TCG TPM Certified products list: http://www.trustedcomputinggroup.org/certification/tpm-certified-products/
UHCI	Universal Host Controller Interface Design Guide, Revision 1.1
USB	Universal Serial Bus Revision 1.1 Specification Universal Serial Bus Revision 2.0 Specification Universal Serial Bus Revision 3.1 G1 Specification Universal Serial Bus Revision 3.1 G2 Specification
SMBIOS	System Management BIOS Reference Specification, Version 2.8
	External BIOS simulator found at: http://h20464.www2.hp.com/index.html

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 labelec 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 Z4 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 3rd party option 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 Euro Union Restriction of Hazardous Substances (RoHS) Directive. HP's goal is to exceed compliance obligations by 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 a purchase may not be low-halogen.
End-of-Life Management and Recycling	HP Inc. offers end-of-life HP product return and recycling programs in many geographic areas. To recycle you please go to: http://www.hp.com/recycle or contact your nearest HP sales office. Products returned to HP wi recycled, recovered or disposed of in a responsible manner. This product is greater than 90% recyclable by w 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 ISO 14001 certificates

System Technical Specifications

Additional Information

- This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Dire 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 Envirc
- Does not contain ozone-depleting substances (ODS)
- Does not contain heavy metals (lead, mercury, cadmium or hexavalent chromium) in excess of 100 ppr 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 mate a lower volume footprint than conventional single-unit packaging. Please contact your sales represent 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

	Intel® Xeon® W Processor Family	Intel® Core™ X-series Processors
Industry Standard Specifications	This product meets the following industry standard specifications for manageability functionality: • DASH 1.1 (via Intel® LAN on motherboard)	None apply
Intel Active Management Technology (AMT)	Intel® Active Management Technology (AMT) 11.1x 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 11.1x 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 • 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 Z4 G4 Workstation supports Intel® vPro™ technology when configured as outlined below: • Intel® Xeon® processor W-2100 product family featuring Intel® vPro™ Technology • Intel® C422 chipset • Intel® I219LM GbE LAN	Not supported
Remote Manageability Software Solutions	The HP Z4 G4 Workstation is supported on the following optional remote manageability software consoles: • LANDesk Management Suite (HP recommended solution) • Microsoft System Center Configuration Manager For questions or support for manageability needs, please visit http://www.hp.com/go/easydeploy	• Microsoft System Center Configuration Manager
System Software Manager	For easydeploy questions or support for SSM, please visit: http://www.hp.com/go/ssm	
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. 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

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 designed and tested to work with all HP Z Workstation platforms through their end of life. These components and their corresponding HP Workstation platform compatibility are outlined in this section.

HP Stable & Consistent Offerings are available worldwide to all HP Workstation customers-no special programs, no additional cost-no kidding. Simply select your hardware 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
	TBD	Intel® Xeon® W-2125 4.0 2666 4C CPU
	TBD	Intel® Xeon® W-2123 3.6 2666 4C CPU
	TBD	Intel® Xeon® W-2102 2.9 2400 4C CPU

Hard Drives	Product #	Offering
	LQ037AA	1TB SATA 7200 RPM

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

Memory	Product #	Offering
	TBD	TBD
	TBD	TBD
	TBD	TBD
	TBD	TBD
	TBD	TBD
	TBD	TBD
	TBD	TBD

Optical and Removable Storage	Product #	Offering
	TBD	TBD
	TBD	TBD

Intel® Xeon® W-2100 Series CPU

Intel® Xeon® W-2195 2.3 2666 18C CPU
Intel® Xeon® W-2175 2.5 2666 14C CPU
Intel® Xeon® W-2155 3.3 2666 10C CPU
Intel® Xeon® W-2145 3.7 2666 8C CPU
Intel® Xeon® W-2135 3.7 2666 6C CPU
Intel® Xeon® W-2133 3.6 2666 6C CPU
Intel® Xeon® W-2125 4.0 2666 4C CPU
Intel® Xeon® W-2123 3.6 2666 4C CPU
Intel® Xeon® W-2104 3.2 2400 4C CPU
Intel® Xeon® W-2102 2.9 2400 4C CPU

Intel® Core™ X-Series CPU

Intel® Core™ i9-9980XE 3.0 2666 18C CPU
Intel® Core™ i9-9920X 3.5 2666 12C CPU
Intel® Core™ i9-9820X 3.3 2666 10C CPU
Intel® Core™ i7-9800X 3.8 2666 8C CPU
Intel® Core™ i9-7980XE 2.6 2666 18C CPU
Intel® Core™ i9-7960X 2.8 2666 16C CPU
Intel® Core™ i9-7940X 3.1 2666 14C CPU
Intel® Core™ i9-7920X 2.9 2666 12C CPU
Intel® Core™ i9-7900X 3.3 2666 10C CPU
Intel® Core™ i7-7820X 3.6 2666 8C CPU
Intel® Core™ i7-7800X 3.5 2400 6C CPU

Storage/Hard Drives

HP SAS (Serial Attached SCSI) Hard Drives for HP Workstations	**HP 300GB SAS 15K SFF HDD**	**Capacity**	300GB	
		Height	5.9 in; 15 cm	
		Width	**Media Diameter**	3.5 in; 8.9 cm
		Interface	12Gb/s SAS	
		Synchronous Transfer Rate (Maximum)	Up to 1200 MB/s (SAS single port)*	
		Buffer	128MB	
		Seek Time (typical reads, includes controller overhead, including settling)	**Average**	2.0ms *
		Rotational Speed	15K rpm	
		Operating Temperature	41° to 131° F (5° to 55° C)	
		*Actual performance may vary.		
SATA (Serial ATA) Hard Drives for HP Workstations	**500GB SATA 7200 rpm 6Gb/s 3.5" HDD**	**Capacity**	500GB	
		Height	1 in; 2.54 cm	
		Width	**Media Diameter**	3.5 in; 8.9 cm
			Physical Size	4 in; 10.17 cm
		Interface	Serial ATA (6.0Gb/s), NCQ enabled	
		Synchronous Transfer Rate (Maximum)	Up to 600MB/s*	
		Buffer	16MB	
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	2 ms*
			Average	11 ms*
			Full Stroke	21 ms*
		Rotational Speed	7,200 rpm	
		Logical Blocks	976,773,168	
		Operating Temperature	41° to 131° F (5° to 55° C)	
		*Actual performance may vary.		
	1TB SATA 7200 rpm 6Gb/s 3.5" HDD	**Capacity**	1TB	
		Height	1 in; 2.54 cm	
		Width	**Media Diameter**	3.5 in; 8.9 cm
			Physical Size	4 in; 10.17 cm
		Interface	Serial ATA (6.0Gb/s), NCQ enabled	
		Synchronous Transfer Rate (Maximum)	Up to 600 MB/s*	
		Buffer	64MB	

Technical Specifications - Hard Drives

	Cache	Adaptive	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	2 ms*
		Average	11 ms*
		Full Stroke	21 ms*
	Rotational Speed	7,200 rpm	
	Operating Temperature	41° to 131° F (5° to 55° C)	
	*Actual performance may vary.		
2.0TB SATA 7200 rpm 6Gb/s 3.5" HDD	**Capacity**	2.0TB	
	Height	1 in; 2.54 cm	
	Width	**Media Diameter**	3.5 in; 8.9 cm
		Physical Size	4 in; 10.17 cm
	Interface	Serial ATA (6.0 Gb/s), NCQ Enabled	
	Synchronous Transfer Rate (Maximum)	Up to 600 MB/s*	
	Buffer	64MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	1.0 ms*
		Average	11 ms*
		Full Stroke	18 ms*
	Rotational Speed	7,200 rpm	
	Logical Blocks	3,907,029,168	
	Operating Temperature	41° to 131° F (5° to 55° C)	
	*Actual performance may vary.		
1TB SATA 7200 rpm 6Gb/s 3.5" HDD (Enterprise Class)	**Capacity**	1TB	
	Protocol	SATA	
	Form Factor	3.5"	
	Controller	AHCI	
	Reliability (MTBF)	2.0M hours	
	Rated Power On Hours	8760/yr	
	Annualized Failure Rate (based on Rated POH)	<0.62%	
	Rated for 24/7/365 operation	YES	
	Physical Size (Height)	1 in; 2.54 cm	
	Physical Size (Width)	4 in; 10.17 cm	
	Media Diameter	3.5 in; 8.9 cm	
	Interface	Serial ATA (6Gb/s), NCQ enabled	
	Synchronous Transfer Rate (Maximum)	Up to 600MB/s*	
	Buffer	128MB	

Technical Specifications - Hard Drives

	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.32ms*
		Average	7.45ms*
		Full Stroke	14.2ms*
	Operating Temperature	41° to 140° F (5° to 60° C)	
	Performance	**Sequential Read**	up to 226MB/s*
		Sequential Write	up to 226MB/s*
	Enterprise Class Features	High Reliability	
	*Actual performance may vary.		
4TB SATA 7200 rpm 6Gb/s 3.5" HDD (Enterprise Class)	**Capacity**	4TB	
	Height	0.275 in; 0.7 cm	
	Width	**Media Diameter**	2.5 in; 6.36 cm
		Physical Size	2.75 in; 6.99 cm
	Interface	Serial ATA (6Gb/s), NCQ enabled	
	Synchronous Transfer Rate (Maximum)	Up to 600MB/s*	
	Buffer	128MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.7ms*
		Average	8.5ms*
		Full Stroke	15.7ms*
	Rotational Speed	7,200 rpm	
	Operating Temperature	32° to 140° F (0° to 60° C)	
	*Actual performance may vary.		
500GB SATA 7.2K SED SFF HDD	**Capacity**	500GB	
	Height	0.275 in; 0.7 cm	
	Width	**Media Diameter**	2.5 in; 6.36 cm
		Physical Size	2.75 in; 6.99 cm
	Interface	Serial ATA (6Gb/s)	
	Synchronous Transfer Rate (Maximum)	Up to 600MB/s*	
	Buffer	32MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	1ms*
		Average	4.2ms*
		Full Stroke	25ms (typical)*
	Rotational Speed	7,200 rpm	
	Operating Temperature	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**	**Capacity**	256GB	
		Protocol	SATA	
		Form Factor	2.5"	
		Controller	AHCI	
		NAND Type	3D TLC	
		Endurance	192TBW (TB Written)	
		Reliability (MTTF)	1.5M hours	
		Physical Size (Height)	0.28 in; 0.7 cm	
		Physical Size (Width)	2.5 in; 6.36 cm	
		Interface	SATA 6Gb/s	
		Synchronous Transfer Rate (Maximum)	Up to 600MB/s*	
		Operating Temperature	32° to 158° F (0° to 70° C)	
		Performance	**Sequential Read**	530MB/s (max)*
			Sequential Write	500MB/s (max)*
			Random Read	55K IOPS (max)*
			Random Write	83K IOPS (max)*
		*Actual performance may vary.		
	HP 256GB SATA 6Gb/s SED Opal 2 SSD	**Capacity**	256GB	
		Protocol	SATA	
		Form Factor	2.5"	
		Controller	AHCI	
		NAND Type	3D TLC	
		Endurance	192TBW (TB Written)	
		Reliability (MTTF)	1.5M hours	
		Physical Size (Height)	0.28 in; 0.7 cm	
		Physical Size (Width)	2.5 in; 6.36 cm	
		Interface	6Gb/s SATA	
		Synchronous Transfer Rate (Maximum)	Up to 550MB/s (Sequential Read)*	
		Operating Temperature	32° to 158° F (0° to 70° C)	
		Performance	**Sequential Read**	530MB/s*
			Sequential Write	500 MB/s*
			Random Read	55K IOPS*
			Random Write	83K IOPS*
		Self-Encrypting Drive Support	OPAL 2	
		*Actual performance may vary.		

Technical Specifications - Hard Drives

HP 512GB SATA 6Gb/s SSD	**Capacity**	512GB	
	Protocol	SATA	
	Form Factor	2.5"	
	Controller	AHCI	
	NAND Type	3D TLC	
	Endurance	388TBW (TB Written)	
	Reliability (MTTF)	1.5M hours	
	Physical Size (Height)	0.28 in; 0.7 cm	
	Physical Size (Width)	2.5 in; 6.36 cm	
	Interface	SATA 6Gb/s	
	Synchronous Transfer Rate (Maximum)	Up to 550MB/s (Sequential Read)*	
	Operating Temperature	32° to 158° F (0° to 70° C)	
	Performance	**Sequential Read**	530 MB/s*
		Sequential Write	500 MB/s*
		Random Read	95K IOPS*
		Random Write	83K IOPS*
	*Actual performance may vary.		
HP 512GB SATA SED SSD	**Capacity**	512GB	
	Protocol	SATA	
	Form Factor	2.5"	
	Controller	AHCI	
	NAND Type	3D TLC	
	Endurance	388TBW (TB Written)	
	Reliability (MTTF)	1.5M hours	
	Physical Size (Height)	0.28 in; 0.7 cm	
	Physical Size (Width)	2.5 in; 6.36 cm	
	Interface	SATA 6Gb/s	
	Synchronous Transfer Rate (Maximum)	Up to 600MB/s*	
	Operating Temperature	32° to 158° F (0° to 70° C)	
	Performance	**Sequential Read**	530 MB/s*
		Sequential Write	500 MB/s*
		Random Read	95K IOPS*
		Random Write	83K IOPS*
	Self-Encrypting Drive Support	OPAL 1 and 2	
	*Actual performance may vary.		

Technical Specifications - Hard Drives

HP 1TB SATA 6Gb/s SSD	**Capacity**	1TB	
	Protocol	SATA	
	Form Factor	2.5"	
	Controller	AHCI	
	NAND Type	3D TLC	
	Endurance	400TBW (TB Written)	
	Reliability (MTTF)	1.5M hours	
	Physical Size (Height)	0.28 in; 0.7 cm	
	Physical Size (Width)	2.5 in; 6.36 cm	
	Interface	SATA 6Gb/s	
	Synchronous Transfer Rate (Maximum)	Up to 550MB/s (Sequential Read)*	
	Operating Temperature	32° to 158° F (0° to 70° C)	
	Performance	**Sequential Read**	530 MB/s*
		Sequential Write	500 MB/s*
		Random Read	95K IOPS*
		Random Write	83K IOPS*
	*Actual performance may vary.		
HP 2TB SATA 6Gb/s SSD	**Capacity**	2TB	
	Protocol	SATA	
	Form Factor	2.5"	
	Controller	AHCI	
	NAND Type	3D TLC	
	Endurance	400TBW (TB Written)	
	Reliability (MTTF)	1.5M hours	
	Physical Size (Height)	0.28 in; 0.7 cm	
	Physical Size (Width)	2.5 in; 6.36 cm	
	Interface	SATA 6Gb/s	
	Synchronous Transfer Rate (Maximum)	Up to 550MB/s (Sequential Read)*	
	Operating Temperature	32° to 158° F (0° to 70° C)	
	Performance	**Sequential Read**	530 MB/s*
		Sequential Write	500 MB/s *
		Random Read	95K IOPS*
		Random Write	83K IOPS*
	*Actual performance may vary.		

Technical Specifications - Hard Drives

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

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

Technical Specifications - Hard Drives

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	**Capacity**	512GB	
		Protocol	PCIe	
		Form Factor	M.2	
		Controller	NVMe	
		NAND Type	3D MLC	
		Endurance	300TB	
		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	1600 MB/s*
			Random Read	260K IOPS*
			Random Write	260K IOPS*
		*Actual performance may vary.		

Technical Specifications - Hard Drives

HP Z Turbo Drive G2 1TB SSD	**Capacity**	1TB	
	Protocol	PCIe	
	Form Factor	M.2	
	Controller	NVMe	
	NAND Type	3D MLC	
	Endurance	600TB	
	Reliability (MTTF)	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**	3000 MB/s*
		Sequential Write	1700 MB/s*
		Random Read	360K IOPS*
		Random Write	330K IOPS*

*Actual performance may vary.

HP Z Turbo Drive Quad Pro 2x256GB PCIe SSD	**Capacity**	512GB	
	Protocol	PCIe	
	Form Factor	PCIe Card, Full Height PCIe Slot	
	Controller	NVMe	
	NAND Type	MLC	
	Endurance	150TB	
	Reliability (MTBF)	1.5M hours	
	Interface	PCIe Gen3 x4 architecture	
	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.

Technical Specifications - Hard Drives

HP Z Turbo Drive Quad Pro 2x512GB PCIe SSD	**Capacity**	1TB	
	Protocol	PCIe	
	Form Factor	PCIe Card, Full Height PCIe Slot	
	Controller	NVMe	
	NAND Type	MLC	
	Endurance	292TB	
	Reliability (MTBF)	1.5M hours	
	Interface	PCIe Gen3 x4 architecture	
	Operating Temperature	32° to 158° F (0° to 70° C)	
	Performance	**Sequential Read**	2800 MB/s*
		Sequential Write	1600 MB/s*
		Random Read	250 K IOPS*
		Random Write	180K IOPS*
	*Actual performance may vary.		
HP Z Turbo Drive G2 256GB SED SSD	**Capacity**	256GB	
	Protocol	PCIe	
	Form Factor	Half-height, half-length	
	Controller	NVMe	
	NAND Type	MLC	
	Endurance	150TBW (TB Written)	
	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*
	Self-Encrypting Drive Support	OPAL 2	
	*Actual performance may vary.		

Technical Specifications - Hard Drives

HP Z Turbo Drive G2 512GB SED SSD	**Capacity**	512GB	
	Protocol	PCIe	
	Form Factor	Half-height, half-length	
	Controller	NVMe	
	NAND Type	3D MLC	
	Endurance	300TBW (TB Written)	
	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	1600 MB/s*
		Random Read	260K IOPS*
		Random Write	150K IOPS*
	Self-Encrypting Drive Support	OPAL 2	

*Actual performance may vary.

HP Z Turbo Drive Quad Pro 2x1TB PCIe SSD	**Capacity**	2TB	
	Protocol	PCIe	
	Form Factor	PCIe Card, Full Height PCIe Slot	
	Controller	NVMe	
	NAND Type	3D MLC	
	Endurance	600TB	
	Interface	PCI Express 3.0 x4 electrical x4 physical	
	Operating Temperature	32° to 158° F (0° to 70° C)	
	Performance	**Sequential Read**	3000 MB/s*
		Sequential Write	1700 MB/s*
		Random Read	360K IOPS*
		Random Write	330K IOPS*

*Actual performance may vary.

Technical Specifications - Hard Drives

HP Z Turbo Drive G2 256GB TLC SSD	**Capacity**	256GB	
	Protocol	PCIe	
	Form Factor	M.2	
	Controller	NVMe	
	NAND Type	3D TLC	
	Endurance	75TBW (TB Written)	
	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	320 MB/s (1100 MB/s max/Turbo)*
		Random Read	250K IOPS*
		Random Write	180K IOPS*
	*Actual performance may vary.		

HP Z Turbo Drive G2 512GB TLC SSD	**Capacity**	512GB	
	Protocol	PCIe	
	Form Factor	M.2	
	Controller	NVMe	
	NAND Type	3D TLC	
	Endurance	150TBW (TB Written)	
	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	660 MB/s (1600 MB/s max/Turbo)*
		Random Read	260K IOPS*
		Random Write	260K IOPS*
	*Actual performance may vary.		

Technical Specifications - Hard Drives

HP Z Turbo Drive G2 1TB TLC SSD	**Capacity**	1TB	
	Protocol	PCIe	
	Form Factor	M.2	
	Controller	NVMe	
	NAND Type	3D TLC	
	Endurance	300TBW (TB Written)	
	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**	3000 MB/s*
		Sequential Write	1150 MB/s (1700 MB/s max/Turbo)*
		Random Read	360K IOPS*
		Random Write	330K IOPS*
	*Actual performance may vary.		
HP Z Turbo Drive G2 2TB TLC SSD	**Capacity**	2TB	
	Protocol	PCIe	
	Form Factor	M.2	
	Controller	NVMe	
	NAND Type	3D TLC	
	Endurance	600TBW (TB Written)	
	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**	3000 MB/s*
		Sequential Write	1000 MB/s (2100 MB/s max/Turbo)*
		Random Read	320K IOPS*
		Random Write	265K IOPS*
	*Actual performance may vary.		

Technical Specifications - Hard Drives

HP Z Turbo Drive Dual Pro 256GB SSD	**Capacity**	256GB	
	Protocol	PCIe	
	Form Factor	M.2 in Half-height, half-length card	
	Controller	NVMe	
	NAND Type	3D TLC	
	Endurance	75TBW (TB Written)	
	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	320 MB/s (1100 MB/s max/Turbo)*
		Random Read	250K IOPS*
		Random Write	180K IOPS*

*Actual performance may vary.

HP Z Turbo Drive Dual Pro 512GB SSD	**Capacity**	512GB	
	Protocol	PCIe	
	Form Factor	M.2 in Half-height, half-length card	
	Controller	NVMe	
	NAND Type	3D TLC	
	Endurance	150TBW (TB Written)	
	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	660 MB/s (1600 MB/s max/Turbo)*
		Random Read	260K IOPS*
		Random Write	260K IOPS*

*Actual performance may vary.

Technical Specifications - Hard Drives

HP Z Turbo Drive Dual Pro 1TB SSD	**Capacity**	1TB	
	Protocol	PCIe	
	Form Factor	M.2 in Half-height, half-length card	
	Controller	NVMe	
	NAND Type	3D TLC	
	Endurance	300TBW (TB Written)	
	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**	3000 MB/s*
		Sequential Write	1150 MB/s (1700 MB/s max/Turbo)*
		Random Read	360K IOPS*
		Random Write	330K IOPS*
	*Actual performance may vary.		

HP Z Turbo Drive Dual Pro 2TB SSD	**Capacity**	2TB	
	Protocol	PCIe	
	Form Factor	M.2 in Half-height, half-length card	
	Controller	NVMe	
	NAND Type	3D TLC	
	Endurance	300TBW (TB Written)	
	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**	3000 MB/s*
		Sequential Write	1150 MB/s (1700 MB/s max/Turbo)*
		Random Read	360K IOPS*
		Random Write	330K IOPS*
	*Actual performance may vary.		

Technical Specifications - Hard Drives

Intel® 905p Series AIC PCIe SSD	**Intel® 905p Series AIC 280GB PCIe SSD**	**Capacity**	280GB	
		Protocol	PCIe	
		Form Factor	PCIe Card, Half Height	
		Controller	NVMe	
		NVM Type	3DXPoint	
		Endurance	5.11 PBW (PB Written)	
		Reliability (MTBF)	1.6M hours	
		Operating Temperature	32° to 185° F (0° to 85° C)	
		Performance	**Sequential Read**	2730 MB/s*
			Sequential Write	2280 MB/s*
			Random Read	587K IOPS*
			Random Write	559K IOPS*
		*Actual performance may vary.		
	Intel® 905p Series AIC 480GB PCIe SSD	**Capacity**	480GB	
		Protocol	PCIe	
		Form Factor	PCIe Card, Half Height	
		Controller	NVMe	
		NVM Type	3DXPoint	
		Endurance	8.76 PBW (PB Written)	
		Reliability (MTBF)	1.6M hours	
		Operating Temperature	32° to 185° F (0° to 85° C)	
		Performance	**Sequential Read**	2710 MB/s*
			Sequential Write	2280 MB/s*
			Random Read	582K IOPS*
			Random Write	561K IOPS*
		*Actual performance may vary.		

Hard Drive Controllers

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

Graphics

NVIDIA® Quadro® P400 2GB Graphics	**Form Factor**	Dimensions: 2.713"? H x 5.7"? L Single Slot, Low Profile Weight: 129 grams
	Graphics Controller	NVIDIA® Quadro® P400 Graphics Card GPU: 256 CUDA cores Power: 30 Watts Cooling: Active
	Bus Type	PCI Express 3.0 x16
	Memory	Size: 2 GB GDDR5, 2000 MHz Memory Interface: 64-bit Memory Bandwidth: 32 GB/s
	Connectors	3mDP Outputs*
	Maximum Resolution	DisplayPort™ 1.4: - up to 3x 5120 x 2880 x 24 bpp @ 60Hz - supports Multi-Stream Transport (MST)
	Image Quality Features	10-bit internal display processing pipeline 10-bit scan-out support
	Display Output	3 mDP Connectors
	Shading Architecture	Full Microsoft DirectX 12 Shader Model 5.1
	Supported Graphics APIs	OpenGL 4.5 DirectX 12 Vulkan 1.0 API support includes: CUDA C, CUDA C++, DirectCompute , OpenCL
	Available Graphics Drivers	Microsoft Windows 10 Microsoft Windows 8.1 Microsoft Windows 7 Linux HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
	Notes	*P400, P600 and P1000 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: - 2MY05AA - HP miniDP-to-DP Adapter Cables - 2KW87A6 - HP (Bulk 12) miniDP-to-DP Adapter Cables

NVIDIA® Quadro® P620 2GB Graphics	**Form Factor**	Dimensions: 2.713"? H x 5.7"? L Single Slot, Low Profile Weight: 129 grams
	Graphics Controller	NVIDIA® Quadro® P620 Graphics Card GPU: 512 CUDA cores Power: 40 Watts Cooling: Active
	Bus Type	PCI Express 3.0 x16
	Memory	Size: 2 GB GDDR5, 2000 MHz Memory Interface: 128-bit Memory Bandwidth: 64 GB/s
	Connectors	4mDP Outputs *
	Maximum Resolution	DisplayPort™ 1.4: - up to 4x 5120 x 2880 x 24 bpp @ 60Hz - supports Multi-Stream Transport (MST)
	Image Quality Features	10-bit internal display processing pipeline 10-bit scan-out support
	Display Output	4 mDP Connectors
	Shading Architecture	Full Microsoft DirectX 12 Shader Model 5.1
	Supported Graphics APIs	OpenGL 4.5 DirectX 12 Vulkan 1.0 API support includes: CUDA C, CUDA C++, DirectCompute , OpenCL
	Available Graphics Drivers	Microsoft Windows 10 Microsoft Windows 8.1 Microsoft Windows 7 Linux HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
	Notes	*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: - 2MY05AA - HP miniDP-to-DP Adapter Cables - 2KW87A6 - HP (Bulk 12) miniDP-to-DP Adapter Cables

Technical Specifications - Graphics

NVIDIA® Quadro® P1000 4GB Graphics	**Form Factor**	Dimensions:2.713"? H x 5.7"? L Single Slot, Low Profile Weight: 129 grams
	Graphics Controller	NVIDIA® Quadro® P1000 Graphics Card GPU: 640 CUDA cores Power: 47 WattsCooling: Active Cooling: Active
	Bus Type	PCI Express 3.0 x16
	Memory	Size: 4 GB GDDR5, 2500 MHz Memory Interface: 128-bit memory interface Memory Bandwidth: 80 GB/s memory bandwidth
	Connectors	4mDP Outputs*
	Maximum Resolution	DisplayPort 1.4: - up to 4x 5120 x 2880 x 24 bpp @ 60Hz - supports Multi-Stream Transport (MST)
	Image Quality Features	10-bit internal display processing pipeline 10-bit scan-out support
	Display Output	4 mDP Connectors
	Shading Architecture	Full Microsoft DirectX 12 Shader Model 5.1
	Supported Graphics APIs	OpenGL 4.5 DirectX 12 Vulkan 1.0 API support includes: CUDA C, CUDA C++, DirectCompute , OpenCL
	Available Graphics Drivers	Microsoft Windows 10 Microsoft Windows 8.1 Microsoft Windows 7 Linux HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
	Notes	*P400, P600 and P1000 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: - 2MY05AA - HP miniDP-to-DP Adapter Cables - 2KW87A6 - HP (Bulk 12) miniDP-to-DP Adapter Cables

NVIDIA® Quadro® P2000 5GB Graphics	**Form Factor**	Dimensions: 4.4"?Hx7.9"?L Single Slot Weight: 260 grams

Technical Specifications - Graphics

Graphics Controller	NVIDIA® Quadro® P2000 Graphics Card Power: 75 Watts Cooling: Active
Bus Type	PCI Express 3.0 x16
Memory	Size: 5GB GDDR5 Memory Bandwidth: 140 GB/s Memory Width: 160-bit
Connectors	4x DisplayPort™ 1.4 Factory Configured Option: No adapter included with card After Market Option: No video cable adapter included Additional DVI to VGA, DisplayPort™ to VGA, DisplayPort™ to DVI, and DisplayPort™ to Dual-Link DVI adapters available as accessories.
Maximum Resolution	DisplayPort™: - up to 5120 x 2880 x 24 bpp @ 60Hz - supports High Bit Rate 2 (HBR2) and Multi-Stream Transport (MST) DP 1.3 & 1.4 ready. DL-DVI(I) output: - up to 2560 x 1600 x 32 bpp @ 60 Hz Single Link-DVI(I) output: - up to 1920 x 1200 x 32 bpp @ 60Hz HDMI 2.0 (requires DP to HDMI adapter): 5120 x 2880 x 24 bpp @ 60Hz
Image Quality Features	12-bit internal display pipeline (hardware support for 12-bit scanout on supported panels, applications and connection) Stereoscopic 3D display support including NVIDIA® 3D Vision™ technology, NVIDIA® Mosaic and nView.
Display Output	Maximum number of displays - 4 direct attached monitors Maximum number of monitors across all available NVIDIA® Quadro® P2000 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 P2000 offered as Factory Configured Option does not include a video cable adapter. Video cable adapters must be ordered separately. 2. Quadro P2000 offered as an After Market Option does not include video cables. Video cable adapters must be ordered separately.

Radeon™ Pro WX 3100 4GB Graphics	**Form Factor**	Low-Profile Single Slot (6.6"? Length)
	Graphics Controller	Radeon™ Pro WX 3100 Graphics Card 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
	Connectors	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.
	Maximum Resolution	5K support @ 60Hz • 1x single-cable 5K monitor, or 2x dual-cable 5K monitors 3x 4K support @ 60Hz
	Image Quality Features	Advanced support for 8-bit and 10-bit per RGB color component. High bandwidth scaler for high quality up and downscaling
	Display Output	3 full physical DP1.3 HBR3 / DP1.4 HDR outputs FreeSync support
	GPU Architecture	Polaris
	Supported Graphics APIs	DirectX®12 OpenGL® 4.5 OpenCL™ 2.0 Vulkan™ 1.0
	Available Graphics Drivers	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	1. HDR content requires that the system be configured with a fully HDR-ready content chain, including: graphics card, monitor/TV, graphics driver and application. Video content must be graded in HDR and viewed with an HDR-ready player. Windowed mode content requires operating system support. 2. AMD PowerTune and AMD ZeroCore Power are technologies offered by certain FirePro™ and Radeon™ Pro products, which are

designed to intelligently manage GPU power consumption in response to certain GPU load conditions.

3. As of September 2016, certified for DisplayPort™ 1.4 HBR3 and ready for DisplayPort™ 1.4 HDR based on independent verification by DisplayPort™ testing authority. HDR content requires that the system be configured with a fully HDR- ready content chain, including: graphics card, monitor/TV, graphics driver and application. Video content must be graded in HDR and viewed with an HDR-ready player. Windowed mode content requires operating system support.

Radeon™ Pro WX 4100 4GB Graphics	**Form Factor**	Low-Profile Single Slot (6.6"? Length)
	Graphics Controller	Radeon™ Pro WX 4100 Graphics card GPU: 1024 Stream Processors organized into 16 Compute Units Power: 50 Watts Cooling: Active
	Memory	4GB GDDR5 memory Memory Bandwidth: 6 Gbps / 96 GB/s Memory Width: 128 bit
	Connectors	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 Additional DisplayPort-to-VGA or DisplayPort-to-DVI adapters are available as Factory Configuration or Option Kit accessories.
	Maximum Resolution	5K support @ 60Hz • 1x single-cable 5K monitor, or 2x dual-cable 5K monitors 4x 4K support @ 60Hz
	Image Quality Features	Advanced support for 8-bit and 10-bit per RGB color component. High bandwidth scaler for high quality up and downscaling
	Display Output	4 full physical DP1.3 HBR3 / DP1.4 HDR outputs FreeSync support
	GPU Architecture	GCN 4th Generation
	Supported Graphics APIs	DirectX®12 OpenGL® 4.5 OpenCL™ 2.0 Vulkan™ 1.0
	Available Graphics Drivers	Windows 10 64-bit Windows® 7 64-bit 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	4. 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. 5. 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.

6. 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.

Factory Configured (Z4 G4/ Z6 G4/ Z8 G4 Workstations): No adapters included
After market option kit: Four mDP-to-DP Adapters included

Additional mDP-to-DP Adapters are available as Factory Configuration or Option Kit accessories:

7. 2MY05AA - HP miniDP-to-DP Adapter Cables
8. 2KW87A6 - HP (Bulk 12) miniDP-to-DP Adapter Cables

NVIDIA® Quadro® P4000 8GB Graphics	**Form Factor**	Dimensions: 4.4"?H x 9.5"?L Single-slot, full-height Weight: 475 grams (without extender)
	Graphics Controller	NVIDIA® Quadro® P4000 Graphics Card GPU: 1792 CUDA cores Power: 120 Watts Cooling: Active
	Bus Type	PCI Express 3.0 x16
	Memory	Size: 8GB GDDR5 Memory Bandwidth: 243 GB/s Memory Width: 256-bit
	Connectors	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
	Maximum Resolution	Dual-link internal TMDS (DVI 1.0): - up to 2560 x 1600 x 32 bpp @ 60 Hz

Technical Specifications - Graphics

	Single-link internal TMDS (DVI 1.0): - up to 1920 x 1200 x 32 bpp @ 60 Hz HDMI™ 2.0b (requires DP to HDMI adapter): - up to 5120 x 2880 x 24 bpp @ 60Hz DisplayPort: - up to 4096 x 2160 x 30 bpp @ 60Hz - up to 2560 x 1600 x 30 bpp @ 120 Hz - supports High Bit Rate 2 (HBR2) and Multi-Stream Transport (MST) Using two DP outputs, the P4000 can drive one dual DP input display with 5120 x 2880 x 30 bpp @ 60Hz resolution.
Image Quality Features	Advanced support for 8-bit, 10-bit, and 12-bit per RGB color component. HDCP 2.2 support over DisplayPort, DVI, and HDMI connectors NVIDIA 3D Vision™ and other 3D stereo technologies NVIDIA Mosaic and nView
Display Output	Maximum number of displays - 4 direct attached monitors Maximum number of monitors across all available Quadro P4000 outputs is 4.
Shading Architecture	Shader Model 5.1
Supported Graphics APIs	OpenGL 4.5 DirectX 12 Vulcan 1.0 API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran
Available Graphics Drivers	Microsoft Windows 10 Microsoft Windows 7 Linux® - Full OpenGL implementation, complete with NVIDIA and ARB extensions HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
Notes	1. Quadro P4000 offered as Factory Configured Option does not include a video cable adapter. Video cable adapters must be ordered separately. 2. Quadro P4000 offered as an After Market Option does not include video cables. Video cable adapters must be ordered separately.

Technical Specifications - Graphics

NVIDIA® Quadro® P5000 16GB Graphics	**Form Factor**	Full-Height Dual Slot (4.4"? Height x 10.5"? Length) Weight: 815 grams / 1.80 lbs
	Graphics Controller	NVIDIA® Quadro® P5000 graphics GPU: 2560 NVIDIA® CUDA® Parallel Processing Cores Power: 180 Watts Cooling: Active
	Memory	16GB GDDR5X memory Memory Bandwidth: Up to 288 GB/s Memory Width: 256 bit ECC Memory (disabled by default)
	Connectors	DP (x4) with HDR support DL-DVI(D) 3-pin mini-DIN connector SLI connector NVIDIA® Quadro® Sync connector (compatible with NVIDIA® 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 NVIDIA Mosaic and nView Desktop Management
	Display Outputs[1]	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

Technical Specifications - Graphics

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 NVIDIA Mosaic and nView
	Display Outputs[1]	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® GP100 16GB Graphics	**Form Factor**	Dual Slot (4.4"? Height x 10.5"? Length) Weight: 989 grams +72 grams extender

Technical Specifications - Graphics

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 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.
Maximum Resolution	5K support @ 60Hz 1x single-cable 5K monitor, or 2x dual-cable 5K monitors
Image Quality Features	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
Display Outputs	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
GPU Architecture	NVIDIA Pascal™
Supported Graphics APIs	DirectX®12 , OpenGL® 4.5, Vulkan™ 1.0 Developer API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran
Available Graphics Drivers	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® GV100 32GB Graphics	**Form Factor**	Dual Slot (4.4"? Height x 10.5"? Length) Weight: 980 grams + 72 grams extender
	Graphics Controller	NVIDIA® QUADRO® GV100 GPU: 5120 NVIDIA® CUDA® Parallel Processing Cores Power: 250 Watts Cooling: Active
	Memory	32GB HBM2 memory Memory Bandwidth: Up to 870 GB/s Memory Width: 5120-bit ECC Memory (disabled by default)
	Connectors	DP (x4) with HDR support 3-pin mini-DIN connector via optional bracket 4-pin header for stereo signal Quadro Sync connector (compatible with Quadro II Sync) One 8-pin auxiliary power connector (2x) NVLink for GV100 connectors (via optional kit) After market option Kit: no power adapter included with card. DisplayPort™ to VGA, DisplayPort™ to DVI (single-link and dual-link), and DisplayPort™ to HDMI adapters available as accessories.
	Maximum Resolution	5K support @ 60Hz 1x single-cable 5K monitor, or 2x dual-cable 5K monitors
	Image Quality Features	HDR support over DisplayPort™ 1.4 (SMPTE 2084/2086, BT. 2020) (4K @ 60 Hz 10b/12b HEVC Decode, 4K @ 60 Hz 10b HEVC Encode) HDCP 2.2 support over DisplayPort™ and HDMI connectors NVIDIA 3D Vision™ technology NVIDIA Mosaic and nView Desktop Management
	Display Outputs	4x DP1.4 HDR2 outputs (up to 5120 x 2880 @ 60Hz)
	GPU Architecture	NVIDIA® Volta™
	Supported Graphics APIs	DirectX®12, OpenGL® 4.5 Developer API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL™, Java, Python, and Fortran
	Available Graphics Drivers	Windows® 10 64-bit Windows® 8 & 8.1 64-bit Windows® 7 64-bit Linux® 64-bit

		HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html Factory Configured (Z4/Z8 G4 Workstation): No adapters included After market option kit: No adapters included
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 lGPU: 2304 NVIDIA® CUDA® Parallel Processing Cores Power: 160 Watts Cooling: Active
	Memory	8GB GDDR6 memory Memory Bandwidth: Up to 416 GB/s Memory Width: 384 bit
	Connectors	3x DP 1.4a and VirtualLink Quadro Sync connector (compatible with Quadro II Sync) One 8-pin auxiliary power connector Factory configured option: No video cable adapter included with card. After market option Kit: No video cable adaptor included with card. DVI to VGA, DisplayPort™ to VGA, DisplayPort™ to DVI, and DisplayPort™ to Dual-Link DVI adapters available as accessories.
	Maximum Resolution	7680x4320 @ 60Hz
	Image Quality Features	Advanced support for 8-bit, 10-bit, and 12-bit per RGB color component. HDCP 2.2 support over DisplayPort™, DVI, and HDMI connectors NVIDIA® 3D Vision™ and other 3D stereo technologies NVIDIA® Mosaic and nView
	Display Outputs[1]	3x DP 1.4a and VirtualLink[2] (7680x4320 @ 60Hz)
	Supported Graphics APIs	DirectX®12, OpenGL® 4.5, OpenCL™ 1.0, Vulkan™ 1.0 Developer API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL™, Java, Python, and Fortran
	Available Graphics Drivers	Windows® 10 64-bit Linux® 64-bit HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
	Notes	1- Supports up to a total of 4 displays 2- VirtualLink's USB-C™ (data) cannot be disabled at a hardware level

Technical Specifications - Graphics

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

Factory Configured (Z4/Z6/Z8 G4 Workstation): No adapters included
After market option kit: No adapters included

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

NVIDIA® Quadro® RTX 6000 24GB Graphics	**Form Factor**	Full-Height Dual Slot (4.4"? Height x 10.5"? Length) Weight: 995 grams + 75 grams extender
	Graphics Controller	NVIDIA® QUADRO® RTX 6000 GPU: 4608 CUDA cores Power: 295 Watts Cooling: Active
	Memory	24GB HBM2 memory Memory Bandwidth: Up to 672 GB/s ECC Memory (disabled by default)
	Connectors	DP (x4) with HDR support 3-pin mini-DIN connector via optional bracket 4-pin header for stereo signal Quadro Sync connector (compatible with Quadro II Sync) One 8-pin auxiliary power connector (2x) NVLink for RTX 5000 connectors (via optional kit) After market option Kit: no power adapter included with card. DisplayPort™ to VGA, DisplayPort™ to DVI (single-link and dual-link), and DisplayPort™ to HDMI adapters available as accessories.
	Maximum Resolution	DisplayPort™ 1.4: 7680x4320 @ 60Hz
	Image Quality Features	HDR support over DisplayPort™ 1.4 (SMPTE 2084/2086, BT. 2020) (4K @ 60 Hz 10b/12b HEVC Decode, 4K @ 60 Hz 10b HEVC Encode) HDCP 2.2 support over DisplayPort™ and HDMI connectors NVIDIA 3D Vision™ technology NVIDIA Mosaic and nView Desktop Management
	Display Outputs	4x DP1.4 HDR2 outputs (up to 7680x4320 @ 60Hz)
	GPU Architecture	NVIDIA® Volta™
	Supported Graphics APIs	DirectX®12, OpenGL® 4.5 Developer API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL™, Java, Python, and Fortran
	Available Graphics Drivers	Windows® 10 64-bit Windows® 8 & 8.1 64-bit

		Windows® 7 64-bit Linux® 64-bit HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html Factory Configured (Z4/Z6/Z8 G4 Workstation): No adapters included After market option kit: No adapters included *VirtualLink's USB-C™ (data) cannot be disabled at a hardware level
NVIDIA® Quadro® RTX 8000 48GB 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 8000 Graphics GPU: 4608 NVIDIA® CUDA® Parallel Processing Cores Power: 295 Watts Cooling: Active
	Memory	48GB GDDR6 memory Memory Bandwidth: Up to 672 GB/s Memory Width: 384 bit
	Connectors	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.
	Maximum Resolution	7680x4320 @ 60Hz
	Image Quality Features	Advanced support for 8-bit, 10-bit, and 12-bit per RGB color component. HDCP 2.2 support over DisplayPort™, DVI, and HDMI connectors NVIDIA® 3D Vision™ and other 3D stereo technologies NVIDIA® Mosaic and nView
	Display Outputs[1]	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 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

Technical Specifications - Graphics

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

Radeon™ Pro WX 7100 8GB Graphics	**Form Factor**	Full-Height Single Slot (9.5"? Length)
	Graphics Controller	Radeon™ Pro WX 7100 graphics GPU: 2304 Stream Processors organized into 36 Compute Units Power: 130 Watts Cooling: Active
	Memory	8GB GDDR5 memory Memory Bandwidth: 7 Gbps / 224 GB/s Memory Width: 256 bit
	Connectors	4x Display Port 1.4 - HDR ready connectors with HBR3 and MST support. Factory Configured: No video cable adapter included After market option kit: No video cable adapter included Additional DisplayPort-to-VGA or DisplayPort-to-DVI adapters are available as Factory Configuration or Option Kit accessories.
	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 16-bit per RGB color component. High bandwidth scaler for high quality up and downscaling
	Display Output	4 full physical DP1.3 HBR3 / DP1.4 HDR outputs FreeSync support
	GPU Architecture	GCN 4th Generation
	Supported Graphics APIs	DirectX®12 OpenGL® 4.5 OpenCL™ 2.0 Vulkan™ 1.0
	Available Graphics Drivers	Windows 10 64-bit 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	9. 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. 10. 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.

11. 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.
12. 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.

Radeon™ Pro WX 9100 16GB Graphics	**Form Factor**	Dual Slot (4.4"? Height x 10.5"? Length)
	Graphics Controller	Radeon™ Pro WX 9100 graphics GPU: 4096 Stream Processors Power: 250 Watts Cooling: Active
	Memory	16GB HBM2 memory Memory Bandwidth: Up to 483 GB/s Memory Width: 2048 bit
	Connectors	6x Mini DisplayPort 1.4 - HDR ready connectors with HBR3 and MST support. Factory Configured: No video cable adapter included After market option kit: No video cable adapter included Additional DisplayPort-to-VGA or DisplayPort-to-DVI adapters are available as Factory Configuration or Option Kit accessories.
	Maximum Resolution	8K support @ 60Hz Single monitor, single or dual-cable
	Image Quality Features	Advanced support for 8-bit, 10-bit, and 16-bit per RGB color component. High bandwidth scaler for high quality up and downscaling
	Display Output	6 full physical mDP 1.4 HDR Ready outputs FreeSync support
	GPU Architecture	Vega™
	Supported Graphics APIs	DirectX® 12.1 OpenGL® 4.5 OpenCL™ 2.0 Vulkan™ 1.0
	Available Graphics Drivers	Windows 10 64-bit Windows 7 available from AMD 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. 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.
2. 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.
3. 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.
4. 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.

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:

- 2MY05AA - HP miniDP-to-DP Adapter Cables
- 2KW87A6 - HP (Bulk 12) miniDP-to-DP Adapter Cables

Technical Specifications - Graphics

NVIDIA® Quadro® Sync II	**Part number**	1WT20AA
	Dimensions (HxD)	6.0 inches × 4.2 inches
	Devices Supported	NVIDIA® Quadro® P4000 NVIDIA® Quadro® P5000 NVIDIA® Quadro® P6000
	Bus Type	Requires one free mechanical PCIe bus slot. 6-pin PCI or SATA power connector
	PCI Form Factor	Full Height, half length, single slot
	Ports	2 RJ45 connectors for carrying frame lock signals over CAT5 cables. BNC Connector for external house synchronization.
	Internal Connectors	6 NVIDIA SLI® style edge fingers for connection to compatible GPUs
		• Included with the board are 4 12-Inch Short Sync Cables to connect to GPU's • Included with the board are 2 24-Inch Long Sync Cables to connect to GPU's
	System Requirements	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.
	Temperature - Operating	0° to 55° C
	Temperature - Storage	-40° to 60° C
	Relative Humidity - Operating	10% to 80%
	Power Requirements	Board power dissipation: <15W
	Operating Systems Supported	Windows 10 64-bit Windows 7 64-bit Linux® 64-bit
	Kit Contents	Contains: • Quadro Sync II Card • 4 x 12-Inch Short Sync Cables • 2 x 24-Inch Long Sync Cables (Two) • Quick Start Guide

Optical and Removable Storage

HP 9.5mm Slim DVD Writer	**Description**	9.5mm height, tray-load	
	Mounting Orientation	Either horizontal or vertical	
	Interface Type	SATA/ATAPI	
	Dimensions (WxHxD)	128 x 9.5 x 127mm	
	Supported Media Types	DVD+R DVD+RW DVD+R DL DVD-R DL DVD-R DVD-RW CD-R CD-RW	
	Disc Capacity	DVD-ROM	8.5 GB DL or 4.7 GB standard
		Full Stroke DVD	< 200 ms (seek)
		Full Stroke CD	< 200 ms (seek)
	Maximum Data Transfer Rates	CD ROM Read	CD-ROM, CD-R Up to 24X CD-RW Up to 24X
		DVD ROM Read	DVD+RW Up to 8X DVD-RW Up to 8X DVD+R DL Up to 8X DVD-R DL Up to 8X DVD-ROM Up to 8X DVD-ROM DL Up to 8X DVD+R Up to 8X DVD-R Up to 8X
	Power	Source	SATA DC power receptacle
		DC Power Requirements	5 VDC ± 5%-100 mV ripple p-p
		DC Current	5 VDC -< 800 mA typical, <1600 mA maximum
	Operating Environmental (all conditions non-condensing)	Temperature	41° to 122° F (5° to 50° C)
		Relative Humidity	10% to 80%
		Maximum Wet Bulb Temperature	84° F (29° C)
	Kit Contents	HP SATA DVD Writer drive, installation guide.	

Technical Specifications – Optical and Removable Storage

HP 9.5mm Slim DVD-ROM Drive	**Description**	9.5mm height, tray-load	
	Mounting Orientation	Either horizontal or vertical	
	Interface Type	SATA / ATAPI	
	Dimensions (WxHxD)	128 x 9.5 x 127mm	
	Disc Capacity	DVD-ROM	Single layer: Up to 4.7 GB Double layer: Up to 8.5 GB
	Access Times	DVD-ROM Single Layer	< 110 ms (typical)
		CD-ROM Mode 1	< 110 ms (typical)
		Full Stroke DVD	< 230 ms (typical)
		Full Stroke CD	< 220 ms (typical)
	Power	Source	SATA DC power receptacle
		DC Power Requirements	5 VDC ± 5%-100 mV ripple p-p
		DC Current	5 VDC - <800mA typical, < 1600 mA maximum
	Operating Environmental (all conditions non-condensing)	Temperature	41° to 122° F (5° to 50° C)
		Relative Humidity	10% to 80%
		Maximum Wet Bulb Temperature	84° F (29° C)
	Kit Contents	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)	**Description**	HP Half Height DVD Writer	
	Mounting Orientation	Either Horizontal or vertical	
	Interface Type	SATA	
	Dimensions (WxHxD)	146x42x165mm	
	Supported Media Types	DVD+R DVD+RW DVD+R DL DVD-R DL DVD-R DVD-RW CD-R CD-RW	
	Disc Capacity	DVD-ROM	8.5 GB DL or 4.7 GB standard
		Full Stroke DVD	145ms (seek)
		Full Stroke CD	120ms (seek)
	Maximum Data Transfer Rates	CD ROM Read	CD-ROM, CD-R Up to 24X CD-RW Up to 24X
		DVD ROM Read	DVD+RW Up to 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 DVD+R Up to 16X DVD-R Up to 16X

Technical Specifications – Optical and Removable Storage

	Power	Source	SATA DC power receptacle
		DC Power Requirements	5 VDC ± 5% -100 mV ripple p-p 12 VDC ± 10% -200 mV ripple p-p
		DC Current	5 VDC -<1500mA typical, <2000 mA maximum.
	Operating Environmental (all conditions non-condensing)	Temperature	41° to 122° F (5° to 50° C)
		Relative Humidity	10% to 90% (Non-Condensing)
	Operating Systems Supported	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.	
	Kit Contents	HP SATA DVD Writer drive, Installation guide.	
HP 9.5mm Slim BDXL Blu-Ray Writer	**Description**	9.5mm height, tray-load	
	Mounting Orientation	Either horizontal or vertical	
	Interface Type	SATA/ATAPI	
	Dimensions (WxHxD)	128 x 9.5 x 127mm	
	Supported Media Types	BD-ROM BD-R BD-RE DVD+R DVD+RW DVD+R DL DVD-R DL DVD-R DVD-RW CD-R CD-RW	
	Disc Capacity	DVD-ROM	8.5 GB DL or 4.7 GB standard
		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 CD-ROM 15S

Technical Specifications – Optical and Removable Storage

Maximum Data Transfer Rates	CD ROM Read	CD-ROM, CD-R Up to 24X CD-RW Up to 24X
	DVD ROM Read	DVD+RW Up to 8X DVD-RW Up to 8X DVD+R DL Up to 8X DVD-R DL Up to 8X DVD-ROM Up to 8X DVD-ROM DL Up to 8X DVD+R Up to 8X DVD-R Up to 8X
	Blu-ray	BD-ROM Up to 6X BD-ROM DL Up to 6X BD-R Up to 6X BD-R DL Up to 6X BD-R Up to 6X BD-RE SL/DL Up to 6X
Power	Source	SATA DC power receptacle
	DC Power Requirements	5 VDC ± 5%-100 mV ripple p-p
	DC Current	5 VDC -900 mA typical, 2000mA maximum
Operating Environmental (all conditions non-condensing)	Temperature	41° to 122° F (5° to 50° C)
	Relative Humidity	10% to 80%
	Maximum Wet Bulb Temperature	84° F (29° C)
Kit Contents	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.	

Technical Specifications – Optical and Removable Storage

HP SD Card Reader	**Description**	Supports hardware ECC (Error Correction Code) function Supports hardware CRC (Cyclic Redundancy Check) function Supports SD 4-bit parallel transfer mode
	Interface Type	USB 3.1 G1 High-speed interface
	Dimensions (WxHxD)	1.15 x .9 x .15 in (29.00 x 23.6 x 3.15 mm) Fits conveniently in the Front IO Bay
	Supported Media Types	Secure Digital Card (SD) Secure Digital High Capacity (SDHC) SD Extended Capacity Memory Card (SDXC) SD Ultra High Speed II(SD UHSII) These additional media types are supported with a card adapter. 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%
	Kit Contents	SD card reader
	Approvals	USB-IF, WHQL, Compliant with USB Mass Storage Class Bulk only Transport Specification Rev. 1.0, Compliant Intel Front Panel I/O Connectivity Design Guide V. 1.3, FCC, CE, BSMI, C-Tick, VCCI, MIC, cUL, TUVT
	Weight	0.35 lbs. (0.16 kg)

Controller Cards

HP Thunderbolt-3 Dual Port2 PCIe 1-port I/O Card	**Data Transfer Rate**	Supports up to 40 Gb/s (40,000 Mb/s)
	Devices Supported	Thunderbolt™, Thunderbolt™ 2 and Thunderbolt™ 3 certified for Windows devices
	Bus Type	PCIe Slot. Slot 4 only
	Ports	Two Thunderbolt™ 3 external USB type-C output connectors (Rear) Two full size DisplayPort input connectors (Rear)
	Internal Connectors	One 2x5-Pin header connector
	System Requirements	Genuine Windows 10 Professional 64-bit, slot 4 PCH PCIe slot.
	Temperature - Operating	50° to 131° F (10° to 55° C)
	Temperature - Storage	-22° to 140° F (-30° to 60° C)
	Relative Humidity - Operating	20% to 80%
	Compliances	FCC Part 15B, cULus 60950, CE Mark EN55022B(1995)/EN55024-1998 STD, Taiwan BSMI CNS13438, Korea MIC
	Operating Systems Supported	Genuine Windows 10 Professional 64-bit.
	Kit Contents	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.

Networking and Communications

Integrated Intel I219 PCIe GbE Controller	**Connector**	RJ-45
	Controller	Intel I219 GbE platform LAN connect networking controller
	Data Rates Supported	10/100/1000 Mbps
	Boot ROM Support	PXE, UEFI
	Connect Speed LED Indicators	Link/Activity LED • Off = No link • Blinking = Activity Speed LED • Off = 10Mbps • Amber = 100Mbps • Green = 1000Mbps
	Management Capabilities	Wake-On-LAN, Intel ® Active Management Technology™ (AMT) 11.1x **NOTE:** Intel ® AMT™ is not available on Intel Core X configs.

Integrated Intel I210 (not available on Intel Core X configs)	**Connector**	RJ-45
	Controller	Intel® I210
	Data Rates Supported	10/100/1000 Mbps
	Boot ROM Support	PXE, UEFI
	Connect Speed LED Indicators	Link/Activity LED • Off = No link • Blinking = Activity Speed LED • Off = 10Mbps • Amber = 100Mbps • Green = 1000Mbps
	Management Capabilities	Wake-On-LAN

Technical Specifications - Networking and Communications

Intel® I210-T1	**Networking Interface**	RJ-45
	System Interface	PCI Express 2.1 x1
	Networking Speeds Supported	10Mbps, 100Mbps, 1Gbps
	Cabling (up to 100m)	Cat3 (or higher) for 10Mbps Cat5 (or higher) for 100Mbps Cat5e (or higher) for 1Gbps
	Power Consumption (active-typical)	0.81W
	Physical Dimensions	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)
	Connect Speed LED Indicators	Link/Activity LED • Off = No link • Blinking = Activity Speed LED • Off = 10Mbps • Green = 100Mbps • Amber = 1Gbps
	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® I350-T2	**Networking Interface**	2 x RJ-45
	System Interface	PCI Express 2.1 x4
	Networking Speeds Supported	10Mbps, 100Mbps, 1Gbps
	Cabling (up to 100m)	Cat3 (or higher) for 10Mbps Cat5 (or higher) for 100Mbps Cat5e (or higher) for 1Gbps
	Power Consumption (active-typical)	4.4W
	Physical Dimensions	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)
	Connect Speed LED Indicators	Link/Activity LED • Off = No link

		• Blinking = Activity Speed LED • Off = 10Mbps • Green = 100Mbps • Amber = 1Gbps
	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® I350-T4	**Networking Interface**	4 x RJ-45
	System Interface	PCI Express 2.1 x4
	Networking Speeds Supported	10Mbps, 100Mbps, 1Gbps
	Cabling (up to 100m)	Cat3 (or higher) for 10Mbps Cat5 (or higher) for 100Mbps Cat5e (or higher) for 1Gbps
	Power Consumption (active-typical)	5W
	Physical Dimensions	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)
	Connect Speed LED Indicators	Link/Activity LED • Off = No link • Blinking = Activity Speed LED • Off = 10Mbps • Green = 100Mbps • Amber = 1Gbps
	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

Technical Specifications - Networking and Communications

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
	Cabling	LC fiber optic cabling with LC SFP+ Transceivers
	Power Consumption (active-typical)	4.3W
	Physical Dimensions	6.578 in x 2.703 in
	Connect Speed LED Indicators	Link/Activity LED • Off = No link • Blinking = Activity Speed LED • Off = 10Mbps • Green = 100Mbps • Amber = 1Gbps

	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
	Note: Windows 7 is NOT supported	
10GbE SFP+ SR Transceiver	**Connector Type**	LC
	Cable Type	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.
	Cable Length	2-300m
	Wavelength	850nm
	Form Factor	SFP+
	Physical Dimensions	0.47(h) x 0.54(w) x 2.19(d) inches (1.19 x 1.38 x 5.57 cm)
	Operating Temperature	0C to 45C (32F to 113F)
	Operating Humidity	0% to 85%, noncondensing
Intel® 8265 WLAN	**Networking Speeds**	802.11ac MU-MIMO (up to 867 Mbps) Bluetooth 4.2
	IEEE WLAN Standard	IEEE 802.11a/b/g/n/ac, 802.11d, 802.11e, 802.11h, 802.11i, 802.11w; 802.11r, 802.11k, 802.11v pending
	Bluetooth	4.2
	System Interface	PCI Express 2.1 x1
	Antenna	2x2

Summary of Changes

Date of change:	Version History:		Description of change:
November 1, 2017	From v1 to v2	Added	HP DisplayPort to HDMI Adapter, NVIDIA SLI 2-slot Graphics Connector and NVIDIA Quadro Sync II to Graphics section
		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, changed System Configuration, DECLARED NOISE EMISSIONS and Physical Security and Serviceability sections
November 29, 2017	From v2 to v3	Added	Processors, hard drives and graphics to offerings, added Intel Xeon W-2195 to Processors section
		Changed	Wattage links on power supply section updated and Voltage links on efficientcy section updated
February 5, 2018	From v3 to v4	Added	Features and Supported Configurations for Intel® Core™ X- Series Processor Family
		Changed	Formatting
February 27, 2018	From v4 to v5	Added	Intel Core i9-X processors footnotes added to processors pre-installed section
March 27, 2018	From v5 to v6	Added	NVIDIA Quadro GP100 16GB Graphics, NVIDIA Quadro GV100 32GB Graphics and AMD Radeon Pro WX 9100 16GB Graphics as High End 3D in Graphics section
August 13, 2018	From v6 to v7	Added	Footnote to Networking and Communications section
		Changed	Operating Systems section
August 24, 2018	From v7 to v8	Changed	Format
September 21, 2018	From v8 to v9	Added	Intel Optane SSD 905p AiC 280GB & 480GB
September 26, 2018	From v9 to v10	Changed	NVIDIA Quadro P6000 Graphics specs
February 11, 2019	From v10 to v11	Added	NVIDIA Quadro RTX 5000 16GB and NVIDIA Quadro RTX 6000 24GB Graphics, added Intel Core i9-9980XE, Intel Core i9-9920X, Intel Core i9-9820X and Intel Core i7-9800X processors
		Changed	Storage section and Format changes
May 8, 2019	From v11 to v12	Changed	Storage and Graphics sections
June 12, 2019	From v12 to v13	Changed	Storage section
June 24, 2019	From v13 to v14	Changed	RAID Support
July 15, 2019	From v14 to v15	Changed	Corrected Intel 905p Series AIC 480GB PCIe SSD
July 18, 2019	From v15 to v16	Changed	HP SD 4 Card Reader part number
July 23, 2019	From v16 to v17	Changed	Windows 10 Pro High End added to Processors and under Intel Core X-series Processors Preinstalled Power supply-high end section re-arranged
September 1, 2019	From v17 to v18	Added	Footnote to Memory section, Added 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

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