

Overview

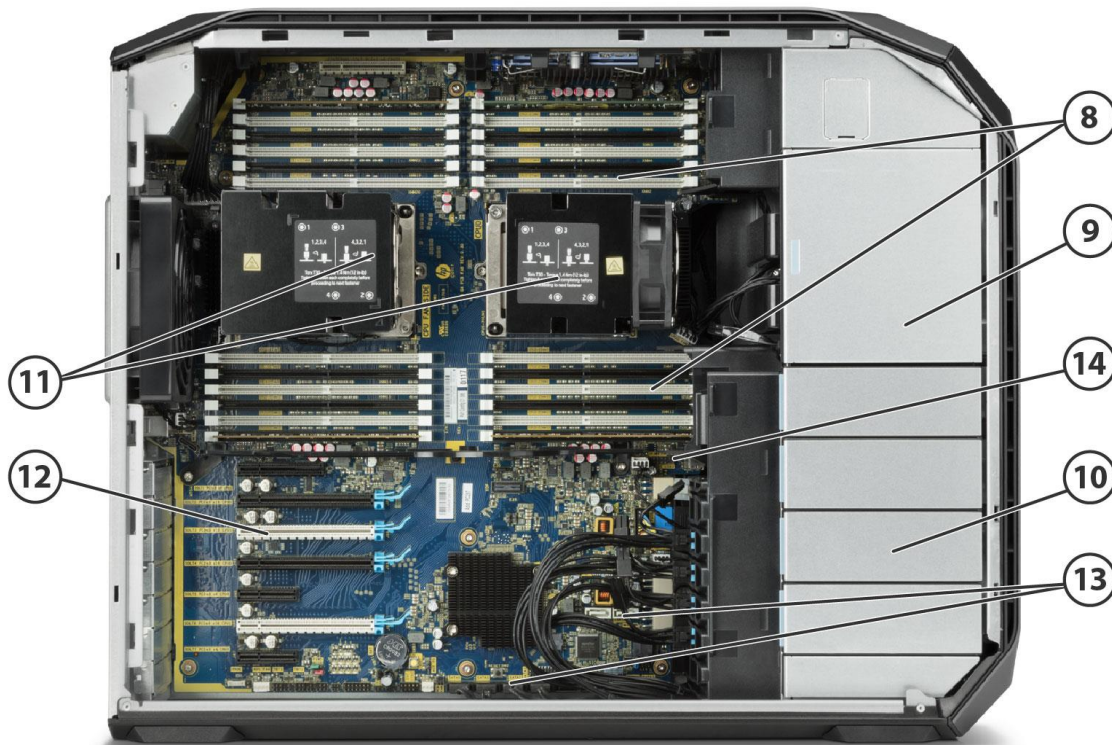
HP Z8 G4 Workstation



Front view

1. Integrated Front Handle
2. Dedicated 9.5mm Optical Drive Bay
3. Power Button
4. HDD Activity LED
5. Front I/O Entry: 4 USB 3.1 Gen1 (Left-most Port has Charging Capability)
Front I/O Premium: 2x USB 3.1 Gen1, 2x USB 3.1 Gen2 Type-C™ (Left-most Type-A Port has Charging Capability)
Note: Premium Front IO is shown on Photography
6. Media Card Reader
7. 1 Headset

Overview



Internal view

- 8. 24 DIMM Slots for DDR4 ECC Memory
- 9. 2 External 5.25" Bays and Slimline Optical
- 10. 4 Internal 3.5" Bays
- 11. 2 Intel® Xeon® Processors (Skylake SP) family
- 12.
 - Slot 1: PCIe Gen3 x4 – Transforms to PCIe Gen3 x8 when 2nd CPU is installed
 - Slot 2: PCIe Gen3 x16
 - Slot 3: PCIe Gen3 x16 – Available ONLY when 2nd processor is installed
 - Slot 4: PCIe Gen3 x16
 - Slot 5: PCIe Gen3 x4
 - Slot 6: PCIe Gen3 x16 - Available ONLY when 2nd processor is installed
 - Slot 7: PCIe Gen3 x4
- 13. 2 sSATA, 8 SATA (AHCI) Ports
- 14. 3 USB 2.0 Internal Ports, 1 USB 3.0 Gen1 Internal Port

Overview



Rear view

15. Choice of 1125W or 1450W, 90% Efficient Power Supplies

16. Rear I/O:

- Rear Power Button

- 6 USB 3.0 Gen1

- 1 Serial

- PS/2 keyboard and mouse

- 2 RJ-45 to integrated Gigabit LAN

- 1 Audio Line-In (can be retasked as microphone)

- 1 Audio Line-Out

- Optional: 2 10GbE LAN ports

Overview

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Form Factor Operating Systems

Minitower

Preinstalled:

- Windows 10 Pro 64 for Workstations
- Windows 10 Downgrade to Windows 7
- HP Linux-ready (minimal OS ready for customer OS installation)
- Red Hat® Enterprise Linux® Desktop Workstation (Paper license with 1 year support; no preinstalled OS)

Supported:

- Windows 7 Professional 64-bit (downgrade media available by request from HP Support)*
- 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

*Windows 10 is preinstalled. Windows 7 media is available upon request from HP Customer Support. You may only use one version of the Windows software at a time. Switching between versions will require you to uninstall one version and install the other version.

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

Available Processors

Name	Cores	Clock Speed (GHz)	Cache (MB)	Memory Speed (MT/s)	Hyper-Threading	Featuring Intel® vPro™ Technology	Intel® Turbo Boost Technology ¹	TDP (W)
Intel® Xeon® Platinum 8180 processor	28	2.5GHz	38.50	2666	YES	YES	3.8GHz	205
Intel® Xeon® Platinum 8160 processor	24	2.1GHz	33.00	2666	YES	YES	3.7GHz	150
Intel® Xeon® Gold 6152 processor	22	2.1GHz	30.25	2666	YES	YES	3.7GHz	140
Intel® Xeon® Gold 6154 processor	18	3.0GHz	24.75	2666	YES	YES	3.7GHz	200
Intel® Xeon® Gold 6148 processor	20	2.4GHz	27.50	2666	YES	YES	3.7GHz	150
Intel® Xeon® Gold 6146M processor	12	3.2GHz	24.75	2666	YES	YES	YES	165
Intel® Xeon® Gold 6146 processor	12	3.2GHz	24.75	2666	YES	YES	YES	165
Intel® Xeon® Gold 6144M processor	8	3.5GHz	24.75	2666	YES	YES	YES	150
Intel® Xeon® Gold 6144 processor	8	3.5GHz	24.75	2666	YES	YES	YES	150
Intel® Xeon® Gold 6142 processor	16	2.6GHz	22.00	2666	YES	YES	3.7GHz	150
Intel® Xeon® Gold 6140 processor	18	2.3GHz	24.75	2666	YES	YES	3.7GHz	140
Intel® Xeon® Gold 6136 processor	12	3.0GHz	24.75	2666	YES	YES	3.7GHz	150

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Intel® Xeon® Gold 6134 processor	8	3.2GHz	24.75	2666	YES	YES	3.7GHz	130
Intel® Xeon® Gold 6132 processor	14	2.6GHz	19.25	2666	YES	YES	3.7GHz	140
Intel® Xeon® Gold 6130 processor	16	2.1GHz	22.00	2666	YES	YES	3.7GHz	125
Intel® Xeon® Gold 6128 processor	6	3.4GHz	19.25	2666	YES	YES	3.7GHz	115
Intel® Xeon® Gold 5120 processor	14	2.2GHz	19.25	2400	YES	YES	3.2GHz	105
Intel® Xeon® Gold 5118 processor	12	2.3GHz	16.50	2400	YES	YES	3.2GHz	105
Intel® Xeon® Gold 5122 processor	4	3.6GHz	16.50	2666	YES	YES	3.7GHz	105
Intel® Xeon® Silver 4116 processor	12	2.1GHz	16.50	2400	YES	YES	3.0GHz	85
Intel® Xeon® Silver 4114 processor	10	2.2GHz	13.75	2400	YES	YES	3.0GHz	85
Intel® Xeon® Silver 4112 processor	4	2.6GHz	8.25	2400	YES	YES	3.0GHz	85
Intel® Xeon® Silver 4110 processor	8	2.1GHz	11.00	2400	YES	YES	YES	85
Intel® Xeon® Silver 4108 processor	8	1.8GHz	11.00	2400	YES	YES	3.0GHz	85
Intel® Xeon® Bronze 3106 processor	8	1.7GHz	11.00	2133	NO	YES	N/A	85
Intel® Xeon® Bronze 3104 processor	6	1.7GHz	8.25	2133	NO	YES	N/A	85

¹The specifications shown in this column represent the following: (all core maximum turbo steps, one core maximum turbo steps). Turbo boost stepping occurs in 100MHz increments. Processors that do not have turbo functionality are denoted as N/A.

Available Processors

Disclaimers

When ordering two processors, the second processor must be the same as the first. Intel processor numbers are not a measurement of higher performance. Processor numbers differentiate features within each processor family, not across different processor families. See: http://www.intel.com/products/processor_number/ for details.

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)

Slot 1:

PCIe Gen3 x4 - Transforms to PCIe Gen3 x8 when 2nd CPU is installed

Slot 2:



Overview

PCIe Gen3 x16

Slot 3:

PCIe Gen3 x16 - Available ONLY when 2nd processor is installed

Slot 4:

PCIe Gen3 x16

Slot 5:

PCIe Gen3 x4

Slot 6:

PCIe Gen3 x16 - Available ONLY when 2nd processor is installed

Slot 7:

PCIe Gen3 x4

Note: The PCIe x4 and PCIe x8 connectors above are open ended, allowing a PCIe x16 card to be seated in the slot.

Expansion Bays (see storage section for more details)

4 internal 3.5" bays (All 4 include acoustic dampening rail assemblies)
2 external 5.25" bays (175mm depth limit)

1 dedicated 9.5mm slim optical disk drive bay

Front I/O

- Base: 4 USB 3.1 Gen1 Type-A connector. Left most connector has charging capability, 1 Combo Headset, 1 Optional Media Card Reader
- Premium: 2 USB 3.1 Gen1 Type-A connector. Left most connector has charging capability, 2 USB 3.1 Gen2 Type-C™ connector, 1 Combo Headset, 1 Optional Media Card Reader

Internal I/O

Internal Slot 1 CPU1: PCIe Gen3 x8 - always available
Internal Slot 2 CPU2: PCIe Gen3 x8 - available when 2nd CPU is installed
2 USB 2.0 ports available with a single 2x5 header
1 USB 2.0 port available with a 1x6 header
1 USB 3.1 Gen1 and 1 USB 2.0 port available with a 2x6 header

Notes: The 2x5 header can be converted to a standard (Type-A) USB 2.0 connector through the use of one HP Internal USB Port Kit (EM165AA). This port kit uses one half of the 2x5 header.

The 1x6 header can be converted to a standard (Type-A) USB 2.0 connector through the use of one HP Internal USB Port Kit (EM165AA). This port kit uses 5 pin positions on the header.

The 2x6 header can be converted to a standard (Type-A) USB 2.0 connector through the use of one HP Internal USB Port Kit (EM165AA). This port kit uses one half of the 2x6 header.

Rear I/O

6 USB 3.1 Gen1 (aka USB 3.0), 1 Serial, PS/2 keyboard and mouse, 2 RJ-45 to integrated Gigabit LAN, 1 Audio Line-In (can be retasked as microphone), 1 Audio Line-Out

Optional: 2 RJ-45 to 10GbE LAN ports

Interfaces Supported

10 channel SATA 6.0 Gb/s interface
Factory integrated RAID available for SATA drives (RAID 0 and 1)
Internal USB 3.1 Gen1, USB 3.1 Gen2, USB 2.0

On-board RAID Support

SATA RAID 0 Striped Array Configuration
SATA RAID 1 Mirrored Array Configuration

Overview

SATA RAID 10 Striped/Mirrored Configuration
SATA RAID 5 Parity Array Configuration

Chassis Dimensions (H x W x D)

Footprint:	H: 17.5" [444.5mm] W: 8.5" [215.9mm] D: 21.7" [551.2mm] (measured to the rear of service panel)
Maximum:	H: 17.5" [444.5mm] W: 8.5" [215.9mm] D: 21.85" [555.2mm] (measured to the embossment for the rear chassis fans)

Packaged Dimensions

H: 25" (636mm)
W: 13.1" (332mm)
D: 28.9" (734mm)

Rack Dimensions

5U

Weight

Exact weights depend upon configuration (System weight only).
Minimum: 22.4kg (49.4lbs.)
Typical: 23.7kg (52.2lbs.)
Maximum: 31.7kg (70lbs.)

Temperature

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

Humidity

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

Maximum Altitude (non-pressurized)

Operating: 3,048m (10,000ft)
Non-operating: 9,144m (30,000ft)

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

Power Supply

Choice of:

- 1125W/100V/15A 90% Efficient wide-ranging, active Power Factor Correction
The power delivery system includes four 6+2-pin graphics power cables.
- 1450W/200V/10A 90% Efficient wide-ranging, active Power Factor Correction
The power delivery system includes four 6+2-pin graphics power cables.
- Available in limited regions
- 1450W/100V/20A 90% Efficient wide-ranging, active Power Factor Correction
The power delivery system includes four 6+2-pin graphics power cables.
- 1700W/200V/10A 90% Efficient wide-ranging, active Power Factor Correction
The power delivery system includes four 6+2-pin graphics power cables.

Notes: The 1125W/100V/15A (1450W at 200V Input Voltage) power supply can also supply 1275W of output power when the input voltage is greater than 105V. If the input voltage is less than 105V, but greater than 90V for any reason, the maximum power that can be drawn is 1125W. An uninterruptible power supply (UPS) is highly recommended if 1275W output power is desired.
The 1125W Power Supply can also supply 1450W of output power when the input voltage is greater than 200V under all conditions.

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The 1450W/100V/20A (1700W at 200V Input Voltage) power supply can also supply 1550W of output power when the input voltage is greater than 105V. If the input voltage is less than 105V, but greater than 90V for any reason, the maximum power that can be drawn is 1450W. An uninterruptible power supply (UPS) is highly recommended if 1550W output power is desired.

The 1450W Power Supply can also supply 1700W of output power when the input voltage is greater than 200V under all conditions.

The 1450W/100V/20A chassis is shipped with a 20A power cord and requires a 20A outlet in an environment with 100V/110V. Site modification may be required. Check with your sales lead and click here for the [Site Prep Guide](#).

The Z8 G4 power supply efficiency reports can be found at these links:

1125W – Link:

https://plugloadsolutions.com/psu_reports/HP%20Inc_DPS-1125BB%20A_1125W_ECOS%204825_Report.pdf

1450W – Link:

https://plugloadsolutions.com/psu_reports/HP%20Inc_DPS-1450AB%20A_1450W_ECOS%204826_Report.pdf

Workstation ISV Certifications

See the latest list of certifications at

<http://www.hp.com/united-states/campaigns/workstations/partnerships.html>

Supported Components

Processors

Intel® Xeon® processor Scalable family	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Intel® Xeon® Platinum 8180 processor	Y	Y	1XM54AA	
Intel® Xeon® Platinum 8160 processor	Y	Y	1XM56AA	
Intel® Xeon® Gold 6152 processor	Y	Y	1XM57AA	
Intel® Xeon® Gold 6154 processor	Y	Y	1XM58AA	
Intel® Xeon® Gold 6148 processor	Y	Y	1XM59AA	
Intel® Xeon® Gold 6146 processor	Y	Y	2SQ75AV	
Intel® Xeon® Gold 6146M processor	Y	Y	2SQ76AV	
Intel® Xeon® Gold 6144 processor	Y	Y	2SQ73AV	
Intel® Xeon® Gold 6144M processor	Y	Y	2SQ74AV	
Intel® Xeon® Gold 6142 processor	Y	Y	1XM61AA	
Intel® Xeon® Gold 6140 processor	Y	Y	1XM64AA	
Intel® Xeon® Gold 6136 processor	Y	Y	1XM62AA	
Intel® Xeon® Gold 6134 processor	Y	Y	1XM66AA	
Intel® Xeon® Gold 6132 processor	Y	Y	1XM67AA	
Intel® Xeon® Gold 6130 processor	Y	Y	1XM68AA	
Intel® Xeon® Gold 6128 processor	Y	Y	1XM69AA	
Intel® Xeon® Gold 5120 processor	Y	Y	1XM70AA	
Intel® Xeon® Gold 5118 processor	Y	Y	1XM71AA	
Intel® Xeon® Gold 5122 processor	Y	Y	1XM72AA	
Intel® Xeon® Silver 4116 processor	Y	Y	1XM73AA	
Intel® Xeon® Silver 4114 processor	Y	Y	1XM74AA	
Intel® Xeon® Silver 4112 processor	Y	Y	1XM75AA	
Intel® Xeon® Silver 4110 processor	Y	Y	TBD	
Intel® Xeon® Silver 4108 processor	Y	Y	1XM76AA	
Intel® Xeon® Bronze 3106 processor	Y	Y	1XM77AA	
Intel® Xeon® Bronze 3104 processor	Y	Y	1XM78AA	
<p>*Multi-Core is designed to improve performance of certain software products. Not all customers or software applications will necessarily benefit from use of this technology. 64-bit computing system required. Performance will vary depending on your hardware and software configurations. Intel's numbering, branding and/or naming is not a measurement of higher performance.</p>				
Intel® Xeon® Silver 4112 processor	Y	Y	1XM75AA	

Supported Components

Monitors / Displays

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

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

Storage / Hard Drives

SAS Hard Drives

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
SAS Hard Drives for HP Workstations				
HP 300GB 15k SAS SFF	Y	Y	L5B74AA	

NOTE: SAS controller add-in card required

SATA Hard Drives

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
SATA (Serial ATA) Hard Drives for HP Workstations				
500GB SATA 7200RPM 6Gb/s 3.5" HDD	Y	Y	LQ036AA	
500GB SATA 7200RPM 6Gb/s OPAL2 SFF 3.5" HDD	Y	Y	D8N29AA	
1TB SATA 7200RPM 3.5" HDD	Y	Y	LQ037AA	
1TB SATA 7200RPM Ent 3.5" HDD	Y	Y	WOR10AA	
2TB SATA 7200RPM HDD	Y	Y	QB576AA	
4TB SATA 7200RPM Ent 3.5" HDD	Y	Y	K4T76AA	

NOTES:

Up to (5) 3.5-inch 7200 rpm SATA drives: 500 GB, 1.0, 2.0, 4.0 TB; 20TB max total

Supported Components

SATA Solid State Drives

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

PCIe Solid State Drives

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
PCIe SSDs for HP Workstations				
HP Z Turbo Drive 256GB MLC Z8G4 SSDModule	Y	Y	1PD50AA	
HP Z Turbo Drive 512GB MLC Z8G4 SSDModule	Y	Y	1PD51AA/AT	
HP Z Turbo Drive 1TB MLC Z8G4 SSDModule	Y	Y	1PD52AA/AT	
HP Z Turbo Drive 256GB TLC Z8G4 SSDModule	Y	Y	1PD53AA	
HP Z Turbo Drive 512GB TLC Z8G4 SSDModule	Y	Y	1PD54AA/AT	
HP Z Turbo Drive 1TB TLC Z8G4 SSDModule	Y	Y	1PD55AA	
HP Z Turbo Drive 256GB SED Z8G4 SSDModule	Y	Y	2SA34AA	
HP Z Turbo Drive 512GB SED Z8G4 SSDModule	Y	Y	2SA36AA	
HP Z Turbo Drive 256GB MLC Z8 G4 SSD Kit	Y	Y	1PD44AA	
HP Z Turbo Drive 512GB MLC Z8 G4 SSD Kit	Y	Y	1PD45AA/AT	
HP Z Turbo Drive 1TB MLC Z8 G4 SSD Kit	Y	Y	1PD46AA	
HP Z Turbo Drive 256GB TLC Z8 G4 SSD Kit	Y	Y	1PD47AA	
HP Z Turbo Drive 512GB TLC Z8 G4 SSD Kit	Y	Y	1PD48AA/AT	
HP Z Turbo Drive 1TB TLC Z8 G4 SSD Kit	Y	Y	1PD49AA	
HP Z Turbo Drive 256GB SED Z8 G4 SSD Kit	Y	Y	2SA33AA	
HP Z Turbo Drive 512GB SED Z8 G4 SSD Kit	Y	Y	2SA35AA	
HP Z Turbo Drive Quad Pro				
HP Z Turbo Drive Quad Pro 2x256GB PCIe SSD	Y	Y	N2M98AA	1
HP Z Turbo Drive Quad Pro 2x512GB PCIe SSD	Y	Y	N2M99AA	1
HP Z Turbo Drive Quad Pro 2x1TB PCIe SSD	Y	Y	T9H99AA	1
HP Z Turbo Drive Quad Pro 256GB SSD module	N	Y	N2N00AA	2
HP Z Turbo Drive Quad Pro 512GB SSD module	N	Y	N2N01AA	2
HP Z Turbo Drive Quad Pro 1TB SSD module	N	Y	T9J00AA	2

Supported Components

Intel® 905p Series SSD (Optane SSD)

Intel® Optane SSD 905p 280GB AiC**,***	Y	Y	25C47AA
Intel® Optane SSD 905p 480GB AiC**,***	Y	Y	25C48AA

NOTE 1: Dual M.2 SSD modules plus carrier

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

*For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 30GB of system disk is reserved for system recovery software

** PCIe card installed in standard PCIe x4 slot

*** Intel® Optane SSD Available Fall 2018

Hard Drive Controllers

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

Graphics

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes	Supported # of cards
Graphics Cable Adapters					
HP miniDP-to-DP Adapter	Y	Y			
HP miniDP-to-DP Adapter (2-pack)	Y	N			
HP miniDP-to-DP Adapter (4-pack)	Y	N			
HP miniDP-to-DP Adapter (8-pack)	Y	N			
HP DisplayPort to Dual Link DVI Adapter	Y	Y	NR078AA		
HP DisplayPort to DVI-D Adapter	Y	Y	FH973AA		
HP DisplayPort to DVI-D Adapter (2-pack)	Y	N			
HP DisplayPort to DVI-D Adapter (4-pack)	Y	N			
HP DisplayPort to DVI-D Adapter (6-pack)	Y	N			
HP DisplayPort to VGA Adapter	Y	Y	AS615AA		
HP DisplayPort to HDMI Adapter	Y	Y	K2K92AA		
NVIDIA SLI 2-slot Graphics Connector	Y	Y	2YY84AA		
Entry 3D					
NVIDIA® Quadro® P400 1 st GFX 2GB Graphics	Y	Y	1ME43AA/AT		2
NVIDIA® Quadro® P600 1 st GFX 2GB Graphics	Y	Y	1ME42AA/AT		2
AMD FirePro™ W2100 2GB Graphics	Y	Y	J3G91AA/AT		2
Mid-range 3D					
NVIDIA® Quadro® P1000 1 st GFX 4GB Graphics	Y	Y	1ME01AA/AT		4
NVIDIA® Quadro® P2000 1 st GFX 5GB Graphics	Y	Y	1ME41AA/AT		4
AMD Radeon™ Pro WX 3100 4GB Graphics	Y	Y	2TF08AA		4
AMD Radeon™ Pro WX 4100 4GB Graphics	N	Y	Z0B15AA/AT		4
High End 3D					

Supported Components

NVIDIA® Quadro® P4000 1 st GFX 8GB Graphics	Y	Y	1ME40AA/AT	3
NVIDIA® Quadro® P5000 1 st GFX 16GB Graphics	Y	Y	Z0B13AA/AT	3
NVIDIA® Quadro® P6000 1 st GFX 24GB Graphics	Y	Y	Z0B12AA/AT	3
NVIDIA® Quadro® GP100 16GB Graphics	Y	Y	1ZE81AA/AT	3
NVIDIA® Quadro® GV100 32GB Graphics	Y	Y	3ME26AA/AT	1
AMD Radeon™ Pro WX 7100 1 st GFX 8GB Graphics	Y	Y	Z0B14AA/AT	3
AMD Radeon™ Pro WX 9100 16GB Graphics	Y	Y	2TF01AA/AT	2
NVIDIA® Quadro® Sync II	Y	Y	1WT20AA	

Memory	CTO	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
DDR4-2666 ECC Registered DIMMs					
	8GB (1x8GB) DDR4-2666 ECC Reg 1CPU Memory	Y	Y	1XD84AA/AT	
	16GB (1x16GB) DDR4-2666 ECC Reg 1CPU Memory	N	Y	1XD85AA/AT	
	32GB (1x32GB) DDR4-2666 ECC Reg 1CPU Memory	N	Y	1XD86AA/AT	
	64GB (1x64GB) DDR4-2666 ECC LR Memory	N	Y	1XD87AA	

NOTES:

For details on the supported memory configurations on the HP Z8 G4 Workstation, please refer to the System Technical Specifications - System Board section of this document.

Sleep (S3 state) support:

- Sleep (S3 state) may not be supported with non-HP validated and qualified 64 GB LR DIMMs.
- Sleep (S3 state) not supported with 128 GB LR DIMMs

DIMMs should be equally distributed across all six memory channels for optimal performance.

Each processor supports up to 6 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 a 2400MT/s capable CPU is used in the system, the maximum speed the memory will run at is 2400MT/s, regardless of the specified speed of the memory.

MT/s = Million Transfers per second

You cannot intermix LR DIMMs with Registered DIMMs. The system will not work.

The Z8 G4 is designed to work ONLY with DDR4 memory. The system will not work with DDR3 memory.

Multimedia and Audio Devices

Supported Components

Multimedia and Audio Devices

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

Optical and Removable Storage

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP SlimTray Optical Drives				
HP 9.5mm Slim Blu Ray Disc Writer	Y	Y	K3R65AA	1
HP 9.5mm Slim DVD ROM	Y	Y	K3R63AA	1
HP 9.5mm Slim DVD Writer*	Y	Y	K3R64AA	1
HP SD Card Reader				
HP SD 4 Card Reader	Y	Y	Y0L99AA	

NOTE 1: Installing an optical drive into Z8 G4 requires a 5.25" external bay adapter.

*Actual speeds may vary. No support for DVD-RAM (DVD Writer). Does not permit copying of commercially available DVD movies or other copyright protected materials. Intended for creation and storage of your original material and other lawful uses. Double Layer discs can store more data than single layer discs. However, double-layer discs burned with this drive may not be compatible with many existing single-layer DVD drives and players.

With Blu-ray, certain disc, digital connection, compatibility and/or performance issues may arise, and do not constitute defects in the product. Flawless playback on all systems is not guaranteed. In order for some Blu-ray titles to play, they may require a DVI or HDMI digital connection and your display may require HDCP support. HD-DVD movies cannot be played on this workstation.

Networking and Communications

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP i350-T2 PCIe Dual Port Gigabit NIC	Y	Y	V4A91AA	
Intel® i350-T4 PCIe 4-Port Gigabit NIC	N	Y	W8X25AA	
Intel® Ethernet I210-T1 PCIe x1 Gb NIC	Y	Y	E0X95AA	
Intel® X550-T2 10GbE Dual Port NIC	Y	Y	1QL46AA	
Intel® X710-DA2 10GbE SFP+ Dual Port NIC	Y	Y	1QL47AA	1
Intel® 8265 802.11 a/b/g/n/ac&BT PCIe	N	Y	1QL48AA	
10GBASE-T Dual NIC Module Z6/8 G4	Y	Y	1QL49AA	
HP 10GbE SFP+ SR 1st Transceiver	Y	Y	C3N53AA	

Note 1: Windows 7 is NOT supported

Racking and Physical Security

Supported Components

Racking and Physical Security

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Security Cable with Kensington Lock	N	Y	PC766A	
HP Chassis Intrusion Sensor	Y	N		1
HP Z640/Z840/Z8G4 Rail Rack Kit	N	Y	2FZ77AA	
HP Z8 Rack Rail Upgrade Kit	N	Y	2FZ76AA	
HP Keyed Cable Lock 10mm	N	Y	T1A62AA	

NOTE 1: Standard on all systems

Input Devices

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP Wireless Business Slim Keyboard and Mouse	Y	Y	N3R88AA	
Business Slim PS/2 Wired Keyboard	Y	Y	N3R86AA	
USB Business Slim Wired Keyboard	Y	Y	N3R87AA	
USB Premium Wired Keyboard	Y	Y	Z9N40AA	
USB Wired SmartCard CCID Keyboard	Y	Y	E6D77AA	
3Dconnexion CADMouse	Y	Y	M5C35AA	
HP Optical USB Mouse	Y	Y	QY777AA	
HP PS/2 Mouse	Y	Y	QY775AA	
USB 1000dpi Laser Mouse	Y	Y	QY778AA	
HP USB Hardened Mouse	Y	Y	P1N77AA	

Other Hardware

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP Internal USB Port Kit	N	Y	EM165AA	Note 1
HP eSATA PCI Cable Kit	Y	Y	GM110AA	Note 2
HP Optical Bay HDD Mounting Bracket	N	Y	NQ099AA	Note 3
HP 2.5in HDD/SSD 2-in-1 ODD Bay Bracket	N	Y	K4T74AA	Note 4
HP Z Premium Front I/O 2xUSB-A 2xUSB-C	N	Y	1XM32AA	
HP Power Cord Kit	Y	N		
HP Workstation Mouse Pad	Y	N		Japan Only
HP ENERGY STAR® Certified Configuration	Y	N		

NOTE 1: The HP Internal USB Port kit has a single USB 2.0 type A connector.

NOTE 2: No hot plug / hot swap supported with eSATA

NOTE 3: NQ099AA used to install greater than four 3.5" HDDs in the factory or when purchasing Aftermarket Option (AMO) drives

NOTE 4: K4T74AA used to install greater than four 2.5" HDD/SSDs in the factory or when purchasing Aftermarket Option (AMO) drives

Supported Components

Software

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Sobey Video Editing SW	Y	N		China Only
SW HP RGS for Z	Y	N		
HP Sure Start Gen3	Y	N		1

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

Supported Components

Operating Systems

Support Notes

Windows 10 Pro 64

Windows 7 Professional 64-bit

Note 3, 4

Windows 10 Downgrade to Windows 7

HP Linux® Installer Kit

Note 2

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

Note 1

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

NOTE 2: includes drivers for 64-bit OS versions of RHEL 6 & 7, SUSE Linux® Enterprise Desktop 11 and Ubuntu 14.04.

For detailed Linux® OS/hardware support information, see:

http://www.hp.com/support/linux_hardware_matrix

NOTE 3: downgrade media available by request from HP Support.

For detailed Windows 7 OS hardware support information see

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

NOTE 4: Windows 10 is preinstalled. You may only use one version of the Windows software at a time. Switching between versions will require you to uninstall one version and install the other version

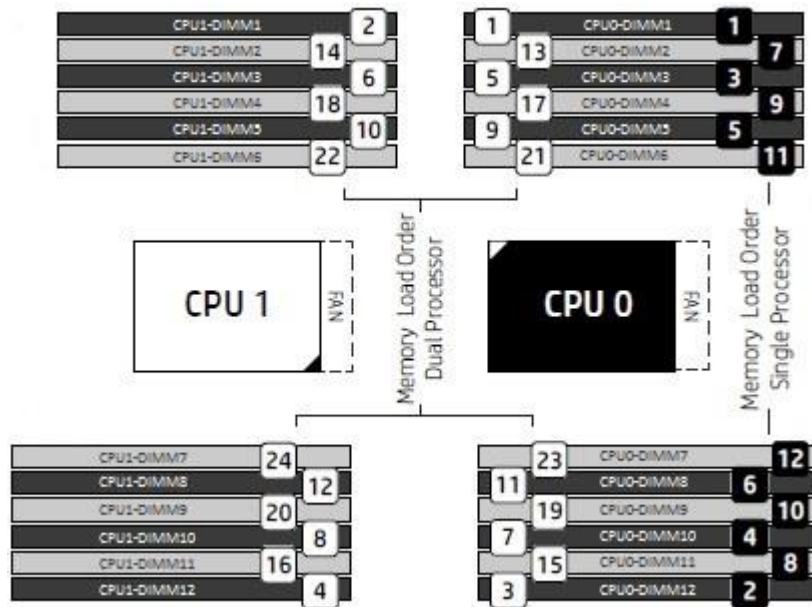
System Technical Specifications

System Board

System Board Form Factor	Custom Form Factor, 16.34"x15.25" (415mm x 387.2mm)
Processor Socket	Dual FCLGA3647 (Socket P)
CPU Bus Speed	UPI: Up to 10.4GT/second, depending on processor
Chipset	Intel® C622 Chipset
Super I/O Controller	Nuvoton SIO15
Memory Expansion Slots	24 slots (12 slots per CPU)
Memory Type Supported	DDR4 R-DIMM (Registered), ECC: 8GB, 16GB, and 32GB DDR4 LR-DIMM (Load Reduced), ECC: 64GB (128GB and 256GB added after initial release)
Memory Modes	NUMA (Non-Uniform Memory Architecture), Memory Node Interleave
Memory Speed Supported	2133MT/s, 2400MT/s, and 2666MT/s

Memory Loading Order:

Load Order for Single and Dual Processor Configuration



Maximum Memory Supports up to 768GB using RDIMMs
Supports up to 3TB using LRDIMMs*

- Memory Configuration (Supported)** Only ECC Registered DIMMs are supported.
- RDIMM (Registered) and LR DIMM (Load Reduction) memory cannot be mixed. All memory installed in the system must be either RDIMM or LR DIMM.
 - Do not install memory modules into memory slots if corresponding processor is not installed.
 - Dual processor configurations with memory modules installed for only one processor is not supported.

Notes For systems installed with 32 bit operating systems, the max accessible system memory is 4GB.

System Technical Specifications

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

- Sleep (S3 state) support:
- Sleep (S3 state) may not be supported with non-HP validated and qualified 64 GB LR DIMMs.
- Sleep (S3 state) not supported with 128 GB LR DIMMs

The Z8 G4 will support up to 1.5TB at initial release.

*3 TB system memory available the first half of 2018.

PCI Express Connectors

Two PCIe Gen3 x16 with latch
 Two PCIe Gen3 x16 with latch.

- Enabled only with optional 2nd CPU is installed.

One PCIe Gen3 x8 open-ended connector.

- Enabled for One PCIe Gen2 x4 slot with 1 CPU
- Enabled for One PCIe Gen3 x8 with optional 2nd CPU installed

Two PCIe Gen3 x4 open-ended connectors

Supported Drive Interfaces

SATA 2 sSATA @6Gb/s, supports RAID 0, 1 and NCQ.
 8 sSATA @6Gb/s, Supports RAID 0, 1, 5, 10 and NCQ.
 Factory integrated RAID is Microsoft Windows only.

External SATA (eSATA)*
 Supported on all SATA and sSATA ports configurable with optional eSATA* After-Market Option cable kit)
 * hot plug / hot swap not supported with eSATA

Factory Configured RAID SATA: RAID 0, 1, 10

Integrated Graphics None

Network Controller **Integrated Intel I219LM**

Memory Integrated 3KB receive buffer and 3KB transmit buffer
 Data rates supported: 10/100/1000 Mb/s
 Compliance IEEE 802.1as/1588, 802.1p, 802.1Q, 802.3, 802.3ab, 802.3az, 802.3i
 802.3u, 802.3x, 802.3z
 Up to 32 programmable filters
 Bus architecture PCIe 1.0 x1 and SMBus
 UEFI and PXE Boot ROM support
 Network transfer rates:
 10BASE-T (half-duplex) 10 Mb/s
 10BASE-T (full-duplex) 20 Mb/s
 100BASE-TX (half-duplex) 100 Mb/s
 100BASE-TX (full-duplex) 200 Mb/s
 1000BASE-T (full-duplex) 2000 Mb/s
 Management capabilities: WOL (All Power States, including Max Power Savings), auto MDI crossover, PXE, RSS, Advanced cable diagnostics, AMT 11.20 support, vPro compliant

Integrated Intel X722 for 1GbE

System Technical Specifications

Data rates supported: 1000 Mb/s
 Compliance IEEE 802.1as/1588v2, 802.1p, 802.1Q, 802.3, 802.3ab, 802.3az, 802.3x
 Up to 16 UDP/TCP programmable filters
 Bus architecture: PCIe 3.0
 UEFI and PXE Boot ROM support
 Intel iWARP Support (RDMA)
 Network transfer rates:
 1000BASE-T (full-duplex) 2000 Mb/s
 Management capabilities: WOL (Excluding Max Power Savings), auto MDI crossover, PXE, Quad Hash filtering, RSS, Advanced cable diagnostics

PCI-X Connectors None
PCI Card Guide Yes
Wake on LAN Yes, both ports
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/>
 CG TPM Certified products list:
<http://www.trustedcomputinggroup.org/certification/tpm-certified-products/>

IEEE 1394 Connector(s) **Front** None
Rear None
Internal None

USB Connector(s) **Front** Front I/O Entry: 4 USB 3.1 Gen1 (Left-most Port has Charging Capability)
 Front I/O Premium: 2x USB 3.1 Gen1, 2x USB 3.1 Gen2 Type-C™ (Left-most Port has Charging Capability)

Rear 6 USB 3.0 Gen1, Type A

Internal 1 USB 3.0 Gen1 available with a single 20-pin shrouded connector. This header supports a USB Media Card reader.

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 Two headers for CPU fans
Memory Fan Header Two headers
Chassis Fan Header One Rear Chassis Fan Header
Front PCI Fan Header One Front and one Aux Fan Header
Front User Interface Header Power Button; Power and HDD Activity LEDs; Power for USB Ports
Front Audio Header FIO Headset/Mic and Speaker
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:

System Technical Specifications

<https://trustedcomputinggroup.org/membership/certification/tpm-certified-products/>

Power Supply Headers	Yes			
Clear Password Jumper	Yes			
Serial Port	Yes, on rear panel			
Parallel Port	No			
Keyboard/Mouse	Yes			
Power Supply	1125W/1275W*/1450W* 90% Efficient, Custom PSU (Wide-Ranging, Active PFC)		1450W/1550W*/1700W* 90% Efficient, Custom PSU (Wide-Ranging, Active PFC)	
Operating Voltage Range	90-269 VAC		90-269 VAC	
Rated Voltage Range	100-127 VAC 200-240 VAC	118 VAC	100-127VAC 200-240VAC	118 VAC
Rated Line Frequency	50-60 Hz	400 Hz	50-60Hz	400 Hz
Operating Line Frequency Range	47-66 Hz	393-407 Hz	47-66Hz	393-407 Hz
Rated Input Current	12A @ 100-127 VAC 10A @ 200-240 VAC	12A @ 118 VAC	16A @ 100-127 VAC 10A @ 200-240 VAC	16A@118VAC
Heat Dissipation (Configuration and software dependent)	Typical = 2419 btu/hr Max 1 = 4626 btu/hr Max 2 = 5001 btu/hr Max 3 = 5560 btu/hr		Typical = 2970 btu/hr Max 1 = 5962 btu/hr Max 2 = 6080 btu/hr Max 3 = 6519 btu/hr	
Power Supply Fan	(2) Blowers variable speed		(2) Blowers variable speed	
ENERGY STAR Qualified (Configuration dependent)	Yes		Yes	
Power Supply Efficiency	90% Efficient		90% Efficient	
	The Z8 G4 1125W (1450W at 200V Input Voltage) power supply efficiency report can be found at this link: https://plugloadsolutions.com/psu_reports/HP%20Inc_nc_DPS-1125BB%20A_1125W_ECOS%204825_Report.pdf		The Z8 G4 1450W (1700W at 200V Input Voltage) power supply efficiency report can be found at this link: https://plugloadsolutions.com/psu_reports/HP%20Inc_nc_DPS-1450AB%20A_1450W_ECOS%204826_Report.pdf	
FEMP Standby Power Compliant @115V (<2W 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)	TBD		TBD	

System Technical Specifications

**ENERGY STAR) -
Suspend to RAM (S3)
(Instantly Available
PC)**

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

*Input voltage restriction

NOTE: The 1125W (1450W at 200V Input Voltage) power supply can also supply 1275W of output power when the input voltage is greater than 105V. If the input voltage is less than 105V, but greater than 90V for any reason, the maximum power that can be drawn is 1125W. An uninterruptible power supply (UPS) is highly recommended if 1275W output power is desired.

The 1125W Power Supply can also supply 1450W of output power when the input voltage is greater than 180V under all conditions.

NOTE: The 1450W (1700W at 200V Input Voltage) power supply can also supply 1550W of output power when the input voltage is greater than 105V. If the input voltage is less than 105V, but greater than 90V for any reason, the maximum power that can be drawn is 1450W. An uninterruptible power supply (UPS) is highly recommended if 1550W output power is desired.

The 1450W Power Supply can also supply 1700W of output power when the input voltage is greater than 180V under all conditions.

AUX IN (audio)	No
Clear CMOS Button	Yes
Multibay Header	No
Integrated Gigabit Ethernet	Yes, dual port.
Access Panel Solenoid Lock Header	No
Access Panel Intrusion Sensor Header	Yes, as part of Front UI (Control Panel) cable header
Memory Fan Connector	Yes, blind-mate

System Technical Specifications

System Configurations

Example Z8 G4 Configuration #1	Processor Info	1x Intel Xeon 3106 1.7 2133 8C 85 1stCPU					
	Memory Info	16GB DDR4-2666 (2x8GB) RegRAM CPU1					
	Graphics Info	1x NVIDIA Quadro P600 1st GFX					
	Disks/Optical/Floppy	1x 256GB SATA 1st SSD /1x DVD-ROM SATA					
	Power Supply	1125W 90% Custom PSU					
	Other	-					
Energy Consumption		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Enabled
	Windows Idle (S0)	75.4		74.8		75.7	
	Windows Busy Typ(S0)	122.04		111.9		113.6	
	Windows Busy Max (S0)	125.4		124.6		126.6	
	Sleep (S3)	6.22	6.26	6.26	6.26	6.33	6.25
	Off (S5)	4.23	4.19	4.19	4.16	4.13	4.12
	Zero Power Mode (ErP)	0.31		0.40		0.29	
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)	257.5		255.3		258.5	
	Windows Busy Typ(S0)	416.4		382.0		387.6	
	Windows Busy Max (S0)	427.9		425.1		432.0	
	Sleep (S3)	21.2	21.1	21.3	21.2	21.6	21.3
	Off (S5)	14.4	14.0	14.3	14.2	14.1	14.1
	Zero Power Mode (ErP)	1.04		1.38		0.99	

Example Z8 G4 Configuration #2	Processor Info	2x Intel Xeon 4114 2.2 2400 10C 85 1stCPU					
	Memory Info	48GB DDR4-2666 (6x8GB) RegRAM CPU2					
	Graphics Info	1x NVIDIA Quadro P2000 1st GFX					
	Disks/Optical/Floppy	4x 512GB SATA 1st SSD /1x DVD-ROM SATA					
	Power Supply	1125W 90% Custom PSU					
	Other	-					
Energy Consumption		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Enabled
	Windows Idle (S0)	105.2		103.3		102.5	
	Windows Busy Typ(S0)	257.4		246.3		260.9	
	Windows Busy Max (S0)	296.2		289.9		297.6	
	Sleep (S3)	8.46	8.35	8.57	8.45	8.58	8.57
	Off (S5)	4.15	4.14	4.31	4.19	4.21	4.15
	Zero Power Mode (ErP)	0.31		0.40		0.29	
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)	359.0		352.5		349.8	

System Technical Specifications

Windows Busy Typ(S0)	878.3		840.5		890.2	
Windows Busy Max (S0)	1010.7		989.1		1015.6	
Sleep (S3)	28.8	28.5	29.2	28.8	29.2	29.2
Off (S5)	14.1	14.1	14.6	14.2	14.3	14.1
Zero Power Mode (ErP)	1.04		1.36		0.99	

Example Z8 G4 Configuration #3	Processor Info	2x Intel Xeon 5120 2.2 2400 14C 105 1stCPU				
	Memory Info	96GB DDR4-2666 (12x8GB) RegRAM CPU2				
	Graphics Info	1x NVIDIA Quadro P4000 1st GFX				
	Disks/Optical/Floppy	4x 2TB 7200 RPM SATA 1st HDD /1x DVD RW SATA				
	Power Supply	1125W 90% Custom PSU				
	Other	-				

Energy Consumption		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Enabled
	Windows Idle (S0)	125.7		123.6		125.8	
	Windows Busy Typ(S0)	340.7		332.9		343.7	
	Windows Busy Max (S0)	417.1		411.8		426.1	
	Sleep (S3)	9.28	9.10	9.24	9.15	9.49	9.26
	Off (S5)	4.15	4.14	4.32	4.10	4.21	4.16
	Zero Power Mode (ErP)	0.31		0.41		0.30	

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)	429.3		422.0		429.5	
	Windows Busy Typ(S0)	1162.7		1136.0		1172.9	
	Windows Busy Max (S0)	1423.4		1405.3		1453.9	
	Sleep (S3)	31.6	31.0	31.5	31.2	32.4	31.5
	Off (S5)	14.1	14.1	14.7	13.9	14.3	14.2
	Zero Power Mode (ErP)	1.05		1.38		1.03	

Example Z8 G4 Configuration #4	Processor Info	2x Intel Xeon 6152 2.1 2666 22C 140 CPU				
	Memory Info	192GB DDR4-2666 (24x8GB) RegRAM CPU				
	Graphics Info	2x NVIDIA Quadro P5000 GFX				
	Disks/Optical/Floppy	6x 1 TB SATA SSD /1x DVD RW SATA				
	Power Supply	1125W 90% Custom PSU				
	Other	-				

Energy Consumption		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Enabled
	Windows Idle (S0)	161.1		157.8		160.4	
	Windows Busy Typ(S0)	524.7		500.7		496.1	
	Windows Busy Max (S0)	644.2		624.2		652.7	
Sleep (S3)	10.3	10.2	10.2	10.1	10.1	10.1	

System Technical Specifications

	Off (S5)	4.14	4.01	4.19	4.19	4.16	4.15
	Zero Power Mode (ErP)	0.31		0.41		0.31	
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)	549.6		538.4		547.5	
	Windows Busy Typ(S0)	1790.4		1708.6		1692.6	
	Windows Busy Max (S0)	2198.1		2129.8		2227.0	
	Sleep (S3)	35.3	34.9	35.0	34.7	34.5	134.3
	Off (S5)	14.1	13.6	14.3	14.3	14.2	14.1
	Zero Power Mode (ErP)	1.06		1.39		1.04	

Example Z8 G4 Configuration #5	Processor Info	2x Intel Xeon 6136 3.0 2666 12C 150 CPU					
	Memory Info	768GB DDR4-2666 (24x32GB) RegRAM CPU2					
	Graphics Info	2x NVIDIA Quadro P6000 GFX					
	Disks/Optical/Floppy	HP Z Turbo Quad Pro 4x1TB + 4x 1 TB SATA SSD /1x DVDRW SATA					
	Power Supply	1450W 90% Custom PSU					
	Other	-					

Energy Consumption		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Enabled
	Windows Idle (S0)	194.0		192.6		197.0	
	Windows Busy Typ(S0)	640.2		622.0		647.0	
	Windows Busy Max (S0)	788.0		761.3		800.6	
	Sleep (S3)	21.1	19.7	19.7	18.8	21.3	19.8
Off (S5)	4.24	4.22	4.53	4.51	4.24	4.21	

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)	662.1		657.2		672.3	
	Windows Busy Typ(S0)	2184.3		2122.3		2207.7	
	Windows Busy Max (S0)	2688.8		2597.8		2731.7	
	Sleep (S3)	72.3	67.5	67.5	64.1	72.6	67.7
Off (S5)	14.4	14.4	15.4	15.4	14.4	14.3	

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

System Configuration (Entry level)	Processor Info	2-Intel® Xeon® Gold 6134 processor 3.2GHz 8C CPU					
	Memory Info	96GB (12x8GB) DDR4-2666 ECC Memory RDIMMs					
	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	1125 W					

System Technical Specifications

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)		Sound Power (LWAd, bels)	Deskside Sound Pressure (LpAm, decibels)
	Idle		3.6
Hard drive Operating (random reads)		3.7	19

System Configuration (Mid-range)	Processor Info	2-Intel® Xeon® Gold 6146 processor 3.2GHz 12C CPU	
	Memory Info	384GB (24x16GB) DDR4-2666 ECC Memory RDIMMs	
	Graphics Info	1-NVIDIA® Quadro® P6000 24GB	
	Disks/Optical	2-300GB 12Gb/s 15KRPM SAS HDD / 1-HP 9.5mm Slim Blu Ray Disc Writer	
	Power Supply	1450 W	

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)		Sound Power (LWAd, bels)	Deskside Sound Pressure (LpAm, decibels)
	Idle		3.6
Hard drive Operating (random reads)		3.8	23

ENVIRONMENTAL DATA

Environmental Requirements	Temperature	Operating: 5° to 35° C (40° to 95° F) Non-operating: -40° to 60° C (-40° to 140° F)
	Humidity	Operating: 8% to 85% RH, non-condensing Non-operating: 8% to 90% RH, non-condensing
	Maximum Altitude	Operating: 3,048 m (10,000 feet) Non-operating: 9,144 m (30,000 feet)
	Dynamic (new)	Shock Operating: ½-sine: 40g, 2-3ms (~62 cm/sec) Non-operating: ½-sine: 160 cm/s, 2-3ms (~105g) square: 422 cm/s, 20g NOTE: Values represent individual shock events and do not indicate repetitive shock events.
	Cooling	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 NOTE: Values do not indicate continuous vibration. Above 1524 m (5,000 feet) altitude, the maximum operating temperature is reduced by 1° C (1.8° F) for every 305 m (1,000 feet) increase in elevation, up to 3048 m (10,000 feet)

Physical Security and Serviceability

Access Panel	Tool-less Includes system board and memory information.
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System Technical Specifications

Optical Drive	Tool-less, 2 nd Optical Drive requires a 5.25" bay carrier
Hard Drives	Tool-less
Expansion Cards	Tool-less
Processor Socket	Tool-less
Blue User Touch Points	Yes, on tool-free internal chassis components.
Color-coordinated Cables and Connectors	Yes
Memory	Tool-less
System Board	Tool-less, retained by Front Card Guide and Top Memory Fan Holder
Dual Color Power and HD LED on Front of Computer	No
Configuration Record SW	Yes
Over-Temp Warning on Screen	Yes. Temp-Caution and Temp Critical are provide via the WMI interface. Tools like the HPPA can display the Critical and Caution state.
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	No
Cable Lock Support	Yes, Kensington Cable Lock (optional): Prevents entire system theft only. 3mm x 7mm slot at rear of system
Universal Chassis Clamp Lock Support	No
Solenoid Lock and Hood Sensor	No
Rear Port Control Cover	No
Serial, USB, Audio, Network, Enable/Disable Port Control	Yes. USB controls are Front, Rear and Internal
Removable Media Write/Boot Control	No
Power-On Password Setup Password	Yes, prevents an unauthorized person from booting up the workstation Yes, prevents an unauthorized person from changing the workstation configuration
3.3V Aux Power LED on System PCA	No
NIC LEDs (integrated) (Green & Amber)	Yes
CPUs and Heatsinks	A torx driver (T30) is needed to remove the heatsink(s). CPU attached to heatsink via tool-less clip
Power Supply Diagnostic LED	Yes
Front Power Button	Yes
Front Power LED	Yes, white (normal), red (fault)
Front Hard Drive Activity LED	Yes, white
Front ODD Activity LED	Yes
Internal Speaker	Yes
System/Emergency ROM Flash Recovery	Recovers corrupted system BIOS

System Technical Specifications

Cooling Solutions	Air cooled forced convection
Power Supply Fans	2x – Dual Side Inlet Blowers
CPU Heatsink Fan	80mm x 25mm 5-wire PWM for each CPU
Chassis Fan	Rear: 120mm x 38mm Front: 120mm x 25mm (PCIe zone)
Memory Heatsink Fan	Front 92mm x 25mm (upper memory bank); Front 80mm x 25mm (lower memory bank)
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 a download from HP Support.
Access Panel Key Lock	Yes, prevents removal of the access panel and all internal components including optical and storage devices
ACPI-Ready Hardware	Advanced Configuration and Power Management Interface (ACPI). <ul style="list-style-type: none"> • Allows the system to wake from a low-power mode. • Controls system power consumption, making it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system
Trusted Platform Module Chip	Yes
Integrated Chassis Handles	Yes, front and rear
Power Supply PCIe Card Retention	Tool-less, rear access direct-connect (blind-mate) Yes, tool-less Rear (all) Middle (full-height cards) Front (full-length cards with extenders)
Flash ROM	Yes.SPI ROM
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 BIOS supports 32 and 64-bit Operating systems.
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 compliant with the Distributed Management Task Force (DMTF) Common Information Model (CIM) and WBEM specifications.
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 Technical Specifications

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). BiosConfigurationUtility.exe utility can then replicate these settings on machines being deployed without entering Computer Configuration Utility (F10 Setup).
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: <ul style="list-style-type: none"> • NORMAL - normal temperature ranges. • ALERTED - excessive temperatures are detected. Raises a flag so action can be taken 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.
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 affecting other 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.
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 system.
ROM revision levels	Reports the system BIOS revision level in Computer Configuration Utility (F10 Setup). Version is available through an industry standard interface (SMBIOS and WMI) so that management SW applications can use and report this information.
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 keyboard 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 UEFI Specification Revision	Revision Supported by the BIOS 2.5
ACPI	Advanced Configuration and Power Management Interface, Version 5.0

System Technical Specifications

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
SPD	PC SDRAM Serial Presence Detect (SPD) Specification, Revision 1.2B
TPM	Trusted Computing Group TPM Specification Version 2.0 (Infineon SLB 9665). Common Criteria EAL4+ 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 3.0 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 labeled with one or more of these marks:

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

The Z8 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 store for solar generator accessories at <http://www.hp.com/go/options>

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

System Technical Specifications

- Lead greater than 40ppm by weight

Restricted Material Usage This product meets the material restrictions specified in HP's General Specification for the Environment.

HP Inc. is committed to compliance with all applicable environmental laws and regulations, including the European Union Restriction of Hazardous Substances (RoHS) Directive. HP's goal is to exceed compliance obligations by meeting the requirements of the RoHS Directive on a worldwide basis

Low Halogen Statement This product is low-halogen except for power cords, external cables and peripherals. The following customer-configurable internal components may not be low-halogen: 3 ½" SAS HDDs. Service parts obtained after 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 your product, please go to: <http://www.hp.com/recycle> or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner. This product is greater than 90% recyclable by weight when properly disposed of at end of life.

HP Inc. Corporate Environmental Information

For more information about HP's commitment to the environment:

[Sustainability Report](#)

Eco-label certifications:

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

ISO 14001 certificate:

<http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html>

Additional Information

- This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive – 2002/96/EC. [Product Disassembly Instructions](#)
- Plastic parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.
- This product is >90% recycle-able when properly disposed of at end of life.

Packaging

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

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

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

System Technical Specifications

Industry Standard Specifications

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

- DASH 1.1 (via Intel® LAN on motherboard)

Intel® Active Management Technology (AMT)

Intel® Active Management Technology (AMT) 11.20
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 11.20 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 Z8 G4 Workstation supports Intel® vPro™ technology when configured as outlined below:

- Intel® Xeon® processor E5-1600 v5 or E5-2600 v5 product family featuring Intel® vPro™ Technology
- Intel® C622 chipset
- Intel® I219LM GbE LAN

Remote Manageability Software Solutions

The HP Z8 G4 Workstation is supported on the following remote manageability software consoles:

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

System Software Manager Service, Support, and Warranty

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

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

System Technical Specifications

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 are extended service contracts that go beyond the standard limited warranties. Service starts from date of hardware purchase. To choose the right level of service for your HP product, use the HP Care Pack Services Lookup Tool at: <http://www.hp.com/go/lookuptool>. Additional HP Care Pack Services information by product is available at: <http://www.hp.com/hps/carepack>. Service levels and response times for HP Care Packs may vary depending on your geographic location. HP services are governed by the applicable HP terms and conditions of service provided or indicated to Customer at the time of purchase. Customer may have additional statutory rights according to applicable local laws, and such rights are not in any way affected by the HP terms and conditions of service or the HP Limited Warranty provided with your HP Product.

Product Change Notification

- Program to proactively communicate Product Change Notifications (PCNs) and Customer Advisories by email to customers, based on a user-defined profile.
- PCNs provide advance notification of hardware and software changes to be implemented in the factory providing time to plan for transition.
- Customer Advisories provide concise, effective problem resolution, greatly reducing the need to call technical support.

Stable & Consistent Offerings

Global Series SKUs

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

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

Processors

Product #	Offering
1XM69AA	Intel® Xeon® Gold 6128 processor
1XM74AA	Intel® Xeon® Silver 4114 processor
1XM76AA	Intel® Xeon® Silver 4108 processor

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
TBD	TBD
TBD	TBD
TBD	TBD
TBD	TBD

Optical and Removable Storage

Product #	Offering
TBD	TBD
TBD	TBD

Technical Specifications - Processors

Intel® Xeon® Platinum 8180 processor
Intel® Xeon® Platinum 8160 processor
Intel® Xeon® Gold 6152 processor
Intel® Xeon® Gold 6154 processor
Intel® Xeon® Gold 6148 processor
Intel® Xeon® Gold 6142 processor
Intel® Xeon® Gold 6136 processor
Intel® Xeon® Gold 6140 processor
Intel® Xeon® Gold 6134 processor
Intel® Xeon® Gold 6132 processor
Intel® Xeon® Gold 6130 processor
Intel® Xeon® Gold 6128 processor
Intel® Xeon® Gold 5120 processor
Intel® Xeon® Gold 5118 processor
Intel® Xeon® Gold 5122 processor
Intel® Xeon® Silver 4116 processor
Intel® Xeon® Silver 4114 processor
Intel® Xeon® Silver 4112 processor
Intel® Xeon® Silver 4108 processor
Intel® Xeon® Bronze 3106 processor
Intel® Xeon® Bronze 3104 processor

Technical Specifications - Hard Drives

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)	

Technical Specifications - Hard Drives

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)

**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
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)

**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)

Technical Specifications - Hard Drives

**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	
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	

Technical Specifications - Hard Drives

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)

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)

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)

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

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

Technical Specifications - Hard Drives

	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	<table border="0"> <tr> <td>Sequential Read</td> <td>530 MB/s</td> </tr> <tr> <td>Sequential Write</td> <td>500 MB/s</td> </tr> <tr> <td>Random Read</td> <td>95K IOPS</td> </tr> <tr> <td>Random Write</td> <td>83K IOPS</td> </tr> </table>	Sequential Read	530 MB/s	Sequential Write	500 MB/s	Random Read	95K IOPS	Random Write	83K IOPS
Sequential Read	530 MB/s									
Sequential Write	500 MB/s									
Random Read	95K IOPS									
Random Write	83K IOPS									
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	<table border="0"> <tr> <td>Sequential Read</td> <td>530 MB/s</td> </tr> <tr> <td>Sequential Write</td> <td>500 MB/s</td> </tr> <tr> <td>Random Read</td> <td>95K IOPS</td> </tr> <tr> <td>Random Write</td> <td>83K IOPS</td> </tr> </table>	Sequential Read	530 MB/s	Sequential Write	500 MB/s	Random Read	95K IOPS	Random Write	83K IOPS
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								
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	<table border="0"> <tr> <td>Sequential Read</td> <td>530 MB/s</td> </tr> <tr> <td>Sequential Write</td> <td>500 MB/s</td> </tr> <tr> <td>Random Read</td> <td>95K IOPS</td> </tr> <tr> <td>Random Write</td> <td>83K IOPS</td> </tr> </table>	Sequential Read	530 MB/s	Sequential Write	500 MB/s	Random Read	95K IOPS	Random Write	83K IOPS
Sequential Read	530 MB/s									
Sequential Write	500 MB/s									
Random Read	95K IOPS									
Random Write	83K IOPS									

Technical Specifications - Hard Drives

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	

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		

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

Technical Specifications - Hard Drives

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	

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

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

HP Z Turbo Drive G2 1TB SSD

Capacity	1TB	
Protocol	PCIe	
Form Factor	M.2	
Controller	NVMe	

Technical Specifications - Hard Drives

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

Technical Specifications - Hard Drives

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
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	3D MLC
	Endurance	300TB
	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 260 K IOPS
		Random Write 260K IOPS
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 360 K IOPS
		Random Write 330K IOPS
	HP Z Turbo Drive G2 256GB SED SSD	Capacity
Protocol		PCIe

Technical Specifications - Hard Drives

Form Factor	M.2	
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	

HP Z Turbo Drive G2 512GB SED SSD

Capacity	512GB	
Protocol	PCIe	
Form Factor	M.2	
Controller	NVMe	
NAND Type	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	260K IOPS
Self-Encrypting Drive Support	OPAL 2	

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
Capacity	512GB	

Technical Specifications - Hard Drives

HP Z Turbo Drive G2 512GB TLC SSD	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
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
HP Z Turbo Drive Quad Pro 256GB SSD module	Capacity	256GB (one M.2 PCIe NVMe module)	
	Interface	PCI Express 3.0 x4 electrical x4 physical	
	Operating Temperature	32° to 158° F (0° to 70° C)	
HP Z Turbo Drive Quad Pro 512GB SSD module	Capacity	512GB (one M.2 PCIe NVMe module)	
	Interface	PCI Express 3.0 x4 electrical x4 physical	
	Operating Temperature	32° to 158° F (0° to 70° C)	
HP Z Turbo Drive Quad Pro 1TB SSD module	Capacity	1TB (one M.2 PCIe NVMe module)	
	Interface	PCI Express 3.0 x4 electrical x4 physical	
	Operating Temperature	32° to 158° F (0° to 70° C)	

**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

Technical Specifications - Hard Drives

Intel® 905p Series AIC 480GB PCIe SSD	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
	Capacity	480TB	
	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	27100 MB/s	
	Sequential Write	2280 MB/s	
	Random Read	582K IOPS	
	Random Write	561K IOPS	

Technical Specifications - Hard Drive Controllers

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	

Technical Specifications - Graphics

GRAPHICS

NVIDIA® Quadro® P400 1st GFX 2GB Graphics

Form Factor	Dimensions: 2.713” H x 5.7” L Single Slot, Low Profile Cooling: Active Weight: 129 grams
Graphics Controller	NVIDIA® Quadro® P400 Graphics Card GP107-825 GPU 256 NVIDIA® CUDA® cores Max Power: 30 Watts
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

NVIDIA® Quadro® P600 1st GFX 2GB Graphics

Form Factor	Dimensions: 2.713” H x 5.7” L Single Slot, Low Profile Cooling: Active Weight: 129 grams
Graphics Controller	NVIDIA® Quadro® P600 Graphics Card GP107-850 GPU 384 NVIDIA® CUDA® cores Max Power: 40 Watts
Bus Type	PCI Express 3.0 x16

Technical Specifications - Graphics

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

AMD FirePro™ W2100 2GB Graphics

Form Factor	Low Profile, half length (full-height bracket included)
Graphics Controller	AMD FirePro™ W2100 professional graphics based on Oland GPU. GPU: 320 Stream Processors organized into 5 Compute Units GPU Frequency: 630Mhz Power: 26W Cooling: Active
Bus Type	PCI Express® x8, Generation 3.0
Memory	2GB DDR3 memory Memory Bandwidth: up to 28.8 GB/s Memory Width: 128 bit
Connectors	2x DisplayPort™ 1.2 connectors 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	DisplayPort™ 1.2: - up to 4096x2160 x 24 bpp @ 60Hz

Technical Specifications - Graphics

Dual Link DVI(I) (requires adapter cable):
- up to 2560 x 1600 x 32 bpp @ 60Hz

Single Link-DVI(I)(requires adapter cable):
- up to 1920 x 1200 x 32 bpp @ 60Hz

VGA (requires adapter cable):
- up to 1920 x 1200 x 32 bpp @ 60Hz

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 2 x DisplayPort™ 1.2a
Maximum number of displays: 2

Shading Architecture Shader Model 5.0

Supported Graphics APIs OpenCL™ 1.2, DirectX® 11.2/12, OpenGL® 4.4

OpenGL® 4.4 support with driver release 14.301.xxx
OpenCL™ 1.2 conformance expected with drive release 14.301.xxx

Available Graphics Drivers Windows10 (64-bit)
Windows 8.1 (64-bit)
Windows 7 (64-bit)
Linux®

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

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

NVIDIA® Quadro® P1000 1st GFX 4GB Graphics

Form Factor Dimensions: 2.713" H x 5.7" L
Single Slot, Low Profile
Cooling: Active
Weight: 129 grams

Graphics Controller NVIDIA® Quadro® P1000 Graphics Card
GP107-860 GPU
640 NVIDIA® CUDA® cores
Max Power: 47 Watts

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

Technical Specifications - Graphics

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

NVIDIA® Quadro® P2000 1st GFX 5GB Graphics

Form Factor	Dimensions: 4.4”Hx7.9”L Single Slot Cooling: Active Weight: 260 grams
Graphics Controller	NVIDIA® Quadro® P2000 Graphics Card Power: 75 Watts
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
Maximum Resolution	Additional DVI to VGA, DisplayPort™ to VGA, DisplayPort™ to DVI, and DisplayPort™ to Dual-Link DVI adapters available as accessories. DisplayPort™: - up to 5120 x 2880 x 24 bpp @ 60Hz - supports High Bit Rate 2 (HBR2) and Multi-Stream Transport (MST) DP 1.3 & 1.4 ready. DL-DVI(I) output: - up to 2560 x 1600 x 32 bpp @ 60 Hz Single Link-DVI(I) output: - up to 1920 x 1200 x 32 bpp @ 60Hz HDMI 2.0 (requires DP to HDMI adapter):

Technical Specifications - Graphics

Image Quality Features	5120 x 2880 x 24 bpp @ 60Hz 12-bit internal display pipeline (hardware support for 12-bit scanout on supported panels, applications and connection)
Display Output	Stereoscopic 3D display support including NVIDIA® 3D Vision™ technology, NVIDIA® Mosaic and nView. Maximum number of displays - 4 direct attached monitors Maximum number of monitors across all available NVIDIA® Quadro® 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	

Radeon™ Pro WX 3100 4GB Graphics

Form Factor	Low-Profile Single Slot (6.6" Length)
Graphics Controller	Polaris12 GL GPU: 512 Stream Processors organized into 8 Compute Units Power: 50 Watts Cooling: Active
Memory	4GB GDDR5 memory Memory Bandwidth: 6 Gbps / 96 GB/s Memory Width: 128 bit
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 <ul style="list-style-type: none"> • 1x single-cable 5K monitor, or 2x dual-cable 5K monitors 3x 4K support @ 60Hz

Technical Specifications - Graphics

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	Polaris 11 Baffin GL XT 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

Technical Specifications - Graphics

	Additional DisplayPort™-to-VGA or DisplayPort™-to-DVI adapters are available as Factory Configuration or Option Kit accessories.
Maximum Resolution	5K support @ 60Hz <ul style="list-style-type: none"> 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	<ol style="list-style-type: none"> HDR content requires that the system be configured with a fully HDR-ready content chain, including: graphics card, monitor/TV, graphics driver and application. Video content must be graded in HDR and viewed with an HDR-ready player. Windowed mode content requires operating system support. AMD PowerTune and AMD ZeroCore Power are technologies offered by certain FirePro™ and Radeon™ Pro products, which are designed to intelligently manage GPU power consumption in response to certain GPU load conditions. As of September 2016, certified for DisplayPort™ 1.4 HBR3 and ready for DisplayPort™ 1.4 HDR based on independent verification by DisplayPort™ testing authority. HDR content requires that the system be configured with a fully HDR-ready content chain, including: graphics card, monitor/TV, graphics driver and application. Video content must be graded in HDR and viewed with an HDR-ready player. Windowed mode content requires operating system support.
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NVIDIA® Quadro® P4000 1st GFX 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: GP104 with 1792 CUDA cores Power: 120 Watts
	Bus Type	PCI Express 3.0 x16
	Memory	Size: 8GB GDDR5

Technical Specifications - Graphics

	<p>Memory Bandwidth: 243 GB/s Memory Width: 256-bit</p>
Connectors	<p>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</p> <p>Factory Configured Option: No video cable adapter included After Market Option: No video cable adapter included</p> <p>Additional DisplayPort-to-VGA, DisplayPort-to-HDMI, or DisplayPort-to-DVI adapters are available as accessories</p>
Maximum Resolution	<p>Dual-link internal TMDS (DVI 1.0): - up to 2560 x 1600 x 32 bpp @ 60 Hz</p> <p>Single-link internal TMDS (DVI 1.0): - up to 1920 x 1200 x 32 bpp @ 60 Hz</p> <p>HDMI™ 2.0b (requires DP to HDMI adapter): - up to 5120 x 2880 x 24 bpp @ 60Hz</p> <p>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)</p> <p>Using two DP outputs, the P4000 can drive one dual DP input display with 5120 x 2880 x 30 bpp @ 60Hz resolution.</p>
Image Quality Features	<p>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</p>
Display Output	<p>Maximum number of displays - 4 direct attached monitors</p> <p>Maximum number of monitors across all available Quadro P4000 outputs is 4.</p>
Shading Architecture	<p>Shader Model 5.1</p>
Supported Graphics APIs	<p>OpenGL 4.5 DirectX 12 Vulkan 1.0</p> <p>API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran</p>
Available Graphics Drivers	<p>Microsoft Windows 10 Microsoft Windows 7 Linux - Full OpenGL implementation, complete with NVIDIA and ARB extensions</p>

Technical Specifications - Graphics

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

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

Notes

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

NVIDIA® Quadro® P5000 1st GFX 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

Technical Specifications - Graphics

Display Outputs¹	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® P6000 1st GFX 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(I) 3-pin mini-DIN connector SLI connector NVIDIA® Quadro® Sync connector (compatible with NVIDIA® Quadro® II Sync) One 8-pin auxiliary power connector

Technical Specifications - Graphics

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 Outputs¹	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
Notes	HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html 1- 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

Graphics Controller

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

Technical Specifications - Graphics

Memory	<p>16GB HBM2</p> <p>Memory Bandwidth: Up to 717 GB/s</p> <p>Memory Width: 4096-bit</p> <p>ECC Memory (disabled by default)</p>
Connectors	<p>DP (x4) with HDR support</p> <p>DL-DVI(D)</p> <p>3-pin mini-DIN connector via optional bracket</p> <p>4-pin header for stereo signal</p> <p>Quadro Sync connector (compatible with Quadro II Sync)</p> <p>One 8-pin auxiliary power connector</p> <p>(2x) NVLink connectors</p> <p>Factory configured option: 8-pin power adapter included with card.</p> <p>After market option Kit: 8-pin power adapter included with card.</p> <p>DVI to VGA, DisplayPort™ to VGA, DisplayPort™ to DVI, and DisplayPort™ to Dual-Link DVI adapters available as accessories.</p>
Maximum Resolution	<p>5K support @ 60Hz</p> <p>1x single-cable 5K monitor, or 2x dual-cable 5K monitors</p>
Image Quality Features	<p>HDR support over DisplayPort™ 1.4 (SMPTE 2084/2086, BT. 2020) (4K @ 60 Hz 10b/12b HEVC Decode, 4K @ 60 Hz 10b HEVC Encode)</p> <p>HDCP 2.2 support over DisplayPort™, DVI, and HDMI connectors</p> <p>NVIDIA 3D Vision™ technology</p> <p>NVIDIA Mosaic and nView Desktop Management</p>
Display Outputs	<p>4x DP1.4 MST & HDR2 outputs (up to 5120 x 2880 @ 60Hz)</p> <p>1x Dual-link DVI-D output (up to 2560 x 1600 @ 60 Hz)</p> <p>1x Single-link DVI-D output (up to 1920 x 1200 @ 60 Hz)</p> <p>HDMI™ 2.0b (up to 5120 x 2880 @ 60Hz)*</p> <p>*requires DP to HDMI adapter</p>
GPU Architecture	NVIDIA Pascal™
Supported Graphics APIs	<p>DirectX®12 , OpenGL® 4.5, Vulkan™ 1.0</p> <p>Developer API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran</p>
Available Graphics Drivers	<p>Windows® 10</p> <p>Windows® 7 Professional 64-bit</p> <p>Linux®</p> <p>HP qualified drivers may be preloaded or available from the HP support Web site:</p> <p>http://welcome.hp.com/country/us/en/support.html</p>

Technical Specifications - Graphics

Factory Configured (Z840 Workstations): No adapters included
 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 gram 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

Technical Specifications - Graphics

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

Radeon™ Pro WX 7100 1st GFX 8GB Graphics

Form Factor Graphics Controller

Full-Height Single Slot (9.5" Length)
Radeon™ Pro WX 7100 graphics
GPU: 2304 Stream Processors organized into 36 Compute Units
Power: 130 Watts
Cooling: 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

Technical Specifications - Graphics

Available Graphics Drivers	<p>Vulkan™ 1.0</p> <p>Windows 10 64-bit</p> <p>Windows® 7 64-bit</p> <p>Linux® 64-bit</p>
Notes	<p>HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html</p> <ol style="list-style-type: none"> 7. 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. 8. 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. 9. 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. 10. 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	<p>Radeon™ Pro WX 9100 graphics</p> <p>GPU: 4096 Stream Processors</p> <p>Power: 250 Watts</p> <p>Cooling: Active</p>
Memory	<p>16GB HBM2 memory</p> <p>Memory Bandwidth: Up to 483 GB/s</p> <p>Memory Width: 2048 bit</p>
Connectors	6x Mini DisplayPort 1.4 – HDR ready connectors with HBR3 and MST support.

Factory Configured: No video cable adapter included

Technical Specifications - Graphics

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

Technical Specifications - Graphics

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.

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 <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • Quadro Sync II Card • 4 x 12-Inch Short Sync Cables • 2 x 24-Inch Long Sync Cables (Two) • Quick Start Guide

Technical Specifications – Optical and Removable Storage

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)	
Operating Systems Supported	Windows 10, Windows 7 Professional 64-bit, Windows Vista Business 64*, Windows 2000. Red Hat® Enterprise Linux®(RHEL) WS4**, 5, 6 Desktop/Workstation SUSE Linux® Enterprise Desktop 10 & 11		
	* No driver is required for this device. Native support is provided by the operating system.		
Kit Contents	HP SATA DVD Writer drive, installation guide.		

HP 9.5mm Slim DVD-ROM Drive	Description	9.5mm height, tray-load
	Mounting Orientation	Either horizontal or vertical

Technical Specifications – Optical and Removable Storage

Interface Type	SATA / ATAPI	
Dimensions (WxHxD)	128 x 9.5 x 127mm	
Disc Capacity	DVD-ROM	Single layer: Up to 4.7 GB Double layer: Up to 8.5 GB
Access Times	DVD-ROM Single Layer	< 110 ms (typical)
	CD-ROM Mode 1	< 110 ms (typical)
	Full Stroke DVD	< 230 ms (typical)
	Full Stroke CD	< 220 ms (typical)
Power	Source	SATA DC power receptacle
	DC Power Requirements	5 VDC ± 5%-100 mV ripple p-p
	DC Current	5 VDC – <800mA typical, < 1600 mA maximum
Operating Environmental (all conditions non-condensing)	Temperature	41° to 122° F (5° to 50° C)
	Relative Humidity	10% to 80%
	Maximum Wet Bulb Temperature	84° F (29° C)
Operating Systems Supported	Windows 10, Windows 8.1, Windows 7 Professional 64-bit, Windows Vista Business 64*, Windows 2000. Red Hat® Enterprise Linux®(RHEL) WS4**, 5, 6 Desktop/Workstation SUSE Linux® Enterprise Desktop 10 & 11	
	No driver is required for this device. Native support is provided by the operating system.	
Kit Contents	9.5mm Slim DVD-ROM Drive, 5.25" ODD Bay adapter/carrier, slim SATA data/power cable, 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)

Technical Specifications – Optical and Removable Storage

	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
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)
Operating Systems Supported	Windows 8.1, Windows 7 Professional 64-bit, Windows Vista Business 64*, Windows 2000. Red Hat® Enterprise Linux®(RHEL) WS4**, 5, 6 Desktop/Workstation SUSE Linux® Enterprise Desktop 10 & 11	
	No driver is required for this device. Native support is provided by the operating system.	
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	

Technical Specifications – Optical and Removable Storage

require a DVI or HDMI digital connection and your display may require HDCP support. HD-DVD movies cannot be played on this workstation.

HP SD 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 3.0 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. Memory Stick Micro (M2) miniSD miniSD High Capacity Micro SD Memory Card (MicroSD) Micro SD High Capacity Memory Card (MicroSDHC)
	Operating Systems Supported	Test Parameters/Conditions - Power applied, unit operating on system ±5% Windows 10
		No driver is required for this device. Native support is provided by the operating system.
	Kit Contents	Media 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)

Technical Specifications - Controller Cards

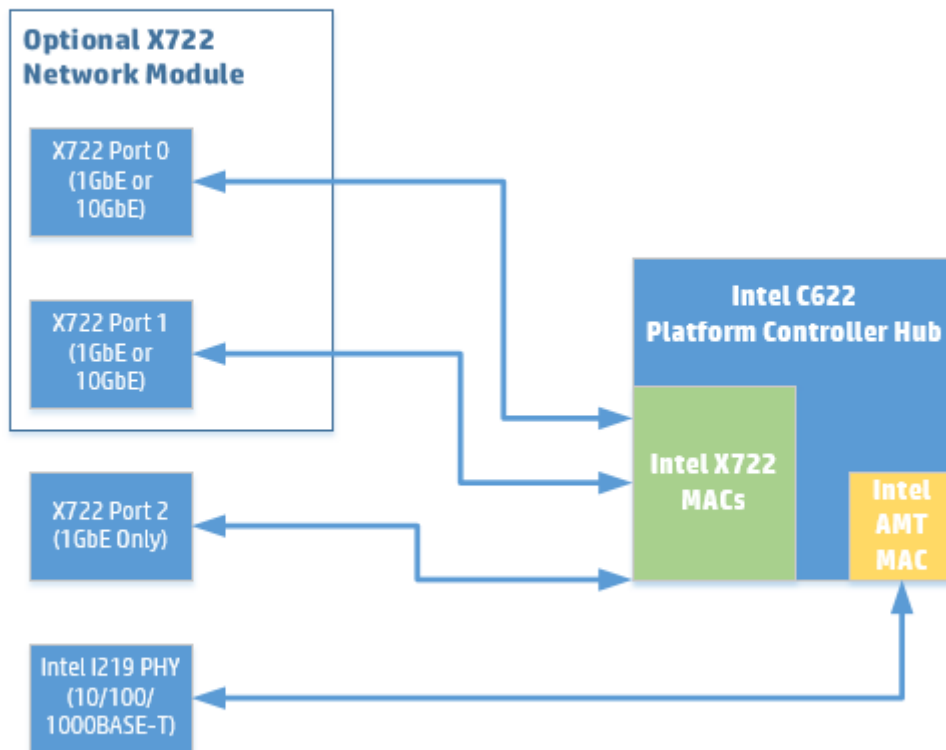
CONTROLLER CARDS

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 card, full height PCIe slots
	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, available dedicated 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

HP Z6 Gen4 and HP Z8 Gen 4 Integrated Network Architecture



Note: When an optional X722 network module is not installed in the system, a “dummy” port is enumerated as Function 0 of the Intel X722 MACs, which allows for the X722 Port 2 on the Motherboard to enumerate.

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

Management Capabilities Intel® Active Management Technology™ 11

Technical Specifications - Networking and Communications

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

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

Intel® I210-T1	Networking Interface	1 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)

Technical Specifications - Networking and Communications

Connect Speed LED Indicators	<p>Link/Activity LED</p> <ul style="list-style-type: none"> • Off = No link • Blinking = Activity <p>Speed LED</p> <ul style="list-style-type: none"> • 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 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	<p>Link/Activity LED</p> <ul style="list-style-type: none"> • Off = No link • Blinking = Activity <p>Speed LED</p> <ul style="list-style-type: none"> • 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 RJ-45
	System Interface	PCI Express 2.1 x4
	Networking Speeds Supported	10Mbps, 100Mbps, 1Gbps

Technical Specifications - Networking and Communications

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 <ul style="list-style-type: none"> • Off = No link • Blinking = Activity Speed LED <ul style="list-style-type: none"> • 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

Aquantia® AQN-108	Networking Interface	RJ-45
	System Interface	PCI Express 3 x1
	Networking Speeds Supported	100Mbps, 1Gbps, 2.5Gbps, 5Gbps
	Cabling (up to 100m)	Cat5e (or higher) for all speeds
	Power Consumption (active-typical)	3.5W at 5Gbps, 3.0W at 2.5Gbps
	Physical Dimensions	3.72 in x 3.18 in (without bracket)
	Connect Speed LED Indicators	Link/Activity LED <ul style="list-style-type: none"> • Off = No link • Blinking = Activity Speed LED <ul style="list-style-type: none"> • Off = No link • Amber = <5Gbps • Green = 5Gbps
	Operating Temperature	0 °C to 55 °C (32 °F to 131 °F)
	Hardware Certifications	USA: FCC B, EU: UL CE, Japan: VCCI, Taiwan: BSMI, Australia/New Zealand: CTICK, Korea: KCC, Canada: ICES-003/NMB-003

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 <ul style="list-style-type: none"> • Off = No link • Blinking = Activity Speed LED <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> • Off = No link • Blinking = Activity Speed LED <ul style="list-style-type: none"> • Off = 10Mbps • Green = 100Mbps • Amber = 1Gbps
	Operating Temperature	0 °C to 55 °C (32 °F to 131 °F)

Technical Specifications - Networking and Communications

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

SUMMARY OF CHANGES

Date of change:	Version History:		Description of change:
September 20, 2017	From v1 to v2	Added	Specs for the Power Supply section
		Changed	The System Configurations section and changed notes for the NVIDIA Quadro P4000, P5000 & P6000 Graphics
November 1, 2017	From v2 to v3	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, Networking and Communications, Other Hardware and Memory sections, changed Front view info on the Overview section, changed Operating Systems section, changed Processors section, changed System Board section, Physical Security and Serviceability section
November 10, 2017	From v3 to v4	Added	Windows 10 to the supporting systems by the 9.5mm Slim DVD-ROM drive
		Removed	Microsemi 3152-8i SAS ROC RAID Controller from SAS controller on the Hard Drive Controllers section.
November 29, 2017	From v4 to v5	Added	Processors, hard drives and graphics to offerings, added Declared Noise Emissions information
		Changed	Wattage links on power supply section updated and Voltage links on efficiency section updated
January 30, 2018	From v5 to v6	Changed	Factory configured option to yes on Networking and communications for : Intel® 8265 802.11 a/b/g/n/ac&BT PCIe
		Removed	NVIDIA SLI Graphics Connector from Graphics Cable Adapters section
February 14, 2018	From v6 to v7	Removed	RAID 5 and 10 references from “Factory integrated” in interfaces supported section
March 27, 2018	From v7 to v8	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
		Added	Intel Xeon processors added
August 13, 2018	From v8 to v9	Added	Footnote to Networking and Communications section
		Changed	Operating Systems section
September 6, 2018	From v9 to v10	Added	Integrated Network Architecture Diagram on The Networking and Communications section
September 6, 2018	From v10 to v11	Changed	Power Supply section
September 21, 2018	From v11 to v12	Added	Intel Optane SSD 905p AiC 280GB & 480GB

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