

Overview

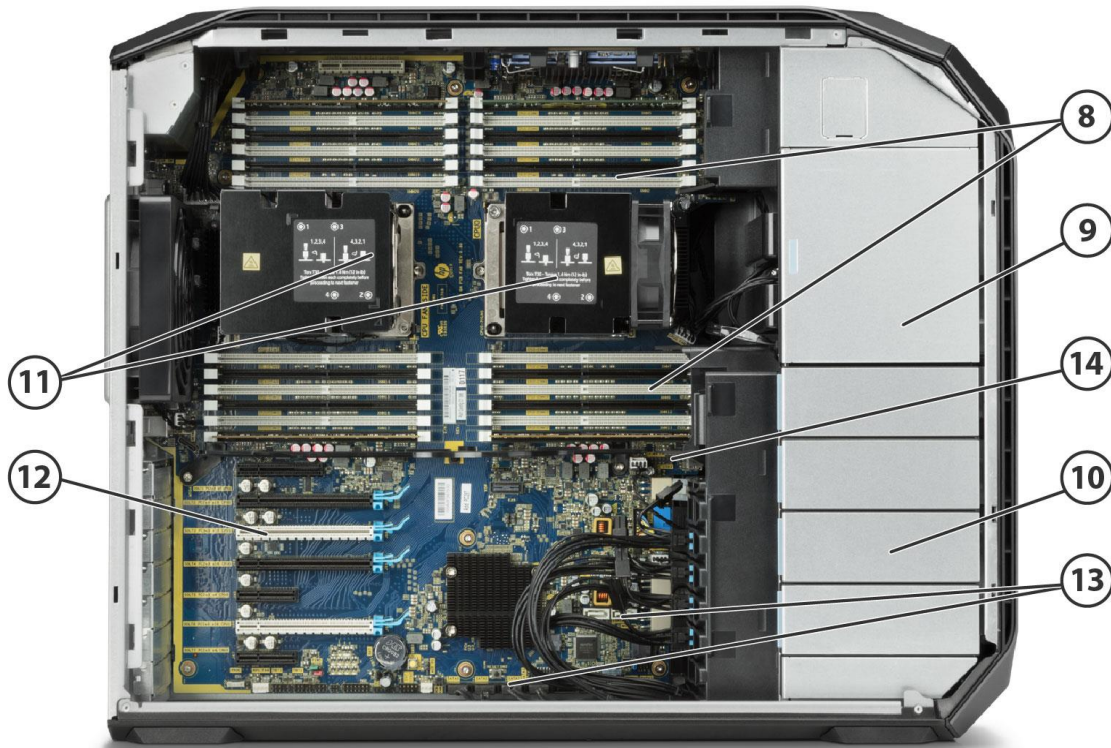
HP Z8 G4 Workstation



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 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

Overview

Form Factor Operating Systems

Minitower

Preinstalled:

- Windows 10 Pro 64
- HP Installer Kit for Linux® (includes drivers for 64-bit OS versions of RHEL 6 & 7, SUSE Linux® Enterprise Desktop 11 and Ubuntu 14.04)
- 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 6, 7
- SUSE Linux® Enterprise Desktop 11 SP3, 12

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

*Windows 10 is preinstalled. Windows 7 media is only 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.

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 6142 processor	16	2.6GHz	22.00	2666	YES	YES	3.7GHz	150
Intel® Xeon® Gold 6136 processor	12	3.0GHz	24.75	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 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

Overview

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 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
<p>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.</p>								

Available Processors

Disclaimers

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

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

Overview

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.

Note: Thunderbolt™ 3 PCIe card support available the first half of 2018

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

Interfaces Supported Optional: 2 RJ-45 to 10GbE LAN ports
10 channel SATA 6.0 Gb/s interface
Factory integrated RAID available for SATA drives (RAID 0, 1, 5, and 10)
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
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)

Rack Dimensions 5U

Overview

Weight	Exact weights depend upon configuration. 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/100V/15A 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/100/15A (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. The 1450W/100/15A (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 Z8 G4 power supply efficiency reports can be found at these links: 1125W – Link TBD 1450W - Link TBD
Workstation ISV Certifications	See the latest list of certifications at http://www.hp.com/united-states/campaigns/workstations/partnerships.html

Supported Components

Processors

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Intel® Xeon® processor Scalable family				
Intel® Xeon® Platinum 8180 processor	Y	N		
Intel® Xeon® Platinum 8160 processor	Y	N		
Intel® Xeon® Gold 6152 processor	Y	N		
Intel® Xeon® Gold 6154 processor	Y	N		
Intel® Xeon® Gold 6148 processor	Y	N		
Intel® Xeon® Gold 6142 processor	Y	N		
Intel® Xeon® Gold 6136 processor	Y	N		
Intel® Xeon® Gold 6140 processor	Y	N		
Intel® Xeon® Gold 6134 processor	Y	N		
Intel® Xeon® Gold 6132 processor	Y	N		
Intel® Xeon® Gold 6130 processor	Y	N		
Intel® Xeon® Gold 6128 processor	Y	N		
Intel® Xeon® Gold 5120 processor	Y	N		
Intel® Xeon® Gold 5118 processor	Y	N		
Intel® Xeon® Gold 5122 processor	Y	N		
Intel® Xeon® Silver 4116 processor	Y	N		
Intel® Xeon® Silver 4114 processor	Y	N		
Intel® Xeon® Silver 4112 processor	Y	N		
Intel® Xeon® Silver 4108 processor	Y	N		
Intel® Xeon® Bronze 3106 processor	Y	N		
Intel® Xeon® Bronze 3104 processor	Y	N		

*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.

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

Supported Components

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	W0R10AA	
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	
HP Z Turbo Drive 1TB MLC Z8G4 SSDModule	Y	Y	1PD52AA	
HP Z Turbo Drive 256GB TLC Z8G4 SSDModule	Y	Y	1PD53AA	
HP Z Turbo Drive 512GB TLC Z8G4 SSDModule	Y	Y	1PD54AA	
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	
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	
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

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

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					
HP miniDP-to-DP Adapter (2-pack)					
HP miniDP-to-DP Adapter (4-pack)					
HP miniDP-to-DP Adapter (8-pack)					
HP DisplayPort to Dual Link DVI Adapter					
HP DisplayPort to DVI-D Adapter					
HP DisplayPort to DVI-D Adapter (2-pack)					
HP DisplayPort to DVI-D Adapter (4-pack)					
HP DisplayPort to DVI-D Adapter (6-pack)					
HP DisplayPort to VGA Adapter					
NVIDIA SLI Graphics Connector					
Entry 3D					
NVIDIA® Quadro® P400 2GB Graphics	Y	Y	1ME43AA		2
NVIDIA® Quadro® P600 2GB Graphics	Y	Y	1ME42AA		2
AMD FirePro™ W2100 2GB Graphics	Y	Y	J3G91AA		2
Mid-range 3D					
NVIDIA® Quadro® P1000 4GB Graphics	Y	Y	1ME01AA		4
NVIDIA® Quadro® P2000 5GB Graphics	Y	Y	1ME41AA		4
AMD Radeon™ Pro WX 3100 4GB Graphics	Y	Y	2TF08AA		4
AMD Radeon™ Pro WX 4100 4GB Graphics	N	Y	Z0B15AA		4
High End 3D					
NVIDIA® Quadro® P4000 8GB Graphics	Y	Y	1ME40AA		3
NVIDIA® Quadro® P5000 16GB Graphics	Y	Y	Z0B13AA		3
NVIDIA® Quadro® P6000 24GB Graphics	Y	Y	Z0B12AA		3
Radeon™ Pro WX7100 8GB Graphics*	Y	Y	Z0B14AA		3

Supported Components

NOTE: NVIDIA® Quadro® GP100 and AMD Radeon™ Pro WX 9100 support available the first half of 2018

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	
	16GB (1x16GB) DDR4-2666 ECC Reg 1CPU Memory	N	Y	1XD85AA	
	32GB (1x32GB) DDR4-2666 ECC Reg 1CPU Memory	N	Y	1XD86AA	
	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.

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	
HP 10GbE SFP+ SR 1st Transceiver	Y	Y	C3N53AA	

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 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		

Supported Components

Operating Systems

Support Notes

Windows 10 Pro 64

Windows 7 Professional 64-bit

HP Linux® Installer Kit

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

Note 3, 4

Note 2

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.

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

NOTE 4: Windows 10 is preinstalled. Windows 7 media is only 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

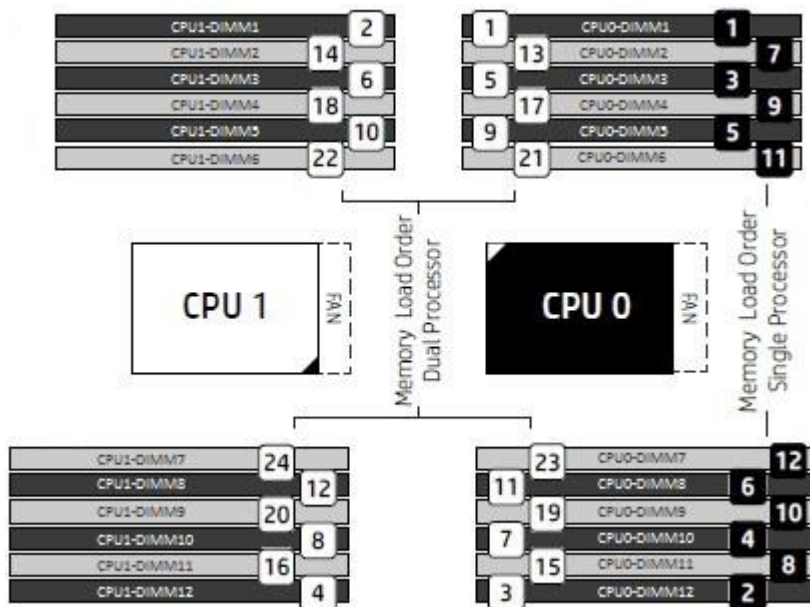
System Technical Specifications

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

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	<p>Two PCIe Gen3 x16 with latch Two PCIe Gen3 x16 with latch.</p> <ul style="list-style-type: none"> • Enabled only with optional 2nd CPU is installed. <p>One PCIe Gen3 x8 open-ended connector.</p> <ul style="list-style-type: none"> • Enabled for One PCIe Gen2 x4 slot with 1 CPU • Enabled for One PCIe Gen3 x8 with optional 2nd CPU installed <p>Two PCIe Gen3 x4 open-ended connectors</p>
Supported Drive Interfaces	<p>SATA</p> <p>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.</p> <p>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</p>
Integrated RAID	<p>SATA: RAID 0, 1 (Supports one RAID) SATA: RAID 0, 1, 5, 10 (Supports up to 2 RAIDs)</p>
Integrated Graphics	None
Network Controller	<p>Integrated Intel I219LM</p> <p>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, Multi-port teaming, RSS, Advanced cable diagnostics, AMT 11.20 support, vPro compliant</p> <p>Integrated Intel X722 for 1GbE</p> <p>Data rates supported: 1000 Mb/s</p>

System Technical Specifications

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, Multi-port teaming, 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	Rated Voltage Range	118 VAC
Rated Line Frequency	50-60 Hz	400 Hz	Rated Line Frequency	400 Hz
Operating Line Frequency Range	47-66 Hz	393-407 Hz	Operating Line Frequency Range	393-407 Hz
Rated Input Current	12A @ 100-127 VAC 10A @ 200-240 VAC	12A @ 118 VAC	Rated Input Current	16A @ 100-127 VAC 10A @ 200-240 VAC
Heat Dissipation (Configuration and software dependent)	Typical = TBD Max-1= TBD Max-2= TBD Max-3= TBD		Typical = TBD Max-1= TBD Max-2= TBD Max-3= TBD	
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: TBD		The Z8 G4 1450W (1700W at 200V Input Voltage) power supply efficiency report can be found at this link: TBD	
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 ENERGY STAR) - Suspend to RAM (S3)	TBD		TBD	

System Technical Specifications

(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 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.

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)	75.481		74.835		75.790	
	Windows Busy Typ(S0)	122.04		111.97		113.62	
	Windows Busy Max (S0)	125.418		124.605		126.612	
	Sleep (S3)	6.223	6.206	6.263	6.262	6.335	6.256
	Off (S5)	4.231	4.111	4.193	4.167	4.131	4.120
	Zero Power Mode (ErP)	0.305		0.403		0.293	
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)	257.541		255.337		258.595	
	Windows Busy Typ(S0)	416.400		382.042		387.671	
	Windows Busy Max (S0)	427.926		425.152		432.000	
	Sleep (S3)	21.233	21.175	21.369	21.365	21.615	21.346
	Off (S5)	14.436	14.027	14.306	14.217	14.095	14.057
	Zero Power Mode (ErP)	1.041		1.375		0.999	

Example Z8 G4 Configuration #2 (ENERGY STAR QUALIFIED)	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)	105.224		103.324		102.549	
	Windows Busy Typ(S0)	257.44		246.36		260.92	
	Windows Busy Max (S0)	296.221		289.903		297.67	
	Sleep (S3)	8.460	8.356	8.578	8.456	8.585	8.572
	Off (S5)	4.150	4.140	4.306	4.186	4.206	4.149
	Zero Power Mode (ErP)	0.306		0.399		0.291	
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)	359.024		352.541		349.897	

System Technical Specifications

Windows Busy Typ(S0)	878.385		840.580		890.259	
Windows Busy Max (S0)	1010.706		989.149		1015.650	
Sleep (S3)	28.866	28.511	29.268	28.852	29.292	29.248
Off (S5)	14.160	14.127	14.692	14.283	14.351	14.156
Zero Power Mode (ErP)	1.044		1.361		0.993	

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)	125.782		123.694		125.882	
	Windows Busy Typ(S0)	340.780		332.970		343.775	
	Windows Busy Max (S0)	417.186		411.876		426.129	
	Sleep (S3)	9.280	9.109	9.248	9.154	9.499	9.261
	Off (S5)	4.157	4.144	4.326	4.100	4.211	4.164
	Zero Power Mode (ErP)	0.307		0.405		0.301	

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)	429.319		422.044		429.509	
	Windows Busy Typ(S0)	1162.741		1136.094		1172.960	
	Windows Busy Max (S0)	1423.439		1405.321		1453.952	
	Sleep (S3)	31.663	31.080	31.554	31.233	32.411	31.599
	Off (S5)	14.184	14.139	14.760	13.989	14.368	14.208
	Zero Power Mode (ErP)	1.047		1.382		1.027	

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)	161.097		157.816		160.491	
	Windows Busy Typ(S0)	524.750		500.790		496.077	
	Windows Busy Max (S0)	644.232		624.221		652.723	
Sleep (S3)	10.350	10.230	10.258	10.185	10.122	10.070	

System Technical Specifications

	Off (S5)	4.146	4.013	4.195	4.193	4.167	4.154
	Zero Power Mode (ErP)	0.310		0.409		0.305	
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)	549.663		538.468		547.595	
	Windows Busy Typ(S0)	1790.447		1708.695		1692.614	
	Windows Busy Max (S0)	2198.120		2129.842		2227.091	
	Sleep (S3)	35.314	34.905	35.001	34.751	34.536	134.358
	Off (S5)	14.146	13.692	14.313	14.307	14.218	14.173
	Zero Power Mode (ErP)	1.058		1.396		1.041	

Example Z8 G4 Configuration #5 (ENERGY STAR QUALIFIED)	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 4x1 TB + 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)	194.061		192.625		197.049	
	Windows Busy Typ(S0)	640.200		622.030		647.040	
	Windows Busy Max (S0)	788.046		761.380		800.631	
	Sleep (S3)	21.198	19.794	19.786	18.806	21.301	19.844
Off (S5)	4.243	4.225	4.535	4.515	4.243	4.211	

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)	662.136		657.237		672.331	
	Windows Busy Typ(S0)	2184.362		2122.366		2207.700	
	Windows Busy Max (S0)	2688.813		2597.829		2731.753	
	Sleep (S3)	72.328	67.537	67.510	64.166	72.679	67.707
Off (S5)	14.477	14.415	15.473	15.405	14.477	14.368	

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	1x Intel Xeon 4116 Silver 2.1GHz 12C 85W CPU
	Memory Info	2x 16GB DDR4-2666 RDIMMs
	Graphics Info	1x NVIDIA® Quadro® P600
	Disks/Optical/Floppy	1x 256GB SATA SSD 1x SATA DVD-RW

System Technical Specifications

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)		Sound Power (LWAd, bels)	Deskside Sound Pressure (LpAm, decibels)
	Idle	TBD	TBD
	Hard drive Operating (random reads)	TBD	TBD
	DVD-ROM Operating (sequential reads)	TBD	TBD

System Configuration (Mainstream)	Processor Info	2x Intel Xeon 6140 Gold 2.3GHz 18C 140W CPUs
	Memory Info	12x 32GB DDR4-2666 RDIMMs
	Graphics Info	1x NVIDIA® Quadro® P4000
	Disks/Optical/Floppy	2x 2TB 6Gb/s 7200 RPM HDDs 1x Blue-ray DVD-RW

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)		Sound Power (LWAd, bels)	Deskside Sound Pressure (LpAm, decibels)
	Idle	TBD	TBD
	Hard drive Operating (random reads)	TBD	TBD
	DVD-ROM Operating (sequential reads)	TBD	TBD

System Configuration (Extreme)	Processor Info	2x Intel Xeon 8180 Platinum 2.5GHz 28C 205W CPUs
	Memory Info	24x 64GB DDR4-2666 RDIMM
	Graphics Info	2x NVIDIA® Quadro® P6000
	Disks/Optical/Floppy	4x 300GB 10K SFF HDDs 1x Blue-ray DVD-RW

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)		Sound Power (LWAd, bels)	Deskside Sound Pressure (LpAm, decibels)
	Idle	TBD	TBD
	Hard drive Operating (random reads)	TBD	TBD
	DVD-ROM Operating (sequential reads)	TBD	TBD

ENVIRONMENTAL DATA

Environmental Requirements

Temperature

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

System Technical Specifications

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)	<p>Shock</p> <p>Operating: ½-sine: 40g, 2-3ms (~62 cm/sec) Non-operating: ½-sine: 160 cm/s, 2-3ms (~105g) square: 422 cm/s, 20g</p> <p>NOTE: Values represent individual shock events and do not indicate repetitive shock events.</p> <p>Vibration</p> <p>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</p> <p>NOTE: Values do not indicate continuous vibration.</p>
Cooling	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.
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	Yes. USB controls are Front, Rear and Internal

System Technical Specifications

Control

Removable Media Write/Boot Control	No
Power-On Password	Yes, prevents an unauthorized person from booting up the workstation
Setup Password	Yes, prevents an unauthorized person from changing the workstation configuration
3.3V Aux Power LED on System PCA	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

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 Vision Diagnostics Offline Edition
 The diagnostics utility enables you to perform testing and to view critical computer hardware and software configuration information from various sources. This utility enables you to:

- Run diagnostics
- View the hardware configuration of the system

Key features and benefits

HP Vision Diagnostics simplifies the process of effectively identifying, diagnosing, and isolating the hardware issues. In addition to robust management tools, service tools can be invaluable in quickly resolving system problems. To streamline the service process and resolve problems quickly, it is necessary to have the right information available at the time that a service call is placed. The primary information requirement, which is also the one that provides the greatest Vision into potential system issues, is the configuration of the system. Vision Diagnostics helps provide higher system availability.

Typical uses of the Vision Diagnostics are:

- Testing and diagnosing apparent hardware failures
- Documenting system configurations for upgrade planning, standardization, inventory tracking, disaster recovery, and maintenance
- Sending configuration information to another location for more in-depth analysis
- Entered using F2

System Technical Specifications

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 Tool-less, rear access direct-connect (blind-mate)

PCIe Card Retention 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/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:
 • NORMAL - normal temperature ranges.

System Technical Specifications

	<ul style="list-style-type: none"> • 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)	<p>Allows the system to enter and resume from low power modes (sleep states).</p> <p>Enables an operating system to control system power consumption based on the dynamic workload.</p> <p>Makes it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system.</p> <p>Supports ACPI 5.0 for full compatibility with 64-bit operating systems.</p>
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	<p>Allows management SW to read revision level of the system board.</p> <p>Revision level is digitally encoded into the HW and cannot be modified.</p>
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
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	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> PCI Local Bus Specification, Revision 2.3 PCI Power Management Specification, Revision 1.1 PCI Firmware Specification, Revision 3.0, Draft .7
PCI Express	<ul style="list-style-type: none"> PCI Express Base Specification, Revision 2.0 PCI Express Base Specification, Revision 3.0

System Technical Specifications

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
- 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

System Technical Specifications

- 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 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:

System Technical Specifications

- 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 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.

System Technical Specifications

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
TBD	TBD
TBD	TBD
TBD	TBD
TBD	TBD

Hard Drives

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

Graphics

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

Memory

Product #	Offering
TBD	TBD
TBD	TBD
TBD	TBD
TBD	TBD

Stable & Consistent Offerings

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	<table> <tr> <td>Sequential Read</td> <td>2800 MB/s</td> </tr> <tr> <td>Sequential Write</td> <td>660 MB/s (1600 MB/s max/Turbo)</td> </tr> <tr> <td>Random Read</td> <td>260K IOPS</td> </tr> <tr> <td>Random Write</td> <td>260K IOPS</td> </tr> </table>	Sequential Read	2800 MB/s	Sequential Write	660 MB/s (1600 MB/s max/Turbo)	Random Read	260K IOPS	Random Write	260K IOPS
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	<table> <tr> <td>Sequential Read</td> <td>3000 MB/s</td> </tr> <tr> <td>Sequential Write</td> <td>1150 MB/s (1700 MB/s max/Turbo)</td> </tr> <tr> <td>Random Read</td> <td>360K IOPS</td> </tr> <tr> <td>Random Write</td> <td>330K IOPS</td> </tr> </table>	Sequential Read	3000 MB/s	Sequential Write	1150 MB/s (1700 MB/s max/Turbo)	Random Read	360K IOPS	Random Write	330K IOPS
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)

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 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 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 and 32-bit)
Windows 8.1 (64-bit and 32-bit)
Windows 7 (64-bit and 32-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 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 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
	Additional DVI to VGA, DisplayPort™ to VGA, DisplayPort™ to DVI, and DisplayPort™ to Dual-Link DVI adapters available as accessories.
Maximum Resolution	DisplayPort™: - up to 5120 x 2880 x 24 bpp @ 60Hz - supports High Bit Rate 2 (HBR2) and Multi-Stream Transport (MST) DP 1.3 & 1.4 ready. DL-DVI(I) output: - up to 2560 x 1600 x 32 bpp @ 60 Hz Single Link-DVI(I) output: - up to 1920 x 1200 x 32 bpp @ 60Hz HDMI 2.0 (requires DP to HDMI adapter):

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.
--------------	--

NVIDIA® Quadro® P4000 8GB Graphics	Form Factor	Dimensions: 4.376" H x 6.6" L Single Slot, Full Height Cooling: Active Weight: 239 grams
	Graphics Controller	NVIDIA® Quadro® M2000 Graphics Card GPU: GM206 with 768 NVIDIA® CUDA® cores Power: 75 Watts
	Bus Type	PCI Express 3.0 x16

Technical Specifications - Graphics

Memory	Size: 4GB GDDR5 Memory Bandwidth: 105.7 GB/s Memory Width: 128-bit
Connectors	4x DisplayPort™ 1.2a Factory Configured Option: No video cable adapter included After Market Option: No video cable adapter included Additional DisplayPort™-to-VGA, DisplayPort™-to-HDMI, or DisplayPort™-to-DVI adapters are available as accessories
Maximum Resolution	DisplayPort™: - up to 4096 x 2160 x 30 bpp @ 60Hz - up to 2560 x 1600 x 30 bpp @ 120 Hz - supports High Bit Rate 2 (HBR2) and Multi-Stream Transport (MST) Using two DP outputs, the M2000 can drive one dual DP input display with 5120 x 2880 x 30 bpp @ 60Hz resolution.
Image Quality Features	12-bit internal display pipeline (hardware support for 12-bit scanout on supported panels, applications and connection) Stereoscopic 3D display support including NVIDIA® 3D Vision™ technology, 3D DLP, Interleaved, and passive stereo
Display Output	Maximum number of displays - 4 direct attached monitors Maximum number of monitors across all available NVIDIA® Quadro® M2000 outputs is 4.
Shading Architecture	Shader Model 5.0
Supported Graphics APIs	OpenGL® 4.5 DirectX® 12 API support includes: CUDA C, CUDA C++, DirectCompute 5.0, and OpenCL™ software
Available Graphics Drivers	Microsoft Windows 10 Microsoft Windows 7 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	<ol style="list-style-type: none"> 1. NVIDIA® Quadro® M2000 offered as Factory Configured Option does not include a video cable adapter. Video cable adapters must be ordered separately. 2. NVIDIA® Quadro® M2000 offered as an After Market Option does not include video cables. Video cable adapters must be ordered separately.

Technical Specifications - Graphics

NVIDIA® Quadro® P5000 16GB Graphics	Form Factor	Full-Height Dual Slot (4.4" Height x 10.5" Length) Weight: 815 grams / 1.80 lbs
	Graphics Controller	NVIDIA® Quadro® P5000 graphics GPU: 2560 NVIDIA® CUDA® Parallel Processing Cores Power: 180 Watts Cooling: Active
	Memory	16GB GDDR5X memory Memory Bandwidth: Up to 288 GB/s Memory Width: 256 bit ECC Memory (disabled by default)
	Connectors	DP (x4) with HDR support DL-DVI(D) 3-pin mini-DIN connector SLI connector NVIDIA® Quadro® Sync connector (compatible with NVIDIA® Quadro® II Sync) One 8-pin auxiliary power connector Factory configured option: No video cable adapter included with card. After market option Kit: No video cable adaptor included with card. DVI to VGA, DisplayPort™ to VGA, DisplayPort™ to DVI, and DisplayPort™ to Dual-Link DVI adapters available as accessories.
	Maximum Resolution	5K support @ 60Hz 1x single-cable 5K monitor, or 2x dual-cable 5K monitors
	Image Quality Features	Advanced support for 8-bit, 10-bit, and 12-bit per RGB color component. HDCP 2.2 support over DisplayPort™, DVI, and HDMI connectors NVIDIA 3D Vision™ and other 3D stereo technologies NVIDIA® Mosaic and nView Desktop Management
	Display 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

Technical Specifications - Graphics

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

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

Notes

- 1- Supports up to a total of 4 displays
- 2- For HP Z440 Workstations, the 700W power supply option must be used.
- 3- For HP Z840 Workstation configurations, the 1125W power supply option must be used for multiple P5000 configurations.

NVIDIA® Quadro® P6000 24GB Graphics

Form Factor

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

Graphics Controller

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

Memory

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

Connectors

DP (x4) with HDR support
DL-DVI(I)
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

Display Outputs¹

4x DP1.4 HDR outputs (up to 3840x2160 UHD @ 120Hz refresh, or up to 8K at 30Hz)

Technical Specifications - Graphics

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
- 2- For HP Z440 Workstations, the 700W power supply option must be used.
- 3- For HP Z840 Workstation configurations, the 1125W power supply option must be used for P6000.

Radeon™ Pro WX 7100 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

Technical Specifications - Graphics

GPU Architecture	GCN 4th Generation
Supported Graphics APIs	DirectX® 12 OpenGL® 4.5 OpenCL™ 2.0 Vulkan™ 1.0
Available Graphics Drivers	Windows 10 64-bit Windows® 7 64-bit Linux® 64-bit

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

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

Notes

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.

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 Full Stroke DVD Full Stroke CD	8.5 GB DL or 4.7 GB standard < 200 ms (seek) < 200 ms (seek)
	Maximum Data Transfer Rates	CD ROM Read DVD ROM Read	CD-ROM, CD-R Up to 24X CD-RW Up to 24X 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 DC Power Requirements DC Current	SATA DC power receptacle 5 VDC ± 5%-100 mV ripple p-p 5 VDC -< 800 mA typical, <1600 mA maximum
	Operating Environmental (all conditions non-condensing)	Temperature Relative Humidity Maximum Wet Bulb Temperature	41° to 122° F (5° to 50° C) 10% to 80% 84° F (29° C)
	Operating Systems Supported	Windows 10, Windows 7 Professional 32-bit and 64-bit, Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32*. Red Hat® Enterprise Linux®(RHEL) WS4**, 5, 6 Desktop/Workstation SUSE Linux® Enterprise Desktop 10 & 11	
Kit Contents	HP SATA DVD Writer drive, installation guide.		

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

Description 9.5mm height, tray-load

Technical Specifications – Optical and Removable Storage

HP 9.5mm Slim DVD-ROM Drive	Mounting Orientation	Either horizontal or vertical		
	Interface Type	SATA / ATAPI		
	Dimensions (WxHxD)	128 x 9.5 x 127mm		
	Disc Capacity	DVD-ROM	Single layer: Up to 4.7 GB Double layer: Up to 8.5 GB	
	Access Times	DVD-ROM Single Layer	< 110 ms (typical)	
		CD-ROM Mode 1	< 110 ms (typical)	
		Full Stroke DVD	< 230 ms (typical)	
		Full Stroke CD	< 220 ms (typical)	
	Power	Source	SATA DC power receptacle	
		DC Power Requirements	5 VDC ± 5%-100 mV ripple p-p	
		DC Current	5 VDC – <800mA typical, < 1600 mA maximum	
Operating Environmental (all conditions non-condensing)	Temperature	41° to 122° F (5° to 50° C)		
	Relative Humidity	10% to 80%		
	Maximum Wet Bulb Temperature	84° F (29° C)		
Operating Systems Supported	Windows 8.1, Windows 8 32-bit and 64-bit, Windows 7 Professional 32-bit and 64-bit, Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32*.			
	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				
Disc Capacity	DVD-ROM	8.5 GB DL or 4.7 GB standard		

Technical Specifications – Optical and Removable Storage

	Blu-ray	25 GB (single-layer) 50 GB (dual-layer) 100/128 GB (BDXL)
	Full Stroke DVD	< 230 ms (seek)
	Full Stroke CD	< 220 ms (seek)
	Blu-ray	< 230 ms (seek) (Full Stroke Blu-ray)
	Startup Time	(Time to drive ready from tray loading) BD-ROM (SL/DL) 25S / 28S BD-R (SL/DL) 25S / 28S BD-RE (SL/DL) 25S / 28S DVD-ROM (SL/DL) 18S / 18S DVD-R (SL/DL) 25S / 25S DVD-RW 25S DVD+R (SL/DL) 25S / 25S DVD+RW 25S CD-ROM 15S
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-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 8 32-bit and 64-bit, Windows 7 Professional 32-bit and 64-bit, Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32*.	
	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.	

Technical Specifications – Optical and Removable Storage

Kit Contents	<p>9.5mm Slim BDXL Blu-Ray Writer, 5.25" ODD Bay adapter/carrier, slim SATA data/power cable, installation guide</p> <p>As Blu-ray is a new format containing new technologies, certain disc, digital connection, compatibility and/or performance issues may arise, and do not constitute defects in the product. Flawless playback on all systems is not guaranteed. In order for some Blu-ray titles to play, they may require a DVI or HDMI digital connection and your display may require HDCP support. HD-DVD movies cannot be played on this workstation.</p>
---------------------	---

HP SD Card Reader	Description	<p>Supports hardware ECC (Error Correction Code) function</p> <p>Supports hardware CRC (Cyclic Redundancy Check) function</p> <p>Supports SD 4-bit parallel transfer mode</p>
	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	<p>Secure Digital Card (SD)</p> <p>Secure Digital High Capacity (SDHC)</p> <p>SD Extended Capacity Memory Card (SDXC)</p> <p>SD Ultra High Speed II (SD UHSII)</p> <p>These additional media types are supported with a card adapter.</p> <p>Memory Stick Micro (M2)</p> <p>miniSD</p> <p>miniSD High Capacity</p> <p>Micro SD Memory Card (MicroSD)</p> <p>Micro SD High Capacity Memory Card (MicroSDHC)</p> <p>Test Parameters/Conditions - Power applied, unit operating on system ±5%</p>
	Operating Systems Supported	<p>Windows 10</p> <p>No driver is required for this device. Native support is provided by the operating system.</p>
	Kit Contents	Media card reader
	Approvals	<p>USB-IF, WHQL, Compliant with USB Mass Storage Class Bulk only Transport Specification Rev. 1.0,</p> <p>Compliant Intel Front Panel I/O Connectivity Design Guide V. 1.3, FCC, CE, BSMI, C-Tick, VCCI, MIC, cUL, TUVT</p>
	Weight	0.35 lbs. (0.16 kg)

Technical Specifications - Networking and Communications

NETWORKING AND COMMUNICATIONS

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

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
-----------------------	-----------------------------	---------

Technical Specifications - Networking and Communications

System Interface	PCI Express 2.1 x1
Networking Speeds Supported	10Mbps, 100Mbps, 1Gbps
Cabling (up to 100m)	Cat3 (or higher) for 10Mbps Cat5 (or higher) for 100Mbps Cat5e (or higher) for 1Gbps
Power Consumption (active-typical)	0.81W
Physical Dimensions	Length: 6.7cm (2.64 inches) (Bracket) Width: 1.8cm (0.709 inches) Full-height end bracket: 12.07cm (4.755 inches) Low-profile end bracket: 8cm (3.15 inches)
Connect Speed LED Indicators	Link/Activity LED <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

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	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

Intel® I350-T4	Networking Interface	4 RJ-45
	System Interface	PCI Express 2.1 x4
	Networking Speeds Supported	10Mbps, 100Mbps, 1Gbps
	Cabling (up to 100m)	Cat3 (or higher) for 10Mbps Cat5 (or higher) for 100Mbps Cat5e (or higher) for 1Gbps
	Power Consumption (active-typical)	5W
	Physical Dimensions	Length: 13.54cm (5.33 inches) Width: 6.89 (2.71 inches) Full-height end bracket: 12.0cm (4.725 inches) Low-profile end bracket: 7.92cm (3.117 inches)
	Connect Speed LED Indicators	Link/Activity LED <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)

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 = No link • Amber = <5Gbps • Green = 5Gbps
Operating Temperature	0 °C to 55 °C (32 °F to 131 °F)
Hardware Certifications	USA: FCC B, EU: UL CE, Japan: VCCI, Taiwan: BSMI, Australia/New Zealand: CTICK, Korea: KCC, Canada: ICES-003/NMB-003

Intel® X550-T2	Networking Interface	2 x RJ-45
	System Interface	PCI Express 3 x4
	Networking Speeds Supported	100Mbps, 1Gbps, 2.5Gbps, 5Gbps, 10Gbps
	Cabling (up to 100m)	Cat5 (or higher) for 100Mbps Cat5e (or higher) for 1Gbps, 2.5Gbps, or 5Gbps Cat6a (or higher) for 10Gbps
	Power Consumption (active-typical)	3.9W at 100Mbps 5.5W at 1Gbps 11.2W at 10Gbps
	Physical Dimensions	5.2 in x 2.7 in (without bracket)
	Connect Speed LED Indicators	<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 = 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

Technical Specifications - Networking and Communications

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

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:
	From v1 to v2		

© 2017 HP Development Company, L.P. The information contained herein is subject to change without notice. The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein. Intel, Xeon, and Thunderbolt are trademarks of Intel Corporation in the U.S. and other countries. Microsoft and Windows are U.S. registered trademarks of Microsoft Corporation. Red Hat is a registered trademark of Red Hat, Inc. in the United States and other countries. Firewire is a trademark of Apple Inc. Linux® is the registered trademark of Linus Torvalds in the U.S. and other countries.