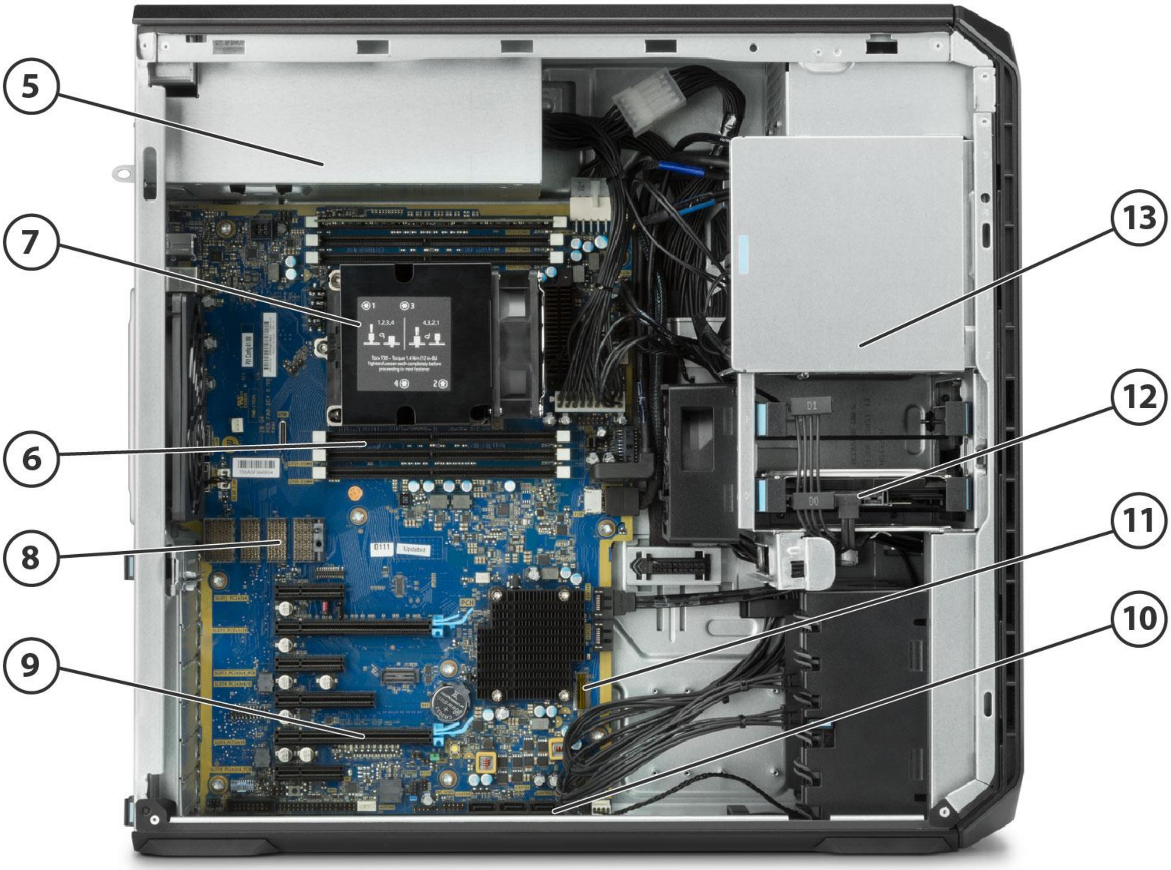
Overview

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

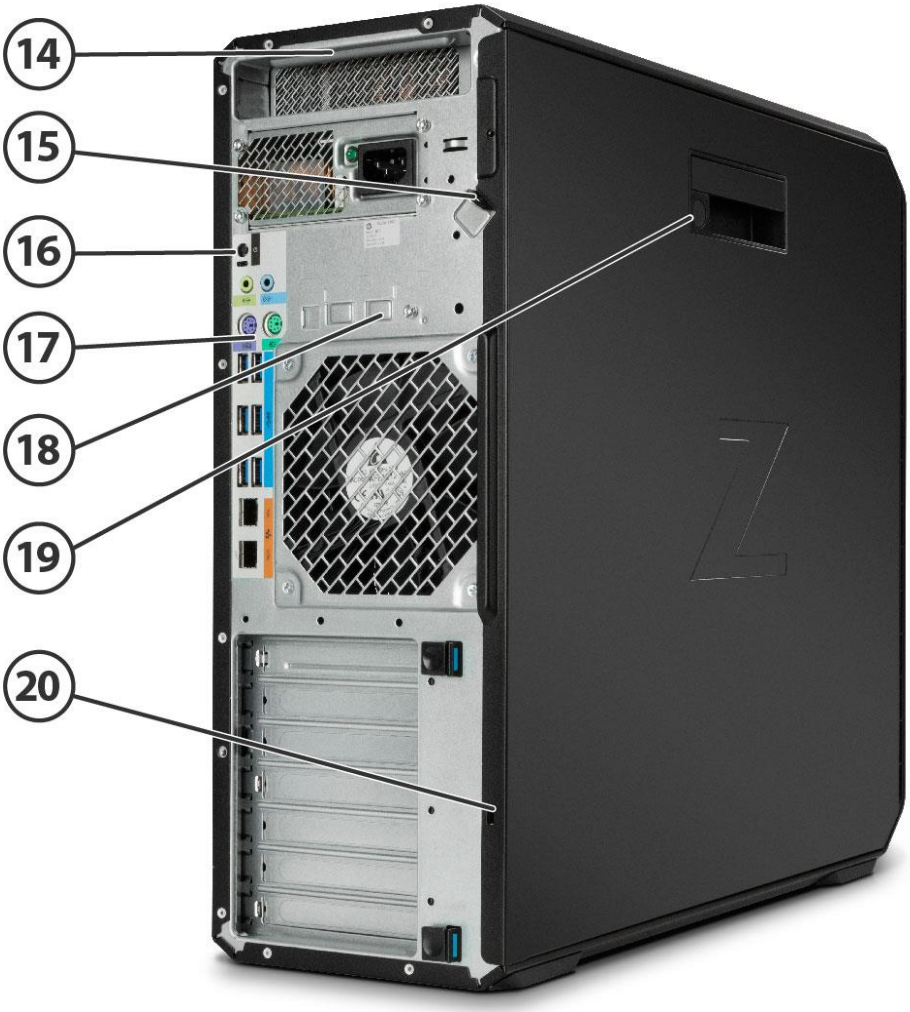
Overview



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

Overview

Form Factor Tower

Operating Systems Preinstalled:

- Windows 11 Pro for Workstations[2]
- Windows 10 Pro for Workstations[1,2]
- Ubuntu 20.04 LTS[3]
- HP Linux-ready (minimal OS ready for customer OS installation)
- Red Hat® Enterprise Linux® Desktop Workstation (Paper license with 1 year support; no preinstalled OS)

Supported:

- Red Hat Enterprise Linux Workstation 6, 7, 8[4]
- SUSE Linux Enterprise Desktop 12, 15[4]
- Ubuntu 16.04, 18.04, 20.04 LTS[3]

[1] Device comes with Windows 10 and a free Windows 11 upgrade or may be preloaded with Windows 11. Upgrade timing may vary by device. Features and app availability may vary by region. Certain features require specific hardware (see Windows 11 Specifications).

[2] Not all features are available in all editions or versions of Windows. Systems may require upgraded and/or separately purchased hardware, drivers, software or BIOS update to take full advantage of Windows functionality. Windows is automatically updated and enabled. High speed internet and Microsoft account required. ISP fees may apply and additional requirements may apply over time for updates. See http://www.windows.com.

[3] Not all features are available in all editions or versions of Ubuntu. Systems may require upgraded and/or separately purchased hardware, drivers, software or BIOS to take full advantage of Ubuntu functionality. Ubuntu may be automatically updated. ISP fees may apply, and additional requirements may apply over time for updates.

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

NOTE: In accordance with Microsoft's support policy, HP does not support the Windows® 7 operating system on products configured with Intel® 7th Generation and forward processors.

Available Processors

Name	Cores	Clock Speed (GHz)	Cache (MB)	Memory Speed (MT/s)	Hyper-Threading	Intel® Turbo Boost Technology[1]	Supports Intel® DCPMM Technology[2]	TDP (W)
Intel® Xeon® W Processors								
Intel® Xeon® W-3275 processor	28	2.5 GHz	38.5	2933	Yes	4.4, 4.6	NO	205
Intel® Xeon® W-3265 processor	24	2.7 GHz	33	2933	Yes	4.4, 4.6	NO	205
Intel® Xeon® W-3245 processor	16	3.2 GHz	22	2933	YES	4.4, 4.6	NO	205
Intel® Xeon® W-3235 processor	12	3.3 GHz	19.25	2933	YES	4.4, 4.5	NO	180
Intel® Xeon® W-3225 processor	8	3.7 GHz	16.5	2666	YES	4.3, 4.4	NO	160

Overview

Intel® Xeon® W-3223 processor	8	3.5 GHz	16.5	2666	YES	4, 4.2	NO	160
Intel® Xeon® Scalable Processors								
Intel® Xeon® Gold 6258R processor	28	2.7 GHz	38.50	2933	YES	4.0, 3.4	YES	205
Intel® Xeon® Gold 6248R processor	24	3.0 GHz	35.75	2933	YES	4.0, 3.9	YES	205
Intel® Xeon® Gold 6246R processor	16	3.4 GHz	35.75	2933	YES	4.1, 4.0	YES	205
Intel® Xeon® Gold 6244 processor	8	3.6 GHz	24.75	2933	YES	4.3, 4.4	YES	150
Intel® Xeon® Gold 6242R processor	20	3.1 GHz	35.75	2933	YES	4.1, 3.8	YES	205
Intel® Xeon® Gold 6242 processor	16	2.6 GHz	22	2933	YES	3.5, 3.9	YES	150
Intel® Xeon® Gold 6240R processor	24	2.4 GHz	35.75	2933	YES	4.0, 3.2	YES	165
Intel® Xeon® Gold 6240 processor	18	2.6 GHz	24.75	2933	YES	3.3, 3.9	YES	150
Intel® Xeon® Gold 6238R processor	28	2.2 GHz	38.5	2933	YES	4.0, 3.0	YES	165
Intel® Xeon® Gold 6234 processor	8	3.3 GHz	24.75	2933	YES	4.0, 4.0	YES	130
Intel® Xeon® Gold 6230R processor	26	2.1 GHz	35.75	2933	YES	4.0, 3.0	YES	150
Intel® Xeon® Gold 6226R processor	16	2.9 GHz	22	2933	YES	3.9, 3.6	YES	150
Intel® Xeon® Gold 6226 processor	12	2.7 GHz	19.25	2933	YES	3.5, 3.7	YES	125
Intel® Xeon® Gold 6136 processor	12	3.0 GHz	24.75	2666	YES	3.6, 3.7	NO	150
Intel® Xeon® Gold 6128 processor	6	3.4 GHz	19.25	2666	YES	3.7, 3.7	NO	115
Intel® Xeon® Gold 5222 processor	4	3.8 GHz	16.5	2933	YES	3.9, 3.9	YES	105
Intel® Xeon® Gold 5220R processor	24	2.2 GHz	35.75	2666	YES	4.0, 2.9	YES	150
Intel® Xeon® Gold 5218R processor	20	2.1GHz	27.5	2666	YES	4.0, 2.9	YES	125
Intel® Xeon® Gold 5218 processor	16	2.3 GHz	22	2666	YES	2.8, 3.9	YES	125
Intel® Xeon® Gold 5215 processor	10	2.5 GHz	13.75	2666	YES	3.0, 3.4	YES	85
Intel® Xeon® Gold 5118 processor	12	2.3 GHz	16.50	2400	YES	2.7, 3.2	NO	105
Intel® Xeon® Silver 4216 processor	16	2.1 GHz	22	2400	YES	2.7, 3.2	NO	100
Intel® Xeon® Silver 4215R processor	8	3.2 GHz	11	2400	YES	4.0, 3.6	YES	130
Intel® Xeon® Silver 4214R processor	12	2.4 GHz	16.5	2400	YES	3.0, 3.5	NO	100
Intel® Xeon® Silver 4214 processor	12	2.2 GHz	16.5	2400	YES	2.7, 3.2	NO	85
Intel® Xeon® Silver 4210R processor	10	2.4 GHz	13.75	2400	YES	2.9, 3.2	NO	100

Intel® Xeon® Silver 4210 processor	10	2.2 GHz	13.75	2400	YES	2.7, 3.2	NO	85
Intel® Xeon® Silver 4208 processor	8	2.1 GHz	11	2400	YES	2.5, 3.2	NO	85
Intel® Xeon® Silver 4114 processor	10	2.2 GHz	13.75	2400	YES	2.5, 3.0	NO	85
Intel® Xeon® Silver 4108 processor	8	1.8 GHz	11.00	2400	YES	2.1, 3.0	NO	85
Intel® Xeon® Bronze 3206R processor	8	1.9 GHz	11.00	2133	YES	N/A	NO	85
Intel® Xeon® Bronze 3204 processor	6	1.9 GHz	8.25	2133	YES	N/A	NO	85
	All Z6G4 Intel® Xeon® CPUs Feature Intel® vPro™ Technology. [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. [2]Intel® Data Center Persistent Memory Modules availability will be announced at a future date.							

Available Processors

Disclaimers

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

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

Color

Black

Convertibility

No

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*

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

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

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

Expansion Bays (see storage section for more details)	2 internal 3.5" bays (with acoustic dampening rail assemblies pre-installed) 2 external 5.25" bays • 3rd and 4th 3.5" HDD each occupy one external bay • 3rd and 4th 2.5" HDD/SSD occupy a single external bay within a 2:1 carrier) 1 dedicated 9.5mm slim optical disk drive bay
Front I/O	• Base: Power button, 1 Headset audio port, 4 USB 3.1 G1 Type A (1 charging) • Premium (optional): Power button, 1 Headset audio port, 2 USB 3.1 G2 Type C™, 2 USB 3.1 G1 Type A (1 charging) • Optional: SD reader
Internal I/O	1 USB 3.1 G1 (aka USB 3.0) single-port header, 1 USB 2.0 single-port header and 1 USB 2.0 dual-port header
Rear I/O	6 USB 3.1 G1 (aka USB 3.0) Type A ports, 2 1Gbe LAN ports (1x supporting Intel® AMT), Audio: 1 Line out, 1 Line in (Line in can be retasked as microphone), 1 PS/2 mouse port, 1 PS/2 keyboard port, 1 Rear power button Optional: 1 serial port (cable up to rear bulkhead)
Interfaces Supported	SD card reader (optional) 6-channel SATA interface (6 @ 6.0 Gb/s) 6 channels are eSATA configurable for use with eSATA CTO/AMO Kit (No hot plug / hot swap supported) USB 2.0, USB 3.1 G1 (aka USB 3.0), USB 3.1 G2 (optional)
On-board RAID Support	SATA RAID 0 Striped Array SATA RAID 1 Mirrored Array SATA RAID 5 Striped/Parity SATA RAID 10 Striped/Mirrored
Chassis Dimensions (H x W x D)	H: 17.5" (445mm) W: 6.65" (169mm) D: 18.3" (465mm)
Packaged Dimensions	H: 24" (610mm) W: 12.3" (313mm) D: 23.3" (593mm)
Palletization Profile	6 units x 3 layers = 18 units per pallet 1200x1000x1836mm (pallet included)
Rack Dimensions	4U
Weight	Exact weights depend upon configuration (System weight only).

Overview

	Minimum: 13.1 kg (29 lbs.) Standard: 13.6 kg (30.1 lbs.) Maximum: 23.9 kg (52.7 lbs.)
Temperature	Operating: 5° to 35°C (40° to 95°F) Non-operating: -40° to 60°C (-40° to 140°F) **NOTE:** Above 1524 m (5,000 feet) altitude, maximum operating temperature is reduced by 1° C (1.8° F) per 305 m (1,000 feet) elevation increase
Humidity	Operating: 10% to 85% relative humidity, non-condensing, 35° C maximum wet bulb Non-operating: 10% to 90% relative humidity, non-condensing, 35° C maximum wet bulb
Maximum Altitude (non-pressurized)	Operating: 3,048m (10,000ft) Non-operating: 9,144m (30,000ft) **NOTE:** Above 1524 m (5,000 feet) altitude, maximum operating temperature is reduced by 1° C (1.8° F) per 305 m (1,000 feet) elevation increase
Power Supply	1000 watts wide-ranging, active Power Factor Correction, 90% Efficient, with 2X 6-pin graphics power cables (graphics power cables are 6/8-pin convertible) The Z6 G4 1000W power supply efficiency report can be found at this link: https://plugloadsolutions.com/psu_reports/HP_D15-1K0P1A_1000W_ECOS%204838_Report.pdf **NOTE:** All power cords supplied by HP for Desktop Workstations are between 1.83m and 2.5m (dependent on country localization and platform).
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[1]	Support Notes
Intel® Xeon® W-3200 Series CPU				
Intel® Xeon® W-3275 2.5 2933 28C processor	Y	N		
Intel® Xeon® W-3265 2.7 2933 24C processor	Y	N		
Intel® Xeon® W-3245 3.2 2933 16C processor	Y	N		
Intel® Xeon® W-3235 3.3 2933 12C processor	Y	N		
Intel® Xeon® W-3225 3.7 2666 8C processor	Y	N		
Intel® Xeon® W-3223 3.5 2666 8C processor	Y	N		
Intel® Xeon® Scalable CPU				
Intel® Xeon® Gold 6258R processor	Y	N		
Intel® Xeon® Gold 6248R processor	Y	N		
Intel® Xeon® Gold 6246R processor	Y	N		
Intel® Xeon® Gold 6244 processor	Y	Y	5YT05AA	1
Intel® Xeon® Gold 6242R processor	Y	N		
Intel® Xeon® Gold 6242 processor	Y	Y	5YT04AA	1
Intel® Xeon® Gold 6240R processor	Y	N		
Intel® Xeon® Gold 6240 processor	Y	Y	5YT02AA	1
Intel® Xeon® Gold 6238R processor	Y	N		
Intel® Xeon® Gold 6234 processor	Y	Y	5YT00AA	1
Intel® Xeon® Gold 6230R processor	Y	Y	9VA87AA	1
Intel® Xeon® Gold 6226R processor	Y	Y	9VA85AA	1
Intel® Xeon® Gold 6226 processor	Y	Y	5YS98AA	1
Intel® Xeon® Gold 6136 processor	Y	Y	1XM39AA	1
Intel® Xeon® Gold 6128 processor	Y	Y	1XM44AA	1
Intel® Xeon® Gold 5222 processor	Y	Y	5YS97AA	1
Intel® Xeon® Gold 5220R processor	Y	Y	8BC99AA/AT	1
Intel® Xeon® Gold 5218R processor	Y	Y	9VA83AA	1
Intel® Xeon® Gold 5218 processor	Y	Y	5YS95AA	1
Intel® Xeon® Gold 5215 processor	Y	Y	5YS94AA	1
Intel® Xeon® Gold 5118 processor	Y	Y	1XM45AA	1
Intel® Xeon® Silver 4216 processor	Y	Y	5YS93AA	1
Intel® Xeon® Silver 4215R processor	Y	Y	9VA81AA	1
Intel® Xeon® Silver 4214R processor	Y	Y	8BC96AA/AT	1
Intel® Xeon® Silver 4214 processor	Y	Y	5YS91AA	1
Intel® Xeon® Silver 4210R processor	Y	Y	8BC95AA	1
Intel® Xeon® Silver 4210 processor	Y	Y	5YS90AA	1
Intel® Xeon® Silver 4208 processor	Y	Y	5YS89AA	1
Intel® Xeon® Silver 4114 processor	Y	Y	1XM49AA	1
Intel® Xeon® Silver 4108 processor	Y	Y	1XM51AA	1
Intel® Xeon® Bronze 3206R processor	Y	Y	8BC93AA	1
Intel® Xeon® Bronze 3204 processor	Y	Y	5YS88AA	1

[1] Options kits available for second processor upgrade.

Supported Components

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

Note 1: Intel® DCPMM® (Data Center Persistent Memory) Supported.

Monitors / Displays

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

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

Storage / Hard Drives

SAS Hard Drives

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

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	
2TB 7200RPM SATA 3.5in Enterprise	Y	Y	2Z274AA	
4TB SATA 7200RPM Ent 3.5” HDD	Y	Y	K4T76AA	
6TB SATA 7200RPM Ent 3.5” HDD	Y	Y	3DH90AA	
8TB 7200RPM SATA 3.5in Enterprise	Y	Y	2Z273AA	

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/AT	
HP 256GB SATA SED OPAL2 SSD	Y	Y	G7U67AA	
HP 512GB SATA SED OPAL2 SSD	Y	Y	N8T26AA	
HP 240GB SATA Enterprise SSD	Y	Y	T3U07AA	
HP 480GB SATA Enterprise SSD	Y	Y	T3U08AA	
HP 960GB 2.5in Enterprise SATA-3 SSD	Y	Y	1W6P8AA	
1920GB 2.5in Enterprise SATA-3 SSD	Y	Y	1W6P9AA	

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	4
HP Z Turbo Drive 512GB MLC Z4/Z6 G4 SSD Kit	Y	Y	1PD57AA/AT	4
HP Z Turbo Drive 1TB MLC Z4/Z6 G4 SSD Kit	Y	Y	1PD58AA	4
HP Z Turbo Drive 256GB TLC Z4/Z6 G4 SSD Kit	Y	Y	1PD59AA/AT	
HP Z Turbo Drive 512GB TLC Z4/Z6 G4 SSD Kit	Y	Y	1PD60AA	
HP Z Turbo Drive 1TB TLC Z4/Z6 G4 SSD Kit	Y	Y	1PD61AA	
HP Z Turbo Drive 2TB TLC Z4/Z6 G4 SSD Kit	Y	Y	3KP39AA	
HP Z Turbo Drive 256GB Z4/Z6 G4 SED Kit	N	N	EOL	4
HP Z Turbo Drive 512GB Z4/Z6 G4 SED Kit	N	N	EOL	4
HP Z Turbo Drive 1TB TLC Z4/Z6 G4 SED Kit	Y	Y	6YT76AA	
HP Z Turbo Drive 1TB TLC Z4/Z6 G4 SED Module	Y	Y	6YT79AA	
HP Z Turbo 2TB SED OPAL2 TLC M.2 Z4/Z6 SSD	Y	Y	2Y7W6AA	
HP 256GB M.2 2280 PCIe NVMe TLC SSD Z2/Z4/Z6 Kit	Y	Y	8PE68AA	3
HP 512GB M.2 2280 PCIe NVMe TLC SSD Z2/Z4/Z6 Kit	Y	Y	8PE69AA	3
HP 1TB M.2 2280 PCIe NVMe TLC SSD Z2/Z4/Z6 Kit	Y	Y	8PE70AA	3
HP 256GB M.2 2280 PCIe NVMe TLC SSD Module	N	Y	8PE62AA	2
HP 512GB M.2 2280 PCIe NVMe TLC SSD Module	N	Y	8PE63AA	2
HP 1TB M.2 2280 PCIe NVMe TLC SSD Z2 Module	N	Y	8PE64AA	2
HP 2TB PCIe NVME TLC M.2 Z4/6 G4 SSD	Y	Y	35F74AA	
HP Z Turbo Drive Dual Pro				
HP Z Turbo Drive Dual Pro 256GB TLC SSD	Y	Y	4YF60AA	3
HP Z Turbo Drive Dual Pro 512GB TLC SSD	Y	Y	4YF61AA	3
HP Z Turbo Drive Dual Pro 1TB TLC SSD	Y	Y	4YF62AA	3

HP Z Turbo Drive Dual Pro 2TB TLC SSD	Y	Y	4YF63AA	3
HP 256GB M.2 2280 PCIe NVMe TLC SSD Dual Pro Kit	Y	Y	8PE74AA	3
HP 512GB M.2 2280 PCIe NVMe TLC SSD Dual Pro Kit	Y	Y	8PE75AA	3
HP 1TB M.2 2280 PCIe NVMe TLC SSD Dual Pro Kit	Y	Y	8PE76AA	3
HP Z Turbo Drive Quad Pro				
HP Z Turbo Drive Quad Pro 2x256GB PCIe TLC SSD	Y	Y	4YZ38AA	1
HP Z Turbo Drive Quad Pro 2x512GB PCIe TLC SSD	Y	Y	4YZ39AA	1
HP Z Turbo Drive Quad Pro 2x1TB PCIe TLC SSD	Y	Y	4YZ40AA	1
HP Z Turbo Drive Quad Pro 2x2TB PCIe TLC SSD	Y	Y	3KP42AA	
HP Z Turbo Drive Quad Pro 256GB SSD module	N	Y	N2N00AA	2
HP Z Turbo Drive Quad Pro 512GB SSD module	N	Y	N2N01AA	2
HP Z Turbo Drive Quad Pro 1TB SSD module	N	Y	T9J00AA	2
HP Z Turbo Drive Quad Pro 2TB SSD module	N	Y	3KP43AA	
Intel® 905p Series SSD (Optane SSD)				
Intel® Optane SSD 905p 280GB AiC**	Y	Y	2SC47AA	
Intel® Optane SSD 905p 480GB AiC**	Y	Y	2SC48AA	
Intel® Optane SSD 905p 380GB M.2 SSD Module	Y	Y	6LA66AA	

Note 1: Dual M.2 SSD modules plus carrier and heat sink
Note 2: M.2 SSD module only, for Quad Pro or Dual Pro carrier
Note 3: Single M.2 SSD module plus dual carrier and heat sink
Note 4: These M.2 SSD kits and module are End of Life and no longer available.
** PCIe card installed in standard PCIe x4 slot

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

Graphics

	Factory Configured	**Option Kit**	**Option Kit Part Number**	**Support Notes**	**Supported # of cards**
Graphics Cable Adapters					
HP DisplayPort to VGA Adapter	Y	Y	AS615AA		
HP DisplayPort to HDMI Adapter	Y	Y	K2K92AA		
HP DisplayPort to Dual Link DVI Adapter	Y	Y	NR078AA		1
HP DisplayPort to DVI-D Adapter	Y	Y	FH973AA		1
HP DisplayPort to DVI-D Adapter (2-pack)	Y	N			1
HP DisplayPort to DVI-D Adapter (4-pack)	Y	N			1
HP DisplayPort to DVI-D Adapter (6-pack)	Y	N			1
NVIDIA® SLI 3-slot Graphics Connector	Y	Y	2YY85AA		1

Quadro RTX NVLink High-Bandwidth 3-slotBridge (RTX 8000, RTX 6000)	N	Y	6FY13AA	2
Quadro RTX NVLink 3-slotBridge (RTX 5000)	Y	Y	6FY14AA	2
NVIDIA NVLink 3 Slot Bridge (RTX A6000, RTX A5000)	Y	Y	340L3AA	2
Entry 3D				
NVIDIA® Quadro® P620 2GB Graphics	Y	Y	3ME25AA	2
NVIDIA® T400 2 GB Graphics	Y	Y	340K8AA	2
NVIDIA® T400 4 GB 3mDP Graphics	Y	Y	5Z7E0AA/AT	2
Mid-range 3D				
NVIDIA® T1000 4 GB 4mDP Graphics	Y	Y	20X22AA/AT	2
NVIDIA® T1000 8 GB 4mDP Graphics	Y	Y	5Z7D8AA	2
NVIDIA® Quadro® P1000 4GB Graphics	Y	Y	1ME01AA	3
NVIDIA RTX A2000 6 GB 4mDP Graphics	Y	Y	340L0AA	3
NVIDIA RTX A2000 12 GB 4mDP Graphics	Y	Y	5Z7D9AA	2
AMD Radeon™ Pro WX 3200 4GB Graphics	Y	Y	6YT68AA	2
AMD Radeon Pro W6600 8 GB GDDR6 4DP Graphics	Y	Y	340K5AA	1
High End 3D				
NVIDIA® RTX A4500 20 GB GDDR6 4DP Graphics	Y	Y	5S458AA/AT	2
AMD Radeon™ Pro W5500 8GB Graphics	Y	Y	9GC16AA/AT	2
AMD Radeon™ Pro W5700 8GB Graphics	Y	Y	9GC15AA/AT	1
Ultra High-End 3D				
NVIDIA® RTX A5000 24 GB Graphics	Y	Y	20X23AA	2
NVIDIA® RTX A6000 48 GB 4DP Graphics	Y	Y	2S6U3AA	1
AMD Radeon Pro W6800 32 GB Graphics	Y	Y	340K7AA	1
NVIDIA® Quadro® Sync II	Y	Y	1WT20AA	

Memory	**SL Processor**	**CL Processor**	**Factory Configured**	**Option Kit**	**Option Kit Part Number**	**Support Notes**
DDR4-2666 ECC Registered DIMMs						
8GB (1x8GB) DDR4-2666 ECC Reg Memory	Y	N	Y	Y	1XD84AA	1,2
16GB (1x16GB) DDR4-2666 ECC Reg Memory	Y	N	N	Y	1XD85AA	1,2
32GB (1x32GB) DDR4-2666 ECC Reg Memory	Y	N	N	Y	1XD86AA	1,2
DDR4-2933 ECC Registered DIMMs						
8GB (1x8GB) DDR4-2933 ECC Reg Memory	Y	Y	Y	Y	5YZ56AA	1,2
16GB (1x16GB) DDR4-2933 ECC Reg Memory	N	Y	N	Y	5YZ54AA	1,2
32GB (1x32GB) DDR4-2933 ECC Reg Memory	N	Y	N	Y	5YZ55AA	1,2
64GB (1x64GB) DDR4-2399 ECC Reg Memory	N	Y	N	Y	5YZ57AA	1,2

SL Processor: Are processors formerly known as Intel® Skylake that are sold under the model name Intel® Xeon® SP: Platinum 8100, Gold 6100, Gold 5100, Silver 4100 and Bronze 3100 Family

CL Processor: Are processors formerly known as Intel® Cascade Lake that are sold under the model name Intel® Xeon® SP: Platinum 8200, Gold 6200, Gold 5200, Silver 4200 and Bronze 3200 Family

NOTES:

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

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

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

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

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

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).

NOTE: Factory-configured CTO (xxxxxAV) and aftermarket AMO (xxxxxAA, xxxxxAT) HP memory part numbers designated as “2666” may ship with "2933" or "3200" speed memory components. Similarly, HP Memory part numbers designated as "2933" may ship with "3200" speed memory. This does not affect HP part number availability, nor does it affect system performance or operation. All hardware configurations currently supporting HP memory part numbers designated as “2666” or 2933 have been fully qualified to work with fast speed memory and are fully supported by HP under standard support terms.

NVDIMM Memory		**Factory Configured**	**Option Kit**	**Option Kit Part Number**	**Support Notes**
	Intel® Optane™ DC Persistent Memory (DCPMM)				
	128GB (1x128GB) DC Persistent Memory Module	Y	Y	9NH78AA	1
	256GB (2x128GB) DC Persistent Memory Configuration	Y	N		1
	512GB (4x128GB) DC Persistent Memory Configuration	Y	N		1,2

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

a. Available as factory configured in Memory Mode or Storage Mode.
b. Systems configured with DCPMM memory will operate the memory subsystem at 2666 MT/s.
c. Operating System Support:
   i. Windows 11 Pro for Workstations with all updates applied
   ii. Windows 10 Pro for Workstations v1903 or later with all updates applied.
   iii. Linux OS support may be found in the Linux Hardware Support Matrix.
d. Detailed setup, security and support information may be found in the Intel® Optane™ DC Persistent Memory: Configuration and Setup on HP Z6 G4 and Z8 G4 Workstation white paper.
e. DCPMM solutions require additional DRAM memory to be included in the solution:
   i. Systems configured with DCPMM in Memory Mode will include DRAM memory to be used as cache. The amount of included DRAM memory is based on an 8:1 DCPMM to DRAM capacity ratio.
   ii. Systems configured with DCPMM in Storage Mode will require DRAM System Memory to be ordered separately.
   iii. DCPMM Memory will report approximately 2% less than advertised capacity .
f. Total Memory (DCPMM + DRAM) per processor must be <= 1TB or 2TB per dual processor system.
   i. When configured in memory mode, additional DRAM does not count against maximum processor memory.
g. Maximum number of DCPMM modules in a Z6G4 is 4 per processor.

h. Customer is responsible for additional required DRAM when adding DCPMM modules in Memory Mode.
i. HP Z6G4 configured with some AMD Graphics are limited to 1TB of total DCPMM and DRAM memory. See AMD Graphics specifications for details.

NOTE 2: Requires 2nd processor option.

Multimedia and Audio Devices

Multimedia and Audio Devices

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

Optical and Removable Storage

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP SlimTray Optical Drives				
HP 9.5mm Slim Blu Ray Disc Writer	Y	Y	K3R65AA	1
HP 9.5mm Slim DVD ROM	Y	Y	K3R63AA	1
HP 9.5mm Slim DVD Writer	Y	Y	K3R64AA	1
HP Half Height Optical Drives				
HP HH DVD Writer (16X RW DVD-R)	N	Y	4AR67AA	
HP SD Card Reader				
HP SD 4 Card Reader	Y	Y	Y0L99AA	
HDD Frame/Carriers				
HP DX175 Removable HDD Carrier	N	Y	1ZX72AA	
HP DX175 Removable HDD Frame/Carrier	N	Y	1ZX71AA	
NVMe Frame/Carrier				
HP QX310 Removable NVMe Frame/Carrier w/PCIe card	Y	N	8GQ89AA/AT	
HP QX310 Removable Carrier only	N	Y	8GQ91AA/AT	

NOTE 1: Installing an optical drive into Z6 G4 requires a 5.25” external bay adapter 746536-001 which is included in the ODD kit.

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
NVIDIA® Mellanox® ConnectX-6 DX Dual Port 10/25GbE SFP28 NIC	Y	Y	436M8AA	1
HP i350-T2 PCIe Dual Port Gigabit NIC	Y	Y	V4A91AA	
Intel® i350-T4 PCIe 4-Port Gigabit NIC	N	Y	W8X25AA	

Supported Components

Intel® Ethernet I210-T1 PCIe x1 Gb NIC	Y	Y	E0X95AA	
Aquantia® NBASE-T 5GbE PCIe NIC	N	Y	1PM63AA	
HP Dual Port 10GBase-T NIC Module	Y	Y	1QL49AA	
Intel® 8265 802.11 a/b/g/n/ac + BT PCIe WLAN	N	Y	1QL48AA	
Intel® X550-T2 10GbE Dual Port NIC	Y	Y	1QL46AA	
Intel® X710-DA2 10GbE SFP+ Dual Port NIC	Y	Y	1QL47AA	2
HP 10GbE SFP+ SR 1st Transceiver	Y	Y	C3N53AA	
HP 10GbE SFP+ SR 2nd Transceiver	Y	Y	C3N53AA	
Intel® Wi-Fi 6 AX200 & BT PCIe	N	Y	7CE01AA	2
Intel AX210 Wi-Fi 6e non-vPro +Bluetooth 5.2 External Antenna WLAN	N	Y	340L7AA	
Allied Telesis AT-2914SX/LC-901 1GB LC Fiber NIC	Y	Y	1C7Q2AA	
Allied Telesis AT-2911T/2-901 Dual Port 1GbE NIC	Y	Y	6E3Y9AA/AT	

Note 1: 3rd part transceivers sold separately. You must have a transceiver installed in order to connect this card to a network.

Note 2: Windows 7 is NOT supported

Racking and Physical Security

Supported Components

Racking and Physical Security

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP Z4/Z6 Side Panel Barrel Keylock	Y	N		
HP Solenoid Lock / Hood Sensor	Y	N		
HP Z4/Z6 Depth Adjustable Fixed Rail Rack Kit	N	Y	2HW42AA	
HP Z2 Mini/Z2 TWR/Z4/Z6 Dept Adj Fixed Rail Rack Kit		Y	2A8Y5AA	
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	
HP 320K Wired Keyboard	Y	Y	9SR37AA	
HP Optical USB Mouse	Y	Y	QY777AA	
HP PS/2 Mouse	Y	Y	QY775AA	
HP USB Hardened Mouse	Y	Y	P1N77AA	
HP Creator 935 Black Wireless Mouse	N	Y	1D0K8AA	
HP Wired 320M Mouse	Y	Y	9VA80AA	

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.

Supported Components

Application Software

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Sobey Video Editing SW	Y	N		
HP ZCentral Remote Boost	N	N		
Data Science Stack	Y	N		1, 2
WSL2/Ubuntu Data Science Stack	Y	N		1, 3

*Not all Application Software for Z Desktop Workstations is included with purchase.
Note 1: Only available with NVIDIA graphics cards selections.
Note 2: Only available with Ubuntu 20.04 LTS preinstall.
Note 3: Only available with Windows 10 Pro for Workstations or Windows 11 Pro for Workstations.

Operating Systems

	Support Notes
Windows 11 Pro for Workstations	Note 4,1
Windows 10 Pro for Workstations	Note 3,4,1
Ubuntu 20.04 LTS	Note 2
HP Linux® Installer Kit	Note 2
Red Hat® Enterprise Linux® (RHEL) Workstation - Paper License (1yr)	Note 2,5

NOTE 1: Available with Windows Subsystem for Linux® (WSL2).
NOTE 2: For detailed Linux® OS/hardware support information, see: http://www.hp.com/support/linux_hardware_matrix
NOTE 3: Device comes with Windows 10 and a free Windows 11 upgrade or may be preloaded with Windows 11. Upgrade timing may vary by device. Features and app availability may vary by region. Certain features require specific hardware (see Windows 11 Specifications).
NOTE 4: Not all features are available in all editions or versions of Windows. Systems may require upgraded and/or separately purchased hardware, drivers, software or BIOS update to take full advantage of Windows functionality. Windows is automatically updated and enabled. High speed internet and Microsoft account required. ISP fees may apply and additional requirements may apply over time for updates. See http://www.windows.com.
NOTE 5: This second OS must be ordered with the HP Linux® Installer Kit as the first OS.

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 R-DIMM (Registered), ECC: 8GB, 16GB, 32GB, and 64GB
Memory Modes	NUMA (Non-Uniform Memory Architecture), Memory Node Interleave
Memory Speed Supported	2133MT/s, 2400MHz, 2666MT/s, and 2933MT/s

Available Memory Configurations:

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

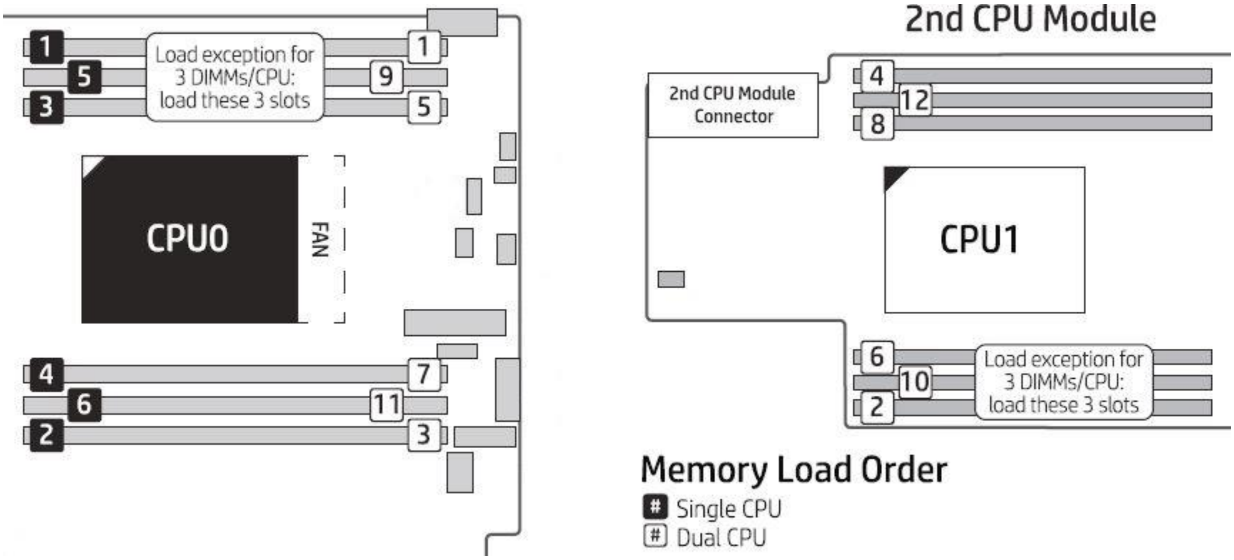
System Technical Specifications

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

System Technical Specifications

Memory Loading Order:

Load Order for Single and Dual Processor Configuration



Maximum Memory

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

Memory Configuration (Supported)

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

Notes

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

*768 GB configuration requires 2 CPUs configuration.

NVDIMM Memory

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

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

NOTES:

a. Supported only with Xeon 82xx, 62xx, 52xx and 4215/4215R processors.
b. Available as factory configured in Memory Mode or Storage Mode.
c. Systems configured with DCPMM memory will operate the memory subsystem at 2666 MT/s.
d. Operating System Support:
    i. Windows 11 Pro for Workstations with all updates applied.
    ii. Windows 10 Pro for Workstations v1903 or later with all updates applied.
    iii. Linux OS support may be found in the Linux Hardware Support Matrix.
e. Detailed setup, security and support information may be found in the Intel® Optane™ DC Persistent Memory: Configuration and Setup on HP Z6 G4 and Z8 G4 Workstation white paper.
f. DCPMM solutions require additional DRAM memory to be included in the solution:

    i. Systems configured with DCPMM in Memory Mode will include DRAM memory to be used as cache. The amount of included DRAM memory is based on an 8:1 DCPMM to DRAM capacity ratio.
    ii. Systems configured with DCPMM in Storage Mode will require DRAM System Memory to be ordered separately.
    iii. DCPMM Memory will report approximately 2% less than advertised capacity .

g. Total Memory (DCPMM + DRAM) per processor must be <= 1TB or 2TB per dual processor system.
    i. When Configured in Memory Mode, additional DRAM does not count against maximum processor memory.
    ii. Maximum number of DCPMM modules in a Z6G4 is 4 per processor.

h. Customer is responsible for additional required DRAM when adding DCPMM modules in Memory Mode.

i. HP Z6G4 configured with some AMD Graphics are limited to 1TB of total DCPMM and DRAM memory. See AMD Graphics specifications for details.

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, 5, & 10
	Serial Attached SCSI	Requires Optional PCIe card
	Factory Configured RAID	SATA RAID 0 Striped Array SATA RAID 1 Mirrored Array SATA RAID 10 Striped/Mirrored

System Technical Specifications

		Notes: Factory integrated Intel® SATA RAID is Microsoft Windows only.
	External SATA (eSATA)	Supported on all SATA ports configurable with optional eSATA* cable kit * hot plug / hot swap not supported with eSATA
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
	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
USB Connector(s)	**Front**	Front I/O Entry: 4 USB 3.1 Gen1 (Left-most Port has Charging Capability) Front I/O Premium: 2x USB 3.1 Gen1, 2x USB 3.1 Gen2 Type-C™ (Left-most Port has Charging Capability) • Charging Ports provide 1.5 Amps @ 5 Volts • Standard USB Type A Ports provide 900mA @ 5 Volts • USB Type C Ports provide 3 Amps @ 5 Volts and adhere to the Power Delivery 3.0 specification.
	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
Integrated Graphics	No	
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 FIPS 140-2 Certified (firmware v7.85) TPM Certified products list: https://trustedcomputinggroup.org/membership/certification/tpm-certifiedproducts/	
Power Supply Headers	Yes	
Power Switch, Power LED & Hard Drive LED Header	Yes	

System Technical Specifications

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 (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® I219LM GbE LAN
Clear CMOS Button	Yes

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	

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

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)		**Sound Power** (LWAd, bels)	**Deskside Sound Pressure** (LpAm, decibels)
	Idle	3.3	15
	Hard drive Operating (random reads)	3.5	18

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

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)		**Sound Power** (LWAd, bels)	**Deskside Sound Pressure** (LpAm, decibels)
	Idle	3.8	23
	Hard drive Operating (random reads)	3.9	23

System Technical Specifications

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

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)		**Sound Power** (LWAd, bels)	**Deskside Sound Pressure** (LpAm, decibels)
	Idle	3.8	23
	Hard drive Operating (random reads)	3.9	24

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

System Technical Specifications

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
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

System Technical Specifications

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
Trusted Platform Module Chip	Integrated Infineon TPM 2.0. TCG and FIPS 140-2 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.

System Technical Specifications

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.
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	2.6
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

System Technical Specifications

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 FIPS 140-2 Certification TCG TPM Certified products list: http://www.trustedcomputinggroup.org/certification/tpm-certified-products/
UHCI	Universal Host Controller Interface Design Guide, Revision 1.1
USB	Universal Serial Bus Revision 1.1 Specification Universal Serial Bus Revision 2.0 Specification Universal Serial Bus Revision 3.1 Specification
SMBIOS	System Management BIOS Reference Specification, Version 2.8

External BIOS simulator found at: http://csrsml.itcs.hp.com/

Social and Environmental Responsibility

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

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

*TCO Certified configurations available when ENERGY STAR configurations are selected with a USB Type-C® connector. ENERGY STAR available with a combination of high-performance CPU's, high-performance GPU's and select memory configurations.

The Z6 G4 is registered EPEAT® Silver 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.
(**NOTE:** optional low-halogen power cables are available for some countries in Europe)

End-of-Life Management and Recycling
HP Inc. offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: http://www.hp.com/recycle or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner. This product is greater than 90% recyclable by weight when properly disposed of at end of life.

HP Inc. Corporate Environmental Information
For more information about HP's commitment to the environment:
Sustainability Report

Eco-label certifications:
http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html

ISO 14001 certificate:
http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html

Additional Information

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

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

- Does not contain restricted substances listed in HP Standard 011-1 General Specification for the Environment
- Does not contain ozone-depleting substances (ODS)
- Does not contain heavy metals (lead, mercury, cadmium or hexavalent chromium) in excess of 100 ppm sum total for all heavy metals listed
- Maximizes the use of post-consumer recycled content materials in packaging materials
- All packaging material is recyclable
- All packaging material is designed for ease of disassembly
- Reduced size and weight of packages to improve transportation fuel efficiency
- Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards formatting
- A multi-unit eco packaging option is available to institutional customers that uses less packaging material or has a lower volume footprint than conventional single-unit packaging. Please contact your sales representative for additional details.

Packaging Materials

Internal	Cushions and plastic bags made of low density polyethylene (LDPE).
External	Outer carton, accessories carton, and insert made of corrugated paper board.

Manageability

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

- DASH 1.1 (via Intel® LAN on motherboard)

Intel® Active Management Technology (AMT)
Intel® Active Management Technology (AMT) 11.2x

An advanced set of remote management features and functionality providing IT administrators the latest and most effective tools to remotely discover, heal, and protect networked client systems regardless of the system's health or power state. AMT 11.2x includes the following advanced management functions:

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

Intel® vPro™ Technology

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

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

Remote Manageability Software Solutions

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

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

For questions or support for manageability needs, please visit http://www.hp.com/go/clientmanagement

System Software Manager

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

Global Series SKUs

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

Stable & Consistent Offerings

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

Processors	**Product #**	**Offering**
	2DL32AV	Intel® Xeon® Gold 6128 processor
	2DL33AV, 1XM44AA	Intel® Xeon® Gold 6128 2nd processor
	2DL22AV	Intel® Xeon® Silver 4114 processor
	2DL23AV, 1XM49AA	Intel® Xeon® Silver 4114 2nd processor
	2DL18AV	Intel® Xeon® Silver 4108 processor
	2DL19AV, 1XM51AA	Intel® Xeon® Silver 4108 2nd processor

Hard Drives	**Product #**	**Offering**
	Z5H22AV, LQ037AA	1TB SATA 7200 RPM 3.5” HDD
	Z5H23AV	1TB 7200RPM SATA 3.5in 2nd
	Z5H25AV	1TB 7200RPM SATA 3.5in 3rd
	Z5H24AV	1TB 7200RPM SATA 3.5in 4th

Graphics	**Product #**	**Offering**
	N/A	N/A

Memory	**Product #**	**Offering**
	N/A	N/A

Optical and Removable Storage	**Product #**	**Offering**
	N/A	N/A

Technical Specifications - Processors

Intel® Xeon® W-3200 Series CPU

Intel® Xeon® W-3275 2.5 2933 28C processor
Intel® Xeon® W-3265 2.7 2933 24C processor
Intel® Xeon® W-3245 3.2 2933 16C processor
Intel® Xeon® W-3235 3.3 2933 12C processor
Intel® Xeon® W-3225 3.7 2666 8C processor
Intel® Xeon® W-3223 3.5 2666 8C processor

Intel® Xeon® Scalable CPU

Intel® Xeon® Gold 6258R processor
Intel® Xeon® Gold 6248R processor
Intel® Xeon® Gold 6246R processor
Intel® Xeon® Gold 6244 processor
Intel® Xeon® Gold 6242R processor
Intel® Xeon® Gold 6242 processor
Intel® Xeon® Gold 6240R processor
Intel® Xeon® Gold 6240 processor
Intel® Xeon® Gold 6238R processor
Intel® Xeon® Gold 6234 processor
Intel® Xeon® Gold 6230R processor
Intel® Xeon® Gold 6226R processor
Intel® Xeon® Gold 6226 processor
Intel® Xeon® Gold 6136 processor
Intel® Xeon® Gold 6128 processor
Intel® Xeon® Gold 5222 processor
Intel® Xeon® Gold 5220R processor
Intel® Xeon® Gold 5218R processor
Intel® Xeon® Gold 5218 processor
Intel® Xeon® Gold 5215 processor
Intel® Xeon® Gold 5118 processor
Intel® Xeon® Silver 4216 processor
Intel® Xeon® Silver 4215R processor
Intel® Xeon® Silver 4214R processor
Intel® Xeon® Silver 4214 processor
Intel® Xeon® Silver 4210R processor
Intel® Xeon® Silver 4210 processor
Intel® Xeon® Silver 4208 processor
Intel® Xeon® Silver 4114 processor
Intel® Xeon® Silver 4108 processor
Intel® Xeon® Bronze 3206R processor
Intel® Xeon® Bronze 3204 processor

STORAGE/HARD DRIVES

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

*Actual performance may vary.

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)	
		*Actual performance may vary.		
	1TB SATA 7200 rpm 6Gb/s 3.5" HDD	**Capacity**	1TB	
		Height	1 in; 2.54 cm	
		Width	**Media Diameter**	3.5 in; 8.9 cm
			Physical Size	4 in; 10.17 cm
		Interface	Serial ATA (6.0Gb/s), NCQ enabled	
		Synchronous Transfer Rate (Maximum)	Up to 600 MB/s*	
		Buffer	64MB	
		Cache	Adaptive	
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	2 ms*
			Average	11 ms*
			Full Stroke	21 ms*
		Rotational Speed	7,200 rpm	
		Operating Temperature	41° to 131° F (5° to 55° C)	
		*Actual performance may vary.		
	2.0TB SATA 7200 rpm 6Gb/s 3.5" HDD CMR	**Capacity**	2.0TB	
		Height	1 in; 2.54 cm	
		Width	**Media Diameter**	3.5 in; 8.9 cm
			Physical Size	4 in; 10.17 cm
		Interface	Serial ATA (6.0 Gb/s), NCQ Enabled	
		Synchronous Transfer Rate (Maximum)	Up to 600 MB/s*	
		Buffer	64MB	
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	1.0 ms*
			Average	11 ms*
			Full Stroke	18 ms*
		Rotational Speed	7,200 rpm	

	Logical Blocks	3,907,029,168	
	Operating Temperature	41° to 131° F (5° to 55° C)	

*Actual performance may vary.

2.0TB SATA 7200 rpm 6Gb/s 3.5" HDD SMR	**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**	1.2 ms*
		Average	12 ms*
		Full Stroke	21 ms*
	Rotational Speed	7,200 rpm	
	Logical Blocks	3,907,029,168	
	Operating Temperature	41° to 140° F (5° to 60° C)	

*Actual performance may vary.

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)	

*Actual performance may vary.

Technical Specifications - Hard Drives

1TB SATA 7200 rpm 6Gb/s 3.5" HDD (Enterprise Class)	**Capacity**	1TB	
	Protocol	SATA	
	Form Factor	3.5"	
	Controller	AHCI	
	Reliability (MTBF)	2.0M hours	
	Rated Power On Hours	8760/yr	
	Annualized Failure Rate (based on Rated POH)	<0.62%	
	Rated for 24/7/365 operation	YES	
	Physical Size (Height)	1 in; 2.54 cm	
	Physical Size (Width)	4 in; 10.17 cm	
	Media Diameter	3.5 in; 8.9 cm	
	Interface	Serial ATA (6Gb/s), NCQ enabled	
	Synchronous Transfer Rate (Maximum)	Up to 600MB/s*	
	Buffer	128MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.32ms*
		Average	7.45ms*
		Full Stroke	14.2ms*
	Operating Temperature	41° to 140° F (5° to 60° C)	
	Performance	**Sequential Read**	up to 226MB/s*
		Sequential Write	up to 226MB/s*
	Enterprise Class Features	High Reliability	

*Actual performance may vary.

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)	

*Actual performance may vary.

500GB SATA 7.2K SED SFF HDD	**Capacity**	500GB	
	Height	0.275 in; 0.7 cm	
	Width	**Media Diameter**	2.5 in; 6.36 cm
		Physical Size	2.75 in; 6.99 cm
	Interface	Serial ATA (6Gb/s)	
	Synchronous Transfer Rate (Maximum)	Up to 600MB/s*	
	Buffer	32MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	1ms*
		Average	4.2ms*
		Full Stroke	25ms (typical)*
	Rotational Speed	7,200 rpm	
	Operating Temperature	32° to 140° F (0° to 60° C)	

*Actual performance may vary.

Technical Specifications - Hard Drives

SATA SSDs for HP Workstations	**HP 256GB SATA 6Gb/s SSD**	**Capacity**	256GB	
		Protocol	SATA	
		Form Factor	2.5"	
		Controller	AHCI	
		NAND Type	3D TLC	
		Endurance	192TBW (TB Written)	
		Reliability (MTTF)	1.5M hours	
		Physical Size (Height)	0.28 in; 0.7 cm	
		Physical Size (Width)	2.5 in; 6.36 cm	
		Interface	SATA 6Gb/s	
		Synchronous Transfer Rate (Maximum)	Up to 600MB/s*	
		Operating Temperature	32° to 158° F (0° to 70° C)	
		Performance	**Sequential Read**	530MB/s (max)*
			Sequential Write	500MB/s (max)*
			Random Read	95K IOPS (max)*
			Random Write	83K IOPS (max)*
		*Actual performance may vary.		
	HP 256GB SATA 6Gb/s SED Opal 2 SSD	**Capacity**	256GB	
		Protocol	SATA	
		Form Factor	2.5"	
		Controller	AHCI	
		NAND Type	3D TLC	
		Endurance	192TBW (TB Written)	
		Reliability (MTTF)	1.5M hours	
		Physical Size (Height)	0.28 in; 0.7 cm	
		Physical Size (Width)	2.5 in; 6.36 cm	
		Interface	6Gb/s SATA	
		Synchronous Transfer Rate (Maximum)	Up to 550MB/s (Sequential Read)*	
		Operating Temperature	32° to 158° F (0° to 70° C)	
		Performance	**Sequential Read**	530MB/s*
			Sequential Write	500 MB/s*
			Random Read	95K IOPS*
			Random Write	83K IOPS*
		Self-Encrypting Drive Support	OPAL 2	
		*Actual performance may vary.		
	HP 512GB SATA 6Gb/s SSD	**Capacity**	512GB	
		Protocol	SATA	
		Form Factor	2.5"	
		Controller	AHCI	
		NAND Type	3D TLC	
		Endurance	388TBW (TB Written)	

	Reliability (MTTF)	1.5M hours	
	Physical Size (Height)	0.28 in; 0.7 cm	
	Physical Size (Width)	2.5 in; 6.36 cm	
	Interface	SATA 6Gb/s	
	Synchronous Transfer Rate (Maximum)	Up to 550MB/s (Sequential Read)*	
	Operating Temperature	32° to 158° F (0° to 70° C)	
	Performance	**Sequential Read**	530 MB/s*
		Sequential Write	500 MB/s*
		Random Read	95K IOPS*
		Random Write	83K IOPS*
	*Actual performance may vary.		
HP 512GB SATA SED SSD	**Capacity**	512GB	
	Protocol	SATA	
	Form Factor	2.5"	
	Controller	AHCI	
	NAND Type	3D TLC	
	Endurance	388TBW (TB Written)	
	Reliability (MTTF)	1.5M hours	
	Physical Size (Height)	0.28 in; 0.7 cm	
	Physical Size (Width)	2.5 in; 6.36 cm	
	Interface	SATA 6Gb/s	
	Synchronous Transfer Rate (Maximum)	Up to 600MB/s*	
	Operating Temperature	32° to 158° F (0° to 70° C)	
	Performance	**Sequential Read**	530 MB/s*
		Sequential Write	500 MB/s*
		Random Read	95K IOPS*
		Random Write	83K IOPS*
	Self-Encrypting Drive Support	OPAL 1 and 2	
	*Actual performance may vary.		
HP 1TB SATA 6Gb/s SSD	**Capacity**	1TB	
	Protocol	SATA	
	Form Factor	2.5"	
	Controller	AHCI	
	NAND Type	3D TLC	
	Endurance	400TBW (TB Written)	
	Reliability (MTTF)	1.5M hours	
	Physical Size (Height)	0.28 in; 0.7 cm	
	Physical Size (Width)	2.5 in; 6.36 cm	
	Interface	SATA 6Gb/s	
	Synchronous Transfer Rate (Maximum)	Up to 550MB/s (Sequential Read)*	
	Operating Temperature	32° to 158° F (0° to 70° C)	

	Performance	**Sequential Read**	530 MB/s*
		Sequential Write	500 MB/s*
		Random Read	95K IOPS*
		Random Write	83K IOPS*

*Actual performance may vary.

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

*Actual performance may vary.

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

*Actual performance may vary.

Technical Specifications - Hard Drives

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

*Actual performance may vary.

Performance PCIe SSDs for HP Workstations	**HP Z Turbo Drive 256GB M.2 2280 TLC SSD**	**Capacity**	256GB	
		Protocol	PCIe	
		Form Factor	M.2	
		Controller	NVMe	
		NAND Type	3D TLC	
		SED Support	Opal 2	
		Endurance	200TB	
		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**	3500 MB/s *
			Sequential Write	2200 MB/s *
			Random Read	240K IOPS *
			Random Write	480K IOPS *

*Actual performance may vary.

	HP ZTurbo Drive 512GB M.2 2280 TLC SSD	**Capacity**	512GB
		Protocol	PCIe
		Form Factor	M.2
		Controller	NVMe
		NAND Type	3D TLC
		SED Support	Opal 2
		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**	3500 MB/s*
		Sequential Write	2900 MB/s*
		Random Read	460 K IOPS*
		Random Write	500K IOPS*

*Actual performance may vary.

HP ZTurbo Drive 1TB M.2 2280 TLC SSD	**Capacity**	1TB	
	Protocol	PCIe	
	Form Factor	M.2	
	Controller	NVMe	
	NAND Type	3D TLC	
	SED Support	Opal 2	
	Endurance	400TB	
	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**	3500 MB/s*
		Sequential Write	3000 MB/s*
		Random Read	580K IOPS*
		Random Write	500K IOPS*

*Actual performance may vary.

HP ZTurbo Drive 2TB M.2 2280 TLC SSD	**Capacity**	2TB	
	Protocol	PCIe	
	Form Factor	M.2	
	Controller	NVMe	
	NAND Type	3D TLC	
	SED Support	Opal 2	
	Endurance	500TB	
	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**	3300 MB/s*
		Sequential Write	2400 MB/s*
		Random Read	500K IOPS*
		Random Write	440K IOPS*

*Actual performance may vary.

HP Z Turbo Drive Quad Pro 2x256GB PCIe TLC SSD	**Capacity**	512GB
	Protocol	PCIe
	Form Factor	PCIe Card, Full Height PCIe Slot

	Controller	NVMe	
	NAND Type	3D TLC	
	SED Support	Opal 2	
	Endurance	200TB	
	Reliability (MTBF)	1.5M hours	
	Interface	PCIe Gen3 x4 architecture	
	Operating Temperature	32° to 158° F (0° to 70° C)	
	Performance	**Sequential Read**	3500 MB/s*
		Sequential Write	2200 MB/s*
		Random Read	240K IOPS*
		Random Write	480K IOPS*

*Actual performance may vary.

HP Z Turbo Drive Quad Pro 2x512GB PCIe TLC SSD	**Capacity**	1TB	
	Protocol	PCIe	
	Form Factor	PCIe Card, Full Height PCIe Slot	
	Controller	NVMe	
	NAND Type	3D TLC	
	SED Support	Opal 2	
	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**	3500 MB/s*
		Sequential Write	2900 MB/s*
		Random Read	460 K IOPS*
		Random Write	500K IOPS*

*Actual performance may vary.

HP Z Turbo Drive Quad Pro 2x1TB PCIe TLC SSD	**Capacity**	2TB	
	Protocol	PCIe	
	Form Factor	PCIe Card, Full Height PCIe Slot	
	Controller	NVMe	
	NAND Type	3D TLC	
	SED Support	Opal 2	
	Endurance	400TB	
	Interface	PCI Express 3.0 x4 electrical x4 physical	
	Operating Temperature	32° to 158° F (0° to 70° C)	
	Performance	**Sequential Read**	3500 MB/s*
		Sequential Write	3000 MB/s*
		Random Read	580K IOPS*
		Random Write	500K IOPS*

*Actual performance may vary.

HP Z Turbo Drive Dual Pro 256GB SSD	**Capacity**	256GB	
	Protocol	PCIe	
	Form Factor	M.2 in Half-height, half-length card	
	Controller	NVMe	
	NAND Type	3D TLC	
	Endurance	200TBW (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**	3500 MB/s*
		Sequential Write	2200 MB/s*
		Random Read	240K IOPS*
		Random Write	480K IOPS*

*Actual performance may vary.

HP Z Turbo Drive Dual Pro 512GB SSD	**Capacity**	512GB	
	Protocol	PCIe	
	Form Factor	M.2 in Half-height, half-length card	
	Controller	NVMe	
	NAND Type	3D TLC	
	Endurance	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**	3500 MB/s*
		Sequential Write	2900 MB/s*
		Random Read	460 K IOPS*
		Random Write	500K IOPS*

*Actual performance may vary.

HP Z Turbo Drive Dual Pro 1TB SSD	**Capacity**	1TB	
	Protocol	PCIe	
	Form Factor	M.2 in Half-height, half-length card	
	Controller	NVMe	
	NAND Type	3D TLC	
	Endurance	400TBW (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**	3500 MB/s*
		Sequential Write	3000 MB/s*
		Random Read	580K IOPS*
		Random Write	500K IOPS*

*Actual performance may vary.

	HP Z Turbo Drive Dual Pro 2TB SSD	**Capacity**	2TB	
		Protocol	PCIe	
		Form Factor	M.2 in Half-height, half-length card	
		Controller	NVMe	
		NAND Type	3D TLC	
		Endurance	500TBW (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**	3500 MB/s*
			Sequential Write	3000 MB/s *
			Random Read	600K IOPS*
			Random Write	500K IOPS*
		*Actual performance may vary.		
Mainstream PCIe SSDs for HP Workstations	**HP 256GB M.2 2280 TLC SSD**	**Capacity**	256GB	
		Protocol	PCIe	
		Form Factor	M.2	
		Controller	NVMe	
		NAND Type	3D TLC	
		Endurance	200TB	
		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**	3100 MB/s *
			Sequential Write	1400 MB/s *
			Random Read	200 K IOPS *
			Random Write	320 K IOPS *
		*Actual performance may vary.		
	HP 512GB M.2 2280 TLC SSD	**Capacity**	512GB	
		Protocol	PCIe	
		Form Factor	M.2	
		Controller	NVMe	
		NAND Type	3D TLC	
		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**	3300 MB/s*
			Sequential Write	2500 MB/s*
			Random Read	225 K IOPS*
			Random Write	430 K IOPS*
		*Actual performance may vary.		

	HP 1TB M.2 2280 TLC SSD	**Capacity**	1TB		
		Protocol	PCIe		
		Form Factor	M.2		
		Controller	NVMe		
		NAND Type	3D TLC		
		Endurance	400TB		
		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**	3300 MB/s*	
			Sequential Write	2500 MB/s*	
			Random Read	400 K IOPS*	
			Random Write	440 K IOPS*	
		*Actual performance may vary.			
	HP 2TB M.2 2280 TLC SSD	**Capacity**	2TB		
		Protocol	PCIe		
		Form Factor	M.2		
		Controller	NVMe		
		NAND Type	3D TLC		
		Endurance	500TB		
		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**	3300 MB/s*	
			Sequential Write	2700 MB/s*	
			Random Read	430 K IOPS*	
			Random Write	500 K IOPS*	
		*Actual performance may vary.			
Intel® 905p Series AIC PCIe SSD	**Intel® 905p Series AIC 280GB PCIe SSD**	**Capacity**	280GB		
		Protocol	PCIe		
		Form Factor	PCIe Card, Half Height		
		Controller	NVMe		
		NVM Type	3DXPoint		
		Endurance	5.11 PBW (PB Written)		
		Reliability (MTBF)	1.6M hours		
		Operating Temperature	32° to 185° F (0° to 85° C)		
		Performance	**Sequential Read**	2730 MB/s*	
			Sequential Write	2280 MB/s*	
			Random Read	587K IOPS*	
			Random Write	559K IOPS*	
		*Actual performance may vary.			
		Capacity	480GB		

Technical Specifications - Hard Drives

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

*Actual performance may vary.

Intel® Optane™ DC Persistent Memory	**Intel® Optane™ DC Persistent Memory 128GB Module**	**Capacity**	128GB	
		Protocol	DDR-T	
		Form Factor	DDR4	
		Controller	NVMe	
		NVM Type	3DXPoint	
		Endurance	292 PBW (256B Sequential Write) 91 PBW (64B Sequential Write)	
		Reliability (MTBF)	2M hours	
		Operating Temperature	32° to 185° F (0° to 85° C)	
		Performance	**Sequential Read**	6800 MB/s*
			Sequential Write	1850 MB/s*

*Actual performance may vary.

Technical Specifications - Hard Drive Controllers

HARD DRIVE CONTROLLERS

Microsemi SmartHBA2100-4i4e SAS Card	**PCI Bus**	8 lanes, PCI Express 3.0	
	RAID Levels	Offers Integrated RAID (0, 1, and 10)	
	PCI Data Burst Transfer Rate	Half Duplex x8, PCIe, 8000 MB/s	
	SAS Bandwidth	**Half Duplex**	1200 MB/s per lane
	PCI Card Type	3.3V Add-in Card	
	PCI Voltage	12 V ± 10%	
	PCI Power	9.8W typical, Airflow min 200 LFM	
	Bracket	Full height and low profile	
	Certification Level	PCI Express 3.0 compliant	
	SAS Processor	Microsemi 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 **NOTE:** RAID 5 is not supported on MicroSemi 2100-4i4e 8-port SAS 12Gb/s RAID Card	

GRAPHICS

NVIDIA® Quadro® P620 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® P620 Graphics Card GPU: 512 CUDA cores Max Power: 40 Watts
	Bus Type	PCI Express 3.0 x16
	Memory	Size: 2 GB GDDR5, 2000 MHz Memory Interface: 128-bit Memory Bandwidth: 64 GB/s
	Connectors	4mDP Outputs *
	Maximum Resolution	DisplayPort™ 1.4: - up to 4x 5120 x 2880 x 24 bpp @ 60Hz - supports Multi-Stream Transport (MST)
	Image Quality Features	10-bit internal display processing pipeline 10-bit scan-out support
	Display Output	4 mDP Connectors
	Shading Architecture	Full Microsoft DirectX 12 Shader Model 5.1
	Supported Graphics APIs	OpenGL 4.5 DirectX 12 Vulkan 1.0 API support includes: CUDA C, CUDA C++, DirectCompute , OpenCL
	Available Graphics Drivers	Windows 11 Windows10 Windows 7 Professional Linux® HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
	Notes	*P620 only have mini-DisplayPort™ (mDP) video ports. Factory Configured (Z4 G4/ Z6 G4/ Z8 G4 Workstations): No adapters included After market option kit:Two mDP-to-DP Adapters included Additional mDP-to-DP Adapters are available as Factory Configuration or Option Kit accessories: - 2MY05AA - HP miniDP-to-DP Adapter Cables - 2KW87A6 - HP (Bulk 12) miniDP-to-DP Adapter Cables

Technical Specifications - Graphics

NVIDIA® T400 2GB Graphics	**Form Factor**	Dimensions: 2.713" H x 6.137" L Single Slot, Low Profile Weight: 124g
	Graphics Controller	NVIDIA® T400 Graphics Card GPU: 384 CUDA cores Power: 30 Watts Cooling: Active
	Bus Type	PCI Express 3.0 x16
	Memory	Size: 2 GB GDDR6 Memory Interface: 64-bit Memory Bandwidth: 80 GB/s
	Connectors	3x mDP
	Maximum Resolution	3x 5120 x 2880 x 24 bpp @ 60Hz
	Supported Graphics APIs	OpenGL 4.5 DirectX 12 Vulkan 1.0 API support includes: CUDA, OpenCL 1.x
	Available Graphics Drivers	Windows 11 Windows 10 Linux HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html

NVIDIA® T400 4GB Graphics	**Form Factor**	Dimensions: 2.713" H x 6.137" L Single Slot, Low Profile Weight: 124g
	Graphics Controller	NVIDIA® T400 Graphics Card GPU: 384 CUDA cores Power: 30 Watts Cooling: Active
	Bus Type	PCI Express 3.0 x16
	Memory	Size: 4 GB GDDR6 Memory Interface: 64-bit Memory Bandwidth: 80 GB/s
	Connectors	3x mDP
	Maximum Resolution	3x 5120 x 2880 x 24 bpp @ 60Hz
	Supported Graphics APIs	OpenGL 4.5 DirectX 12 Vulkan 1.0 API support includes: CUDA, OpenCL 1.x

Technical Specifications - Graphics

	Available Graphics Drivers	Windows 11 Windows 10 Linux HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
NVIDIA® Quadro® P1000 4GB Graphics	**Form Factor**	Dimensions:2.713” H x 5.7” L Single Slot, Low Profile Cooling: Active Weight: 129 grams
	Graphics Controller	NVIDIA® Quadro® P1000 Graphics Card 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: - 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	Windows 11 Windows 10 Windows 7 Professional 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 Radeon™ Pro WX 3200 4GB Graphics	**Form Factor**	Low-Profile Single Slot (2.75 "H x 6.6” L)
	Graphics Controller	Radeon™ Pro WX 3200 Graphics Card GPU: 640 Stream Processors organized into 8 Compute Units Power: 56 Watts Cooling: Active
	Memory	4GB GDDR5 memory Memory Bandwidth: 96 GB/s Memory Width: 128 bit

	Connectors	4x Mini 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 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	Polaris
	Supported Graphics APIs	DirectX® 12 OpenGL® 4.6 OpenCL™ 2.0 Vulkan™ 1.0
	Available Graphics Drivers	Windows 11 Windows 10 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.
NVIDIA® T1000 4GB Graphics	**Form Factor**	Dimensions: 2.713” H x 6.137” L Single Slot Weight: 132.6 grams
	Graphics Controller	NVIDIA® T1000 Graphics Card

		Power: 50W Cooling: Active
	Bus Type	PCI Express 3.0 x16
	Memory	Size: 4GB GDDR6 Memory Bandwidth: Up to 160 GB/s Memory Width: 128-bit
	Connectors	4x mini DisplayPort™ 1.4a
	Maximum Resolution	7680 x 4320 @ 120Hz
	Display Output	Maximum number of displays: 4 displays
	Architecture	NVIDIA® Turing™
	Supported Graphics APIs	xx
	Available Graphics Drivers	Windows 11 Windows 10 Windows 8.1 Windows 7 Professional Linux® - Full OpenGL® implementation, complete with NVIDIA® Quadro® and ARB extensions HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html

NVIDIA® T1000 8GB Graphics	**Form Factor**	Dimensions: 2.713” H x 6.137” L Single Slot Weight: 132.6 grams
	Graphics Controller	NVIDIA® T1000 Graphics Card Power: 50W Cooling: Active
	Bus Type	PCI Express 3.0 x16
	Memory	Size: 8GB GDDR6 Memory Bandwidth: Up to 160 GB/s Memory Width: 128-bit
	Connectors	4x mini DisplayPort™ 1.4a
	Maximum Resolution	7680 x 4320 @ 120Hz
	Display Output	Maximum number of displays: 4 displays
	Architecture	NVIDIA® Turing™
	Available Graphics Drivers	Windows 11 Windows 10 Windows 8.1 Windows 7 Professional Linux® - Full OpenGL® implementation, complete with NVIDIA® Quadro® and ARB extensions HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html

Technical Specifications - Graphics

NVIDIA® RTX A2000 6GB Graphics	**Form Factor**	Dimensions: 2.713" H x 6.6" L Dual slot, half-height Weight: 295 grams (without extender)
	Graphics Controller	NVIDIA® RTX A2000 Graphics Card Power: 70W Cooling: Active
	Bus Type	PCI Express 4.0 x16
	Memory	Size: 6GB GDDR6 Memory Bandwidth: Up to 288 GB/s Memory Width: 192-bit
	Connectors	4x mini-DisplayPort™ 1.4a
	Maximum Resolution	Up to 4x 5120 x 2880 x 24bpp @ 60Hz
	Architecture	NVIDIA® Ampere™
	Supported Graphics APIs	CUDA, OpenCL™ 1.x
	Available Graphics Drivers	Windows 11 Windows 10 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. RTX A2000 offered as Factory Configured Option does not include a video cable adapter. Video cable adapters must be ordered separately as AMO: a. 2MY05AA - HP Single miniDP-to-DP Adapter Cable b. 2KW87A6 - HP (Bulk 12) miniDP-to-DP Adapter Cables 2. Two mDP-to-DP adapters are included with the RTX A2000 when it is ordered as an AMO kit.

NVIDIA® RTX A4000 16GB Graphics	**Form Factor**	Full-Height Single Slot (4.4" Height x 9.5" Length)
	Graphics Controller	NVIDIA® RTX A4000 Graphics GPU: 6144 NVIDIA® CUDA® Parallel Processing Cores Power: 140 Watts Cooling: Active
	Memory	16GB GDDR6 memory Memory Bandwidth: Up to 448 GB/s Memory Width: 256 bit
	Connectors	4x DP One 6-pin auxiliary power connector Factory configured option: No video cable adapter included with card. After market option Kit: No video cable adaptor included with card. DVI to VGA, DisplayPort™ to VGA, DisplayPort™ to DVI, and DisplayPort™ to Dual-Link DVI adapters available as accessories.

	Maximum Resolution	7680x4320 @ 60Hz
	Display Outputs[1]	4x DP
	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 11 Windows 10 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
NVIDIA® RTX A4500 20GB Graphics	**Form Factor**	Full-Height Dual Slot (4.4" Height x 10.5" Length)
	Graphics Controller	NVIDIA® RTX A4500 Graphics GPU: 7168 NVIDIA® CUDA® Parallel Processing Cores Power: 200 Watts Cooling: Active
	Memory	20GB GDDR6 memory Memory Bandwidth: Up to 640 GB/s Memory Width: 320 bit
	Connectors	4x DP One 8-pin auxiliary power connector Factory configured option: No video cable adapter included with card. After market option Kit: No video cable adaptor included with card. DVI to VGA, DisplayPort™ to VGA, DisplayPort™ to DVI, and DisplayPort™ to Dual-Link DVI adapters available as accessories.
	Maximum Resolution	7680x4320 @ 60Hz
	Display Outputs[1]	4x DP
	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

Technical Specifications - Graphics

	Available Graphics Drivers	Windows 11 Windows 10 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

NVIDIA® RTX A5000 24GB Graphics	**Form Factor**	Full-Height Dual Slot (4.4" Height x 10.5" Length) Weight: 1049 grams + 80 grams extender
	Graphics Controller	NVIDIA® RTX A5000 GPU: 8192 CUDA Cores Power: 230W Cooling: Active
	Memory	24GB GDDR6 Memory Bandwidth: Up to 768GB/s ECC Memory (disabled by default)
	Connectors	DP (x4) with HDR support One 8-pin auxiliary power connector After market option Kit: no power adapter included with card. DisplayPort™ to VGA, DisplayPort™ to DVI (single-link and dual-link), and DisplayPort™ to HDMI adapters available as accessories.
	Maximum Resolution	DisplayPort™ 1.4a: 7680x4320 @ 120Hz
	Display Outputs	4x DP1.4a HDR2 outputs (up to 7680x4320 @ 120Hz)
	GPU Architecture	NVIDIA® Ampere™
	Supported Graphics APIs	DirectX®12, OpenGL® 4.5 Developer API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL™, Java, Python, and Fortran
	Available Graphics Drivers	Windows 11 Windows 10 Windows 7 HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html Factory Configured (Z4/Z6/Z8 G4 Workstation): No adapters included After market option kit: No adapters included

Technical Specifications - Graphics

NVIDIA® RTX™ A6000 48GB Graphics	**Form Factor**	Full-Height Dual Slot (4.4” Height x 10.5” Length) Weight: 1230 grams / 2.71 lbs (with extender)
	Graphics Controller	NVIDIA® RTX™ A6000 Graphics GPU: 10752 NVIDIA® CUDA® Parallel Processing Cores Power: 300 Watts Cooling: Active
	Memory	48GB GDDR6 memory ECC optional Memory Bandwidth: Up to 768 GB/s Memory Width: 384 bit
	Connectors	4x DP 1.4a Quadro Sync II connector Ampere NVLink® Stereo Sync Requires 8-pin CPU auxiliary power
	Maximum Resolution	5120x2880 @ 60Hz (up to 4 displays)
	Display Outputs	4x DP 1.4 (7680x4320 @ 60Hz)
	Supported Graphics APIs	DirectX®12, OpenGL® 4.6, 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 11 Windows 10 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

AMD Radeon™ Pro W5500 8GB	**Form Factor**	Full-Height Single Slot
	Graphics Controller	Architecture: RDNA GPU: 1408 Stream Processors organized into 22 Compute Units Power: 125W Cooling: Active
	Memory	8GB GDDR6 memory Memory Bandwidth: up to 224 GB/s Memory Interface: 128-bit

	Display Output	Max Displays: 4 Video Outputs: 4x DisplayPort™ 1.4 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	7690 x 4320 resolution @ 60Hz
	Software API Support	DirectX®: 12 OpenGL® : 4.6, OpenCL™ : 2.0 Vulkan™ 1.1
	Available Graphics Drivers	HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
AMD Radeon™ Pro W5700 8GB	**Form Factor**	Full-Height Double Slot
	Graphics Controller	Architecture: RDNA GPU: 2304 Stream Processors organized into 36 Compute Units Power: 205W Cooling: Active
	Memory	8GB GDDR6 memory Memory Bandwidth: up to 448 GB/s Memory Interface: 256-bit
	Display Output	Max Displays: 6 Video Outputs: 5x Mini-DisplayPort™ 1.4 and 1x USB-C 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	7690 x 4320 resolution @ 60Hz
	Software API Support	DirectX®: 12 OpenGL® : 4.6,

		OpenCL™ : 2.0 Vulkan™ 1.1
	Available Graphics Drivers	HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
AMD Radeon ™ Pro W6600 8GB Graphics	**Form Factor**	Full height, Single Slot, 241mm length
	Graphics Controller	AMD Radeon™ PR W6600 XT Graphics GPU: AMD RDNA 2 Memory: 8GB GDDR6 Power: 130 Watts, 6-pin Power Cable Cooling: Active, Dual Axial fan
	Bus Type	PCI Express 4.0 x16
	Connectors	4x DisplayPort 1.4 with DSC
	Maximum Resolution	DisplayPort™ 1.4 with DSC: - up to 4x @ 3840x2160px (4K) - up to 4x @ 5120x2880px (5K) - up to 1x @ 7680x4320px (8K)
	Display Outputs	4x DP
	Shading Architecture	Microsoft DirectX 12 Shader Model 6.1
	Supported Graphics APIs	OpenGL 4.6 DirectX 12 Feature Level 12_1 Vulkan 1.1 OpenCL 2.2
	Available Graphics Drivers	Windows 11 Windows 10 Linux® 64-bit (selected distributions) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
AMD Radeon™ Pro W6800 32GB	**Form Factor**	Full-Height Double Slot
	Graphics Controller	Architecture: RDNA 2 GPU Cores: 3840 Power: 261W Cooling: Active fan heatsink
	Memory	32GB GDDR6 memory ECC Capable: Yes Memory Bandwidth: up to 512 GB/s Memory Interface: 256-bit

Technical Specifications - Graphics

	Display Output	Max Displays: 6 Video Output: 6x Mini-DisplayPort™ 1.4 with DSC Display Configurations: 5K Resolution: 6x @ 5120 x 2880 resolution @ 60Hz 8K Resolution: 2x @ 7680 x 4320 resolution @60Hz HDR Support: Yes 8K Support: Yes Notes: W6800 only has mini-DisplayPort™ (mDP) video ports • Configure-to-order must specify AV options to add any required mDP-to-DP Adapters • Two mDP-to-DP Adapters are included in the RTX A2000 AMO kits • If more mDP-to-DP Adapters are needed, Adapters can be ordered separately as AMO: ○ 2MY05AA - HP Single miniDP-to-DP Adapter Cable ○ 2KW87A6 - HP (Bulk 12) miniDP-to-DP Adapter Cables
	Bus Type	PCI Express x16 Gen4
	Software API Support	DirectX®: 12 OpenGL® : 4.6, OpenCL™ : 2.1 Vulkan: 1.2
	Available Graphics Drivers	Windows 11 Windows 10 HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html

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AMD Radeon™ Pro W5500 8GB	**Form Factor**	Full-Height Single Slot
	Graphics Controller	Architecture: RDNA GPU: 1408 Stream Processors organized into 22 Compute Units Power: 125W Cooling: Active
	Memory	8GB GDDR6 memory Memory Bandwidth: up to 224 GB/s Memory Interface: 128-bit

	Display Output	Max Displays: 4 Video Outputs: 4x DisplayPort™ 1.4 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	7690 x 4320 resolution @ 60Hz
	Software API Support	DirectX®: 12 OpenGL® : 4.6, OpenCL™ : 2.0 Vulkan™ 1.1
	Available Graphics Drivers	HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html

AMD Radeon™ Pro W5700 8GB	**Form Factor**	Full-Height Double Slot
	Graphics Controller	Architecture: RDNA GPU: 2304 Stream Processors organized into 36 Compute Units Power: 205W Cooling: Active
	Memory	8GB GDDR6 memory Memory Bandwidth: up to 448 GB/s Memory Interface: 256-bit
	Display Output	Max Displays: 6 Video Outputs: 5x Mini-DisplayPort™ 1.4 and 1x USB-C 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	7690 x 4320 resolution @ 60Hz
	Software API Support	DirectX®: 12 OpenGL® : 4.6, OpenCL™ : 2.0

		Vulkan™ 1.1
	Available Graphics Drivers	HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html

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AMD Radeon™ Pro W6800 32GB	**Form Factor**	Full-Height Double Slot
	Graphics Controller	Architecture: RDNA 2 GPU Cores: 3840 Power: 261W Cooling: Active fan heatsink
	Memory	32GB GDDR6 memory ECC Capable: Yes Memory Bandwidth: up to 512 GB/s Memory Interface: 256-bit
	Display Output	Max Displays: 6 Video Output: 6x Mini-DisplayPort™ 1.4 with DSC Display Configurations: 5K Resolution: 6x @ 5120 x 2880 resolution @ 60Hz 8K Resolution: 2x @ 7680 x 4320 resolution @60Hz HDR Support: Yes 8K Support: Yes Notes: W6800 only has mini-DisplayPort™ (mDP) video ports • Configure-to-order must specify AV options to add any required mDP-to-DP Adapters • Two mDP-to-DP Adapters are included in the RTX A2000 AMO kits • If more mDP-to-DP Adapters are needed, Adapters can be ordered separately as AMO: ○ 2MY05AA - HP Single miniDP-to-DP Adapter Cable ○ 2KW87A6 - HP (Bulk 12) miniDP-to-DP Adapter Cables
	Bus Type	PCI Express x16 Gen4
	Software API Support	DirectX®: 12 OpenGL® : 4.6, OpenCL™ : 2.1 Vulkan: 1.2
	Available Graphics Drivers	Windows 11 Windows 10 HP qualified drivers may be preloaded or available from the HP support Web site:

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

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

HP 9.5mm Slim DVD-ROM Drive	**Description**	9.5mm height, tray-load
	Mounting Orientation	Either horizontal or vertical
	Interface Type	SATA / ATAPI

Technical Specifications – Optical and Removable Storage

	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 11, Windows 10, Windows 7 Professional 64-bit Red Hat® Enterprise Linux®(RHEL) WS4**, 5, 6 Desktop/Workstation SUSE Linux® Enterprise Desktop 10 & 11 No driver is required for this device. Native support is provided by the operating system.	
	Kit Contents	9.5mm Slim DVD-ROM Drive, 5.25" ODD Bay adapter/carrier, slim SATA data/power cable, installation guide	

HP HH DVD Writer (16X RW DVD-R)	**Description**	HP Half Height DVD Writer	
	Mounting Orientation	Either Horizontal or vertical	
	Interface Type	SATA	
	Dimensions (WxHxD)	146x42x165mm	
	Supported Media Types	DVD+R DVD+RW DVD+R DL DVD-R DL DVD-R DVD-RW CD-R CD-RW	
	Disc Capacity	DVD-ROM	8.5 GB DL or 4.7 GB standard
		Full Stroke DVD	145ms (seek)
		Full Stroke CD	120ms (seek)
	Maximum Data Transfer Rates	CD ROM Read	CD-ROM, CD-R Up to 24X CD-RW Up to 24X
		DVD ROM Read	DVD+RW Up to 13X DVD-RW Up to 13X DVD+R DL Up to 12X DVD-R DL Up to 12X DVD-ROM Up to 12X DVD-ROM DL Up to 12X

			DVD+R Up to 16X DVD-R Up to 16X
	Power	Source	SATA DC power receptacle
		DC Power Requirements	5 VDC ± 5% -100 mV ripple p-p 12 VDC ± 10% -200 mV ripple p-p
		DC Current	5 VDC -<1500mA typical, <2000 mA maximum.
	Operating Environmental (all conditions non-condensing)	Temperature	41° to 122° F (5° to 50° C)
		Relative Humidity	10% to 90% (Non-Condensing)
	Operating Systems Supported	Windows 11, Windows 10, Windows 7 Professional 64-bit. Red Hat Enterprise Linux WS4**,5,6 Desktop/Workstation. No driver is required for this device, Native support is provided by operating system.	
	Kit Contents	HP SATA DVD Writer drive, Installation guide.	

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

			CD-ROM 15S
	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 11, Windows 10, Windows 7 Professional 64-bit Red Hat® Enterprise Linux® (RHEL) 6, 7 Desktop/Workstation SUSE Linux® Enterprise Desktop 12 No driver is required for this device. Native support is provided by the operating system.	
	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 SD Card Reader	**Description**	Supports hardware ECC (Error Correction Code) function Supports hardware CRC (Cyclic Redundancy Check) function Supports SD 4-bit parallel transfer mode
	Interface Type	USB 3.1 GEN 1 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)

Technical Specifications – Optical and Removable Storage

	SD Ultra High Speed II(SD UHSII) These additional media types are supported with a card adapter. Memory Stick Micro (M2) miniSD miniSD High Capacity Micro SD Memory Card (MicroSD) Micro SD High Capacity Memory Card (MicroSDHC) Test Parameters/Conditions - Power applied, unit operating on system ±5%
Operating Systems Supported	Windows 11, 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 Thunderbolt-3 Dual Port2 PCIe 1-port I/O Card	**Data Transfer Rate**	Supports up to 40 Gb/s (40,000 Mb/s)
	Devices Supported	Thunderbolt™, Thunderbolt™ 2 and Thunderbolt™ 3 certified for Windows devices
	Bus Type	PCIe card, full height PCIe slots
	Ports	Two Thunderbolt™ 3 external USB type-C output connectors (Rear) Two full size DisplayPort input connectors (Rear)
	Internal Connectors	One 2x5-Pin header connector
	System Requirements	Windows 11, Windows 10 Professional, available dedicated PCH PCIe slot.
	Temperature - Operating	50° to 131° F (10° to 55° C)
	Temperature - Storage	-22° to 140° F (-30° to 60° C)
	Relative Humidity - Operating	20% to 80%
	Compliances	FCC Part 15B, cULus 60950, CE Mark EN55022B(1995)/EN55024-1998 STD, Taiwan BSMI CNS13438, Korea MIC
	Operating Systems Supported	Windows 11, Windows 10 Professional.
	Kit Contents	HP Thunderbolt™ 3 Dual Port PCIe I/O Card, 2- DisplayPort cables, GPIO (General-Purpose Input/Output) cables, Installation documentation and warranty card.

*Maximum speed requires DisplayPort™ and PCIe aggregation.

NETWORKING AND COMMUNICATIONS

Integrated Intel® 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)

	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)

	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
Allied Telesis AT-2914SX/LC-901 1GB LC Fiber NIC	**Network Interface**	1Gb LC Fiber 850 nm
	System Interface	PCIeG2 x1, Half Height, Half Length
	Networking Speeds Supported	1000Base-X (1Gbps)

Technical Specifications - Networking and Communications

	Cabling	50/125 µm (core/cladding) multimode fiber optic cable up to 500m 62.5/125 µm (core/cladding) multimode fiber optic cable up to 220m
	Power Consumption (active- typical)	1.5 Watts
	Physical Dimensions	8.8 cm x 6.9 cm (3.5 in x 2.7 in)
	Connect Speed LED Indicators	ON: 1Gbps Link OFF: Link down
	Operating Temperature	-25°C to 70°C (-13°F to 158°F)
	Hardware Certifications	IEEE 802.1p (Quality of Service), IEEE 802.1Q (VLANs), IEEE 802.2 (LLC), IEEE 802.3ac (MAC), IEEE 802.3x (Flow control auto-negotiation), IEEE 802.3z (1000 Base-X), IEEE 802.3ad (Link aggregation) RoHS, UL, FCC/EN55022 Class A, TUV, EN55024, CE, C-TICK, VCCI

Allied Telesis AT-2911T/2-901	**Networking Interface**	2 RJ-45
	System Interface	PCI Express 3 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)	2.4W
	Physical Dimensions	Length: 8.8cm (3.5 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
	Operating Temperature	0 °C to 40 °C (32 °F to 104 °F)
	Hardware Certifications	USA: FCC B, EU: UL CE, UKCA Japan: VCCI, Taiwan: BSMI, Australia/New Zealand: CTICK, Korea: KCC, Canada: ICES-003/NMB-003

Intel® X710-DA2 10GBASE-SR Converged Network Adapter	**Networking Interface**	2 SFP+ Ports for LC SFP+ Transceivers
	System Interface	PCI Express 3.0 x8
	Networking Speeds Supported	10Gbps (or 1Gbps with 3rd party transceiver)
	Cabling	LC fiber optic cabling with LC SFP+ Transceivers
	Power Consumption (active-typical)	4.3W
	Physical Dimensions	6.578 in x 2.703 in

Technical Specifications - Networking and Communications

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

NOTE: Windows 7 is NOT supported

10GbE SFP+ SR Transceiver	**Connector Type**	LC
	Cable Type	62.5/125um or 50/125um (core/cladding), graded-index, low metal content, multimode fiber optic, complying with ITU-T G.651 and ISO/IEC 793-2 Type A1b or A1a, respectively.
	Cable Length	2-300m
	Wavelength	850nm
	Form Factor	SFP+
	Physical Dimensions	0.47(h) x 0.54(w) x 2.19(d) inches (1.19 x 1.38 x 5.57 cm)
	Operating Temperature	0C to 45C (32F to 113F)
	Operating Humidity	0% to 85%, noncondensing

NVIDIA® Mellanox® ConnectX-6 DX Dual Port 10/25GbE SFP28 NIC	**Connector**	2 x SFP28 Transceiver Cage (Dual Port)*
	Cabling	Depends on transceiver pairing. Typically OM4 or higher MMF LC fiber optic cabling with LC SFP28 Transceivers.
	Controller	ConnectX6-DX
	Memory	256Mbit SPI Quad Flash Device
	Data Rates Supported	1/10/25GbE
	Compliance	– IEEE 802.3by 25 Gigabit Ethernet – IEEE 802.3ae 10 Gigabit Ethernet – IEEE 802.3ap based auto-negotiation and KR startup – IEEE 802.3ad, 802.1AX Link Aggregation – IEEE 802.1Q, 802.1P VLAN tags and priority – IEEE 802.1Qau (QCN) – Congestion Notification – IEEE 802.1Qaz (ETS) – IEEE 802.1Qbb (PFC) – IEEE 802.1Qbg – IEEE 1588v2 – Jumbo frame support (9.6KB)

Technical Specifications - Networking and Communications

		– Safety: CB/cTUVus/CE – EMC: CE/FCC/VCCI/ICES/RCM – RoHS Compliant
	Bus Architecture	PCIe Gen 4 x8
	Data Transfer Mode	PCI Express - stores and accesses Ethernet fabric connection information and packet data
	Power Requirements	11.5 Watts (typical)
	Network Transfer Rate	1Gbps, 10Gbps, 25Gbps **NOTE:** Network Transfer Rate depends on transceiver model.*
	Kit Contents	NVIDIA® Mellanox® ConnectX-6 DX Dual Port 10/25GbE SFP28 NIC

*3rd party transceivers sold separately. You must have a transceiver installed in order to connect this card to a network.

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
November 29, 2017	From v2 to v3	Added	Processors, hard drives and graphics to offerings, added Declared Noise Emissions information
January 30, 2018	From v3 to v4	Removed	NVIDIA SLI Graphics Connectors from Graphics Cable Adapters section
March 27, 2018	From v4 to v5	Added	Intel Xeon processors added
April 16, 2018	From v5 to v6	Removed	RAID 5
August 13, 2018	From v6 to v7	Added	Footnote to Networking and Communications section
		Changed	Processors section and Operating Systems section
September 4, 2018	From v7 to v8	Removed	HP IEEE 1394b FireWire PCIe Card
September 6, 2018	From v8 to v9	Removed	Microsemi 3152-8i SAS ROC RAID Controller
September 21, 2018	From v9 to v10	Added	Intel Optane SSD 905p AiC 280GB & 480GB
September 26, 2018	From v10 to v11	Changed	NVIDIA Quadro P6000 Graphics specs
April 8, 2019	From v11 to v12	Added	New Intel Xeon Processors and graphics, added HP DX175 Removable HDD Carrier into the HDD Frame/Carriers section
		Changed	Storage / Hard Drives, Memory sections and format changes
May 15, 2019	From v12 to v13	Added	NVIDIA Quadro RTX 8000 48GB Graphics
		Changed	External BIOS simulator link on Physical Security and Serviceability section
		Removed	Intel 9260 WLAN
June 12, 2019	From v13 to v14	Changed	Storage section
July 7, 2019	From v14 to v15	Added	Intel Xeon W Processors
July 15, 2019	From v15 to v16	Changed	Corrected Intel 905p Series AIC 480GB PCIe SSD
August 1, 2019	From v16 to v17	Changed	Processors Matrix
September 1, 2019	From v17 to v18	Added	Footnote to Memory section, Added Optane 905P 380GB M.2 SSD Module, HP Z Turbo Drive 1TB SED TLC Z4/Z6 G4 SSD Kit & module to Storage section, Added Intel® Wi-Fi 6 AX200 & BT PCIe to Networking section
October 26, 2019	From v18 to v19	Changed	Graphics section
November 1, 2019	From v19 to v20	Added	NVDIMM Memory sections, Added HP QX310 Removable NVMe Frame/Carrier w/PCIe card to Optical and Removable Storage section
January 2, 2020	From v20 to v21	Changed	Storage section
February 26, 2020	From v21 to v22	Added	New Intel Xeon Processors
		Changed	Overview, PCIe Solid State Drives sections
April 2, 2020	From v22 to v23	Changed	Processors and NVDIMM Memory sections
July 18, 2020	From v23 to v24	Changed	Processors, Graphics section
January 5, 2021	From v24 to v25	Changed	Processors, Memory, Graphics, Racking and Physical Security, Operating Systems and Hard Drives sections
February 1, 2021	From v25 to v26	Changed	NETWORKING AND COMMUNICATIONS section
March 1, 2021	From v26 to v27	Changed	Overview section
April 13, 2021	From v27 to v28	Changed	Processors, Graphics and Social and Environmental Responsibility sections
May 1, 2021	From v28 to v29	Changed	Graphics section
June 1, 2021	From v29 to v30	Changed	Memory and Graphics sections
July 1, 2021	From v30 to v31	Changed	Graphics section
August 1, 2021	From v31 to v32	Changed	Graphics section
September 1, 2021	From v32 to v33	Changed	Input Devices and Graphics sections
October 1, 2021	From v33 to v34	Changed	Graphics and System Board sections

Summary of Changes

November 1, 2021	From v34 to v35	Changed	Processors and Graphics sections
December 1, 2021	From v35 to v36	Changed	Operating Systems, Graphics, Networking and Communications and Input Devices sections
December 15, 2021	From v36 to v37	Changed	OPERATING SYSTEM and Social and Environmental Responsibility sections
January 1, 2022	From v37 to v38	Changed	Graphics, OPERATING SYSTEM and Application Software sections
February 1, 2022	From v38 to v39	Changed	Input Devices section
March 1, 2022	From v39 to v40	Changed	Graphics, Social and Environmental Responsibility sections
April 1, 2022	From v40 to v41	Changed	Processors, Graphics and Stable & Consistent Offerings sections
May 2, 2022	From v41 to v42	Changed	Graphics section
June 1, 2022	From v42 to v43	Changed	Graphics, Networking and Communications sections
July 1, 2022	From v43 to v44	Changed	Graphics section
August 1, 2022	From v44 to v45	Changed	NETWORKING AND COMMUNICATIONS section
September 1, 2022	From v45 to v46	Changed	Format page 18
October 1, 2022	From v46 to v47	Changed	Graphics section
December 1, 2022	From v47 to v48	Changed	Input Devices section
December 9, 2022	From v48 to v49	Changed	Optical and Removable Storage section
January 1, 2023	From v49 to v50	Changed	Networking and Communications, GRAPHICS sections