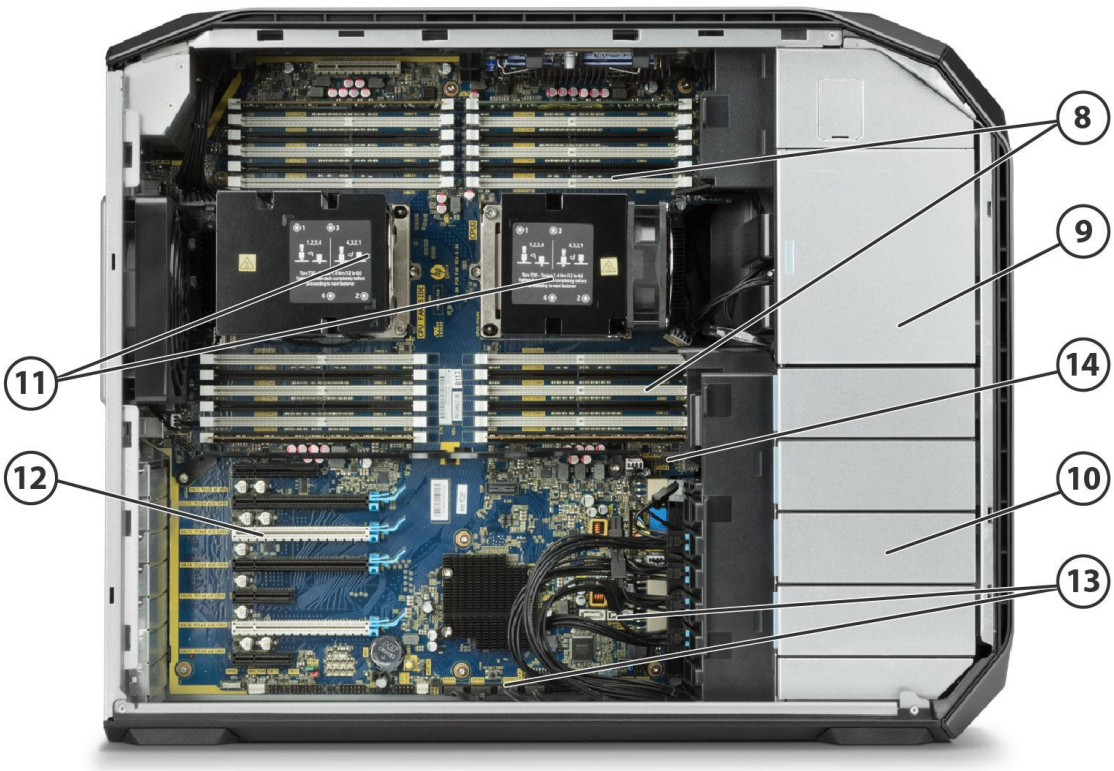
Overview

HP Z8 G4 Workstation

Front view

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

Overview



Internal view

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

Overview

Rear view

15. Choice of 1125W or 1450W, 90% Efficient Power Supplies
16. Rear I/O:
    Rear Power Button
    6 USB 3.1 Gen1
    1 Serial
    PS/2 keyboard and mouse
    2 RJ-45 to integrated Gigabit LAN
    1 Audio Line-In (can be retasked as microphone)
    1 Audio Line-Out
17. Optional: 2 10GbE 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® Platinum 8260L processor	24	2.4 GHz	35.75	2933	YES	3.1, 3.9	YES	165
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, 3.6	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

Overview

Intel® Xeon® Gold 6242 processor	16	2.8 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	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	3.4GHz	19.25	2666	YES	3.7, 3.7	NO	115
Intel® Xeon® Gold 5222 processor	4	3.8 GHz	16.5	2666	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	2.1 GHz	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

Overview

	All Z8G4 Intel® Xeon® CPUs Feature Intel® vPro™ Technology. [1]The specifications shown in this column represent the following: (all core maximum turbo steps, one core maximum turbo steps). Turbo boost stepping occurs in 100MHz increments. Processors that do not have turbo functionality are denoted as N/A.

Available Processors

Disclaimers

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

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

Color

Black

Convertibility

No

Expansion Slots (see system board section for more details)

Slot 1:
PCIe Gen3 x4 - Transforms to PCIe Gen3 x8 when 2nd CPU is installed

Slot 2:
PCIe Gen3 x16

Slot 3:
PCIe Gen3 x16 - Available ONLY when 2nd processor is installed

Slot 4:
PCIe Gen3 x16

Slot 5:
PCIe Gen3 x4

Slot 6:
PCIe Gen3 x16 - Available ONLY when 2nd processor is installed

Slot 7:
PCIe Gen3 x4

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

Expansion Bays (see storage section for more details)

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

1 dedicated 9.5mm slim optical disk drive bay

Front I/O

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

Overview

Internal I/O	Internal Slot 1 CPU1: PCIe Gen3 x8 - always available Internal Slot 2 CPU2: PCIe Gen3 x8 - available when 2nd CPU is installed 2 USB 2.0 ports available with a single 2x5 header 1 USB 2.0 port available with a 1x6 header 1 USB 3.1 Gen1 and 1 USB 2.0 port available with a 2x6 header **Notes:** The 2x5 header can be converted to a standard (Type-A) USB 2.0 connector through the use of one HP Internal USB Port Kit (EM165AA). This port kit uses one half of the 2x5 header. The 1x6 header can be converted to a standard (Type-A) USB 2.0 connector through the use of one HP Internal USB Port Kit (EM165AA). This port kit uses 5 pin positions on the header. The 2x6 header can be converted to a standard (Type-A) USB 2.0 connector through the use of one HP Internal USB Port Kit (EM165AA). This port kit uses one half of the 2x6 header.
Rear I/O	6 USB 3.1 Gen1 (aka USB 3.0), 1 Serial, PS/2 keyboard and mouse, 2 RJ-45 to integrated Gigabit LAN, 1 Audio Line-In (can be retasked as microphone), 1 Audio Line-Out Optional: 2 RJ-45 to 10GbE LAN ports
Interfaces Supported	10 channel SATA 6.0 Gb/s interface Factory integrated RAID available for SATA drives (RAID 0, 1 and 10) Internal USB 3.1 Gen1, USB 3.1 Gen2, USB 2.0
On-board RAID Support	SATA RAID 0 Striped Array SATA RAID 1 Mirrored Array SATA RAID 10 Striped/Mirrored SATA RAID 5 Parity Array
Chassis Dimensions (H x W x D)	Footprint: H: 17.5" [444.5mm] W: 8.5" [215.9mm] D: 21.7" [551.2mm] (measured to the rear of service panel) Maximum: H: 17.5" [444.5mm] W: 8.5" [215.9mm] D: 21.85" [555.2mm] (measured to the embossment for the rear chassis fans)
Packaged Dimensions	H: 25" (636mm) W: 13.1" (332mm) D: 28.9" (734mm)
Palletization Profile	4 units x 3 layers = 12 units per pallet 1200x1000x2034mm (pallet included)
Rack Dimensions	5U
Weight	Exact weights depend upon configuration (System weight only). Minimum: 22.4kg (49.4lbs.) Typical: 23.7kg (52.2lbs.) Maximum: 31.7kg (70lbs.)
Temperature	Operating: 5° to 35°C (40° to 95°F) Non-operating: -40° to 60°C (-40° to 140°F)
Humidity	Operating: Operating: 10% to 85% RH, non-condensing, 35° C maximum wet bulb Non-operating: 10% to 90%, non-condensing, 35° C maximum wet bulb

Overview

Maximum Altitude (non-pressurized)	Operating: 3,048m (10,000ft) Non-operating: 9,144m (30,000ft) **Note:** Above 1524 m (5,000 feet) altitude, maximum operating temperature is reduced by 1° C (1.8° F) per 305 m (1,000 feet) elevation increase
Power Supply	Choice of: 1125W/100V/15A 90% Efficient wide-ranging, active Power Factor Correction The power delivery system includes four 6+2-pin graphics power cables. 1450W/200V/10A 90% Efficient wide-ranging, active Power Factor Correction The power delivery system includes four 6+2-pin graphics power cables. - Available in limited regions 1450W/100V/20A 90% Efficient wide-ranging, active Power Factor Correction The power delivery system includes four 6+2-pin graphics power cables. 1700W/200V/10A 90% Efficient wide-ranging, active Power Factor Correction The power delivery system includes four 6+2-pin graphics power cables. **Notes:** The 1125W/100V/15A (1450W at 200V Input Voltage) power supply can also supply 1275W of output power when the input voltage is greater than 105V. If the input voltage is less than 105V, but greater than 90V for any reason, the maximum power that can be drawn is 1125W. An uninterruptible power supply (UPS) is highly recommended if 1275W output power is desired. The 1125W Power Supply can also supply 1450W of output power when the input voltage is greater than 200V under all conditions. The 1450W/100V/20A (1700W at 200V Input Voltage) power supply can also supply 1550W of output power when the input voltage is greater than 105V. If the input voltage is less than 105V, but greater than 90V for any reason, the maximum power that can be drawn is 1450W. An uninterruptible power supply (UPS) is highly recommended if 1550W output power is desired. The 1450W Power Supply can also supply 1700W of output power when the input voltage is greater than 200V under all conditions. The 1450W/100V/20A chassis is shipped with a 20A power cord and requires a 20A outlet in an environment with 100V/110V. Site modification may be required. Check with your sales lead and click here for the Site Prep Guide. The Z8 G4 power supply efficiency reports can be found at these links: 1125W – Link: https://plugloadsolutions.com/psu_reports/HP%20Inc_DPS-1125BB%20A_1125W_ECOS%204825_Report.pdf 1450W – Link: https://plugloadsolutions.com/psu_reports/HP%20Inc_DPS-1450AB%20A_1450W_ECOS%204826_Report.pdf
Workstation ISV Certifications	See the latest list of certifications at http://www.hp.com/united-states/campaigns/workstations/partnerships.html

Supported Components

Processors

Intel® Xeon® processor Scalable family	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Intel® Xeon® Platinum 8260L processor	Y	Y	170R9AA	1
Intel® Xeon® Gold 6258R processor	Y	Y	9VA96AA	1
Intel® Xeon® Gold 6248R processor	Y	Y	9VA93AA	1
Intel® Xeon® Gold 6246R processor	Y	Y	9VA92AA	1
Intel® Xeon® Gold 6244 processor	Y	Y	5YZ47AA	1
Intel® Xeon® Gold 6242R processor	Y	Y	9VA91AA	1
Intel® Xeon® Gold 6242 processor	Y	Y	5YZ46AA	1
Intel® Xeon® Gold 6240R processor	Y	Y	9VA90AA	1
Intel® Xeon® Gold 6240 processor	Y	Y	5YZ44AA	1
Intel® Xeon® Gold 6238R processor	Y	Y	9VA89AA	1
Intel® Xeon® Gold 6234 processor	Y	Y	5YZ42AA	1
Intel® Xeon® Gold 6230R processor	Y	Y	9VA88AA	1
Intel® Xeon® Gold 6226R processor	Y	Y	9VA86AA	1
Intel® Xeon® Gold 6226 processor	Y	Y	5YZ40AA	1
Intel® Xeon® Gold 6136 processor	Y	Y	1XM62AA	1
Intel® Xeon® Gold 6128 processor	Y	Y	1XM69AA	1
Intel® Xeon® Gold 5222 processor	Y	Y	5YZ39AA	1
Intel® Xeon® Gold 5220R processor	Y	Y	8BD06AA/AT	1
Intel® Xeon® Gold 5218R processor	Y	Y	9VA84AA	1
Intel® Xeon® Gold 5218 processor	Y	Y	5YZ37AA	1
Intel® Xeon® Gold 5215 processor	Y	Y	5YZ35AA	1
Intel® Xeon® Gold 5118 processor	Y	Y	1XM71AA	1
Intel® Xeon® Silver 4216 processor	Y	Y	5YZ34AA	1
Intel® Xeon® Silver 4215R processor	Y	Y	9VA82AA	1
Intel® Xeon® Silver 4214R processor	Y	Y	8BD03AA/AT	1
Intel® Xeon® Silver 4214 processor	Y	Y	5YZ32AA	1
Intel® Xeon® Silver 4210R processor	Y	Y	8BD02AA	1
Intel® Xeon® Silver 4210 processor	Y	Y	5YZ31AA	1
Intel® Xeon® Silver 4208 processor	Y	Y	5YZ30AA	1
Intel® Xeon® Silver 4114 processor	Y	Y	1XM74AA	1
Intel® Xeon® Silver 4108 processor	Y	Y	1XM76AA	1
Intel® Xeon® Bronze 3206R processor	Y	Y	8BD00AA	1
Intel® Xeon® Bronze 3204 processor	Y	Y	5YZ29AA	1

[1] Options kits available for second processor upgrade.

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.

Supported Components

Monitors / Displays

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

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

Storage / Hard Drives

SAS Hard Drives

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 CMR	Y	Y	QB576AA	
2TB SATA 7200RPM HDD SMR				
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 (5) 3.5-inch 7200 rpm SATA drives: 500 GB, 1.0, 2.0, 4.0 TB; 20TB max total

Supported Components

SATA Solid State Drives

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP Solid State Drives (SSDs) for Workstations				
HP 256GB SATA SSD	Y	Y	A3D26AA	
HP 512GB SATA SSD	Y	Y	D8F30AA	
HP 1TB SATA SSD	Y	Y	F3C96AA	
HP 2TB SATA SSD	Y	Y	Y6P08AA	
HP 256GB SATA SED OPAL2 SSD	Y	Y	G7U67AA	
HP 512GB SATA SED OPAL2 SSD	Y	Y	N8T26AA	
HP 240GB SATA Enterprise SSD	Y	Y	T3U07AA	
HP 480GB SATA Enterprise SSD	Y	Y	T3U08AA	
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 Z8G4 SSD Module	N	N	EOL	5
HP Z Turbo Drive 512GB MLC Z8G4 SSD Module	N	N	EOL	5
HP Z Turbo Drive 1TB MLC Z8G4 SSD Module	N	N	EOL	5
HP Z Turbo Drive 256GB TLC Z8G4 SSD Module	Y	Y	1PD53AA	2
HP Z Turbo Drive 512GB TLC Z8G4 SSD Module	Y	Y	1PD54AA	2
HP Z Turbo Drive 1TB TLC Z8G4 SSD Module	Y	Y	1PD55AA	2
HP Z Turbo Drive 2TB TLC Z8G4 SSD Module	Y	Y	3KP41AA	2
HP Z Turbo Drive 256GB SED Z8G4 SSD Module	N	N	EOL	5
HP Z Turbo Drive 512GB SED Z8G4 SSD Module	N	N	EOL	5
HP Z Turbo Drive 256GB MLC Z8 G4 SSD Kit	N	N	EOL	5
HP Z Turbo Drive 512GB MLC Z8 G4 SSD Kit	N	N	EOL	5
HP Z Turbo Drive 1TB MLC Z8 G4 SSD Kit	N	N	EOL	5
HP Z Turbo Drive 256GB TLC Z8 G4 SSD Kit	Y	Y	1PD47AA	4
HP Z Turbo Drive 512GB TLC Z8 G4 SSD Kit	Y	Y	1PD48AA	4
HP Z Turbo Drive 1TB TLC Z8 G4 SSD Kit	Y	Y	1PD49AA	4
HP Z Turbo Drive 2TB TLC Z8 G4 SSD Kit	Y	Y	3KP40AA	4
HP Z Turbo Drive 256GB SED Z8 G4 SSD Kit	Y	Y	2SA33AA	4
HP Z Turbo Drive 512GB SED Z8 G4 SSD Kit	Y	Y	2SA35AA	4
HP Z Turbo Drive 1TB SED Z8 G4 SSD Kit	Y	Y	6YT75AA	4
HP Z Turbo Drive 1TB SED Z8 G4 SSD Module	Y	Y	6YT79AA	2
HP Z Turbo 2TB SED OPAL2 TLC M.2 Z8 SSD	Y	Y	2Y7W7AA	
HP 1x256GB M.2 2280 PCIe NVMe TLC SSD Z8 G4 Kit	Y	Y	8PE71AA	3
HP 1x512GB M.2 2280 PCIe NVMe TLC SSD Z8 G4 Kit	Y	Y	8PE72AA	

Supported Components

HP 1x1TB M.2 2280 PCIe NVMe TLC SSD Z8 G4 Kit	Y	Y	8PE73AA	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 Module	N	N	8PE64AA	2
HP 2TB PCIe NVME TLC M.2 Z8 G4 SSD	Y	Y	307N2AA	
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 PCIe SSD	Y	Y	3KP42AA	
HP Z Turbo Drive Quad Pro 256GB TLC SSD module	N	Y	4YZ35AA	2
HP Z Turbo Drive Quad Pro 512GB TLC SSD module	N	Y	4YZ36AA	2
HP Z Turbo Drive Quad Pro 1TB TLC SSD module	N	Y	4YZ37AA	2
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
Intel® 905p Series SSD (Opatane SSD)				
Intel® Optane SSD 905p 280GB AiC**	Y	Y	2SC47AA	
Intel® Optane SSD 905p 480GB AiC**	Y	Y	2SC48AA	
Intel® Optane SSD 905p 380GB M.2 SSD Module	Y	Y	6LA66AA	

NOTE 1: Dual M.2 SSD drive plus Quad Pro carrier
NOTE 2: M.2 SSD drive only designed to be installed in Quad Pro, Dual Pro or personality module
NOTE 3: Kit includes single M.2 SSD, dual pro carrier and heat sink
NOTE 4: Kit includes single M.2 SSD, dual personality module carrier and heat sink
NOTE 5: These M.2 SSD Kits and modules are End of Life and no longer available.

*For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 30GB of system disk is reserved for system recovery software
** PCIe card installed in standard PCIe x4 slot

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

Supported Components

Graphics Cable Adapters				
HP miniDP-to-DP Adapter	Y	Y		
HP miniDP-to-DP Adapter (2-pack)	Y	N		
HP miniDP-to-DP Adapter (4-pack)	Y	N		
HP miniDP-to-DP Adapter (8-pack)	Y	N		
HP DisplayPort to Dual Link DVI Adapter	Y	Y	NR078AA	
HP DisplayPort to DVI-D Adapter	Y	Y	FH973AA	
HP DisplayPort to DVI-D Adapter (2-pack)	Y	N		
HP DisplayPort to DVI-D Adapter (4-pack)	Y	N		
HP DisplayPort to DVI-D Adapter (6-pack)	Y	N		
HP DisplayPort to VGA Adapter	Y	Y	AS615AA	
HP DisplayPort to HDMI Adapter	Y	Y	K2K92AA	
NVIDIA SLI 2-slot Graphics Connector	Y	Y	2YY84AA	
Quadro RTX NVLink High-Bandwidth 2-slotBridge (RTX 8000, RTX 6000)	N	Y	6FY11AA	
Quadro RTX NVLink 2-slotBridge (RTX 5000)	Y	Y	6FY12AA	
NVIDIA NVLink 2-Slot Bridge (RTX A6000, RTX A5000)	N	Y	340L2AA	
Entry 3D				
NVIDIA® Quadro® P400 2GB Graphics	Y	Y	1ME43AA	2
NVIDIA® Quadro® P620 2GB Graphics	Y	Y	3ME25AA	2
NVIDIA® T400 2 GB GDDR6 LP Blower Fan 3mDP PCIe x16 Graphics	Y	Y	340K8AA	2
NVIDIA® T600 4 GB GDDR6 LP Blower Fan 4mDP PCIe x16 Graphics	Y	Y	340K9AA	2
Mid-range 3D				
NVIDIA® Quadro® P1000 4GB Graphics	Y	Y	1ME01AA	4
NVIDIA® Quadro® P2000 5GB Graphics	Y	Y	1ME41AA	4
NVIDIA® Quadro® P2200 5GB Graphics	Y	Y	6YT67AA	4
AMD Radeon™ Pro WX 3200 4GB Graphics	Y	Y	6YT68AA	4
NVIDIA® T1000 4 GB 4mDP Graphics	Y	Y	20X22AA/AT	3
NVIDIA RTX A2000 6 GB 4mDP Graphics	Y	Y	340L0AA	3
High End 3D				
NVIDIA® Quadro RTX 4000 8GB Graphics	Y	Y	5JV89AA	3
NVIDIA® RTX A4000 16 GB 4DP Graphics	Y	Y	20X24AA/AT	4
NVIDIA® RTX A4500 20 GB GDDR6 4DP Graphics	Y	Y	5S458AA/AT	3
AMD Radeon™ Pro W5500 8GB 4DP GFX	Y	Y	9GC16AA/AT	3
AMD Radeon™ Pro W5700 8GB 5mDP+USBc GFX	Y	Y	9GC15AA/AT	2
Ultra High-End 3D				
NVIDIA® Quadro® GV100 32GB Graphics	Y	Y	3ME26AA	3
NVIDIA® Quadro RTX 5000 16GB Graphics	Y	Y	5JH81AA	2
NVIDIA® RTX A5000 24 GB Graphics	Y	Y	20X23AA	3
NVIDIA® RTX A6000 48GB Graphics	Y	Y	2S6U3AA	2
AMD Radeon Pro W6800 32GB Graphics	Y	Y	340K7AA	2
NVIDIA® Quadro® Sync II	Y	Y	1WT20AA	

Supported Components

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	1,3
16GB (1x16GB) DDR4-2666 ECC Reg Memory	Y	N	N	Y	1XD85AA	1,3
32GB (1x32GB) DDR4-2666 ECC Reg Memory	Y	N	N	Y	1XD86AA	1,3
64GB (1x64GB) DDR4-2666 ECC LR Memory	Y	N	N	Y	1XD87AA End of Life	1,2,3
128GB (1x128GB) DDR4-2666 ECC 3DS LR Memory	Y	N	N	Y	3GE82AA End of Life	1,2,3
8GB (1x8GB) DDR4-2933 ECC Reg Memory	Y	Y	Y	Y	5YZ56AA	1,3
16GB (1x16GB) DDR4-2933 ECC Reg Memory	N	Y	N	Y	5YZ54AA	1,3
32GB (1x32GB) DDR4-2933 ECC Reg Memory	N	Y	N	Y	5YZ55AA	1,3
64GB (1x64GB) DDR4-2399 ECC Reg Memory	N	Y	N	Y	5YZ57AA	1,3

SL CPU: 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 CPU: Are processors formerly known 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 Z8 G4 Workstation, please refer to the System Technical Specifications - System Board section of this document.

2. Sleep (S3 state) support:
- Sleep (S3 state) may not be supported with non-HP validated and qualified 64 GB LR DIMMs.
- Sleep (S3 state) is not supported with 128 GB 3DS LR DIMMs

3. You cannot intermix different types of memory. The system will not work if LR DIMMs, RDIMMs or 3DS LR DIMMs are intermixed.

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

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

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

MT/s = Million Transfers per second

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

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

Supported Components

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
256GB (1x256GB) DC Persistent Memory Module	N	Y	4D8C0AA	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.
   i. Option Kit 4D8C0AA is currently only supported in memory 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. Z8 G4 Note: “M” processors support a total memory limit < =2TB per processors or 4TB per dual processor system
   ii. When Configured in Memory Mode, additional DRAM does not count against maximum processor memory.
g. Maximum number of DCPMM modules in a Z8G4 is 6 per processor.
h. Customer is responsible for additional required DRAM when adding DCPMM modules in Memory Mode.
i. HP Z8G4 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

Supported Components

Multimedia and Audio Devices

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

Optical and Removable Storage

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP SlimTray Optical Drives				
HP 9.5mm Slim Blu Ray Disc Writer	Y	Y	K3R65AA	1
HP 9.5mm Slim DVD ROM	Y	Y	K3R63AA	1
HP Half Height Optical Drives				
HP HH DVD Writer (16X RW DVD-R)	N	Y	4AR67AA	
HP 9.5mm Slim DVD Writer*	Y	Y	K3R64AA	1
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		
HP QX310 Removable Carrier only	N	Y	8GQ91AA/AT	

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

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

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

Networking and Communications

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Intel® I350-T2 PCIe Dual Port Gigabit NIC	Y	Y	V4A91AA	
Intel® I350-T4 PCIe 4-Port Gigabit NIC	N	Y	W8X25AA	
Intel® Ethernet I210-T1 PCIe x1 Gb NIC	Y	Y	E0X95AA	
Aquantia® NBASE-T 5GbE PCIe NIC	N	Y	1PM63AA	

Supported Components

Intel® X550-T2 10GbE Dual Port NIC	Y	Y	1QL46AA	
Intel® X710-DA2 10GbE SFP+ Dual Port NIC	Y	Y	1QL47AA	1
HP 10GBASE-T Dual NIC Module Z6/8 G4	Y	Y	1QL49AA	
Intel® 8265 802.11 a/b/g/n/ac&BT PCIe	N	Y	1QL48AA	
Intel® 9260 802.11 a/b/g/n/ac&BT PCIe	N	Y	6SL33AA	US/CAN only
HP 10GbE SFP+ SR 1st Transceiver	Y	Y	C3N53AA	
Intel® Wi-Fi 6 AX200 & BT PCIe	N	Y	7CE01AA	
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 **Note 1:** Windows 7 is NOT supported	Y	Y	1C7Q2AA	

Racking and Physical Security

Supported Components

Racking and Physical Security

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

NOTE 1: Standard on all systems

Input Devices

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP Wireless Business Slim Keyboard and Mouse	Y	Y	N3R88AA	
Business Slim PS/2 Wired Keyboard	Y	Y	N3R86AA	
USB Business Slim Wired Keyboard	Y	Y	N3R87AA	
USB Premium Wired Keyboard	Y	Y	Z9N40AA	
USB Wired SmartCard CCID Keyboard	Y	Y	E6D77AA	
HP Optical USB Mouse	Y	Y	QY777AA	
HP PS/2 Mouse	Y	Y	QY775AA	
USB 1000dpi Laser Mouse	Y	Y	QY778AA	
HP USB Hardened Mouse	Y	Y	P1N77AA	
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 Internal USB Port Kit	N	Y	EM165AA	Note 1
HP eSATA PCI Cable Kit	Y	Y	GM110AA	Note 2
HP Optical Bay HDD Mounting Bracket	N	Y	NQ099AA	Note 3
HP 2.5in HDD/SSD 2-in-1 ODD Bay Bracket	N	Y	K4T74AA	Note 4
HP Z Premium Front I/O 2xUSB-A 2xUSB-C	N	Y	1XM32AA	
HP Power Cord Kit	Y	N		
HP Workstation Mouse Pad	Y	N		Japan Only
HP ENERGY STAR® Certified Configuration	Y	N		

NOTE 1: The HP Internal USB Port kit has a single USB 2.0 type A connector.
NOTE 2: No hot plug / hot swap supported with eSATA
NOTE 3: NQ099AA used to install greater than four 3.5" HDDs in the factory or when purchasing Aftermarket Option (AMO) drives

Supported Components

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

Application Software

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

Supported Components

Operating Systems

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

NOTE 1: This second OS must be ordered with the HP Linux® Installer Kit as the first OS.
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: Available with Windows Subsystem for Linux® (WSL2).

System Technical Specifications

System Board

System Board Form Factor	Custom Form Factor, 16.34"x15.25" (415mm x 387.2mm)
Processor Socket	Dual FCLGA3647 (Socket P)
CPU Bus Speed	UPI: Up to 10.4GT/second, depending on processor
Chipset	Intel® C622 Chipset
Super I/O Controller	Nuvoton SIO15
Memory Expansion Slots	24 slots (12 slots per CPU)
Memory Type Supported	DDR4 R-DIMM (Registered), ECC: 8GB, 16GB, 32GB, and 64GB DDR4 LR-DIMM (Load Reduced), ECC: 64GB DDR4 3DS LR DIMM (3D Stacked, Load Reduced), ECC: 128GB* *128GB DIMMs are supported but no longer supplied by HP
Memory Modes	NUMA (Non-Uniform Memory Architecture), Memory Node Interleave
Memory Speed Supported	2133MT/s, 2400MT/s, and 2666MT/s, and 2933MT/s

Available Memory Configurations:

	Single Processor												
	CPU 0												
System	Top Slots						Bottom Slots						Perf
Memory	DIMM 1	DIMM 2	DIMM 3	DIMM 4	DIMM 5	DIMM 6	DIMM 7	DIMM 8	DIMM 9	DIMM 10	DIMM 11	DIMM 12	Rating
8GB	8GB												Fair
16GB	8GB											8GB	Good
24GB	8GB		8GB		8GB								Better
32GB	8GB		8GB							8GB		8GB	Better
	16GB											16GB	Good
48GB	8GB		8GB		8GB			8GB		8GB		8GB	Best
	16GB		16GB		16GB								Better
64GB	16GB		16GB							16GB		16GB	Better
	32GB											32GB	Good
96GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	Best
	16GB		16GB		16GB			16GB		16GB		16GB	Best
	32GB		32GB		32GB								Better
128GB	32GB		32GB							32GB		32GB	Better
192GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	Best
	32GB		32GB		32GB			32GB		32GB		32GB	Best
256GB	32GB	32GB	32GB		32GB			32GB		32GB	32GB	32GB	Better
	64GB		64GB							64GB		64GB	Better
384GB	32GB	32GB	32GB	32GB	32GB	32GB	32GB	32GB	32GB	32GB	32GB	32GB	Best
	64GB		64GB		64GB			64GB		64GB		64GB	Best
512GB	64GB	64GB	64GB		64GB			64GB		64GB	64GB	64GB	Better
768 GB	64GB	64GB	64GB	64GB	64GB	64GB	64GB	64GB	64GB	64GB	64GB	64GB	Best
	128GB		128GB		128GB			128GB		128GB		128GB	Best
1.5 TB	128GB	128GB	128GB	128GB	128GB	128GB	128GB	128GB	128GB	128GB	128GB	128GB	Best

System Technical Specifications

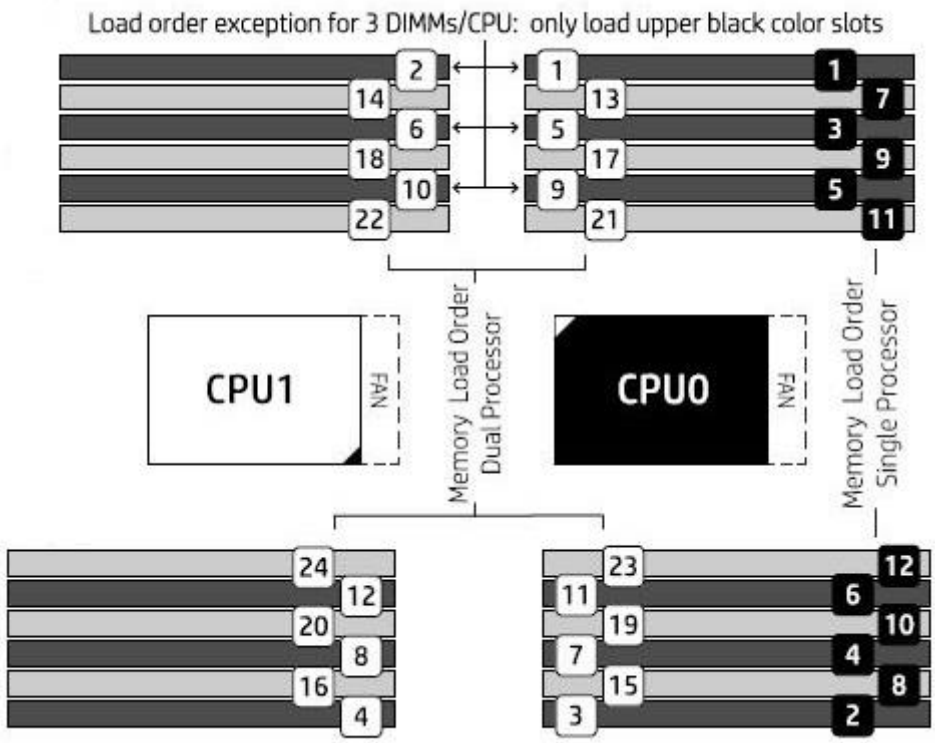
System Memory	Dual Processor Configuration																								Perf Rating
	CPU 0												CPU 1												
	Top Slots						Bottom Slots						Top Slots						Bottom Slots						
	DIMM 1	DIMM 2	DIMM 3	DIMM 4	DIMM 5	DIMM 6	DIMM 7	DIMM 8	DIMM 9	DIMM 10	DIMM 11	DIMM 12	DIMM 1	DIMM 2	DIMM 3	DIMM 4	DIMM 5	DIMM 6	DIMM 7	DIMM 8	DIMM 9	DIMM 10	DIMM 11	DIMM 12	
16GB	8GB												8GB												Fair
32GB	8GB											8GB	8GB											8GB	Good
48GB	8GB		8GB		8GB								8GB		8GB		8GB								Better
64GB	8GB		8GB							8GB		8GB	8GB		8GB							8GB		8GB	Better
	16GB											16GB	16GB											16GB	Good
96GB	8GB		8GB		8GB			8GB		8GB		8GB	8GB		8GB		8GB			8GB		8GB		8GB	Best
	16GB		16GB		16GB								16GB		16GB		16GB								Better
128GB	16GB		16GB							16GB		16GB	16GB		16GB							16GB		16GB	Better
	32GB											32GB	32GB											32GB	Good
192GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	Best
	16GB		16GB		16GB			16GB		16GB		16GB	16GB		16GB		16GB			16GB		16GB		16GB	Best
	32GB		32GB		32GB								32GB		32GB		32GB								Better
256GB	32GB		32GB							32GB		32GB	32GB		32GB							32GB		32GB	Better
	64GB											64GB	64GB											64GB	Good
384GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	Best
	32GB		32GB		32GB			32GB		32GB		32GB	32GB		32GB		32GB			32GB		32GB		32GB	Best
	64GB		64GB		64GB								64GB		64GB		64GB								Better
512GB	64GB		64GB							64GB		64GB	64GB		64GB							64GB		64GB	Better
768GB	32GB	32GB	32GB	32GB	32GB	32GB	32GB	32GB	32GB	32GB	32GB	32GB	32GB	32GB	32GB	32GB	32GB	32GB	32GB	32GB	32GB	32GB	32GB	32GB	Best
	64GB		64GB		64GB			64GB		64GB		64GB	64GB		64GB		64GB			64GB		64GB		64GB	Best
	128GB		128GB		128GB								128GB		128GB		128GB								Better
1TB	64GB	64GB	64GB		64GB			64GB		64GB	64GB	64GB	64GB	64GB	64GB		64GB			64GB		64GB	64GB	64GB	Better
1.5TB	64GB	64GB	64GB	64GB	64GB	64GB	64GB	64GB	64GB	64GB	64GB	64GB	64GB	64GB	64GB	64GB	64GB	64GB	64GB	64GB	64GB	64GB	64GB	64GB	Best
	128GB		128GB		128GB			128GB		128GB		128GB	128GB		128GB		128GB			128GB		128GB		128GB	Best

System Technical Specifications

3TB	128GB	128GB	128GB	128GB	128GB	128GB	128GB	128GB	128GB	128GB	128GB	128GB	128GB	128GB	128GB	128GB	128GB	128GB	128GB	128GB	128GB	128GB	128GB	Best

Memory Loading Order:

Load Order for Single and Dual Processor Configuration



Maximum Memory

Supports up to 1.5TB with two processors, using RDIMMs
Supports up to 3TB with two processors, using 3DS LR DIMMs*
*The 3TB configuration requires 128GB DIMMs which are no longer sold by HP

Memory Configuration (Supported)

Only ECC Registered DIMMs are supported.

- RDIMM (Registered) ,LR DIMM (Load Reduction) and 3DS LR DIMM (3D Stacked Load Reduced) memory cannot be mixed. All memory installed in the system must be either RDIMM , LR DIMM or 3DS LR DIMM.
- Do not install memory modules into memory slots if corresponding processor is not installed.
- Dual processor configurations with memory modules installed for only one processor is not supported.

Notes

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

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

System Technical Specifications

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:

1. Supported only with Xeon 82xx, 62xx, 52xx and 4215 processors.
   a. Available as factory configured in Memory Mode or Storage Mode.
      i. Microsoft Configured Memory Mode will be available in CQ1 2020
   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. Z8 G4 Note: "M" processors support a total memory limit < =2TB per processors or 4TB per dual processor system
2. Option Kit available in CQ1-2020.
3. Requires 2nd processor option.

PCI Express Connectors

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

- Enabled only with optional 2nd CPU is installed.

One PCIe Gen3 x8 open-ended connector.

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

Two PCIe Gen3 x4 open-ended connectors

Supported Drive Interfaces

SATA	2 sSATA @6Gb/s, supports RAID 0, 1. 8 SATA @6Gb/s, supports RAID 0, 1, 5, 10. Factory integrated Intel® SATA RAID is Microsoft Windows only.
External SATA (eSATA)*	Supported on all SATA and sSATA ports configurable with optional eSATA* After-Market Option cable kit) * hot plug / hot swap not supported with eSATA
Factory Configured RAID	SATA: RAID 0, 1, 10

Network Controller

Integrated Intel I219LM	Memory Integrated 3KB receive buffer and 3KB transmit buffer Data rates supported: 10/100/1000 Mb/s Compliance IEEE 802.1as/1588, 802.1p, 802.1Q, 802.3, 802.3ab, 802.3az, 802.3i 802.3u, 802.3x, 802.3z Up to 32 programmable filters Bus architecture PCIe 1.0 x1 and SMBus UEFI and PXE Boot ROM support Network transfer rates: 10BASE-T (half-duplex) 10 Mb/s 10BASE-T (full-duplex) 20 Mb/s

System Technical Specifications

		100BASE-TX (half-duplex) 100 Mb/s 100BASE-TX (full-duplex) 200 Mb/s 1000BASE-T (full-duplex) 2000 Mb/s Management capabilities: WOL (All Power States, including Max Power Savings), auto MDI crossover, PXE, RSS, Advanced cable diagnostics, AMT 11.2x support, vPro compliant
	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
Integrated Graphics	None	
PCI-X Connectors	None	
PCI Card Guide	Yes	
Wake on LAN	Yes, both ports	
Integrated Trusted Platform Module	Trusted Platform Module (TPM) 2.0 (Infineon SLB 9670) Common Criteria EAL4+ Certified FIPS 140-2 Certified (firmware v7.85) TPM Certified products list: https://trustedcomputinggroup.org/membership/certification/tpm-certified-products/ CG TPM Certified products list: http://www.trustedcomputinggroup.org/certification/tpm-certified-products/	
IEEE 1394 Connector(s)	**Front**	None
	Rear	None
	Internal	None
USB Connector(s)	**Front**	Front I/O Entry: 4 USB 3.1 Gen1 (Left-most Port has Charging Capability) Front I/O Premium: 2x USB 3.1 Gen1, 2x USB 3.1 Gen2 Type-C™ (Left-most Port has Charging Capability) • 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
	Rear	6 USB 3.1 Gen1, Type A
	Internal	1 USB 3.1 Gen1 available with a single 12-pin shrouded connector.This header supports a USB Media Card reader. 1 USB 2.0 single-port header 1x USB 2.0 dual-port header
HD Integrated Audio	Realtek ALC221	
Flash ROM	Yes	
CPU Fan Header	Two headers for CPU fans	
Memory Fan Header	Two headers	
Chassis Fan Header	One Rear Chassis Fan Header	
Front PCI Fan Header	One Front and one Aux Fan Header	

System Technical Specifications

Front User Interface Header	Power Button; Power and HDD Activity LEDs; Power for USB Ports			
Front Audio Header	FIO Headset/Mic and Speaker			
CMOS Battery Holder - Lithium	Yes			
Power Supply Headers	Yes			
Clear Password Jumper	Yes			
Serial Port	Yes, on rear panel			
Parallel Port	No			
Keyboard/Mouse	Yes			
Power Supply	1125W/1275W*/1450W* 90% Efficient, Custom PSU (Wide-Ranging, Active PFC)		1450W/1550W*/1700W* 90% Efficient, Custom PSU (Wide-Ranging, Active PFC)	
Operating Voltage Range	90-269 VAC		90-269 VAC	
Rated Voltage Range	100-127 VAC 200-240 VAC	118 VAC	100-127VAC 200-240VAC	118 VAC
Rated Line Frequency	50-60 Hz	400 Hz	50-60Hz	400 Hz
Operating Line Frequency Range	47-66 Hz	393-407 Hz	47-66Hz	393-407 Hz
Rated Input Current	12A @ 100-127 VAC 10A @ 200-240 VAC	12A @ 118 VAC	16A @ 100-127 VAC 10A @ 200-240 VAC	16A@ 118VAC
Heat Dissipation (Configuration and software dependent)	Typical = 2419 btu/hr Max 1 = 4626 btu/hr Max 2 = 5001 btu/hr Max 3 = 5560 btu/hr		Typical = 2970 btu/hr Max 1 = 5962 btu/hr Max 2 = 6080 btu/hr Max 3 = 6519 btu/hr	
Power Supply Fan	(2) Blowers variable speed		(2) Blowers variable speed	
ENERGY STAR Qualified (Configuration dependent)	Yes		Yes	
Power Supply Efficiency	90% Efficient		90% Efficient	
	The Z8 G4 1125W (1450W at 200V Input Voltage) power supply efficiency report can be found at this link: https://plugloadsolutions.com/psu_reports/HP%20Inc_DPS-1125BB%20A_1125W_ECOS%204825_Report.pdf		The Z8 G4 1450W (1700W at 200V Input Voltage) power supply efficiency report can be found at this link: https://plugloadsolutions.com/psu_reports/HP%20Inc_DPS-1450AB%20A_1450W_ECOS%204826_Report.pdf	
FEMP Standby Power Compliant @115V (<2W in S5 - Power Off)	Yes		Yes	
EuP Compliant @ 230V (<0.5 W in S5 - Power Off)	Yes		Yes	
CECP Compliant @ 220V	Yes; Configuration dependent		Yes; Configuration dependent	

System Technical Specifications

(<4W in S3 - Suspend to RAM)		
Power Consumption in sleep mode (as defined by ENERGY STAR) - Suspend to RAM (S3) (Instantly Available PC)	TBD	TBD
Built-in Self-Test LED	Yes	Yes
Surge Tolerant Full Ranging Power Supply (withstands power surges up to 2000V)	Yes	Yes

*Input voltage restriction

NOTE: The 1125W (1450W at 200V Input Voltage) power supply can also supply 1275W of output power when the input voltage is greater than 105V. If the input voltage is less than 105V, but greater than 90V for any reason, the maximum power that can be drawn is 1125W. An uninterruptible power supply (UPS) is highly recommended if 1275W output power is desired.
The 1125W Power Supply can also supply 1450W of output power when the input voltage is greater than 180V under all conditions.
NOTE: The 1450W (1700W at 200V Input Voltage) power supply can also supply 1550W of output power when the input voltage is greater than 105V. If the input voltage is less than 105V, but greater than 90V for any reason, the maximum power that can be drawn is 1450W. An uninterruptible power supply (UPS) is highly recommended if 1550W output power is desired.

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

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

System Technical Specifications

System Configurations

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

Example Z8 G4 Configuration #2	Processor Info	2x Intel Xeon 4114 2.2 2400 10C 85 1stCPU					
	Memory Info	48GB DDR4-2666 (6x8GB) RegRAM CPU2					
	Graphics Info	1x NVIDIA Quadro P2000					
	Disks/Optical/Floppy	4x 512GB SATA 1st SSD /1x DVD-ROM SATA					
	Power Supply	1125W 90% Custom PSU					
	Other	-					
Energy Consumption		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Enabled
	Windows Idle (S0)	105.2		103.3		102.5	
	Windows Busy Typ(S0)	257.4		246.3		260.9	
	Windows Busy Max (S0)	296.2		289.9		297.6	
	Sleep (S3)	8.46	8.35	8.57	8.45	8.58	8.57
	Off (S5)	4.15	4.14	4.31	4.19	4.21	4.15
	Zero Power Mode (ErP)	0.31		0.40		0.29	
Heat Dissipation (Btu/hr)		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Enabled	LAN Disabled	LAN Enabled
	Windows Idle (S0)	359.0		352.5		349.8	
	Windows Busy Typ(S0)	878.3		840.5		890.2	

System Technical Specifications

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

Example Z8 G4 Configuration #3	Processor Info	2x Intel Xeon 5120 2.2 2400 14C 105 1stCPU					
	Memory Info	96GB DDR4-2666 (12x8GB) RegRAM CPU2					
	Graphics Info	1x NVIDIA Quadro P4000					
	Disks/Optical/Floppy	4x 2TB 7200 RPM SATA 1st HDD /1x DVDRW SATA					
	Power Supply	1125W 90% Custom PSU					
	Other	-					
Energy Consumption		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Enabled
	Windows Idle (S0)	125.7		123.6		125.8	
	Windows Busy Typ(S0)	340.7		332.9		343.7	
	Windows Busy Max (S0)	417.1		411.8		426.1	
	Sleep (S3)	9.28	9.10	9.24	9.15	9.49	9.26
	Off (S5)	4.15	4.14	4.32	4.10	4.21	4.16
	Zero Power Mode (ErP)	0.31		0.41		0.30	
Heat Dissipation (Btu/hr)		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Enabled	LAN Disabled	LAN Enabled
	Windows Idle (S0)	429.3		422.0		429.5	
	Windows Busy Typ(S0)	1162.7		1136.0		1172.9	
	Windows Busy Max (S0)	1423.4		1405.3		1453.9	
	Sleep (S3)	31.6	31.0	31.5	31.2	32.4	31.5
	Off (S5)	14.1	14.1	14.7	13.9	14.3	14.2
	Zero Power Mode (ErP)	1.05		1.38		1.03	

Example Z8 G4 Configuration #4	Processor Info	2x Intel Xeon 6152 2.1 2666 22C 140 CPU					
	Memory Info	192GB DDR4-2666 (24x8GB) RegRAM CPU					
	Graphics Info	2x NVIDIA Quadro P5000					
	Disks/Optical/Floppy	6x 1 TB SATA SSD /1x DVDRW SATA					
	Power Supply	1125W 90% Custom PSU					
	Other	-					
Energy Consumption		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Enabled
	Windows Idle (S0)	161.1		157.8		160.4	
	Windows Busy Typ(S0)	524.7		500.7		496.1	
	Windows Busy Max (S0)	644.2		624.2		652.7	
	Sleep (S3)	10.3	10.2	10.2	10.1	10.1	10.1
	Off (S5)	4.14	4.01	4.19	4.19	4.16	4.15
	Zero Power Mode (ErP)	0.31		0.41		0.31	

System Technical Specifications

		115 VAC		230 VAC		100 VAC	
Heat Dissipation (Btu/hr)		LAN Enabled	LAN Disabled	LAN Enabled	LAN Enabled	LAN Disabled	LAN Enabled
	Windows Idle (S0)	549.6		538.4		547.5	
	Windows Busy Typ(S0)	1790.4		1708.6		1692.6	
	Windows Busy Max (S0)	2198.1		2129.8		2227.0	
	Sleep (S3)	35.3	34.9	35.0	34.7	34.5	134.3
	Off (S5)	14.1	13.6	14.3	14.3	14.2	14.1
	Zero Power Mode (ErP)	1.06		1.39		1.04	

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

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

		115 VAC		230 VAC		100 VAC	
Heat Dissipation (Btu/hr)		LAN Enabled	LAN Disabled	LAN Enabled	LAN Enabled	LAN Disabled	LAN Enabled
	Windows Idle (S0)	662.1		657.2		672.3	
	Windows Busy Typ(S0)	2184.3		2122.3		2207.7	
	Windows Busy Max (S0)	2688.8		2597.8		2731.7	
	Sleep (S3)	72.3	67.5	67.5	64.1	72.6	67.7
	Off (S5)	14.4	14.4	15.4	15.4	14.4	14.3

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

DECLARED NOISE EMISSIONS

System Configuration (Entry level)	**Processor Info**	2-Intel® Xeon® Gold 6134 processor 3.2GHz 8C CPU
	Memory Info	96GB (12x8GB) DDR4-2666 ECC Memory RDIMMs
	Graphics Info	1-NVIDIA® Quadro® P400 2GB
	Disks/Optical	1-500GB SATA 7200RPM 3.5" HDD / 1-HP 9.5mm Slim Blu Ray Disc Writer
	Power Supply	1125 W

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)		**Sound Power** (LWAd, bels)	**Deskside Sound Pressure** (LpAm, decibels)
	Idle	3.6	19

System Technical Specifications

	Hard drive Operating (random reads)	3.7	19

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

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)		**Sound Power** (LWAd, bels)	**Deskside Sound Pressure** (LpAm, decibels)
	Idle	3.6	20
	Hard drive Operating (random reads)	3.8	23

ENVIRONMENTAL DATA

Environmental Requirements

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

Humidity
Operating: 8% to 85% RH, non-condensing
Non-operating: 8% to 90% RH, non-condensing

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

Dynamic (new)

Shock
Operating: ½-sine: 40g, 2-3ms (~62 cm/sec)
Non-operating: ½-sine: 160 cm/s, 2-3ms (~105g)
square: 422 cm/s, 20g
NOTE: Values represent individual shock events and do not indicate repetitive shock events.

Vibration
Operating random: 0.5g (rms), 5-300 Hz, up to 0.0025g²/Hz
Non-operating random: 2.0g (rms), 5-500 Hz, up to 0.0150 g²/Hz
NOTE: Values do not indicate continuous vibration.

Cooling
Above 1524 m (5,000 feet) altitude, the maximum operating temperature is reduced by 1° C (1.8° F) for every 305 m (1,000 feet) increase in elevation, up to 3048 m (10,000 feet)

Physical Security and Serviceability

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

Optical Drive Tool-less, 2nd Optical Drive requires a 5.25" bay carrier

Hard Drives Tool-less

Expansion Cards Tool-less

Processor Socket Tool-less

System Technical Specifications

Blue User Touch Points	Yes, on tool-free internal chassis components.
Color-coordinated Cables and Connectors	Yes
Memory	Tool-less
System Board	Tool-less, retained by Front Card Guide and Top Memory Fan Holder
Dual Color Power and HD LED on Front of Computer	No
Configuration Record SW	Yes
Over-Temp Warning on Screen	Yes. Temp-Caution and Temp Critical are provide via the WMI interface. Tools like the HPPA can display the Critical and Caution state.
Restore CD/DVD Set	Restores the computer to its original factory shipping image; can be obtained via HP Support.
Dual Function Front Power Switch	Yes, causes a fail-safe power off when held for 4 seconds
Padlock Support	No
Cable Lock Support	Yes, Kensington Cable Lock (optional): Prevents entire system theft only. 3mm x 7mm slot at rear of system
Universal Chassis Clamp Lock Support	No
Solenoid Lock and Hood Sensor	No
Rear Port Control Cover	No
Serial, USB, Audio, Network, Enable/Disable Port Control	Yes. USB disablement zones are Front, Rear and Internal
Removable Media Write/Boot Control	No
Power-On Password	Yes, prevents an unauthorized person from booting up the workstation
Setup Password	Yes, prevents an unauthorized person from changing the workstation configuration
3.3V Aux Power LED on System PCA	No
NIC LEDs (integrated) (Green & Amber)	Yes
CPUs and Heatsinks	A torx driver (T30) is needed to remove the heatsink(s). CPU attached to heatsink via tool-less clip
Power Supply Diagnostic LED	Yes
Front Power Button	Yes
Front Power LED	Yes, white (normal), red (fault)
Front Hard Drive Activity LED	Yes, white
Front ODD Activity LED	Yes
Internal Speaker	Yes
System/Emergency ROM Flash Recovery	Recovers corrupted system BIOS
Cooling Solutions	Air cooled forced convection
Power Supply Fans	2x – Dual Side Inlet Blowers
CPU Heatsink Fan	80mm x 25mm 5-wire PWM for each CPU
Chassis Fan	Rear: 120mm x 38mm Front: 120mm x 25mm (PCIe zone)

System Technical Specifications

Memory Heatsink Fan	Front 92mm x 25mm (upper memory bank); Front 80mm x 25mm (lower memory bank)
HP PC Hardware Diagnostics UEFI	HP PC Hardware Diagnostics (UEFI) enables hardware level testing outside the operating system on many components. The diagnostics can be invoked by pressing ESC then F2 upon the PC reboot, and is available as a download from HP Support.
Access Panel Key Lock	Yes, prevents removal of the access panel and all internal components including optical and storage devices
ACPI-Ready Hardware	Advanced Configuration and Power Management Interface (ACPI). • Allows the system to wake from a low-power mode. • Controls system power consumption, making it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system
Trusted Platform Module Chip	Yes
Integrated Chassis Handles	Yes, front and rear
Power Supply	Tool-less, rear access direct-connect (blind-mate)
PCIe Card Retention	Yes, tool-less Rear (all) Middle (full-height cards) Front (full-length cards with extenders)
Flash ROM	Yes.SPI ROM
Diagnostic Power Switch LED on board	Yes
Clear Password Jumper	Yes
Clear CMOS Button	Yes
CMOS Battery Holder	Yes
DIMM Connectors	Yes

BIOS

BIOS 32-bit Services	Standard BIOS 32-bit Service Directory Proposal v0.4 BIOS supports 32 and 64-bit Operating systems.
PCI 3.0 Support	Full BIOS support for PCI Express through industry standard interfaces.
ATAPI	ATAPI Removable Media Device BIOS Specification Version 1.0.
BBS	BIOS Boot Specification v1.01.
WMI Support	WMI is Microsoft's implementation of Web-Based Enterprise Management (WBEM) for Windows. WMI is fully compliant with the Distributed Management Task Force (DMTF) Common Information Model (CIM) and WBEM specifications.
BIOS Boot Spec 1.01+	Provides more control over how and from what devices the workstation will boot.
BIOS Power On	Users can define a specific date and time for the system to power on.
ROM Based Computer Setup Utility (F10)	Review and customize system configuration settings controlled by the BIOS.
System/Emergency ROM Flash Recovery with Video	Recovers system BIOS in corrupted Flash ROM.
Replicated Setup	Saves BIOS settings to USB flash device in human readable file (HpSetup.txt). BiosConfigurationUtility.exe utility can then replicate these settings on machines being deployed without entering Computer Configuration Utility (F10 Setup).
SMBIOS	System Management BIOS 2.8, for system management information.
Boot Control	Disables the ability to boot from removable media on supported devices.

System Technical Specifications

Memory Change Alert	Alerts management console if memory is removed or changed.
Thermal Alert	Monitors the temperature state within the chassis. Three modes: • NORMAL - normal temperature ranges. • ALERTED - excessive temperatures are detected. Raises a flag so action can be taken to avoid shutdown or provide for a smoother system shutdown. • SHUTDOWN - excessive temperatures are encountered. Automatically shuts down the computer without warning before hardware component damage occurs.
Remote ROM Flash	Provides secure, fail-safe ROM image management from a central network console.
ACPI (Advanced Configuration and Power Management Interface)	Allows the system to enter and resume from low power modes (sleep states). Enables an operating system to control system power consumption based on the dynamic workload. Makes it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system. Supports ACPI 5.0 for full compatibility with 64-bit operating systems.
Ownership Tag	A user-defined string stored in non-volatile memory that is displayed in the BIOS splash screen.
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 Computing Group TPM Specification Version 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 Z8 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 size: CR2032 (coin cell)
Battery mass: 3g
Battery type: Lithium Metal
The battery in this product does not contain:

- Mercury greater than 5ppm by weight
- Cadmium greater than 10ppm by weight
- Lead greater than 40ppm by weight

Restricted Material Usage

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

System Technical Specifications

	HP Inc. is committed to compliance with all applicable environmental laws and regulations, including the European Union Restriction of Hazardous Substances (RoHS) Directive. HP's goal is to exceed compliance obligations by meeting the requirements of the RoHS Directive on a worldwide basis .
Low Halogen Statement	This product is low halogen except for power cords, external cables and peripherals. The following customer-configurable internal components may not be low-halogen: 3 ½" SAS HDDs. Service parts obtained after purchase may not be low halogen. (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. • This product is >90% recycle-able when properly disposed of at end of life.
Packaging	HP Workstation product packaging meets the HP's General Specification for the Environment • Does not contain restricted substances listed in HP Standard 011-1 General Specification for the Environment • Does not contain ozone-depleting substances (ODS) • Does not contain heavy metals (lead, mercury, cadmium or hexavalent chromium) in excess of 100 ppm sum total for all heavy metals listed • Maximizes the use of post-consumer recycled content materials in packaging materials • All packaging material is recyclable • All packaging material is designed for ease of disassembly • Reduced size and weight of packages to improve transportation fuel efficiency • Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards formatting • 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

System Technical Specifications

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 Z8 G4 Workstation supports Intel® vPro™ technology when configured as outlined below:

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

Remote Manageability Software Solutions

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

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

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

Product Change Notification

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

Stable & Consistent Offerings

Global Series SKUs

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

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
2DL76AV	Intel® Xeon® Gold 6128 processor
2DL77AV / 1XM69AA	Intel® Xeon® Gold 6128 2nd processor
2DL66AV	Intel® Xeon® Silver 4114 processor
2DL67AV / 1XM74AA	Intel® Xeon® Silver 4114 2nd processor
2DL62AV	Intel® Xeon® Silver 4108 processor
2DL63AV / 1XM76AA	Intel® Xeon® Silver 4108 2nd processor

Hard Drives

Product #	Offering
Z5J60AV / LQ037AA	1TB SATA 7200 RPM 3.5” HDD

Graphics

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

Memory

Product #	Offering
TBD	TBD

Optical and Removable Storage

Product #	Offering
TBD	TBD

Technical Specifications - Processors

Intel® Xeon® Platinum 8260L processor
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 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® Gold 4216 processor
Intel® Xeon® Gold 4215R processor
Intel® Xeon® Gold 4214R processor
Intel® Xeon® Gold 4214 processor
Intel® Xeon® Gold 4210R processor
Intel® Xeon® Gold 4210 processor
Intel® Xeon® Gold 4208 processor
Intel® Xeon® Silver 4114 processor
Intel® Xeon® Silver 4108 processor
Intel® Xeon® Bronze 3206R processor
Intel® Xeon® Bronze 3204 processor

Technical Specifications - Hard Drives

STORAGE/HARD DRIVES

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

*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	

Technical Specifications - Hard Drives

	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; 2.02 cm	
	Width	**Media Diameter**	3.5 in; 8.9 cm
		Physical Size	4 in; 10.16 cm
	Interface	Serial ATA (6.0 Gb/s), NCQ Enabled	
	Synchronous Transfer Rate (Maximum)	Up to 600 MB/s*	
	Buffer	256MB	
	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.		
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	55K IOPS (max)*
			Random Write	83K IOPS (max)*
		*Actual performance may vary.		
	HP 256GB SATA 6Gb/s SED Opal 2 SSD	**Capacity**	256GB	
		Protocol	SATA	
		Form Factor	2.5"	
		Controller	AHCI	
		NAND Type	3D TLC	
		Endurance	192TBW (TB Written)	
		Reliability (MTTF)	1.5M hours	
		Physical Size (Height)	0.28 in; 0.7 cm	
		Physical Size (Width)	2.5 in; 6.36 cm	
		Interface	6Gb/s SATA	
		Synchronous Transfer Rate (Maximum)	Up to 550MB/s (Sequential Read)*	
		Operating Temperature	32° to 158° F (0° to 70° C)	
		Performance	**Sequential Read**	530MB/s*
			Sequential Write	500 MB/s*
			Random Read	55K IOPS*
			Random Write	83K IOPS*
		Self-Encrypting Drive Support	OPAL 2	
		*Actual performance may vary.		
	HP 512GB SATA 6Gb/s SSD	**Capacity**	512GB	
		Protocol	SATA	
		Form Factor	2.5"	
		Controller	AHCI	
		NAND Type	3D TLC	
		Endurance	388TBW (TB Written)	

Technical Specifications - Hard Drives

	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)	

Technical Specifications - Hard Drives

	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	

Technical Specifications - Hard Drives

		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.	
Performance PCIe SSDs for HP Workstations	**HP Z Turbo Drive Quad Pro 2x256GB PCIe TLC SSD**	**Capacity**	512GB
		Protocol	PCIe
		Form Factor	PCIe Card, Full Height PCIe Slot
		Controller	NVMe

Technical Specifications - Hard Drives

	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.		
	Capacity	256GB	

Technical Specifications - Hard Drives

HP Z Turbo Drive Dual Pro 256GB SSD	**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.		

Technical Specifications - Hard Drives

	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.		

Technical Specifications - Hard Drives

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.		

HARD DRIVE CONTROLLERS

MicroSemi 2100-4i4e 8-port SAS 12Gb/s RAID Card	**PCI Bus**	8 lanes, PCI Express 3.0	
	RAID Levels	Offers Integrated RAID (0, 1, and 10)	
	PCI Data Burst Transfer Rate	Half Duplex x8, PCIe, 8000 MB/s	
	SAS Bandwidth	**Half Duplex**	1200 MB/s per lane
	PCI Card Type	3.3V Add-in Card	
	PCI Voltage	12 V ± 10%	
	PCI Power	9.8W typical, Airflow min 200 LFM	
	Bracket	Full height and low profile	
	Certification Level	PCI Express 3.0 compliant	
	SAS Processor	MicroSemi Series 8 SAS Controller	
	Internal Connectors	One x4 internal mini-SASHD (SFF-8643)	
	External Connectors	One x4 external mini-SASHD (SFF-8644)	
	Maximum Number of SCSI Devices	256 Non-RAID SAS/SATA devices	
	LED Indicators	Connector for Drive Activity Light **NOTE:** RAID 5 is not supported on MicroSemi 2100-4i4e 8-port SAS 12Gb/s RAID Card	

Technical Specifications - Graphics

GRAPHICS

NVIDIA® Quadro® P400 2GB Graphics	**Form Factor**	Dimensions: 2.713" H x 5.7" L Single Slot, Low Profile Cooling: Active Weight: 129 grams
	Graphics Controller	NVIDIA® Quadro® P400 Graphics Card GP107 GPU 256 NVIDIA® CUDA® cores Max Power: 30 Watts
	Bus Type	PCI Express 3.0 x16
	Memory	Size: 2 GB GDDR5, 2000 MHz Memory Interface: 64-bit Memory Bandwidth: 32 GB/s
	Connectors	3mDP Outputs
	Maximum Resolution	DisplayPort™ 1.4: - up to 3x 5120 x 2880 x 24 bpp @ 60Hz - supports Multi-Stream Transport (MST)
	Image Quality Features	10-bit internal display processing pipeline 10-bit scan-out support
	Display Output	3 mDP Connectors
	Shading Architecture	Full Microsoft DirectX® 12 Shader Model 5.1
	Supported Graphics APIs	OpenGL® 4.5 DirectX® 12 Vulkan™ 1.0 API support includes: CUDA C, CUDA C++, DirectCompute , OpenCL™
	Available Graphics Drivers	Windows 11 Windows 10 Windows 8.1 (via nvidia.com unless deprecated Windows 7 (via nvidia.com) Linux® HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
	Notes	
NVIDIA® Quadro® 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 GP107 GPU 512 CUDA cores Max Power: 40 Watts
	Bus Type	PCI Express 3.0 x16

Technical Specifications - Graphics

	Memory	Size: 2 GB GDDR5, 2000 MHz Memory Interface: 128-bit Memory Bandwidth: 64 GB/s
	Connectors	4mDP Outputs *
	Maximum Resolution	DisplayPort™ 1.4: - up to 4x 5120 x 2880 x 24 bpp @ 60Hz - supports Multi-Stream Transport (MST)
	Image Quality Features	10-bit internal display processing pipeline 10-bit scan-out support
	Display Output	4 mDP Connectors
	Shading Architecture	Full Microsoft DirectX 12 Shader Model 5.1
	Supported Graphics APIs	OpenGL 4.5 DirectX 12 Vulkan 1.0 API support includes: CUDA C, CUDA C++, DirectCompute , OpenCL
	Available Graphics Drivers	Windows 11 Windows 10 Windows 7 (via nvidia.com) 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
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

Technical Specifications - Graphics

	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® T600 4GB Graphics	**Form Factor**	Dimensions: 2.713" H x 6.137" L Single Slot, Low Profile Weight: 130g
	Graphics Controller	NVIDIA® T600 Graphics Card GPU: 640 CUDA cores Power: 40 Watts Cooling: Active
	Bus Type	PCI Express 3.0 x16
	Memory	Size: 4 GB GDDR6 Memory Interface: 128-bit Memory Bandwidth: 160 GB/s
	Connectors	4x mDP
	Maximum Resolution	4x 5120 x 2880 x 24 bpp @ 60Hz
	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 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 GP107-860 GPU 640 NVIDIA® CUDA® cores Max Power: 47 Watts
	Bus Type	PCI Express 3.0 x16

Technical Specifications - Graphics

	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 (via nvidia.com) Linux® HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
	Notes	
NVIDIA® Quadro® P2000 5GB Graphics	**Form Factor**	Dimensions: 4.4”Hx7.9”L Single Slot Cooling: Active Weight: 260 grams
	Graphics Controller	NVIDIA® Quadro® P2000 Graphics Card Power: 75 Watts
	Bus Type	PCI Express 3.0 x16
	Memory	Size: 5GB GDDR5 Memory Bandwidth: 140 GB/s Memory Width: 160-bit
	Connectors	4x DisplayPort™ 1.4 Factory Configured Option: No adapter included with card After Market Option: No video cable adapter included Additional DVI to VGA, DisplayPort™ to VGA, DisplayPort™ to DVI, and DisplayPort™ to Dual-Link DVI adapters available as accessories.
	Maximum Resolution	DisplayPort™: - up to 5120 x 2880 x 24 bpp @ 60Hz - supports High Bit Rate 2 (HBR2) and Multi-Stream Transport (MST) DP 1.3 & 1.4 ready. DL-DVI(I) output: - up to 2560 x 1600 x 32 bpp @ 60 Hz

Technical Specifications - Graphics

		Single Link-DVI(I) output: - up to 1920 x 1200 x 32 bpp @ 60Hz HDMI 2.0 (requires DP to HDMI adapter): 5120 x 2880 x 24 bpp @ 60Hz
	Image Quality Features	12-bit internal display pipeline (hardware support for 12-bit scanout on supported panels, applications and connection) Stereoscopic 3D display support including NVIDIA® 3D Vision™ technology, NVIDIA® Mosaic and nView.
	Display Output	Maximum number of displays - 4 direct attached monitors Maximum number of monitors across all available NVIDIA® Quadro® P2000 outputs is 4.
	Shading Architecture	Shader Model 5.1
	Supported Graphics APIs	OpenGL® 4.5 DirectX® 12 API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL™, Java, Python, and Fortran software
	Available Graphics Drivers	Windows 11 Windows 10 Windows 7 Professional (via nvidia.com) Linux® - Full OpenGL® implementation, complete with NVIDIA® Quadro® and ARB extensions HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
	Notes	
NVIDIA® Quadro® P2200 5GB Graphics	**Form Factor**	Dimensions: 4.4"H x 7.9"L Single Slot, Full Height Weight: 260 grams
	Graphics Controller	NVIDIA® Quadro® P2200 Graphics Card GPU: 1280 CUDA cores Power: 75 Watts Cooling: Active
	Bus Type	PCI Express 3.0 x16
	Memory	Size: 5GB GDDR5X Memory Bandwidth: 200 GB/s Memory Width: 160-bit
	Connectors	4x DisplayPort™ 1.4 Factory Configured Option: No adapter included with card After Market Option: No video cable adapter included

Technical Specifications - Graphics

		Additional DVI to VGA, DisplayPort™ to VGA, DisplayPort™ to DVI, and DisplayPort™ to Dual-Link DVI adapters available as accessories.
	Maximum Resolution	DisplayPort™: - up to 5120 x 2880 x 24 bpp @ 60Hz - supports High Bit Rate 2 (HBR2) and Multi-Stream Transport (MST) DP 1.3 & 1.4 ready. DL-DVI(I) output: - up to 2560 x 1600 x 32 bpp @ 60 Hz Single Link-DVI(I) output: - up to 1920 x 1200 x 32 bpp @ 60Hz HDMI 2.0 (requires DP to HDMI adapter): 5120 x 2880 x 24 bpp @ 60Hz
	Image Quality Features	12-bit internal display pipeline (hardware support for 12-bit scanout on supported panels, applications and connection) Stereoscopic 3D display support including NVIDIA® 3D Vision™ technology, NVIDIA® Mosaic and nView.
	Display Output	Maximum number of displays - 4 direct attached monitors Maximum number of monitors across all available NVIDIA® Quadro® P2200 outputs is 4.
	Shading Architecture	Shader Model 5.1
	Supported Graphics APIs	OpenGL® 4.5 DirectX® 12 API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL™, Java, Python, and Fortran software
	Available Graphics Drivers	Windows 11 Windows 10 Windows 7 Professional (via nvidia.com) Linux® - Full OpenGL® implementation, complete with NVIDIA® Quadro® and ARB extensions HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
	Notes	1. Quadro P2200 offered as Factory Configured Option does not include a video cable adapter. Video cable adapters must be ordered separately. 2. Quadro P2200 offered as an After Market Option does not include video cables. Video cable adapters must be ordered separately.
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

Technical Specifications - Graphics

Memory	4GB GDDR5 memory Memory Bandwidth: 6 Gbps / 96 GB/s Memory Width: 128 bit
Connectors	2x Mini DisplayPort™ 1.4 plus 1x DisplayPort™ 1.4 – HDR ready connectors with HBR3 and MST support. Factory Configured: No adapters included After market option kit: One mDP-to-DP cable adapters included Additional Mini DisplayPort™-to-DisplayPort™, DisplayPort™-to-VGA or DisplayPort™-to-DVI adapters are available as Factory Configuration or Option Kit accessories.
Maximum Resolution	5K support @ 60Hz • 1x single-cable 5K monitor, or 2x dual-cable 5K monitors 3x 4K support @ 60Hz
Image Quality Features	Advanced support for 8-bit and 10-bit per RGB color component. High bandwidth scaler for high quality up and downscaling
Display Output	3 full physical DP1.3 HBR3 / DP1.4 HDR outputs FreeSync support
GPU Architecture	Polaris
Supported Graphics APIs	DirectX®12 OpenGL® 4.5 OpenCL™ 2.0 Vulkan™ 1.0
Available Graphics Drivers	Windows 11 Windows 10 (Windows® 7 64-bit available from AMD) Linux® 64-bit (selected Enterprise distributions) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
Notes	1. HDR content requires that the system be configured with a fully HDR-ready content chain, including: graphics card, monitor/TV, graphics driver and application. Video content must be graded in HDR and viewed with an HDR-ready player. Windowed mode content requires operating system support. 2. AMD PowerTune and AMD ZeroCore Power are technologies offered by certain FirePro™ and Radeon™ Pro products, which are designed to intelligently manage GPU power consumption in response to certain GPU load conditions. 3. As of September 2016, certified for DisplayPort™ 1.4 HBR3 and ready for DisplayPort™ 1.4 HDR based on independent verification by DisplayPort™ testing authority. HDR content requires that the system be configured with a fully HDR-ready content chain, including: graphics card, monitor/TV, graphics driver and application. Video content must be graded in HDR and viewed with an HDR-ready player. Windowed mode content requires operating system support.

Technical Specifications - Graphics

NVIDIA® T1000 4GB Graphics	**Form Factor**	Dimensions: 2.713" H x 6.137" L Single Slot Weight: xx
	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® 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

Technical Specifications - Graphics

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® Quadro® RTX™ 4000 8GB Graphics	**Form Factor**	Full-Height Single Slot (4.4” Height x 9.5” Length) Weight: 550 grams / 1.21 lbs
	Graphics Controller	NVIDIA® Quadro® RTX™ 4000 Graphics TU104 GPU GPU: 2304 NVIDIA® CUDA® Parallel Processing Cores Power: 160 Watts Cooling: Active
	Memory	8GB GDDR6 memory Memory Bandwidth: Up to 416 GB/s Memory Width: 384 bit
	Connectors	3x DP 1.4a and VirtualLink Quadro Sync connector (compatible with Quadro II Sync) One 8-pin auxiliary power connector Factory configured option: No video cable adapter included with card. After market option Kit: No video cable adaptor included with card. DVI to VGA, DisplayPort™ to VGA, DisplayPort™ to DVI, and DisplayPort™ to Dual-Link DVI adapters available as accessories.
	Maximum Resolution	7680x4320 @ 60Hz
	Image Quality Features	Advanced support for 8-bit, 10-bit, and 12-bit per RGB color component. HDCP 2.2 support over DisplayPort™, DVI, and HDMI connectors NVIDIA® 3D Vision™ and other 3D stereo technologies NVIDIA® Mosaic and nView
	Display Outputs[1]	3x DP 1.4a and VirtualLink (7680x4320 @ 60Hz)
	Supported Graphics APIs	DirectX®12, OpenGL® 4.5, OpenCL™ 1.0, Vulkan™ 1.0 Developer API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL™, Java, Python, and Fortran

Technical Specifications - Graphics

	Available Graphics Drivers	Windows 11 Windows 10 Windows 7 (via nvidia.com) Linux® 64-bit HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
	Notes	1- Supports up to a total of 4 displays

NVIDIA® 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

Technical Specifications - Graphics

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
	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® Quadro® RTX™ 5000 16GB Graphics	**Form Factor**	Full-Height Dual Slot (4.4” Height x 10.5” Length) Weight: 1050 grams / 2.31 lbs
	Graphics Controller	NVIDIA® Quadro® RTX™ 5000 Graphics TU104 GPU GPU: 3072 NVIDIA® CUDA® Parallel Processing Cores Power: 265 Watts Cooling: Active

Technical Specifications - Graphics

Memory	16GB GDDR6 memory Memory Bandwidth: Up to 448 GB/s Memory Width: 384 bit
Connectors	4x DP 1.4a and VirtualLink Quadro Sync connector (compatible with Quadro II Sync) One 8-pin + 6-pin auxiliary power connector Factory configured option: No video cable adapter included with card. After market option Kit: No video cable adaptor included with card. DVI to VGA, DisplayPort™ to VGA, DisplayPort™ to DVI, and DisplayPort™ to Dual-Link DVI adapters available as accessories.
Maximum Resolution	7680x4320 @ 60Hz
Image Quality Features	Advanced support for 8-bit, 10-bit, and 12-bit per RGB color component. HDCP 2.2 support over DisplayPort™, DVI, and HDMI connectors NVIDIA® 3D Vision™ and other 3D stereo technologies NVIDIA® Mosaic and nView
Display Outputs[1]	4x DP 1.4a and VirtualLink (7680x4320 @ 60Hz)
Supported Graphics APIs	DirectX®12, OpenGL® 4.5, OpenCL™ 1.0, Vulkan™ 1.0 Developer API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL™, Java, Python, and Fortran
Available Graphics Drivers	Windows 11 Windows 10 Windows 7 (via nvidia.com) Linux® 64-bit HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
Notes	1- Supports up to a total of 4 displays

NVIDIA® 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

Technical Specifications - Graphics

	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
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®

Technical Specifications - Graphics

		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
NVIDIA® Quadro® GV100 32GB Graphics	**Form Factor**	Dual Slot (4.4" Height x 10.5" Length) Weight: 980 grams + 72 gram extender
	Graphics Controller	NVIDIA® QUADRO® GV100 GPU: 5120 NVIDIA® CUDA® Parallel Processing Cores Power: 250 Watts Cooling: Active
	Memory	32GB HBM2 memory Memory Bandwidth: Up to 870 GB/s Memory Width: 5120-bit ECC Memory (disabled by default)
	Connectors	DP (x4) with HDR support 3-pin mini-DIN connector via optional bracket 4-pin header for stereo signal Quadro Sync connector (compatible with Quadro II Sync) One 8-pin auxiliary power connector (2x) NVLink for GV100 connectors (via optional kit) After market option Kit: no power adapter included with card. DisplayPort™ to VGA, DisplayPort™ to DVI (single-link and dual-link), and DisplayPort™ to HDMI adapters available as accessories.
	Maximum Resolution	5K support @ 60Hz 1x single-cable 5K monitor, or 2x dual-cable 5K monitors

Technical Specifications - Graphics

	Image Quality Features	HDR support over DisplayPort™ 1.4 (SMPTE 2084/2086, BT. 2020) (4K @ 60 Hz 10b/12b HEVC Decode, 4K @ 60 Hz 10b HEVC Encode) HDCP 2.2 support over DisplayPort™ and HDMI connectors NVIDIA 3D Vision™ technology NVIDIA Mosaic and nView Desktop Management
	Display Outputs	4x DP1.4 HDR2 outputs (up to 5120 x 2880 @ 60Hz)
	GPU Architecture	NVIDIA® Volta™
	Supported Graphics APIs	DirectX®12, OpenGL® 4.5 Developer API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL™, Java, Python, and Fortran
	Available Graphics Drivers	Windows 11 Windows 10 Windows 7 (via nvidia.com) Linux® 64-bit HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html Factory Configured (Z4/Z8 G4 Workstation): No adapters included After market option kit: No adapters included
AMD Radeon™ Pro W5700 8GB Graphics	**Form Factor**	Dual Slot (4.4” Height x 10.5” Length)
	Graphics Controller	Radeon™ Pro W5700 graphics GPU: 2304 Stream Processors Power: 205 Watts Cooling: Active
	Memory	8GB GDDR6 memory Memory Bandwidth: Up to 448 GB/s Memory Width: 256 bit
	Connectors	5x MiniDisplayPort 1.4 + USB-C – HDR ready and MST support Factory Configured: No video cable adapter included After market option kit: 2x mDP-to-DP adapters included Additional DisplayPort-to-VGA or DisplayPort-to-DVI adapters are available as Factory Configuration or Option Kit accessories.

Technical Specifications - Graphics

	Maximum Resolution	8K support @ 60Hz Single monitor, single or dual-cable
	Image Quality Features	Advanced support for 8-bit, 10-bit, and 16-bit per RGB color component. High bandwidth scaler for high quality up and downscaling
	Display Output	5 full physical mDP 1.4 + USB-c with DP signaling FreeSync support
	GPU Architecture	RDNA™
	Supported Graphics APIs	DirectX® 12.1 OpenGL® 4.6 OpenCL™ 2.0 Vulkan™ 1.1
	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
	Notes	
AMD Radeon™ Pro W5500 8GB Graphics	**Form Factor**	Single Slot (4.4” Height x 9.5” Length)
	Graphics Controller	Radeon™ Pro W5500 graphics GPU: 1408 Stream Processors Power: 125 Watts Cooling: Active
	Memory	8GB GDDR6 memory Memory Bandwidth: Up to 224 GB/s Memory Width: 128 bit
	Connectors	4x DisplayPort 1.4 – HDR ready and MST support Factory Configured: No video cable adapter included After market option kit: No video cable adapter included Additional DisplayPort-to-VGA or DisplayPort-to-DVI adapters are available as Factory Configuration or Option Kit accessories.
	Maximum Resolution	8K support @ 60Hz

Technical Specifications - Graphics

		Single monitor, single or dual-cable
	Image Quality Features	Advanced support for 8-bit, 10-bit, and 16-bit per RGB color component. High bandwidth scaler for high quality up and downscaling
	Display Output	4 full physical DP 1.4 FreeSync support
	GPU Architecture	RDNA™
	Supported Graphics APIs	DirectX® 12.1 OpenGL® 4.6 OpenCL™ 2.0 Vulkan™ 1.1
	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
	Notes	
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

NVIDIA® Quadro® Sync II	**Part number**	1WT20AA
	Dimensions (HxD)	6.0 inches × 4.2 inches
	Devices Supported	NVIDIA® Quadro® P4000 NVIDIA® Quadro® P5000 NVIDIA® Quadro® P6000
	Bus Type	Requires one free mechanical PCIe bus slot. 6-pin PCI or SATA power connector
	PCI Form Factor	Full Height, half length, single slot
	Ports	2 RJ45 connectors for carrying frame lock signals over CAT5 cables. BNC Connector for external house synchronization.
	Internal Connectors	6 NVIDIA SLI® style edge fingers for connection to compatible GPUs • Included with the board are 4 12-Inch Short Sync Cables to connect to GPU's • Included with the board are 2 24-Inch Long Sync Cables to connect to GPU's
	System Requirements	Requires one free mechanical PCIe bus slot. 6-pin PCI or SATA power connector Must be used with NVIDIA Quadro P4000, P5000 or P6000 graphics cards. Requires Quadro driver version R375 or later.
	Temperature - Operating	0° to 55° C
	Temperature - Storage	-40° to 60° C
	Relative Humidity - Operating	10% to 80%
	Power Requirements	Board power dissipation: <15W
	Operating Systems Supported	Windows 11 Windows 10 Windows 7

Technical Specifications - Graphics

	Linux® 64-bit
Kit Contents	Contains: • Quadro Sync II Card • 4 x 12-Inch Short Sync Cables • 2 x 24-Inch Long Sync Cables (Two) • Quick Start Guide

OPTICAL AND REMOVABLE STORAGE

HP 9.5mm Slim DVD Writer	**Description**	9.5mm height, tray-load	
	Mounting Orientation	Either horizontal or vertical	
	Interface Type	SATA/ATAPI	
	Dimensions (WxHxD)	128 x 9.5 x 127mm	
	Supported Media Types	DVD+R DVD+RW DVD+R DL DVD-R DL DVD-R DVD-RW CD-R CD-RW	
	Disc Capacity	DVD-ROM	8.5 GB DL or 4.7 GB standard
		Full Stroke DVD	< 200 ms (seek)
		Full Stroke CD	< 200 ms (seek)
	Maximum Data Transfer Rates	CD ROM Read	CD-ROM, CD-R Up to 24X CD-RW Up to 24X
		DVD ROM Read	DVD+RW Up to 8X DVD-RW Up to 8X DVD+R DL Up to 8X DVD-R DL Up to 8X DVD-ROM Up to 8X DVD-ROM DL Up to 8X DVD+R Up to 8X DVD-R Up to 8X
	Power	Source	SATA DC power receptacle
		DC Power Requirements	5 VDC ± 5%-100 mV ripple p-p
		DC Current	5 VDC -< 800 mA typical, <1600 mA maximum
	Operating Environmental (all conditions non-condensing)	Temperature	41° to 122° F (5° to 50° C)
		Relative Humidity	10% to 80%
		Maximum Wet Bulb Temperature	84° F (29° C)
	Operating Systems Supported	Windows 11, Windows 10, Windows 7 Professional 64-bit, Windows Vista Business 64*, Windows 2000. 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	HP SATA DVD Writer drive, installation guide.	
HP 9.5mm Slim DVD-ROM Drive	**Description**	9.5mm height, tray-load	
	Mounting Orientation	Either horizontal or vertical	

Technical Specifications – Optical and Removable Storage

	Interface Type	SATA / ATAPI	
	Dimensions (WxHxD)	128 x 9.5 x 127mm	
	Disc Capacity	DVD-ROM	Single layer: Up to 4.7 GB Double layer: Up to 8.5 GB
	Access Times	DVD-ROM Single Layer	< 110 ms (typical)
		CD-ROM Mode 1	< 110 ms (typical)
		Full Stroke DVD	< 230 ms (typical)
		Full Stroke CD	< 220 ms (typical)
	Power	Source	SATA DC power receptacle
		DC Power Requirements	5 VDC ± 5%-100 mV ripple p-p
		DC Current	5 VDC – <800mA typical, < 1600 mA maximum
	Operating Environmental (all conditions non-condensing)	Temperature	41° to 122° F (5° to 50° C)
		Relative Humidity	10% to 80%
		Maximum Wet Bulb Temperature	84° F (29° C)
	Operating Systems Supported	Windows 11, Windows 10, Windows 8.1, 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 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

Technical Specifications – Optical and Removable Storage

			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

Technical Specifications – Optical and Removable Storage

			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)	

Technical Specifications – Optical and Removable Storage

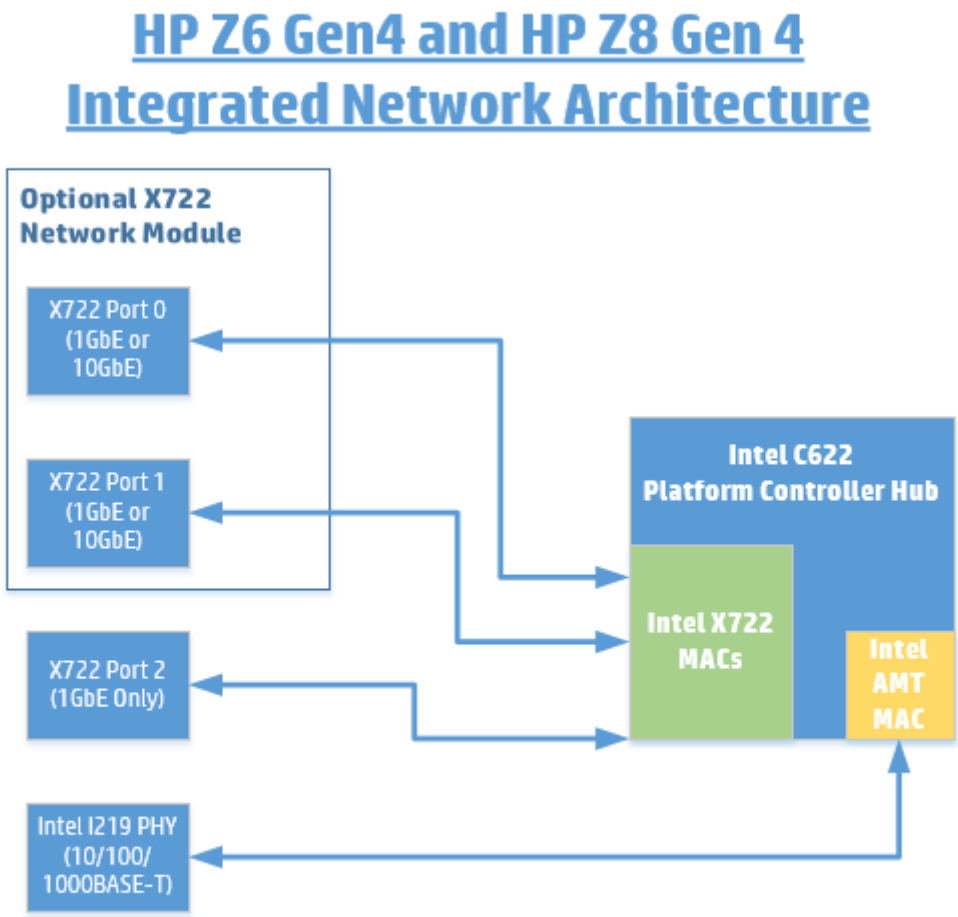
	SD Extended Capacity Memory Card (SDXC) SD Ultra High Speed II(SD UHSII) These additional media types are supported with a card adapter. Memory Stick Micro (M2) miniSD miniSD High Capacity Micro SD Memory Card (MicroSD) Micro SD High Capacity Memory Card (MicroSDHC) Test Parameters/Conditions - Power applied, unit operating on system ±5%
Operating Systems Supported	Windows 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



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

Integrated Intel I219LM	**Connector**	RJ-45
	Controller	Intel I219LM
	Data Rates Supported	10/100/1000 Mbps
	Boot ROM Support	PXE, UEFI
	Connect Speed LED Indicators	Link/Activity LED • Off = No link • Blinking = Activity Speed LED • Off = 10Mbps • Amber = 100Mbps • Green = 1000Mbps
	Management Capabilities	Intel ® Active Management Technology™ 11

Technical Specifications - Networking and Communications

Integrated Intel X722 for 1GbE	**Connector**	1 RJ-45
	Controller	Intel X722 for 1GbE
	Data Rates Supported	1000 Mbps
	Boot ROM Support	PXE, UEFI
	Connect Speed LED Indicators	Link/Activity LED • 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
	System Interface	PCI Express 2.1 x1
	Networking Speeds Supported	10Mbps, 100Mbps, 1Gbps
	Cabling (up to 100m)	Cat3 (or higher) for 10Mbps Cat5 (or higher) for 100Mbps Cat5e (or higher) for 1Gbps
	Power Consumption (active-typical)	0.81W
	Physical Dimensions	Length: 6.7cm (2.64 inches) (Bracket) Width: 1.8cm (0.709 inches) Full-height end bracket: 12.07cm (4.755 inches) Low-profile end bracket: 8cm (3.15 inches)

Technical Specifications - Networking and Communications

	Connect Speed LED Indicators	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

Technical Specifications - Networking and Communications

	Cabling (up to 100m)	Cat3 (or higher) for 10Mbps Cat5 (or higher) for 100Mbps Cat5e (or higher) for 1Gbps
	Power Consumption (active-typical)	5W
	Physical Dimensions	Length: 13.54cm (5.33 inches) Width: 6.89 (2.71 inches) Full-height end bracket: 12.0cm (4.725 inches) Low-profile end bracket: 7.92cm (3.117 inches)
	Connect Speed LED Indicators	Link/Activity LED • 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

Technical Specifications - Networking and Communications

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

Technical Specifications - Networking and Communications

	Networking Speeds Supported	1Gbps, 10Gbps
	Cabling	LC fiber optic cabling with LC SFP+ Transceivers
	Power Consumption (active-typical)	4.3W
	Physical Dimensions	6.578 in x 2.703 in
	Connect Speed LED Indicators	Link/Activity LED • Off = No link • Blinking = Activity Speed LED • Off = 10Mbps • Green = 100Mbps • Amber = 1Gbps
	Operating Temperature	0 °C to 55 °C (32 °F to 131 °F)
	Hardware Certifications	USA: FCC B, EU: UL CE, Japan: VCCI, Taiwan: BSMI, Australia/New Zealand: CTICK, Korea: KCC, Canada: ICES-003/NMB-003
	Note: Windows 7 is NOT supported	
10GbE SFP+ SR Transceiver	**Connector Type**	LC
	Cable Type	62.5/125um or 50/125um (core/cladding), graded-index, low metal content, multimode fiber optic, complying with ITU-T G.651 and ISO/IEC 793-2 Type A1b or A1a, respectively.
	Cable Length	2-300m
	Wavelength	850nm
	Form Factor	SFP+
	Physical Dimensions	0.47(h) x 0.54(w) x 2.19(d) inches (1.19 x 1.38 x 5.57 cm)
	Operating Temperature	0C to 45C (32F to 113F)
	Operating Humidity	0% to 85%, noncondensing
Intel® 8265 WLAN	**Networking Speeds**	802.11ac MU-MIMO (up to 867 Mbps) Bluetooth 4.2
	IEEE WLAN Standard	IEEE 802.11a/b/g/n/ac, 802.11d, 802.11e, 802.11h, 802.11i, 802.11w; 802.11r, 802.11k, 802.11v pending
	Bluetooth	4.2
	System Interface	PCI Express 2.1 x1
	Antenna	2x2
Intel® 9260 WLAN	**Networking Speeds**	802.11ac MU-MIMO (up to 1.73Gbps using 160MHz channels)

Technical Specifications - Networking and Communications

IEEE WLAN Standards	IEEE 802.11a/b/g/n/ac
Bluetooth	5.0
System Interface	PCI Express 2.1 x1
Antenna	2x2

Summary of Changes

SUMMARY OF CHANGES

Date of change:	Version History:		Description of change:
September 20, 2017	From v1 to v2	Added	Specs for the Power Supply section
		Changed	The System Configurations section and changed notes for the NVIDIA Quadro P4000, P5000 & P6000 Graphics
November 1, 2017	From v2 to v3	Added	HP DisplayPort to HDMI Adapter, NVIDIA SLI 2-slot Graphics Connector and NVIDIA Quadro Sync II to Graphics section
		Changed	Graphics, Storage / Hard Drives, Networking and Communications, Other Hardware and Memory sections, changed Front view info on the Overview section, changed Operating Systems section, changed Processors section, changed System Board section, Physical Security and Serviceability section
November 10, 2017	From v3 to v4	Added	Windows 10 to the supporting systems by the 9.5mm Slim DVD-ROM drive
		Removed	Microsemi 3152-8i SAS ROC RAID Controller from SAS controller on the Hard Drive Controllers section.
November 29, 2017	From v4 to v5	Added	Processors, hard drives and graphics to offerings, added Declared Noise Emissions information
		Changed	Wattage links on power supply section updated and Voltage links on efficientcy section updated
January 30, 2018	From v5 to v6	Changed	Factory configured option to yes on Networking and communications for : Intel® 8265 802.11 a/b/g/n/ac&BT PCIe
		Removed	NVIDIA SLI Graphics Connector from Graphics Cable Adapters section
February 14, 2018	From v6 to v7	Removed	RAID 5 and 10 references from “Factory integrated” in interfaces supported section
March 27, 2018	From v7 to v8	Added	NVIDIA Quadro GP100 16GB Graphics, NVIDIA Quadro GV100 32GB Graphics and AMD Radeon Pro WX 9100 16GB Graphics as High End 3D in Graphics section
		Added	Intel Xeon processors added
August 13, 2018	From v8 to v9	Added	Footnote to Networking and Communications section
		Changed	Operating Systems section
September 6, 2018	From v9 to v10	Added	Integrated Network Architecture Diagram on The Networking and Communications section
September 6, 2018	From v10 to v11	Changed	Power Supply section
September 21, 2018	From v11 to v12	Added	Intel Optane SSD 905p AiC 280GB & 480GB
November 19, 2018	From v12 to v13	Added	Intel Xeon Gold 6128 processor
		Changed	NVIDIA Quadro P6000 Graphics specs
January 2, 2019	From v13 to v14	Added	NVIDIA Quadro P620 2GB Graphics
January 8, 2019	From v14 to v15	Added	HP DX175 Removable HDD Carrier into the HDD Frame/Carriers section
		Changed	Intel Xeon Gold 6126 processor specs
January 9, 2019	From v15 to v16	Added	Intel Xeon Gold 6126 processor footnote
January 23, 2019	From v16 to v17	Added	Intel 9260 802.11 a/b/g/n/ac&BT PCIe to Networking section and added HP Z Turbo Drive Dual Pro series to Storage section
April 8, 2019	From v17 to v18	Added	New Intel Xeon Processors and graphics
		Changed	Storage / Hard Drives, Memory sections and format changes
May 15, 2019	From v18 to v19	Added	NVIDIA Quadro RTX 8000 48GB Graphics
		Changed	Networking and Communications section and changed External BIOS simulator link on Physical Security and Serviceability section
June 12, 2019	From v19 to v20	Changed	Storage section
July 15, 2019	From v20 to v21	Changed	Corrected Intel 905p Series AIC 480GB PCIe SSD
August 1, 2019	From v21 to v22	Changed	Processors Matrix
August 6, 2019	From v22 to v23	Changed	Graphics section
September 1, 2019	From v23 to v24	Added	Footnote to Memory section, Added Optane 905P 380GB M.2 SSD Module, HP Z Turbo Drive 1TB SED TLC Z8 G4 SSD Kit & module to Storage section, Added Intel® Wi-Fi 6 AX200 & BT PCIe to Networking section

Summary of Changes

October 26, 2019	From v24 to v25	Changed	Graphics section
November 2, 2019	From v25 to v26	Added	NVDIMM Memory sections, Added HP QX310 Removable NVMe Frame/Carrier w/PCIe card to Optical and Removable Storage section
January 15, 2020	From v26 to v27	Changed	Storage section
February 26, 2020	From v27 to v28	Added	New Intel Xeon Processors
		Changed	Overview, PCIe Solid State Drives sections
April 2, 2020	From v28 to v29	Changed	Processors and NVDIMM Memory sections
July 18, 2020	From v29 to v30	Changed	Processors, Graphics section
January 5, 2021	From v30 to v31	Changed	Processors, Memory, Graphics, Racking and Physical Security, Operating Systems and Hard Drives sections
January 7, 2021	From v31 to v32	Changed	Format
February 1, 2021	From v32 to v33	Added	NVIDIA® RTX A6000 48GB to Graphics section
		Changed	NETWORKING AND COMMUNICATIONS section
March 1, 2021	From v33 to v34	Changed	Overview, Graphics and System Board sections
April 13, 2021	From v34 to v35	Changed	Graphics and Social and Environmental Responsibility sections
May 1, 2021	From v35 to v36	Changed	Graphics section
May 20, 2021	From v36 to v37	Changed	Graphics section
June 1, 2021	From v37 to v38	Changed	Memory and Graphics sections
July 1, 2021	From v38 to v39	Changed	Graphics section
July 15, 2021	From v39 to v40	Changed	PCIe Solid State Drives section
July 16, 2021	From v40 to v41	Changed	PCIe Solid State Drives section
August 1, 2021	From v41 to v42	Changed	Graphics section
October 1, 2021	From v42 to v43	Changed	Input Devices, Graphics and System Board sections
November 1, 2021	From v43 to v44	Changed	Processors and Graphics sections
December 1, 2021	From v44 to v45	Changed	Operating Systems, Graphics, Networking and Communications and Input Devices sections
December 15, 2021	From v45 to v46	Changed	OPERATING SYSTEM and Social and Environmental Responsibility sections
January 1, 2022	From v46 to v47	Changed	Graphics, OPERATING SYSTEM and Application Software sections
February 1, 2022	From v47 to v48	Added	Intel® Xeon® Gold 6234 to Processors section
		Changed	Input Devices section
March 1, 2022	From v48 to v49	Changed	Graphics, Social and Environmental Responsibility sections