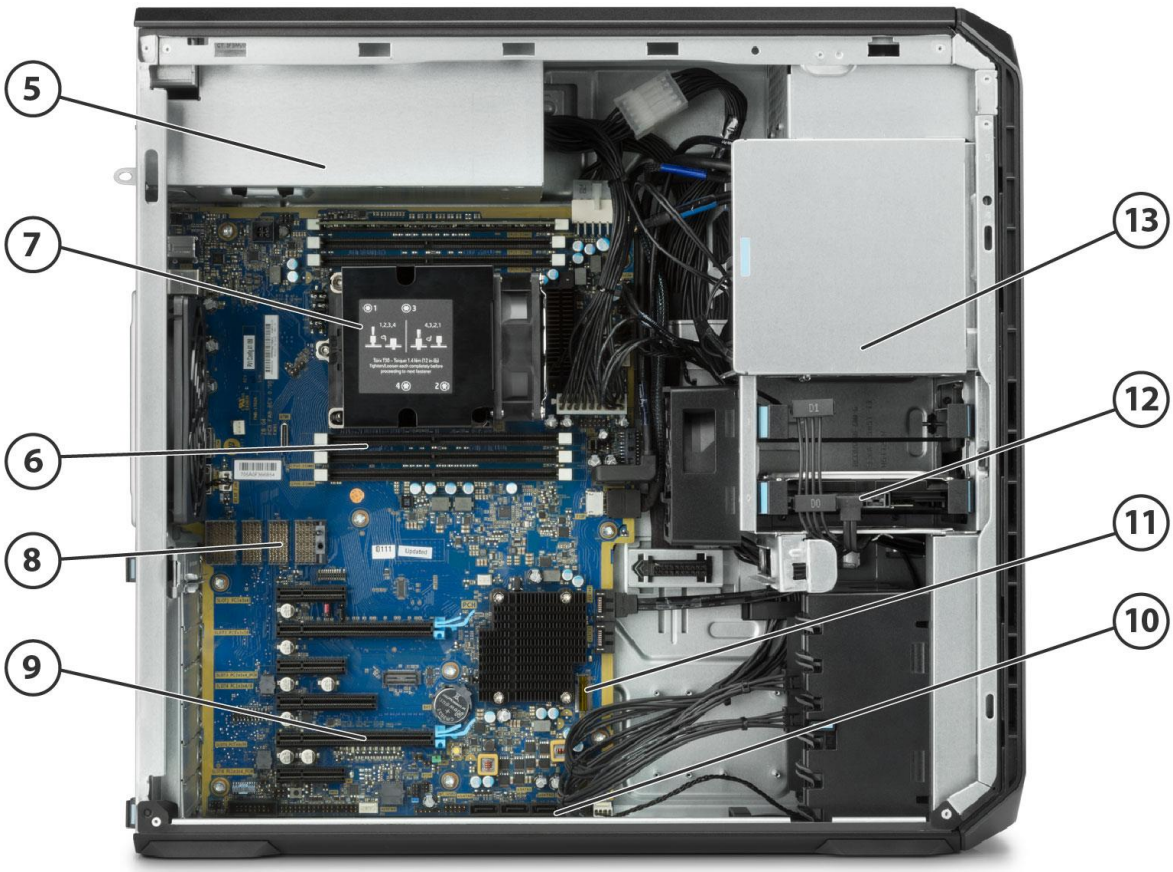
Overview

HP Z6 G4 Workstation

Front view

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

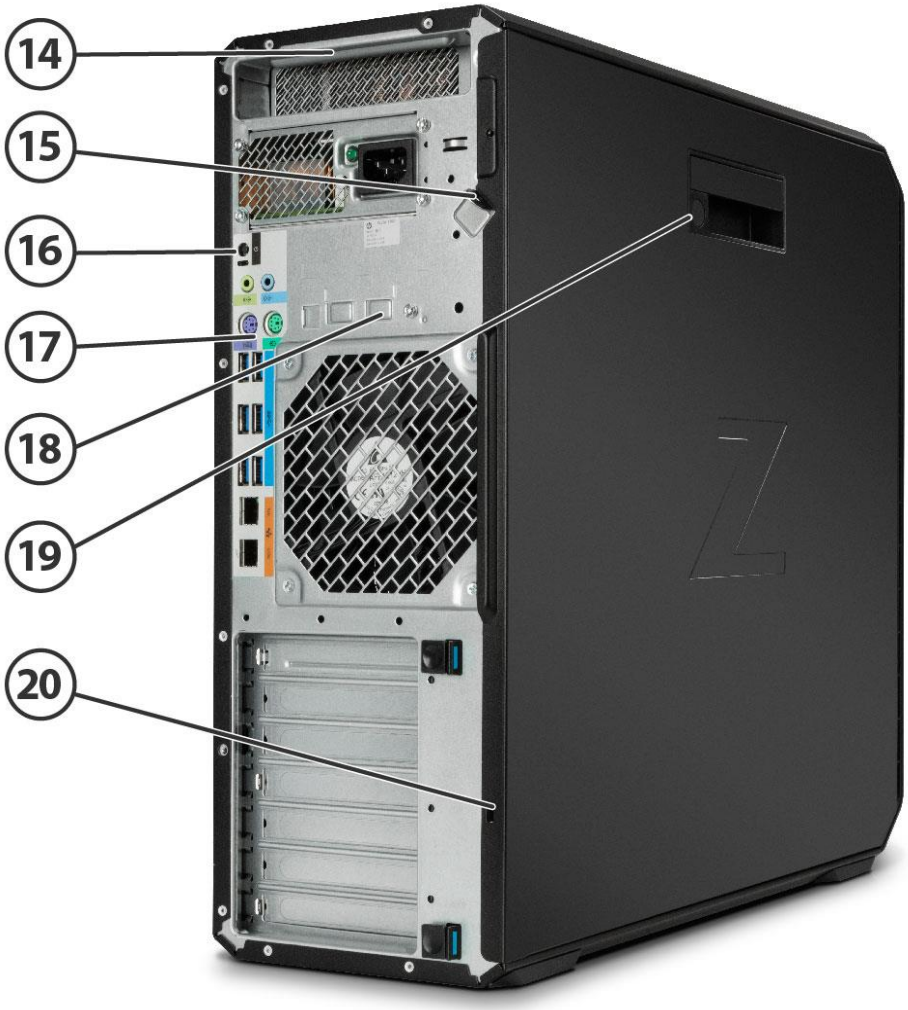
Overview



Internal view

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

Overview



Rear view

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

Overview

Form Factor

Minitower

Operating Systems

Preinstalled:

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

Supported:

- Windows 7 Professional 64-bit (downgrade media available by request from HP Support)*
- Red Hat Enterprise Linux Desktop 7.4
- SUSE Linux Enterprise Desktop 12 SP3
- Ubuntu 16.04 LTS

Notes: For detailed 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	2.5	38.50	2666	YES	YES	3.2, 3.8	205
Intel® Xeon® Platinum 8160 processor	24	2.1	33.00	2666	YES	YES	2.8, 3.7	150
Intel® Xeon® Gold 6152 processor	22	2.1	30.25	2666	YES	YES	2.8, 3.7	140
Intel® Xeon® Gold 6154 processor	18	3.0	24.75	2666	YES	YES	3.7, 3.7	200
Intel® Xeon® Gold 6148 processor	20	2.4	27.50	2666	YES	YES	3.1, 3.7	150
Intel® Xeon® Gold 6142 processor	16	2.6	22.00	2666	YES	YES	3.3, 3.7	150
Intel® Xeon® Gold 6136 processor	12	3.0	24.75	2666	YES	YES	3.6, 3.7	150
Intel® Xeon® Gold 6140 processor	18	2.3	24.75	2666	YES	YES	3.0, 3.7	140
Intel® Xeon® Gold 6134 processor	8	3.2	24.75	2666	YES	YES	3.7, 3.7	130
Intel® Xeon® Gold 6132 processor	14	2.6	19.25	2666	YES	YES	3.3, 3.7	140
Intel® Xeon® Gold 6130 processor	16	2.1	22.00	2666	YES	YES	2.8, 3.7	125
Intel® Xeon® Gold 6128 processor	6	3.4	19.25	2666	YES	YES	3.7, 3.7	115
Intel® Xeon® Gold 5120 processor	14	2.2	19.25	2400	YES	YES	2.6, 3.2	105
Intel® Xeon® Gold 5118 processor	12	2.3	16.50	2400	YES	YES	2.7, 3.2	105

Overview

Intel® Xeon® Gold 5122 processor	4	3.6	16.50	2666	YES	YES	3.7, 3.7	105
Intel® Xeon® Silver 4116 processor	12	2.1	16.50	2400	YES	YES	2.4, 3.0	85
Intel® Xeon® Silver 4114 processor	10	2.2	13.75	2400	YES	YES	2.5, 3.0	85
Intel® Xeon® Silver 4112 processor	4	2.6	8.25	2400	YES	YES	2.9, 3.0	85
Intel® Xeon® Silver 4108 processor	8	1.8	11.00	2400	YES	YES	2.1, 3.0	85
Intel® Xeon® Bronze 3106 processor	8	1.7	11.00	2133	NO	YES	N/A	85
Intel® Xeon® Bronze 3104 processor	6	1.7	8.25	2133	NO	YES	N/A	85
	[1]The specifications shown in this column represent the following: (all core maximum turbo frequency, one core maximum turbo frequency). Processors that do not have turbo functionality are denoted as N/A.							

Available Processors

Disclaimers

Multicore is designed to improve performance of certain software products. Not all customers or software applications will necessarily benefit from use of this technology. Performance and clock frequency will vary depending on application workload and your hardware and software configurations. Intel's numbering, branding and/or naming is not a measurement of higher performance.

Color

Black

Convertibility

No

Expansion Slots (see system board section for more details)

Slot 0:
Mechanical-only, for use with devices that require only rear bulkhead mounting or when 2nd CPU riser is installed

Slot 1:
PCI Express Gen3 x4 - CPU with open-ended connector*

Slot 2:
PCI Express Gen3 x16 - CPU

Slot 3:
PCI Express Gen3 x4 - PCH with open-ended connector*

Slot 4:
PCI Express Gen3 x8 – CPU with open-ended connector (slot converts to x4 electrical when SSD is installed in 2nd M.2 slot)*

Slot 5:
PCI Express Gen3 x16 - CPU

Slot 6:
PCI Express Gen3 x4 - PCH with open-ended connector*

Overview

	M.2 Slot 1: M.2 PCIe Gen 3 x4 - CPU up to 80mm storage devices **M.2 Slot 2:** M.2 PCIe Gen 3 x4 - CPU up to 80mm storage devices * Open-ended connector allows a greater bandwidth (e.g. x16) card to be installed physically into a lower bandwidth connector/slot. **Note:** Thunderbolt™ 3 PCIe card support available the first half of 2018
Expansion Bays (see storage section for more details)	2 internal 3.5" bays (with acoustic dampening rail assemblies pre-installed) 2 external 5.25" bays • 3rd and 4th 3.5" HDD each occupy one external bay • 3rd and 4th 2.5" HDD/SSD occupy a single external bay within a 2:1 carrier) 1 dedicated 9.5mm slim optical disk drive bay
Front I/O	• Base: Power button, 1 Headset audio port, 4 USB 3.1 G1 Type A (1 charging) • Premium (optional): Power button, 1 Headset audio port, 2 USB 3.1 G2 Type C™, 2 USB 3.1 G1 Type A (1 charging) • Optional: SD reader
Internal I/O	1 USB 3.1 G1 (aka USB 3.0) single-port header, 1 USB 2.0 single-port header and 1 USB 2.0 dual-port header
Rear I/O	6 USB 3.1 G1 (aka USB 3.0) Type A ports, 2 1Gbe LAN ports (1x supporting Intel® AMT), Audio: 1 Line out, 1 Line in (Line in can be retasked as microphone), 1 PS/2 mouse port, 1 PS/2 keyboard port, 1 Rear power button Optional: 1 serial port (cable up to rear bulkhead)
Interfaces Supported	SD card reader (optional) 6-channel SATA interface (6 @ 6.0 Gb/s) 6 channels are eSATA configurable for use with eSATA CTO/AMO Kit (No hot plug / hot swap supported) USB 2.0, USB 3.1 G1 (aka USB 3.0), USB 3.1 G2 (optional)
On-board RAID Support	SATA RAID 0 Striped Array Configuration SATA RAID 1 Mirrored Array Configuration SATA RAID 10 Striped/Mirrored Configuration SATA RAID 5 Parity Array Configuration
Chassis Dimensions (H x W x D)	H: 17.5" (445mm) W: 6.65" (169mm) D: 18.3" (465mm)
Packaged Dimensions	H: 24" (610mm) W: 12.3" (313mm) D: 23.3" (593mm)
Rack Dimensions	4U
Weight	Exact weights depend upon configuration (System weight only). Minimum: 13.1 kg (29 lbs.) Standard: 13.6 kg (30.1 lbs.) Maximum: 23.9 kg (52.7 lbs.)

Overview

Temperature	Operating: 5° to 35°C (40° to 95°F) Non-operating: -40° to 60°C (-40° to 140°F) **Note:** Above 1524 m (5,000 feet) altitude, maximum operating temperature is reduced by 1° C (1.8° F) per 305 m (1,000 feet) elevation increase
Humidity	Operating: 10% to 85% relative humidity, non-condensing, 35° C maximum wet bulb Non-operating: 10% to 90% relative humidity, non-condensing, 35° C maximum wet bulb
Maximum Altitude (non-pressurized)	Operating: 3,048m (10,000ft) Non-operating: 9,144m (30,000ft) **Note:** Above 1524 m (5,000 feet) altitude, maximum operating temperature is reduced by 1° C (1.8° F) per 305 m (1,000 feet) elevation increase
Power Supply	1000 watts wide-ranging, active Power Factor Correction, 90% Efficient, with 2X 6-pin graphics power cables (graphics power cables are 6/8-pin convertible) The Z6 G4 1000W power supply efficiency report can be found at this link: https://plugloadsolutions.com/psu_reports/HP_D15-1K0P1A_1000W_ECOS%204838_Report.pdf
Workstation ISV Certifications	See the latest list of certifications at http://www8.hp.com/us/en/campaigns/workstations/industries-and-partners.html

Supported Components

Processors

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Intel® Xeon® Scalable CPU				
Intel® Xeon® Platinum 8180 processor	Y	N		
Intel® Xeon® Platinum 8160 processor	Y	Y	1XM35AA	
Intel® Xeon® Gold 6152 processor	Y	Y	1XM36AA	
Intel® Xeon® Gold 6154 processor	Y	N		
Intel® Xeon® Gold 6148 processor	Y	Y	1XM37AA	
Intel® Xeon® Gold 6142 processor	Y	Y	1XM38AA	
Intel® Xeon® Gold 6136 processor	Y	Y	1XM39AA	
Intel® Xeon® Gold 6140 processor	Y	Y	1XM40AA	
Intel® Xeon® Gold 6134 processor	Y	Y	1XM41AA	
Intel® Xeon® Gold 6132 processor	Y	Y	1XM42AA	
Intel® Xeon® Gold 6130 processor	Y	Y	1XM43AA	
Intel® Xeon® Gold 6128 processor	Y	Y	1XM44AA	
Intel® Xeon® Gold 5120 processor	Y	Y	1XM45AA	
Intel® Xeon® Gold 5118 processor	Y	Y	1XM46AA	
Intel® Xeon® Gold 5122 processor	Y	Y	1XM47AA	
Intel® Xeon® Silver 4116 processor	Y	Y	1XM48AA	
Intel® Xeon® Silver 4114 processor	Y	Y	1XM49AA	
Intel® Xeon® Silver 4112 processor	Y	Y	1XM50AA	
Intel® Xeon® Silver 4108 processor	Y	Y	1XM51AA	
Intel® Xeon® Bronze 3106 processor	Y	Y	1XM52AA	
Intel® Xeon® Bronze 3104 processor	Y	Y	1XM53AA	

*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

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

SATA Hard Drives

SATA (Serial ATA) Hard Drives for HP Workstations	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
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 (4) 3.5-inch 7200 rpm SATA drives: 500 GB, 1.0, 2.0, 4.0 TB; maximum system HDD storage: 16.0TB				

Supported Components

SATA Solid State Drives

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
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 Z4/Z6 G4 SSD Kit	Y	Y	1PD56AA	
HP Z Turbo Drive 512GB MLC Z4/Z6 G4 SSD Kit	Y	Y	1PD57AA/AT	
HP Z Turbo Drive 1TB MLC Z4/Z6 G4 SSD Kit	Y	Y	1PD58AA	
HP Z Turbo Drive 256GB TLC Z4/Z6 G4 SSD Kit	Y	Y	1PD59AA/AT	
HP Z Turbo Drive 512GB TLC Z4/Z6 G4 SSD Kit	Y	Y	1PD60AA	
HP Z Turbo Drive 1TB TLC Z4/Z6 G4 SSD Kit	Y	Y	1PD61AA	
HP Z Turbo Drive 256GB Z4/Z6 G4 SED Kit	Y	Y	2SA31AA	
HP Z Turbo Drive 512GB Z4/Z6 G4 SED Kit	Y	Y	2SA32AA	
HP Z Turbo Drive 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

Note 1: Dual M.2 SSD modules plus carrier
Note 2: M.2 SSD module only, designed to be installed into Quad Pro carrier

Hard Drive Controllers

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
SAS Controller				
MicroSemi SmartHBA2100-4i4e SAS Controller	Y	Y	1FV90AA	
Microsemi 3152-8i SAS ROC RAID Controller	Y	Y	1FV89AA	

Graphics

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes	Supported # of cards
Graphics Cable Adapters					
HP DisplayPort to VGA Adapter	Y	Y	AS615AA		
HP DisplayPort to HDMI Adapter	Y	Y	K2K92AA		
HP DisplayPort to Dual Link DVI Adapter	Y	Y	NR078AA		1
HP DisplayPort to DVI-D Adapter	Y	Y	FH973AA		1
HP DisplayPort to DVI-D Adapter (2-pack)	Y	N			1
HP DisplayPort to DVI-D Adapter (4-pack)	Y	N			1
HP DisplayPort to DVI-D Adapter (6-pack)	Y	N			1
NVIDIA® SLI Graphics Connector	Y	Y	PP654A		1
NVIDIA® SLI 3-slot Graphics Connector	Y	Y	2YY85AA		1
Entry 3D					
NVIDIA® Quadro® P400 1st GFX 2GB Graphics	Y	Y	1ME43AA/AT		2
NVIDIA® Quadro® P600 1st GFX 2GB Graphics	Y	Y	1ME42AA/AT		2
AMD FirePro™ W2100 2GB Graphics	Y	Y	J3G91AA/AT		2
Mid-range 3D					
NVIDIA® Quadro® P1000 1st GFX 4GB Graphics	Y	Y	1ME01AA/AT		2
NVIDIA® Quadro® P2000 1st GFX 5GB Graphics	Y	Y	1ME41AA/AT		2
AMD Radeon™ Pro WX 3100 4GB Graphics	Y	Y	2TF08AA		2
AMD Radeon™ Pro WX 4100 4GB Graphics	N	Y	Z0B15AA/AT		2
High End 3D					
NVIDIA® Quadro® P4000 1st GFX 8GB Graphics	Y	Y	1ME40AA/AT		2
NVIDIA® Quadro® P5000 1st GFX 16GB Graphics	Y	Y	Z0B13AA/AT		2
NVIDIA® Quadro® P6000 1st GFX 24GB Graphics	Y	Y	Z0B12AA/AT		1
AMD Radeon™ Pro WX 7100 1st GFX 8GB Graphics	Y	Y	Z0B14AA/AT		2

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/AT	
16GB (2x8GB) DDR4-2666 ECC Reg 1CPU Memory	Y			
24GB (3x8GB) DDR4-2666 ECC Reg 1CPU Memory	Y			
32GB (4x8GB) DDR4-2666 ECC Reg 1CPU Memory	Y			
48GB (6x8GB) DDR4-2666 ECC Reg 1CPU Memory	Y			
16GB (1x16GB) DDR4-2666 ECC Reg 1CPU Memory	N	Y	1XD85AA/AT	
32GB (2x16GB) DDR4-2666 ECC Reg 1CPU Memory	Y			
48GB (3x16GB) DDR4-2666 ECC Reg 1CPU Memory	Y			
64GB (4x16GB) DDR4-2666 ECC Reg 1CPU Memory	Y			

Supported Components

96GB (6x16GB) DDR4-2666 ECC Reg 1CPU Memory	Y		
32GB (1x32GB) DDR4-2666 ECC Reg 1CPU Memory	N	Y	1XD86AA/AT
64GB (2x32GB) DDR4-2666 ECC Reg 1CPU Memory	Y		
96GB (3x32GB) DDR4-2666 ECC Reg 1CPU Memory	Y		
128GB (4x32GB) DDR4-2666 ECC Reg 1CPU Memory	Y		
192GB (6x32GB) DDR4-2666 ECC Reg 1CPU Memory	Y		
32GB (4x8GB) DDR4-2666 ECC Reg 2CPU Memory	Y		
48GB (6x8GB) DDR4-2666 ECC Reg 2CPU Memory	Y		
64GB (8x8GB) DDR4-2666 ECC Reg 2CPU Memory	Y		
96GB (12x8GB) DDR4-2666 ECC Reg 2CPU Memory	Y		
64GB (4x16GB) DDR4-2666 ECC Reg 2CPU Memory	Y		
96GB (6x16GB) DDR4-2666 ECC Reg 2CPU Memory	Y		
128GB (8x16GB) DDR4-2666 ECC Reg 2CPU Memory	Y		
192GB (12x16GB) DDR4-2666 ECC Reg 2CPU Memory	Y		
128GB (4x32GB) DDR4-2666 ECC Reg 2CPU Memory	Y		
192GB (6x32GB) DDR4-2666 ECC Reg 2CPU Memory	Y		
256GB (8x32GB) DDR4-2666 ECC Reg 2CPU Memory	Y		
384GB (12x32GB) DDR4-2666 ECC Reg 2CPU Memory	Y		

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

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

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

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

ONLY registered DDR4 DIMMs are supported.
DDR3 DIMMs ARE NOT SUPPORTED.

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

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	
HP 9.5mm Slim DVD ROM	Y	Y	K3R63AA	
HP 9.5mm Slim DVD Writer	Y	Y	K3R64AA	
HP SD Card Reader				
HP SD 4 Card Reader	Y	Y	Y0L99AA	

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	
HP Dual Port 10GBase-T NIC Module	Y	Y	1QL49AA	
Intel® 8265 802.11 a/b/g/n/ac + BT PCIe WLAN	N	Y	1QL48AA	
Intel® X550-T2 10GbE Dual Port NIC	Y	Y	1QL46AA	
Intel® X710-DA2 10GbE SFP+ Dual Port NIC	Y	Y	1QL47AA	
HP 10GbE SFP+ SR Transceiver	Y	Y	C3N53AA	

Racking and Physical Security

Supported Components

Racking and Physical Security

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

Input Devices

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

Other Hardware

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

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

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

Software

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

Supported Components

SW HP RGS for Z	Y	N

Supported Components

Operating Systems

	Support Notes
Windows 10 Pro 64	
Windows 7 Professional 64-bit	Note 3, 4
HP Linux® Installer Kit	Note 2
Red Hat® Enterprise Linux® (RHEL) Workstation - Paper License (1yr)	Note 1

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

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

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

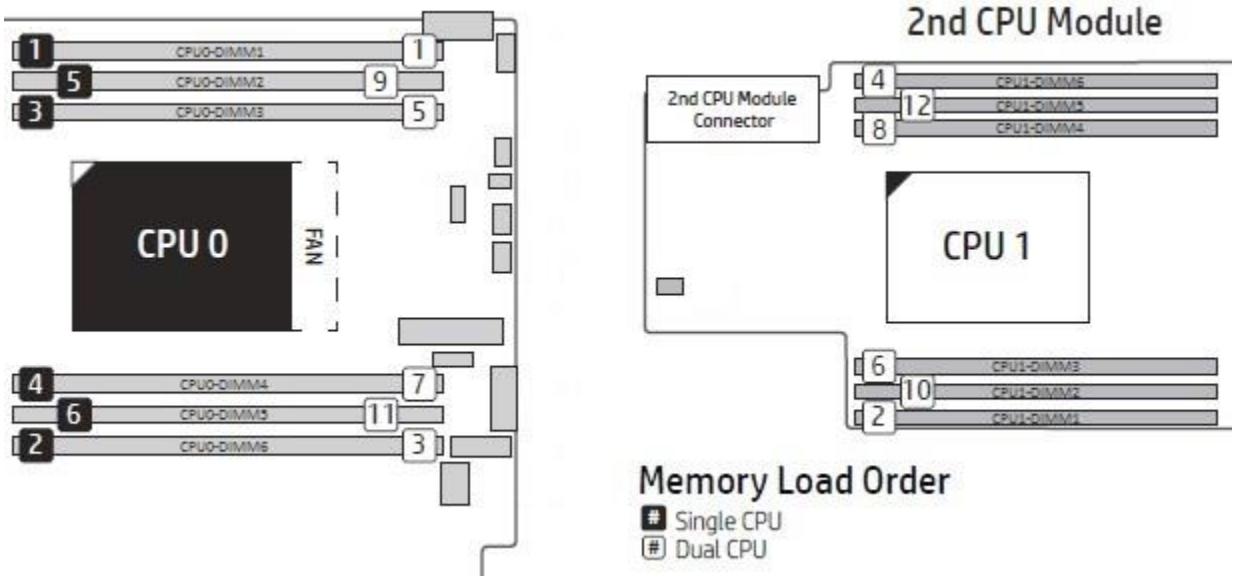
System Technical Specifications

System Board

System Board Form Factor	Main System Board: 24 x 31 cm 9.6 x 12.2 inches 2nd CPU/Memory Board (optional): 14.9 x 29.2 cm 5.85 x 11.50 inches
Processor Socket	FCLGA3647 (Socket P) 1st CPU on system board 2nd CPU on optional 2nd CPU/Memory Module
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	6 on system board(CPU0) + 6 on optional 2nd CPU/Memory Module(CPU1)
Memory Type Supported	DDR4, RDIMM (Registered), ECC: 8GB, 16GB and 32GB
Memory Modes	NUMA (Non-Uniform Memory Architecture), Memory Node Interleave
Memory Speed Supported	2133MT/s, 2400MHz and 2666MT/s

Memory Loading Order:

Load Order for Single and Dual Processor Configuration



Maximum Memory	Supports up to 384GB with two processors.

System Technical Specifications

Memory Configuration (Supported)

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

PCI Express Connectors

Slot 0:
Mechanical-only, for use with devices that require only rear bulkhead mounting or when 2nd CPU riser is installed

Slot 1:
PCI Express Gen3 x4 - CPU with open-ended connector*

Slot 2:
PCI Express Gen3 x16 - CPU

Slot 3:
PCI Express Gen3 x4 - PCH with open-ended connector*

Slot 4:
PCI Express Gen3 x8 – CPU with open-ended connector (slot converts to x4 electrical when SSD is installed in 2nd M.2 slot)*

Slot 5:
PCI Express Gen3 x16 - CPU

Slot 6:
PCI Express Gen3 x4 - PCH with open-ended connector*

M.2 Slot 1:
M.2 PCIe Gen 3 x4 - CPU up to 80mm storage devices

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

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

Supported Drive Interfaces

SATA	6 SATA @6Gb/s, supports RAID 0, 1 and NCQ. Factory integrated RAID is Microsoft Windows only.
Serial Attached SCSI	Requires Optional PCIe card
Factory Configured RAID	• RAID 0 configuration - striped array • RAID 1 configuration - mirrored array • RAID 10 striped and mirrored array *HW RAID functionality not supported by Linux®. Use SW RAID functionality provided in the Red Hat® Operating system instead.
Integrated Graphics	No
Network Controller	Integrated Intel® I219LM GbE LAN Supports the following management functionalities: Intel® AMT11.2, TXT, DASH 1.1, WOL, VLAN, and PXE 2.1

System Technical Specifications

		Integrated Intel X722 for 1GbE Data rates supported: 1000 Mb/s Compliance IEEE 802.1as/1588v2, 802.1p, 802.1Q, 802.3, 802.3ab, 802.3az, 802.3x Up to 16 UDP/TCP programmable filters Bus architecture: PCIe 3.0 UEFI and PXE Boot ROM support Intel iWARP Support (RDMA) Network transfer rates: 1000BASE-T (full-duplex) 2000 Mb/s Management capabilities: WOL (Excluding Max Power Savings), auto MDI crossover, PXE, Quad Hash filtering, RSS, Advanced cable diagnostics
	External SATA (eSATA)	Supported on all SATA ports configurable with optional eSATA* cable kit * hot plug / hot swap not supported with eSATA
USB Connector(s)	**Front**	Front USB depends on which FIO module is selected: - Standard: 4 USB 3.1 G1 Type A (1 charging) - Premium: 2 USB 3.1 G2 Type C, 2 USB 3.1 G1 Type A (1 charging)
	Rear	6 USB 3.1 G1 Type A
	Internal	1 USB 3.1 G1 single-port header 1 USB 2.0 single-port header 1x USB 2.0 dual-port header

HD Integrated Audio	Realtek ALC221
Flash ROM	Yes
CPU Fan Header	One for each CPU socket
Rear Chassis Fan Header	Yes
Front PCI Fan Header	Yes
CMOS Battery Holder - Lithium	Yes
Integrated Trusted Platform Module	Trusted Platform Module (TPM) 2.0 (Infineon SLB 9670) Common Criteria EAL4+ Certified Convertible to FIPS 140-2 Certified mode through firmware v7.80 TPM Certified products list: https://trustedcomputinggroup.org/membership/certification/tpm-certified-products/
Power Supply Headers	Yes
Power Switch, Power LED & Hard Drive LED Header	Yes
Clear Password Jumper	Yes
Serial Port	1 internal header
Parallel Port	No
Keyboard/Mouse	USB or PS/2
Hood Lock Header	Yes
Hood Sensor Header	Yes
Memory Fan	1 Memory Fan Header per CPU
AUX IN (audio)	No

Z6 Required Power Supply Info

Power Supply	1000W 90% Efficient, Custom PSU

System Technical Specifications

	(Wide Ranging, Active PFC)	
Operating Voltage Range	90–269 VAC	
Rated Voltage Range	100-127 VAC 200-240 VAC	118 VAC
Rated Line Frequency	50-60 Hz	400 Hz
Operating Line Frequency Range	47-66 Hz	393-407 Hz
Rated Input Current	12 A @ 100-127 VAC 6.3 A @ 200-240 VAC	12A @ 118 VAC
Heat Dissipation **(Configuration and software dependent)**	Typical = 2467 btu/hr Maximum = 4112 btu/hr	
Power Supply Fan	80x25 mm variable speed	
ENERGY STAR® Qualified **(Configuration dependent)**	Yes	
80 PLUS® Compliant	Yes, 90% Efficient The Z6 G4 1000W power supply efficiency report can be found at this link: https://plugloadsolutions.com/psu_reports/HP_D15-1K0P1A_1000W_ECOS%204838_Report.pdf	
FEMP Standby Power Compliant @115V **(<1W in S5 – Power Off)**	Yes	
EuP Compliant @ 230V **(<0.5 W in S5 – Power Off)**	Yes	
CECP Compliant @ 220V **(<4W in S3 – Suspend to RAM)**	Yes; Configuration dependent	
Power Consumption in sleep mode **(as defined by ENERGY STAR®) – Suspend to RAM (S3)** **(Instantly Available PC)**	<= 20W	
Built-in Self Test LED	Yes	
Surge Tolerant Full Ranging Power Supply **(withstands power surges up to 2000V)**	Yes	

Sensor Header	Integrated in Front User Interface (Power Switch, Power LED, HDD LED, Speaker) Cable
Integrated Gigabit Ethernet	Integrated Intel® I-218 Gbit LAN
Clear CMOS Button	Yes

System Technical Specifications

System Configuration

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

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

System Technical Specifications

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

Example Z6 G4 Configuration #3 ENERGY STAR QUALIFIED	Processor	1x Intel Xeon 6136 (Twelve-core)					
	Memory	6x 8GB DDR4-2666 (Registered DIMM)					
	Graphics	1x NVIDIA QuadroP4000					
	Disks/Optical	2x 1TB SATA 7200 ; 1x Slim DVDRW SATA					
	Power Supply	1000W 90% custom PSU					
	Other	NA					
Energy Consumption (Watts)		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Enabled
	Windows Idle (S0)	79.074		79.109		79.938	
	Windows Busy Typ(S0)	324.975		317.991		327.451	
	Windows Busy Max (S0)	328.268		320.296		329.668	
	Sleep (S3)	7.847	7.756	7.878	7.826	7.931	7.852
	Off (S5)	3.353	3.348	3.535	3.489	3.373	3.355
	Zero Power Mode (ErP)	0.206		0.386		0.196	
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)	269.801		269.920		272.748	
	Windows Busy Typ(S0)	1108.815		1084.985		1117.262	
	Windows Busy Max (S0)	1120.051		1092.850		1124.827	
	Sleep (S3)	26.774	26.463	26.880	26.702	27.061	26.791
	Off (S5)	11.441	11.426	12.061	11.904	11.509	11.447
	Zero Power Mode (ErP)	0.703		1.317		0.669	

Example Z6 G4 Configuration #4	Processor	2x Intel Xeon 8160 (Dual 24-core)					
	Memory	12x 32GB DDR4-2666 (Registered DIMM)					
	Graphics	2x NVIDIA Quadro P5000					
	Disks / Optical	4x 2TB SATA 7200 ; 1x Slim DVDRW SATA					
	Power Supply	1000W 90% custom PSU					
	Other	NA					
Energy Consumption (Watts)		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Enabled
	Windows Idle (S0)	112.388		115.635		112.102	
	Windows Busy Typ(S0)	512.368		490.165		526.905	
	Windows Busy Max (S0)	698.548		673.465		706.461	
	Sleep (S3)	14.208	13.833	14.698	14.487	15.176	13.886

System Technical Specifications

	Off (S5)	3.511	3.418	3.575	3.570	3.509	3.412
	Zero Power Mode (ErP)	0.287		0.387		0.272	
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)	383.469		394.547		382.492	
	Windows Busy Typ(S0)	1748.120		1672.443		1797.800	
	Windows Busy Max (S0)	2383.446		2297.863		2410.445	
	Sleep (S3)	48.478	47.198	50.150	49.430	51.781	47.379
	Off (S5)	11.980	11.662	12.198	12.181	11.973	11.642
	Zero Power Mode (ErP)	0.979		1.321		0.928	

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

DECLARED NOISE EMISSIONS

System Configuration (Entry level)	**Processor Info**	TBD
	Memory Info	TBD
	Graphics Info	TBD
	Disks/Optical/Floppy	TBD

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 (High end)	**Processor Info**	TBD
	Memory Info	TBD
	Graphics Info	TBD
	Disks/Optical/Floppy	TBD

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)
	Humidity	Operating: 10% to 85% RH, non-condensing, 35° C maximum wet bulb Non-operating: 10% to 90% RH, non-condensing, 35° C maximum wet bulb
	Maximum Altitude	Operating: 3,048 m (10,000 feet) Above 1524 m (5,000 feet) altitude, the maximum operating temperature is reduced by 1° C (1.8° F) for every 305 m (1,000 feet) increase in elevation Non-operating: 9,144 m (30,000 feet)
	Shock (non-repetitive)	Operating: ½-sine: 40g, 2-3ms (~62 cm/sec) Non-operating: ½-sine: 160 cm/s, 2-3ms (~105g) square: 422 cm/s, 20g **Vibration** Operating random: 0.5g (rms), 5-300 Hz, up to 0.0025g²/Hz Non-operating random: 2.0g (rms), 5-500 Hz, up to 0.0150 g²/Hz

Physical Security and Serviceability

Access Panel	Tool-less Includes system board and memory information.
Optical Drive	Tool-less, no carrier or rails required
Hard Drives	Tool-less Optional 5.25" external bay carriers
Expansion Cards	Tool-less
Processor Socket	1st socket on main system board. 2nd socket on optional 2nd CPU/Memory Module.
Blue User Touch Points	Yes, on primary serviceable components.
Color-coordinated Cables and Connectors	Yes
Memory	Tool-less
System Board	Torx T15 screws 2nd CPU/Memory Module: Tool-less
Front of Computer LEDs	Dual Color Power/Failure LED = Yes HDD Activity LED = Yes
Configuration Record SW	Yes
Over-Temp Warning on Screen	Yes, at POST screen on reboot
Restore CD/DVD Set	Yes, restores the computer to its original factory shipping image; can be obtained via HP Support.
Dual Function Front Power Switch	Yes, also acts as a reset switch when held for 4 seconds.
Padlock Support	Yes

System Technical Specifications

Cable Lock Support	Kensington Cable Lock (optional): Prevents entire system theft and system access. 3mm x 7mm slot at rear of system
Universal Chassis Clamp Lock Support	No
Solenoid Lock and Hood Sensor	Access Panel Solenoid Lock: Yes (optional). Activated remotely to prevent system entry. Access Panel Intrusion Sensor: Yes (optional).
Removable Media Write/Boot Control	Yes, user can prevent the workstation from writing to or booting from removable media.
Power-On Password	Yes, prevents an unauthorized person from booting up the workstation
Setup Password	Yes, prevents an unauthorized person from changing the workstation configuration
3.3V Aux Power LED on System PCA	Yes
NIC LEDs (integrated) (Green & Amber)	Yes
CPUs and Heatsinks	CPU heatsink removal requires a T-30 Torx screwdriver.
Power Supply Diagnostic LED	Yes
Front Power Button	Yes
Rear Power Button	Yes
Front Power LED	Yes, white (normal), red (fault)
Front Hard Drive Activity LED	Yes, white
Front ODD Activity LED	Yes on device
Internal Speaker	Yes
System/Emergency ROM Flash Recovery	Recovers corrupted system BIOS.
Cooling Solutions	Air cooled forced convection
Power Supply Fans	1 - 80 mm x 80 mm x 25 mm (non-serviceable)
CPU Heatsink Fan	1st CPU: 1 - 80mm Optional 2nd CPU: 1 - 60mm x 25mm
Memory Fan	Front memory fan: 1 – 80mm x 25mm Memory duct blower: 1 – 90mm x 25mm 2nd CPU/Memory Module: 1 - 60mm x 25mm
Chassis Fans	Front chassis fan : 1 - 120mm x 25mm Rear chassis fan: 1 - 120mm x 25mm
HP Vision Diagnostics Offline Edition	HP PC Hardware Diagnostics (UEFI) enables hardware level testing outside the operating system on many components. The diagnostics can be invoked by pressing ESC then F2 upon the PC reboot, and is available as a download from HP Support.
Access Panel Key Lock	Yes, side panel barrel keylock (optional from the factory only)
ACPI-Ready Hardware	Advanced Configuration and Power Management Interface (ACPI).

- Allows the system to wake from a low-power mode.
- Controls system power consumption, making it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system

System Technical Specifications

Trusted Platform Module Chip	Yes, Infineon TPM 2.0 Certified
Integrated Chassis Handles	Yes, Front handle and dedicated rear recess
Power Supply	Requires T15 Torx or flat blade screwdriver
PCIe Card Retention	Yes, tool-less Rear (all) Middle (full-height cards) Front (full-length cards with extender)
Flash ROM	Yes
Diagnostic Power Switch LED on board	Yes
Clear Password Jumper	Yes
Clear CMOS Button	Yes
CMOS Battery Holder	Yes
DIMM Connectors	Yes

BIOS

BIOS 32-bit Services	Standard BIOS 32-bit Service Directory Proposal v0.4
PCI 3.0 Support	Full BIOS support for PCI Express through industry standard interfaces.
ATAPI	ATAPI Removable Media Device BIOS Specification Version 1.0.
BBS	BIOS Boot Specification v1.01.
WMI Support	WMI is Microsoft's implementation of Web-Based Enterprise Management (WBEM) for Windows. WMI is fully 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. • ALERTED - excessive temperatures are detected. Raises a flag so action can be taken to avoid shutdown or provide for a smoother system shutdown. • SHUTDOWN - excessive temperatures are encountered. Automatically shuts down the computer without warning before hardware component damage occurs.
Remote ROM Flash	Provides secure, fail-safe ROM image management from a central network console.
ACPI (Advanced Configuration and Power Management Interface)	Allows the system to enter and resume from low power modes (sleep states). Enables an operating system to control system power consumption based on the dynamic workload. Makes it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system. Supports ACPI 5.0 for full compatibility with 64-bit operating systems.
Ownership Tag	A user-defined string stored in non-volatile memory that is displayed in the BIOS splash screen.

System Technical Specifications

Remote Wakeup/Remote Shutdown	System administrators can power on, restart, and power off a client computer from a remote location.
Instantly Available PC (Suspend to RAM - ACPI sleep state S3)	Allows for very low power consumption with quick resume time.
Remote System Installation via F12 (PXE 2.1) (Remote Boot from Server)	Allows a new or existing system to boot over the network and download software, including the operating system.
ROM revision levels	Reports the system BIOS revision level in Computer Configuration Utility (F10 Setup). Version is available through an industry standard interface (SMBIOS and WMI) so that management SW applications can use and report this information.
System board revision level	Allows management SW to read revision level of the system board. Revision level is digitally encoded into the HW and cannot be modified.
Start-up Diagnostics (Power-on Self-Test)	Assesses system health at boot time with selectable levels of testing.
Auto Setup when new hardware installed	System automatically detects addition of new hardware.
Keyboard-less Operation	The system can be booted without a keyboard.
Localized ROM Setup	Common BIOS image supports System Configuration Utility (F10 Setup) menus in 14 languages with local keyboard mappings.
Asset Tag	The user or MIS to set a unique tag string in non-volatile memory.
Per-slot Control	Allows I/O slot parameters (option ROM enable/disable, bus latency) to be configured individually.
Adaptive Cooling	Control parameters are set according to detected hardware configuration for optimal acoustics.
Pre-boot Diagnostics	(Pre-video) critical errors are reported via beeps and blinks on the power LED.
Industry Standard Specification Support	
Industry Standard	Revision Supported by the BIOS
UEFI Specification Revision	2.5
ACPI	Advanced Configuration and Power Management Interface, Version 5.0
ATA (IDE)	AT Attachment 6 with Packet Interface (ATA/ATAPI-6), Revision 3b
CD Boot	"El Torito" Bootable CD-ROM Format Specification Version 1.0
EDD	- Enhanced Disk Drive Specification Version 1.1 - BIOS Enhanced Disk Drive Specification Version 3.0
EHCI	Enhanced Host Controller Interface for Universal Serial Bus, Revision 1.0
PCI	PCI Local Bus Specification, Revision 2.3 PCI Power Management Specification, Revision 1.1 PCI Firmware Specification, Revision 3.0, Draft .7
PCI Express	PCI Express Base Specification, Revision 2.0 PCI Express Base Specification, Revision 3.0
PMM	POST Memory Manager Specification, Version 1.01
SATA	Serial ATA Specification, Revision 1.0a Serial ATA 3 Gb/s: Serial ATA Specification, Revision 2.5 Serial ATA 6 Gb/s: Serial ATA Specification, Revision 3.0
SPD	PC SDRAM Serial Presence Detect (SPD) Specification, Revision 1.2B
TPM	Trusted Platform Module (TPM) 2.0 (Infineon SLB 9670) Common Criteria EAL4+ Certified Convertible to FIPS 140-2 Certified mode through firmware v7.80 TCG TPM Certified products list: http://www.trustedcomputinggroup.org/certification/tpm-certified-products/
UHCI	Universal Host Controller Interface Design Guide, Revision 1.1

System Technical Specifications

USB	Universal Serial Bus Revision 1.1 Specification Universal Serial Bus Revision 2.0 Specification Universal Serial Bus Revision 3.1 G1 Specification Universal Serial Bus Revision 3.1 G2 Specification
SMBIOS	System Management BIOS Reference Specification, Version 2.8
	External BIOS simulator found at: http://h20464.www2.hp.com/index.html

Social and Environmental Responsibility

Eco-Label Certifications & Declarations

This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks:

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

The Z6 G4 is registered EPEAT® Gold in the US and Canada. EPEAT® registration varies by country. See http://www.epeat.net for registration status by country. Search keyword generator on HP's 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 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

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Low Halogen Statement

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

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:

System Technical Specifications

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

Additional Information

- This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive – 2002/96/EC. Product Disassembly Instructions
- Plastic parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.

Packaging

HP Workstation product packaging meets the HP's General Specification for the Environment

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

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:

- 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

System Technical Specifications

- Access Monitor - Provides oversight into Intel® AMT actions to support security requirements
- PC Alarm Clock
- Microsoft NAP Support
- Host Base set-up and configuration
- Management Engine (ME) firmware roll back
- Local Time Sync to UTC
- Remote Memory Dump Command – Creates memory dump for debug

Intel® vPro™ Technology

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

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

Remote Manageability Software Solutions

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

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

System Software Manager

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

Service, Support, and Warranty

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

NOTE 1: Terms and conditions may vary by country. Certain restrictions and exclusions apply.
NOTE 2: On-site service may be provided pursuant to a service contract between HP and an authorized HP third-party provider, and is not available in certain countries. Global service response times are based on commercially reasonable best effort and may vary by country.
NOTE 3: Technical telephone support applies only to HP-configured, HP and HP-qualified, third-party hardware and software. Toll-free calling and 24x7 support service may not be available in some countries.
HP Care Pack Services extend service contracts beyond the standard warranties. Service starts from date of hardware purchase. To choose the right level of service for your HP product, use the HP Care Pack Services Lookup Tool at: http://www.hp.com/go/lookuptool. Additional HP Care Pack Services information by product is available at: http://www.hp.com/hps/carepack. Service levels and response times for HP Care Packs may vary depending on your geographic location.

Product Change Notification

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

Stable & Consistent Offerings

As part of its commitment to hardware, software, and solution innovation, HP is proud to introduce this breakthrough platform configuration stability to HP Workstation customers. HP Stable & Consistent Offerings are built on the foundation of a carefully chosen set of hardware 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)	
	HP 1.2TB SAS 15K SFF HDD	**Capacity**	1.2TB	
		Height	0.6 in; 1.53 cm	
		Width	**Media Diameter**	2.5 in; 6.36 cm
			Physical Size	2.75 in; 6.99 cm
		Interface	SAS 6Gb/s	
		Synchronous Transfer Rate (Maximum)	Up to 600MB/s	
		Buffer	64MB	
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.18ms (max)
			Average	3.5ms
			Full Stroke	7.17ms

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

3.0TB SATA 7200 rpm 6Gb/s 3.5" HDD	**Capacity**	3.0TB	
	Height	1 in; 2.54 cm	
	Width	**Media Diameter**	3.5 in; 8.9 cm
		Physical Size	4.0 in; 10.17 cm
	Interface	Serial ATA (6.0Gb/s), NCQ enabled	
	Synchronous Transfer Rate (Maximum)	Up to 6.0 Gb/s	
	Buffer	64MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.6 ms
		Average	11 ms
		Full Stroke	Not Specified
	Rotational Speed	7,200 rpm	
	Operating Temperature	41° to 140° F (5° to 60° C)	
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	**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	**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	**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**	256GB	
	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 Quad Pro 2x1TB PCIe SSD	**Capacity**	2TB	
	Protocol	PCIe	
	Form Factor	PCIe Card, Full Height PCIe Slot	
	Controller	NVMe	
	NAND Type	3D MLC	
	Endurance	600TB	
	Interface	PCI Express 3.0 x4 electrical x4 physical	
	Operating Temperature	32° to 158° F (0° to 70° C)	
	Performance	**Sequential Read**	3000 MB/s
		Sequential Write	1700 MB/s
		Random Read	360K IOPS
		Random Write	330K IOPS
HP Z Turbo Drive G2 256GB TLC SSD	**Capacity**	256GB	
	Protocol	PCIe	
	Form Factor	M.2	

Technical Specifications - Hard Drives

	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
HP Z Turbo Drive G2 512GB TLC SSD	**Capacity**	512GB	
	Protocol	PCIe	
	Form Factor	M.2	
	Controller	NVMe	
	NAND Type	3D TLC	
	Endurance	150TBW (TB Written)	
	Reliability (MTBF)	1.5M hours	
	Interface	PCI Express 3.0 x4 electrical x4 physical	
	Operating Temperature	32° to 158° F (0° to 70° C)	
	Performance	**Sequential Read**	2800 MB/s
		Sequential Write	660 MB/s (1600 MB/s max/Turbo)
		Random Read	260K IOPS
		Random Write	260K IOPS
HP Z Turbo Drive G2 1TB TLC SSD	**Capacity**	1TB	
	Protocol	PCIe	
	Form Factor	M.2	
	Controller	NVMe	
	NAND Type	3D TLC	
	Endurance	300TBW (TB Written)	
	Reliability (MTBF)	1.5M hours	
	Interface	PCI Express 3.0 x4 electrical x4 physical	
	Operating Temperature	32° to 158° F (0° to 70° C)	
	Performance	**Sequential Read**	3000 MB/s
		Sequential Write	1150 MB/s (1700 MB/s max/Turbo)
		Random Read	360K IOPS
		Random Write	330K IOPS
HP Z Turbo Drive Quad Pro 256GB SSD module	**Capacity**	256GB (one M.2 PCIe NVMe module)	
	Interface	PCI Express 3.0 x4 electrical x4 physical	
	Operating Temperature	32° to 158° F (0° to 70° C)	

Technical Specifications - Hard Drives

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)

HARD DRIVE CONTROLLERS

Microsemi SmartHBA2100-4i4e SAS Controller	**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 SmartIOC 2100 SAS IO Controller	
	Internal Connectors	One x4 internal mini-SASHD (SFF-8643)	
	External Connectors	One x4 external mini-SASHD (SFF-8644)	
	Maximum Number of SCSI Devices	256 Non-RAID SAS/SATA devices	
	LED Indicators	Connector for Drive Activity Light	

Technical Specifications - Graphics

GRAPHICS

NVIDIA® Quadro® P400 1st GFX 2GB Graphics	**Form Factor**	Dimensions: 2.713" H x 5.7" L Single Slot, Low Profile Cooling: Active Weight: 129 grams
	Graphics Controller	NVIDIA® Quadro® P400 Graphics Card GP107-825 GPU 256 NVIDIA® CUDA® cores Max Power: 30 Watts
	Bus Type	PCI Express 3.0 x16
	Memory	Size: 2 GB GDDR5, 2000 MHz Memory Interface: 64-bit Memory Bandwidth: 32 GB/s
	Connectors	3mDP Outputs
	Maximum Resolution	DisplayPort™ 1.4: - up to 3x 5120 x 2880 x 24 bpp @ 60Hz - supports Multi-Stream Transport (MST)
	Image Quality Features	10-bit internal display processing pipeline 10-bit scan-out support
	Display Output	3 mDP Connectors
	Shading Architecture	Full Microsoft DirectX® 12 Shader Model 5.1
	Supported Graphics APIs	OpenGL® 4.5 DirectX® 12 Vulkan™ 1.0 API support includes: CUDA C, CUDA C++, DirectCompute , OpenCL™
	Available Graphics Drivers	Microsoft Windows 10 Microsoft Windows 8.1 Microsoft Windows 7 Linux® HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
	Notes	
NVIDIA® Quadro® P600 1st GFX 2GB Graphics	**Form Factor**	Dimensions: 2.713" H x 5.7" L Single Slot, Low Profile Cooling: Active Weight: 129 grams
	Graphics Controller	NVIDIA® Quadro® P600 Graphics Card GP107-850 GPU 384 NVIDIA® CUDA® cores Max Power: 40 Watts
	Bus Type	PCI Express 3.0 x16

Technical Specifications - Graphics

	Memory	Size: 2 GB GDDR5, 2000 MHz Memory Interface: 128-bit Memory Bandwidth: 64 GB/s
	Connectors	4mDP Outputs
	Maximum Resolution	DisplayPort™ 1.4: - up to 4x 5120 x 2880 x 24 bpp @ 60Hz - supports Multi-Stream Transport (MST)
	Image Quality Features	10-bit internal display processing pipeline 10-bit scan-out support
	Display Output	4 mDP Connectors
	Shading Architecture	Full Microsoft DirectX® 12 Shader Model 5.1
	Supported Graphics APIs	OpenGL® 4.5 DirectX® 12 Vulkan™ 1.0 API support includes: CUDA C, CUDA C++, DirectCompute , OpenCL™
	Available Graphics Drivers	Microsoft Windows 10 Microsoft Windows 8.1 Microsoft Windows 7 Linux® HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
	Notes	
AMD FirePro™ W2100 2GB Graphics	**Form Factor**	Low Profile, half length (full-height bracket included)
	Graphics Controller	AMD FirePro™ W2100 professional graphics based on Oland GPU. GPU: 320 Stream Processors organized into 5 Compute Units GPU Frequency: 630Mhz Power: 26W Cooling: Active
	Bus Type	PCI Express® x8, Generation 3.0
	Memory	2GB DDR3 memory Memory Bandwidth: up to 28.8 GB/s Memory Width: 128 bit
	Connectors	2x Display Port™ 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 1st GFX 4GB Graphics	**Form Factor**	Dimensions:2.713" H x 5.7" L Single Slot, Low Profile Cooling: Active Weight: 129 grams
	Graphics Controller	NVIDIA® Quadro® P1000 Graphics Card GP107-860 GPU 640 NVIDIA® CUDA® cores Max Power: 47 Watts
	Bus Type	PCI Express 3.0 x16
	Memory	Size: 4 GB GDDR5, 2500 MHz Memory Interface: 128-bit memory interface Memory Bandwidth: 80 GB/s memory bandwidth
	Connectors	4mDP Outputs
	Maximum Resolution	DisplayPort™ 1.4:

Technical Specifications - Graphics

		- up to 4x 5120 x 2880 x 24 bpp @ 60Hz - supports Multi-Stream Transport (MST)
	Image Quality Features	10-bit internal display processing pipeline 10-bit scan-out support
	Display Output	4 mDP Connectors
	Shading Architecture	Full Microsoft DirectX® 12 Shader Model 5.1
	Supported Graphics APIs	OpenGL® 4.5 DirectX® 12 Vulkan™ 1.0 API support includes: CUDA C, CUDA C++, DirectCompute , OpenCL™
	Available Graphics Drivers	Microsoft Windows 10 Microsoft Windows 8.1 Microsoft Windows 7 Linux® HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
	Notes	
NVIDIA® Quadro® P2000 1st GFX 5GB Graphics	**Form Factor**	Dimensions: 4.4”Hx7.9”L Single Slot Cooling: Active Weight: 260 grams
	Graphics Controller	NVIDIA® Quadro® P2000 Graphics Card Power: 75 Watts
	Bus Type	PCI Express 3.0 x16
	Memory	Size: 5GB GDDR5 Memory Bandwidth: 140 GB/s Memory Width: 160-bit
	Connectors	4x DisplayPort™ 1.4 Factory Configured Option: No adapter included with card After Market Option: No video cable adapter included Additional DVI to VGA, DisplayPort™ to VGA, DisplayPort™ to DVI, and DisplayPort™ to Dual-Link DVI adapters available as accessories.
	Maximum Resolution	DisplayPort™: - up to 5120 x 2880 x 24 bpp @ 60Hz - supports High Bit Rate 2 (HBR2) and Multi-Stream Transport (MST) DP 1.3 & 1.4 ready. DL-DVI(I) output: - up to 2560 x 1600 x 32 bpp @ 60 Hz Single Link-DVI(I) output: - up to 1920 x 1200 x 32 bpp @ 60Hz HDMI 2.0 (requires DP to HDMI adapter): 5120 x 2880 x 24 bpp @ 60Hz

Technical Specifications - Graphics

	Image Quality Features	12-bit internal display pipeline (hardware support for 12-bit scanout on supported panels, applications and connection) Stereoscopic 3D display support including NVIDIA® 3D Vision™ technology, NVIDIA® Mosaic and nView.
	Display Output	Maximum number of displays - 4 direct attached monitors Maximum number of monitors across all available 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® 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 • 1x single-cable 5K monitor, or 2x dual-cable 5K monitors 3x 4K support @ 60Hz
	Image Quality Features	Advanced support for 8-bit and 10-bit per RGB color component. High bandwidth scaler for high quality up and downscaling

Technical Specifications - Graphics

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

Technical Specifications - Graphics

	Maximum Resolution	5K support @ 60Hz • 1x single-cable 5K monitor, or 2x dual-cable 5K monitors 4x 4K support @ 60Hz
	Image Quality Features	Advanced support for 8-bit and 10-bit per RGB color component. High bandwidth scaler for high quality up and downscaling
	Display Output	4 full physical DP1.3 HBR3 / DP1.4 HDR outputs FreeSync support
	GPU Architecture	GCN 4th Generation
	Supported Graphics APIs	DirectX®12 OpenGL® 4.5 OpenCL™ 2.0 Vulkan™ 1.0
	Available Graphics Drivers	Windows 10 64-bit Windows® 7 64-bit Linux® 64-bit (selected Enterprise distributions) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
	Notes	4. HDR content requires that the system be configured with a fully HDR-ready content chain, including: graphics card, monitor/TV, graphics driver and application. Video content must be graded in HDR and viewed with an HDR-ready player. Windowed mode content requires operating system support. 5. AMD PowerTune and AMD ZeroCore Power are technologies offered by certain FirePro™ and Radeon™ Pro products, which are designed to intelligently manage GPU power consumption in response to certain GPU load conditions. 6. As of September 2016, certified for DisplayPort™ 1.4 HBR3 and ready for DisplayPort™ 1.4 HDR based on independent verification by DisplayPort™ testing authority. HDR content requires that the system be configured with a fully HDR-ready content chain, including: graphics card, monitor/TV, graphics driver and application. Video content must be graded in HDR and viewed with an HDR-ready player. Windows mode content requires operating system support.
NVIDIA® Quadro® P4000 1st GFX 8GB Graphics	**Form Factor**	Dimensions: 4.4”H x 9.5”L Single-slot, full-height Weight: 475 grams (without extender)
	Graphics Controller	NVIDIA® Quadro® P4000 Graphics Card GPU: GP104 with 1792 CUDA cores Power: 120 Watts
	Bus Type	PCI Express 3.0 x16
	Memory	Size: 8GB GDDR5 Memory Bandwidth: 243 GB/s Memory Width: 256-bit

Technical Specifications - Graphics

Connectors	4 x DisplayPort 1.4 3-pin mini-DIN connector via optional bracket 1 x 6-pin auxiliary power connector 4-pin header for stereo signal SYNC connector for Quadro® Sync II 2 x SLI connectors Factory Configured Option: No video cable adapter included After Market Option: No video cable adapter included Additional DisplayPort-to-VGA, DisplayPort-to-HDMI, or DisplayPort-to-DVI adapters are available as accessories
Maximum Resolution	Dual-link internal TMDS (DVI 1.0): - up to 2560 x 1600 x 32 bpp @ 60 Hz Single-link internal TMDS (DVI 1.0): - up to 1920 x 1200 x 32 bpp @ 60 Hz HDMI™ 2.0b (requires DP to HDMI adapter): - up to 5120 x 2880 x 24 bpp @ 60Hz DisplayPort: - up to 4096 x 2160 x 30 bpp @ 60Hz - up to 2560 x 1600 x 30 bpp @ 120 Hz - supports High Bit Rate 2 (HBR2) and Multi-Stream Transport (MST) Using two DP outputs, the P4000 can drive one dual DP input display with 5120 x 2880 x 30 bpp @ 60Hz resolution.
Image Quality Features	Advanced support for 8-bit, 10-bit, and 12-bit per RGB color component. HDCP 2.2 support over DisplayPort, DVI, and HDMI connectors NVIDIA 3D Vision™ and other 3D stereo technologies NVIDIA Mosaic and nView
Display Output	Maximum number of displays - 4 direct attached monitors Maximum number of monitors across all available Quadro P4000 outputs is 4.
Shading Architecture	Shader Model 5.1
Supported Graphics APIs	OpenGL 4.5 DirectX 12 Vulcan 1.0 API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran
Available Graphics Drivers	Microsoft Windows 10 Microsoft Windows 7 Linux - Full OpenGL implementation, complete with NVIDIA and ARB extensions HP qualified drivers may be preloaded or available from the HP support Web site:

Technical Specifications - Graphics

		http://welcome.hp.com/country/us/en/support.html
	Notes	1. Quadro P4000 offered as Factory Configured Option does not include a video cable adapter. Video cable adapters must be ordered separately. 2. Quadro P4000 offered as an After Market Option does not include video cables. Video cable adapters must be ordered separately.

NVIDIA® Quadro® P5000 1st GFX 16GB Graphics	**Form Factor**	Full-Height Dual Slot (4.4” Height x 10.5” Length) Weight: 815 grams / 1.80 lbs
	Graphics Controller	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 Quadro Sync connector (compatible with Quadro II Sync) One 8-pin auxiliary power connector Factory configured option: No video cable adapter included with card. After market option Kit: No video cable adaptor included with card. DVI to VGA, DisplayPort™ to VGA, DisplayPort™ to DVI, and DisplayPort™ to Dual-Link DVI adapters available as accessories.
	Maximum Resolution	5K support @ 60Hz 1x single-cable 5K monitor, or 2x dual-cable 5K monitors
	Image Quality Features	Advanced support for 8-bit, 10-bit, and 12-bit per RGB color component. HDCP 2.2 support over DisplayPort™, DVI, and HDMI connectors NVIDIA 3D Vision™ and other 3D stereo technologies NVIDIA® Mosaic and nView Desktop Management
	Display Outputs[1]	4x DP1.4 HDR outputs (up to 3840x2160 UHD @ 120Hz refresh, or up to 8K at 30Hz) 1x Dual-link DVI-D output (up to 2560 x 1600 @ 60 Hz and 1920x1200 @ 120 Hz)

Technical Specifications - Graphics

	GPU Architecture	NVIDIA® Pascal™
	Supported Graphics APIs	DirectX®12 , OpenGL® 4.5, OpenCL™ 1.0, Vulkan™ 1.0 Developer API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL™, Java, Python, and Fortran
	Available Graphics Drivers	Windows® 10 64-bit Windows® 7 64-bit Linux® 64-bit HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
	Notes	1- Supports up to a total of 4 displays
NVIDIA® Quadro® P6000 1st GFX 24GB Graphics	**Form Factor**	Full-Height Dual Slot (4.4” Height x 10.5” Length) Weight: 967 grams / 2.14 lbs
	Graphics Controller	NVIDIA® Quadro® P6000 graphics GPU: 3840 NVIDIA® CUDA® Parallel Processing Cores Power: 250 Watts Cooling: Active
	Memory	24GB GDDR5X memory Memory Bandwidth: Up to 432 GB/s Memory Width: 384 bit ECC Memory (disabled by default)
	Connectors	DP (x4) with HDR support DL-DVI(I) 3-pin mini-DIN connector SLI connector Quadro Sync connector (compatible with Quadro II Sync) One 8-pin auxiliary power connector Factory configured option: No video cable adapter included with card. After market option Kit: No video cable adaptor included with card. DVI to VGA, DisplayPort™ to VGA, DisplayPort™ to DVI, and DisplayPort™ to Dual-Link DVI adapters available as accessories.
	Maximum Resolution	5K support @ 60Hz 1x single-cable 5K monitor, or 2x dual-cable 5K monitors
	Image Quality Features	Advanced support for 8-bit, 10-bit, and 12-bit per RGB color component.

Technical Specifications - Graphics

		HDCP 2.2 support over DisplayPort™, DVI, and HDMI connectors NVIDIA® 3D Vision™ and other 3D stereo technologies NVIDIA® Mosaic and nView
	Display Outputs[1]	4x DP1.4 HDR outputs (up to 3840x2160 UHD @ 120Hz refresh, or up to 8K at 30Hz) 1x Dual-link DVI-D output (up to 2560 x 1600 @ 60 Hz and 1920x1200 @ 120 Hz)
	GPU Architecture	NVIDIA® Pascal™
	Supported Graphics APIs	DirectX®12, OpenGL® 4.5, OpenCL™ 1.0, Vulkan™ 1.0 Developer API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL™, Java, Python, and Fortran
	Available Graphics Drivers	Windows® 10 64-bit Windows® 7 64-bit Linux® 64-bit HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
	Notes	1- Supports up to a total of 4 displays
Radeon™ Pro WX 7100 8GB Graphics	**Form Factor**	Full-Height Single Slot (9.5" Length)
	Graphics Controller	Radeon™ Pro WX 7100 graphics GPU: 2304 Stream Processors organized into 36 Compute Units Power: 130 Watts Cooling: Active
	Memory	8GB GDDR5 memory Memory Bandwidth: 7 Gbps / 224 GB/s Memory Width: 256 bit
	Connectors	4x DisplayPort™ 1.4 – HDR ready connectors with HBR3 and MST support. Factory Configured: No video cable adapter included After market option kit: No video cable adapter included Additional DisplayPort™-to-VGA or DisplayPort™-to-DVI adapters are available as Factory Configuration or Option Kit accessories.
	Maximum Resolution	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

Technical Specifications - Graphics

Display Output	4 full physical DP1.3 HBR3 / DP1.4 HDR outputs FreeSync support
GPU Architecture	GCN 4th Generation
Supported Graphics APIs	DirectX®12 OpenGL® 4.5 OpenCL™ 2.0 Vulkan™ 1.0
Available Graphics Drivers	Windows 10 64-bit Windows® 7 64-bit Linux® 64-bit HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html

Notes

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.

OPTICAL AND REMOVABLE STORAGE

HP 9.5mm Slim DVD Writer	**Description**	9.5mm height, tray-load	
	Mounting Orientation	Either horizontal or vertical	
	Interface Type	SATA/ATAPI	
	Dimensions (WxHxD)	128 x 9.5 x 127mm	
	Supported Media Types	DVD+R DVD+RW DVD+R DL DVD-R DL DVD-R DVD-RW CD-R CD-RW	
	Disc Capacity	DVD-ROM	8.5 GB DL or 4.7 GB standard
		Full Stroke DVD	< 200 ms (seek)
		Full Stroke CD	< 200 ms (seek)
	Maximum Data Transfer Rates	CD ROM Read	CD-ROM, CD-R Up to 24X CD-RW Up to 24X
		DVD ROM Read	DVD+RW Up to 8X DVD-RW Up to 8X DVD+R DL Up to 8X DVD-R DL Up to 8X DVD-ROM Up to 8X DVD-ROM DL Up to 8X DVD+R Up to 8X DVD-R Up to 8X
	Power	Source	SATA DC power receptacle
		DC Power Requirements	5 VDC ± 5%-100 mV ripple p-p
		DC Current	5 VDC -< 800 mA typical, <1600 mA maximum
	Operating Environmental (all conditions non-condensing)	Temperature	41° to 122° F (5° to 50° C)
		Relative Humidity	10% to 80%
		Maximum Wet Bulb Temperature	84° F (29° C)
	Operating Systems Supported	Windows 10, Windows 7 Professional 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	HP SATA DVD Writer drive, installation guide.	

	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 CD-R CD-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-R Up to 6X BD-RE SL/DL Up to 6X
Power	Source	SATA DC power receptacle
	DC Power Requirements	5 VDC ± 5%-100 mV ripple p-p
	DC Current	5 VDC -900 mA typical, 2000mA maximum
Operating Environmental (all conditions non-condensing)	Temperature	41° to 122° F (5° to 50° C)
	Relative Humidity	10% to 80%
	Maximum Wet Bulb Temperature	84° F (29° C)
Operating Systems Supported	Windows 8.1, Windows 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	9.5mm Slim BDXL Blu-Ray Writer, 5.25" ODD Bay adapter/carrier, slim SATA data/power cable, installation guide As Blu-ray is a new format containing new technologies, certain disc, digital connection, compatibility and/or performance issues may arise, and do not constitute defects in the product. Flawless playback on all systems is not guaranteed. In order for some Blu-ray titles to play, they may require a DVI or HDMI digital connection and your display may require HDCP support. HD-DVD movies cannot be played on this workstation.
HP DX115 Removable Drive Enclosure	**Interface Type**	Compatible with SAS or SATA controllers. Offers 6Gb/s performance when used with 6Gb/s HDDs.
	Dimensions (WxHxD)	147.6mm W x 41.1mm H x 205mm D (5.81" W x 1.62" H x 8.08" D)
	Approvals	Frame and Carrier: 1.73 kg (3.8 lbs.) Carrier: 0.45 kg (1 lbs.)
HP SD Card Reader	**Description**	Supports hardware ECC (Error Correction Code) function Supports hardware CRC (Cyclic Redundancy Check) function Supports SD 4-bit parallel transfer mode
	Interface Type	USB 3.0 High-speed interface
	Dimensions (WxHxD)	1.15 x .9 x .15 in (29.00 x 23.6 x 3.15 mm) Fits conveniently in the Front IO Bay
	Supported Media Types	Secure Digital Card (SD) Secure Digital High Capacity (SDHC) SD Extended Capacity Memory Card (SDXC) SD Ultra High Speed II(SD UHSII) These additional media types are supported with a card adapter. Memory Stick Micro (M2) miniSD miniSD High Capacity Micro SD Memory Card (MicroSD) Micro SD High Capacity Memory Card (MicroSDHC) Test Parameters/Conditions - Power applied, unit operating on system ±5%
	Operating Systems Supported	Windows 10 No driver is required for this device. Native support is provided by the operating system.
	Kit Contents	Media card reader
	Approvals	USB-IF, WHQL, Compliant with USB Mass Storage Class Bulk only Transport Specification Rev. 1.0, Compliant Intel® Front Panel I/O Connectivity Design Guide V. 1.3, FCC, CE, BSMI, C-Tick, VCCI, MIC, cUL, TUVT
	Weight	0.35 lbs. (0.16 kg)

CONTROLLER CARDS

HP IEEE 1394b FireWire PCIe Card	**Data Transfer Rate**	Supports up to 800 Mb/s
	Devices Supported	IEEE-1394 compliant devices
	Bus Type	PCIe card full height PCIe slots
	Ports	Two IEEE-1394b external 9-Pin connectors (Rear)
	Internal Connectors	One 10-Pin header connector
	System Requirements	Windows 8.1 64-bit, Windows 7 Professional 32-bit and 64-bit, SLED 11 and RHEL 6. Intel® i5 series or higher processor, min 2GB of RAM, 20GB Hard Drive, CD-ROM drive, built in sound system, Available PCIe slot.
	Temperature - Operating	50° to 131° F (10° to 55° C)
	Temperature - Storage	-22° to 140° F (-30° to 60° C)
	Relative Humidity - Operating	20% to 80%
	Compliances	FCC Part 15B, cULus 60950, CE Mark EN55022B(1995)/EN55024-1998 STD, Taiwan BSMI CNS13438, Korea MIC
	Operating Systems Supported	Windows 8.1 64-bit, Windows 7 Professional 32-bit and 64-bit
HP Thunderbolt-2 PCIe 1-port I/O Card	**Data Transfer Rate**	Supports up to 20 Gb/s (20,000 Mb/s)
	Devices Supported	Thunderbolt™ certified devices
	Bus Type	PCIe card, full or half height PCIe slots
	Ports	One Thunderbolt™ 2 external 20-Pin output connectors (Rear) One full size DisplayPort™ input connector (Rear)
	Internal Connectors	One 5-Pin header connector
	System Requirements	Genuine Windows 7 Professional 64-bit, Genuine Windows 8.1 64-bit, Intel® i5 series or higher processor, 4-GB RAM, 20-GB Hard Drive, available PCIe slot.
	Temperature - Operating	50° to 131° F (10° to 55° C)
	Temperature - Storage	-22° to 140° F (-30° to 60° C)
	Relative Humidity - Operating	20% to 80%
	Compliances	FCC Part 15B, cULus 60950, CE Mark EN55022B(1995)/EN55024-1998 STD, Taiwan BSMI CNS13438, Korea MIC
	Operating Systems Supported	Genuine Windows 7 Professional 64-bit, Genuine Windows 8.1 64-bit.
	Kit Contents	HP Thunderbolt™ 2 PCIe 1-port I/O Card, full height and half height bracket, DisplayPort™ to DisplayPort™ cable, internal header cables (2), user documentation and warranty card.

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 • Off = No link • Blinking = Activity Speed LED • 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 • Off = No link • Blinking = Activity Speed LED • 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 • Off = No link • Blinking = Activity Speed LED • 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 • Off = No link • Blinking = Activity Speed LED • Off = 10Mbps • Green = 100Mbps • Amber = 1Gbps
	Operating Temperature	0 °C to 55 °C (32 °F to 131 °F)
	Hardware Certifications	USA: FCC B, EU: UL CE, Japan: VCCI, Taiwan: BSMI, Australia/New Zealand: CTICK, Korea: KCC, Canada: ICES-003/NMB-003
Intel® I350-T2	**Networking Interface**	2 RJ-45
	System Interface	PCI Express 2.1 x4
	Networking Speeds Supported	10Mbps, 100Mbps, 1Gbps
	Cabling (up to 100m)	Cat3 (or higher) for 10Mbps Cat5 (or higher) for 100Mbps Cat5e (or higher) for 1Gbps
	Power Consumption (active-typical)	4.4W
	Physical Dimensions	Length: 13.54cm (5.33 inches) Width: 6.89 (2.71 inches) Full-height end bracket: 12.0cm (4.725 inches) Low-profile end bracket: 7.92cm (3.117 inches)
	Connect Speed LED Indicators	Link/Activity LED • Off = No link • Blinking = Activity Speed LED • Off = 10Mbps • Green = 100Mbps • Amber = 1Gbps
	Operating Temperature	0 °C to 55 °C (32 °F to 131 °F)

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 • Off = No link • Blinking = Activity Speed LED • Off = 10Mbps • Green = 100Mbps • Amber = 1Gbps
	Operating Temperature	0 °C to 55 °C (32 °F to 131 °F)
	Hardware Certifications	USA: FCC B, EU: UL CE, Japan: VCCI, Taiwan: BSMI, Australia/New Zealand: CTICK, Korea: KCC, Canada: ICES-003/NMB-003

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	Link/Activity LED • Off = No link • Blinking = Activity Speed LED • Off = No link • Amber = <5Gbps • Green = 5Gbps
	Operating Temperature	0 °C to 55 °C (32 °F to 131 °F)
	Hardware Certifications	USA: FCC B, EU: UL CE, Japan: VCCI, Taiwan: BSMI, Australia/New Zealand: CTICK, Korea: KCC, Canada: ICES-003/NMB-003
Intel® X550-T2	**Networking Interface**	2 x RJ-45
	System Interface	PCI Express 3 x4
	Networking Speeds Supported	100Mbps, 1Gbps, 2.5Gbps, 5Gbps, 10Gbps
	Cabling (up to 100m)	Cat5 (or higher) for 100Mbps Cat5e (or higher) for 1Gbps, 2.5Gbps, or 5Gbps Cat6a (or higher) for 10Gbps
	Power Consumption (active-typical)	3.9W at 100Mbps 5.5W at 1Gbps 11.2W at 10Gbps
	Physical Dimensions	5.2 in x 2.7 in (without bracket)
	Connect Speed LED Indicators	Link/Activity LED • Off = No link • Blinking = Activity Speed LED • Off = No link • Amber = <10Gbps • Green = 10Gbps
	Operating Temperature	0 °C to 55 °C (32 °F to 131 °F)
	Hardware Certifications	USA: FCC B, EU: UL CE, Japan: VCCI, Taiwan: BSMI, Australia/New Zealand: CTICK, Korea: KCC, Canada: ICES-003/NMB-003
Intel® X710-DA2 10GBASE-SR Converged Network Adapter	**Networking Interface**	2 SFP+ Ports for LC SFP+ Transceivers
	System Interface	PCI Express 3.0 x8

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 • Off = No link • Blinking = Activity Speed LED • Off = 10Mbps • Green = 100Mbps • Amber = 1Gbps
	Operating Temperature	0 °C to 55 °C (32 °F to 131 °F)
	Hardware Certifications	USA: FCC B, EU: UL CE, Japan: VCCI, Taiwan: BSMI, Australia/New Zealand: CTICK, Korea: KCC, Canada: ICES-003/NMB-003
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:
November 1, 2017	From v1 to v2	Added	HP DisplayPort to HDMI Adapter, HP DisplayPort to VGA Adapter, NVIDIA SLI 3-slot Graphics Connector and NVIDIA Quadro Sync II to Graphics section and Microsemi 3152-8i SAS ROC RAID Controller
		Changed	Graphics, Storage / Hard Drives and Memory sections, changed Front and internal view info on the Overview section, changed Operating Systems section, changed System Board section, Physical Security and Serviceability sections