## 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
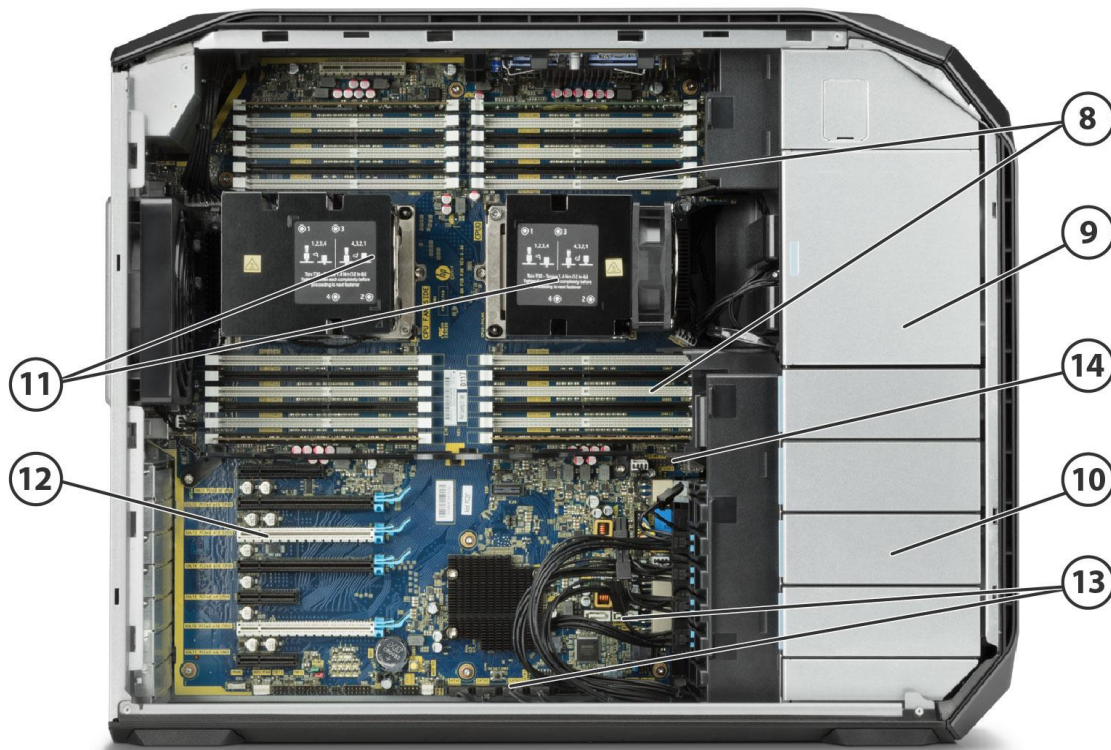


## Internal view

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 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 | 2933 | YES | 3.9, 3.9 | YES | 105 |
| Intel® Xeon® Gold 5220R processor | 24 | 2.2 GHz | 35.75 | 2666 | YES | 4.0, 2.9 | YES | 150 |
| Intel® Xeon® Gold 5218R processor | 20 | 2.1 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 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

<table>
<tr>
<td></td>
<td>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.</td>
</tr>
</table>

**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<br>Internal Slot 2 CPU2: PCIe Gen3 x8 - available when 2nd CPU is installed<br>2 USB 2.0 ports available with a single 2x5 header<br>1 USB 2.0 port available with a 1x6 header<br>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<br><br>Optional: 2 RJ-45 to 10GbE LAN ports |
| **Interfaces Supported** | 10 channel SATA 6.0 Gb/s interface<br>Factory integrated RAID available for SATA drives (RAID 0, 1 and 10)<br>Internal USB 3.1 Gen1, USB 3.1 Gen2, USB 2.0 |
| **On-board RAID Support** | SATA RAID 0 Striped Array<br>SATA RAID 1 Mirrored Array<br>SATA RAID 10 Striped/Mirrored<br>SATA RAID 5 Parity Array |
| **Chassis Dimensions (H x W x D)** | Footprint:   H: 17.5" [444.5mm]<br>             W: 8.5" [215.9mm]<br>             D: 21.7" [551.2mm] (measured to the rear of service panel)<br>Maximum:  H: 17.5" [444.5mm]<br>             W: 8.5" [215.9mm]<br>             D: 21.85" [555.2mm] (measured to the embossment for the rear chassis fans) |
| **Packaged Dimensions** | H: 25" (636mm)<br>W: 13.1" (332mm)<br>D: 28.9" (734mm) |
| **Palletization Profile** | 4 units x 3 layers = 12 units per pallet<br>1200x1000x2034mm (pallet included) |
| **Rack Dimensions** | 5U |
| **Weight** | Exact weights depend upon configuration (System weight only).<br>Minimum: 22.4kg (49.4lbs.)<br>Typical: 23.7kg (52.2lbs.)<br>Maximum: 31.7kg (70lbs.) |
| **Temperature** | Operating: 5° to 35°C (40° to 95°F)<br>Non-operating: -40° to 60°C (-40° to 140°F) |
| **Humidity** | Operating: Operating: 10% to 85% RH, non-condensing, 35° C maximum wet bulb<br>Non-operating: 10% to 90%, non-condensing, 35° C maximum wet bulb |

## Overview

| | |
|---|---|
| **Maximum Altitude (non-pressurized)** | Operating: 3,048m (10,000ft)<br>Non-operating: 9,144m (30,000ft)<br><br>**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:<br>1125W/100V/15A 90% Efficient wide-ranging, active Power Factor Correction<br>The power delivery system includes four 6+2-pin graphics power cables.<br><br>1450W/200V/10A 90% Efficient wide-ranging, active Power Factor Correction The power delivery system includes four 6+2-pin graphics power cables.<br>-       Available in limited regions<br><br>1450W/100V/20A 90% Efficient wide-ranging, active Power Factor Correction<br>The power delivery system includes four 6+2-pin graphics power cables.<br><br>1700W/200V/10A 90% Efficient wide-ranging, active Power Factor Correction<br>The power delivery system includes four 6+2-pin graphics power cables.<br><br>**NOTE:** All power cords supplied by HP for Desktop Workstations are between 1.83m and 2.5m (dependent on country localization and platform).<br><br>**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.<br>The 1125W Power Supply can also supply 1450W of output power when the input voltage is greater than 200V under all conditions.<br><br>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.<br>The 1450W Power Supply can also supply 1700W of output power when the input voltage is greater than 200V under all conditions.<br><br>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.<br><br>The Z8 G4  power supply efficiency reports can be found at these links:<br>1125W – Link:<br> https://plugloadsolutions.com/psu_reports/HP%20Inc_DPS-1125BB%20A_1125W_ECOS%204825_Report.pdf<br><br>1450W – Link:<br>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<br>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 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 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 (4) 3.5-inch 7200 rpm SATA drives: 8TB
Up to (5) 3.5-inch 7200 rpm SATA drives: 500GB, 1.0TB, 2.0TB, 4.0TB, 6.0TB

# QuickSpecs

## 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 | 1 |
| 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, RTX A4500) | N | Y | 340L2AA | |
| **Entry 3D** | | | | |
| NVIDIA® Quadro® P620 2GB Graphics | Y | Y | 3ME25AA | 2 |
| NVIDIA® T400 4 GB 3mDP Graphics | Y | Y | 5Z7E0AA/AT | 2 |
| **Mid-range 3D** | | | | |
| NVIDIA® T1000 4 GB 4mDP Graphics | Y | Y | 20X22AA/AT | 3 |
| NVIDIA® T1000 8 GB 4mDP Graphics | Y | Y | 5Z7D8AA/AT | 3 |
| NVIDIA Long-Life T1000E 8 GB 4mDP Graphics | Y | Y | 6V9V4AA/AT | 3 |
| NVIDIA® Quadro® P1000 4GB Graphics | Y | Y | 1ME01AA | 4 |
| NVIDIA® RTX A2000 6 GB 4mDP Graphics | Y | Y | 340L0AA | 3 |
| NVIDIA® RTX A2000 12 GB 4mDP Graphics | Y | Y | 5Z7D9AA/AT | 3 |
| AMD Radeon™ Pro WX 3200 4GB Graphics | Y | Y | 6YT68AA | 4 |
| AMD Radeon Pro W6600 8 GB GDDR6 4DP Graphics | Y | Y | 340K5AA | 2 |
| **High End 3D** | | | | |
| NVIDIA® RTX A4000 16 GB 4mDP Graphics | Y | Y | | |
| NVIDIA Long-Life RTX A4000E 16 GB 4DP Graphics | N | Y | 6H7J7AA | |
| 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® 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 | 1 |
| 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 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.

## Supported Components

| 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

# QuickSpecs

## 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 adapter746536-001 which is included in the ODD kit.

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

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

### Networking and Communications

|  | Factory Configured | Option Kit | Option Kit Part Number | Support Notes |
|---|---|---|---|---|
| NVIDIA® Mellanox® ConnectX-6 DX Dual Port 10/25GbE SFP28 NIC | Y | Y | 436M8AA | 1 |
| HP 10GbE SFP+ SR/SW LC Fiber Optic Transceiver | N | Y | 860T8AA |  |
| HP 25GbE SFP28 LC Fiber Optic Transceiver | N | Y | 860T9AA |  |

## Supported Components

| | | | | |
|---|---|---|---|---|
| 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 | |
| Intel® X550-T2 10GbE Dual Port NIC | Y | Y | 1QL46AA | |
| Intel® X710-DA2 10GbE SFP+ Dual Port NIC | Y | Y | 1QL47AA | 2 |
| 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 | |
| HP 10GbE SFP+ SR 2nd 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 | Y | Y | 1C7Q2AA | |
| Allied Telesis AT-2911T/2-901 Dual Port 1GbE NIC | Y | Y | 6E3Y9AA/AT | |

**Note 1:** Transceivers sold separately. You must have a transceiver installed in order to connect this card to a network.
**Note 2:** Windows 7 is NOT supported

## Racking and Physical Security

# QuickSpecs

## 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 320K Wired Keyboard | Y | Y | 9SR37AA | |
| 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 | | |
| HP Anyware Remote System Controller | N | Y | 7K6D7AA | Note 5 |
| HP Anyware Remote System Controller Main Board Adapter | N | Y | 7K6D8AA | |

## Supported Components

| | | | | |
|---|---|---|---|---|
| HP Anyware Integrated Remote System Controller | N | Y | 7K6D9AA | Note 5 |
| HP Z4/Z6/Z8 G4 / ZCentral 4R Remote System Controller Cable Adapter | N | Y | 7K6E5AA | Note 6 |
| HP Anyware Remote System Controller for Universal KVM | N | Y | 7K7N2AA | |

**NOTE 1:** The HP Internal USB Port kit has a single USB 2.0 type A connector.
**NOTE 2:** No hot plug / hot swap supported with eSATA
**NOTE 3:** NQ099AA used to install greater than four 3.5" HDDs in the factory or when purchasing Aftermarket Option (AMO) drives
**NOTE 4:** K4T74AA used to install greater than four 2.5" HDD/SSDs in the factory or when purchasing Aftermarket Option (AMO) drives
**NOTE 5:** Requires additional purchase of 7K6E5AA HP Z4/Z6/Z8 G4 / ZCentral 4R Remote System Controller Cable Adapter.
**NOTE 6:** By installing the HP Z4/Z6/Z8 G4 / ZCentral 4R Remote System Controller Cable Adapter (7K6E5AA), power will be stolen from the front USB ports on the host. This was necessary to be able to power the Remote System Controllers in all power states, and it leaves the front USB ports unpowered and unusable.

## 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<br>DDR4 LR-DIMM (Load Reduced), ECC: 64GB<br>DDR4 3DS LR DIMM (3D Stacked, Load Reduced), ECC: 128GB*<br>*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 Memory** | Top Slots | | | | | | Bottom Slots | | | | | | **Perf Rating** |
| | DIMM 1 | DIMM 2 | DIMM 3 | DIMM 4 | DIMM 5 | DIMM 6 | DIMM 7 | DIMM 8 | DIMM 9 | DIMM 10 | DIMM 11 | DIMM 12 | |
| **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

**Dual Processor Configuration**

| System Memory | CPU 0 — Top Slots | | | | | | CPU 0 — Bottom Slots | | | | | | CPU 1 — Top Slots | | | | | | CPU 1 — Bottom Slots | | | | | | Perf Rating |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 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 |

## System Technical Specifications

**Memory Loading Order:**

**Load Order for Single and Dual Processor Configuration**

Load order exception for 3 DIMMs/CPU: only load upper black color slots

| | | | |
|---|---|---|---|
| 2 ↔ 1 | 13 | 1 | 7 |
| 14 | 5 | 3 | |
| 6 ↔ 5 | 17 | 9 | |
| 18 | 9 | 5 | |
| 10 ↔ 9 | 21 | 11 | |
| 22 | | | |

CPU1    FAN    Memory Load Order Dual Processor    CPU0    FAN    Memory Load Order Single Processor

| | | | |
|---|---|---|---|
| 24 | 23 | 12 | |
| 12 | 11 | 6 | |
| 20 | 19 | 10 | |
| 8 | 7 | 4 | |
| 16 | 15 | 8 | |
| 4 | 3 | 2 | |
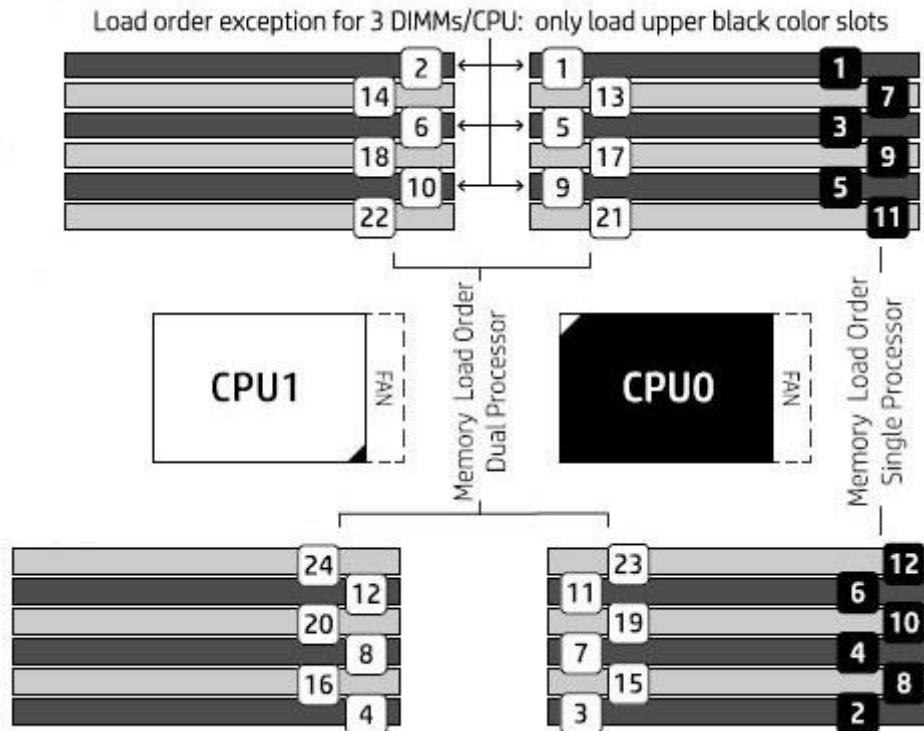
**Maximum Memory**
Supports up to 1.5TB with two processors, using RDIMMs
Supports up to 3TB with two processors, using 3DS LR DIMMs*
*The 3TB configuration requires 128GB DIMMs which are no longer sold by HP

**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:<br>• 128GB (1x128GB) Single Processor Configuration<br>• 256GB (2x128GB) Single Processor Configuration<br>• 512GB (4x128GB) Dual Processor Configuration<br><br>**NOTES:**<br>1. Supported only with Xeon 82xx, 62xx, 52xx and 4215 processors.<br>  a. Available as factory configured in Memory Mode or Storage Mode.<br>    i. Microsoft Configured Memory Mode will be available in CQ1 2020<br>  b. Systems configured with DCPMM memory will operate the memory subsystem at 2666 MT/s.<br>  c. Operating System Support:<br>    i. Windows 11 Pro for Workstations with all updates applied.<br>    ii. Windows 10 Pro for Workstations v1903 or later with all updates applied.<br>    iii. Linux OS support may be found in the Linux Hardware Support Matrix.<br>  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.<br>  e. DCPMM solutions require additional DRAM memory to be included in the solution:<br>    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.<br>    ii. Systems configured with DCPMM in Storage Mode will require DRAM System Memory to be ordered separately.<br>    iii. DCPMM Memory will report approximately 2% less than advertised capacity .<br>  f. Total Memory (DCPMM + DRAM) per processor must be <= 1TB or 2TB per dual processor system.<br>    i. Z8 G4 **NOTE:** "M" processors support a total memory limit < =2TB per processors or 4TB per dual processor system<br>2. Option Kit available in CQ1-2020.<br>3. Requires 2nd processor option. |
| **PCI Express Connectors** | Two PCIe Gen3 x16 with latch<br>Two PCIe Gen3 x16 with latch.<br>• Enabled only with optional 2nd CPU is installed.<br>One PCIe Gen3 x8 open-ended connector.<br>• Enabled for One PCIe Gen2 x4 slot with 1 CPU<br>• Enabled for One PCIe Gen3 x8 with optional 2nd CPU installed<br>Two PCIe Gen3 x4 open-ended connectors |

| | | |
|---|---|---|
| **Supported Drive Interfaces** | **SATA** | 2 sSATA @6Gb/s, supports RAID 0, 1.<br>8 SATA @6Gb/s, supports RAID 0, 1, 5, 10.<br>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)<br>\* 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<br>Data rates supported: 10/100/1000 Mb/s<br>Compliance IEEE 802.1as/1588, 802.1p, 802.1Q, 802.3, 802.3ab, 802.3az, 802.3i 802.3u, 802.3x, 802.3z<br>Up to 32 programmable filters<br>Bus architecture PCIe 1.0 x1 and SMBus<br>UEFI and PXE Boot ROM support<br>Network transfer rates:<br> 10BASE-T (half-duplex) 10 Mb/s<br> 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

| | 115 VAC | | 230 VAC | | 100 VAC | |
|---|---|---|---|---|---|---|
| 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

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

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

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

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

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

## DECLARED NOISE EMISSIONS

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

| 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<br>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<br>Rear (all)<br>Middle (full-height cards)<br>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<br>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).<br>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. |

## System Technical Specifications

| | |
|---|---|
| **Boot Control** | Disables the ability to boot from removable media on supported devices. |
| **Memory Change Alert** | Alerts management console if memory is removed or changed. |
| **Thermal Alert** | Monitors the temperature state within the chassis. Three modes:<br>• NORMAL - normal temperature ranges.<br>• ALERTED - excessive temperatures are detected. Raises a flag so action can be taken to avoid shutdown or provide for a smoother system shutdown.<br>• 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).<br>Enables an operating system to control system power consumption based on the dynamic workload.<br>Makes it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system.<br>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.<br>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<br>- 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 |

## System Technical Specifications

|  |  |
|---|---|
|  | PCI Power Management Specification, Revision 1.1 |
|  | PCI Firmware Specification, Revision 3.0, Draft .7 |
| **PCI Express** | PCI Express Base Specification, Revision 2.0 |
|  | PCI Express Base Specification, Revision 3.0 |
| **PMM** | POST Memory Manager Specification, Version 1.01 |
| **SATA** | Serial ATA Specification, Revision 1.0a |
|  | Serial ATA 3 Gb/s: Serial ATA Specification, Revision 2.5 |
|  | Serial ATA 6 Gb/s: Serial ATA Specification, Revision 3.0 |
| **SPD** | PC SDRAM Serial Presence Detect (SPD) Specification, Revision 1.2B |
| **TPM** | Trusted Computing Group TPM Specification Version 2.0 (Infineon SLB 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 is low halogen except for HP Z Turbo Quad Pro PCIe TLC SSD, CRU QX 428 & QX448 removable storage frames, ConnectX-6 DX Amphenol 10 & 25 Gb Transceivers, Intel VROC M.2 RAID module, power cords, cables, and peripherals. Service parts obtained after purchase may not be Low Halogen.

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:

## System Technical Specifications

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

| | |
|---|---|
| **Restricted Material Usage** | This product meets the material restrictions specified in HP's General Specification for the Environment. HP Inc. is committed to compliance with all applicable environmental laws and regulations, including the European Union Restriction of Hazardous Substances (RoHS) Directive. HP's goal is to exceed compliance obligations by meeting the requirements of the RoHS Directive on a worldwide basis . |
| **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.<br>(**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:<br>Sustainability Report<br><br>Eco-label certifications:<br>http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html<br><br>ISO 14001 certificate:<br>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<br>• Plastic parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.<br>• 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<br><br>• Does not contain restricted substances listed in HP Standard 011-1 General Specification for the Environment<br>• Does not contain ozone-depleting substances (ODS)<br>• Does not contain heavy metals (lead, mercury, cadmium or hexavalent chromium) in excess of 100 ppm sum total for all heavy metals listed<br>• Maximizes the use of post-consumer recycled content materials in packaging materials<br>• All packaging material is recyclable<br>• All packaging material is designed for ease of disassembly<br>• Reduced size and weight of packages to improve transportation fuel efficiency<br>• Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards formatting<br>• 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

## System Technical Specifications

| | |
|---|---|
| **Industry Standard Specifications** | This product meets the following industry standard specifications for manageability functionality:<br><br>• DASH 1.1 (via Intel® LAN on motherboard) |
| **Intel® Active Management Technology (AMT)** | Intel® Active Management Technology (AMT) 11.2x<br><br>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:<br>• Power Management (on, off, reset, graceful shutdown, sleep and hibernate)<br>    o Support in Max Power Savings (Shutdown and Hibernate Modes)<br>• Hardware Inventory (includes BIOS and firmware revisions)<br>• Hardware Alerting<br>• Agent Presence<br>• System Defense Filters<br>• Serial Over LAN (SOL)<br>• USB Redirect (Media Redirection)<br>• ME Wake-on-LAN (WOL), even with Maximum Power Savings Enabled<br>• DASH 1.1 compliance<br>• IPv6 Support<br>• 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<br>• Remote Scheduled Maintenance - pre-schedule when the system connects to the IT or service provider console for maintenance.<br>• Remote Alerts - automatically alert IT or service provider if issues arise<br>• Access Monitor - Provides oversight into Intel® AMT actions to support security requirements<br>• PC Alarm Clock<br>• Microsoft NAP Support<br>• Host Base set-up and configuration<br>• Management Engine (ME) firmware roll back<br>• Local Time Sync to UTC<br>• 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:<br><br>• Intel® Xeon® processor E5-1600 v5 or E5-2600 v5  product family featuring Intel® vPro™ Technology<br>• Intel® C622 chipset<br>• Intel® I219LM GbE LAN |
| **Remote Manageability Software Solutions** | The HP Z8 G4 Workstation is supported on the following remote manageability software consoles:<br><br>• LANDesk Management Suite (HP recommended solution)<br>• Microsoft System Center Configuration Manager<br>• HP Client Automation Enterprise<br><br>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 |

## System Technical Specifications

transferred to another, non-restricted country will remain fully covered under the original warranty and service offering. 24/7 operation will not void the HP warranty.

**NOTE 1:** Terms and conditions may vary by country. Certain restrictions and exclusions apply.
**NOTE 2:** On-site service may be provided pursuant to a service contract between HP and an authorized HP third-party provider, and is not available in certain countries. Global service response times are based on commercially reasonable best effort and may vary by country.
**NOTE 3:** Technical telephone support applies only to HP-configured, HP and HP-qualified, third-party hardware and software. Toll-free calling and 24x7 support service may not be available in some countries.

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

**Certification and Compliance**

Environmental Sustainability questions concerning:
Ecolabels (EPEAT, TCO, etc.)
ENERGY STAR, California Energy Commission (CEC)
Compliance with Environmental legislation (EU ErP, China CECP, EU RoHS and other countries)
Supply Chain Social Environmental Responsibility (SER) (conflict minerals; human rights, etc.)
Product specific environmental features (material content, packaging content, recycled content, etc.)
China Energy Label (CEL)

Please contact sustainability@hp.com

For country specific Regulatory Compliance approval documents or Regulatory and Safety questions concerning:
Declarations of Conformity (for self-service, go to https://www.hp.com/uk-en/certifications/technical/regulations-certificates.html?jumpid=ex_r135_uk/en/any/corp/hpuk-mu_chev/certificates)
GS Certificates
Product Safety Certificates (UL, CB, BIS, etc.)
EMC Certificates, Declarations of Conformity, or Certificates of Conformity (CE, FCC, ICES, etc.)
CCC Certificates
Ergonomics

Please contact techregshelp@hp.com

**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 |
| Z5J61AV | 1TB 7200RPM SATA 3.5in 2nd |
| Z5J64AV | 1TB 7200RPM SATA 3.5in 3rd |
| Z5J62AV | 1TB 7200RPM SATA 3.5in 4th |
| Z5J63AV | 1TB 7200RPM SATA 3.5in 5th |

**Graphics**

| Product # | Offering |
|---|---|
| N/A | N/A |

**Memory**

| Product # | Offering |
|---|---|
| N/A | N/A |

**Optical and Removable Storage**

| Product # | Offering |
|---|---|
| N/A | N/A |

## Technical Specifications - Processors

Intel® Xeon® 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 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 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.

# QuickSpecs

## 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** | 3 D  TLC | |
| **Endurance** | 500TB | |
| **Reliability** (MTBF) | 1.5M hours | |
| **Interface** | PCI Express 3.0 x4 electrical x4 physical | |
| **Operating Temperature** | 32° to 158° F (0° to 70° C) | |
| **Performance** | **Sequential Read** | 3300 MB/s* |
| | **Sequential Write** | 2700 MB/s* |
| | **Random Read** | 430 K IOPS* |
| | **Random Write** | 500 K IOPS* |

*Actual performance may vary.

| Intel® 905p Series AIC PCIe SSD | Intel® 905p Series AIC 280GB PCIe SSD | | |
|---|---|---|---|
| | **Capacity** | 280GB | |
| | **Protocol** | PCIe | |
| | **Form Factor** | PCIe Card, Half Height | |
| | **Controller** | NVMe | |
| | **NVM Type** | 3DXPoint | |
| | **Endurance** | 5.11 PBW (PB Written) | |
| | **Reliability** (MTBF) | 1.6M hours | |
| | **Operating Temperature** | 32° to 185° F (0° to 85° C) | |
| | **Performance** | **Sequential Read** | 2730 MB/s* |
| | | **Sequential Write** | 2280 MB/s* |
| | | **Random Read** | 587K IOPS* |
| | | **Random Write** | 559K IOPS* |

*Actual performance may vary.

| | **Capacity** | 480GB |
|---|---|---|

## Technical Specifications - Hard Drives

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

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

Technical Specifications - Hard Drive Controllers

## HARD DRIVE CONTROLLERS

| MicroSemi 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<br>**NOTE:** RAID 5 is not supported on MicroSemi 2100-4i4e 8-port SAS 12Gb/s RAID Card | |

## Technical Specifications - Graphics

## GRAPHICS

| **NVIDIA® Quadro® P620 2GB Graphics** | **Form Factor** | Dimensions: 2.713" H x 5.7" L<br>Single Slot, Low Profile<br>Cooling: Active<br>Weight: 129 grams |
| --- | --- | --- |
| | **Graphics Controller** | NVIDIA® Quadro® P620 Graphics Card<br>GP107 GPU<br>512 CUDA cores<br>Max Power: 40 Watts |
| | **Bus Type** | PCI Express 3.0 x16 |
| | **Memory** | Size: 2 GB GDDR5, 2000 MHz<br>Memory Interface: 128-bit<br>Memory Bandwidth: 64 GB/s |
| | **Connectors** | 4mDP Outputs * |
| | **Maximum Resolution** | DisplayPort™ 1.4:<br>- up to 4x 5120 x 2880 x 24 bpp @ 60Hz<br>- supports Multi-Stream Transport (MST) |
| | **Image Quality Features** | 10-bit internal display processing pipeline<br>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<br>DirectX 12<br>Vulkan 1.0<br>API support includes:<br>CUDA C, CUDA C++, DirectCompute , OpenCL |
| | **Available Graphics Drivers** | Windows 11<br>Windows 10<br>Windows 7 (via nvidia.com)<br>Linux®<br><br>HP qualified drivers may be preloaded or available from the HP support Web site:<br>http://welcome.hp.com/country/us/en/support.html |
| | **Notes** | *P620 only have mini-DisplayPort™ (mDP) video ports.<br><br>Factory Configured (Z4 G4/ Z6 G4/ Z8 G4 Workstations): No adapters included<br>After market option kit:Two mDP-to-DP Adapters included<br><br>Additional mDP-to-DP Adapters are available as Factory Configuration or Option Kit accessories:<br>- 2MY05AA - HP miniDP-to-DP Adapter Cables<br>- 2KW87A6 - HP (Bulk 12) miniDP-to-DP Adapter Cables |

## Technical Specifications - Graphics

| **NVIDIA® T400 4GB Graphics** | **Form Factor** | Dimensions: 2.713" H x 6.137" L<br>Single Slot, Low Profile<br>Weight: 124g |
|---|---|---|
| | **Graphics Controller** | NVIDIA® T400 Graphics Card<br>GPU: 384 CUDA cores<br>Power: 30 Watts<br>Cooling: Active |
| | **Bus Type** | PCI Express 3.0 x16 |
| | **Memory** | Size: 4 GB GDDR6<br>Memory Interface: 64-bit<br>Memory Bandwidth: 80 GB/s |
| | **Connectors** | 3x mDP |
| | **Maximum Resolution** | 3x 5120 x 2880 x 24 bpp @ 60Hz |
| | **Supported Graphics APIs** | OpenGL 4.5<br>DirectX 12<br>Vulkan 1.0<br>API support includes:<br>CUDA, OpenCL 1.x |
| | **Available Graphics Drivers** | Windows 11<br>Windows 10<br>Linux<br><br>HP qualified drivers may be preloaded or available from the HP support Web site:<br>http://welcome.hp.com/country/us/en/support.html |
| **NVIDIA® Quadro® P1000 4GB Graphics** | **Form Factor** | Dimensions:2.713" H x 5.7" L<br>Single Slot, Low Profile<br>Cooling: Active<br>Weight: 129 grams |
| | **Graphics Controller** | NVIDIA® Quadro® P1000 Graphics Card<br>GP107-860 GPU<br>640 NVIDIA® CUDA® cores<br>Max Power: 47 Watts |
| | **Bus Type** | PCI Express 3.0 x16 |
| | **Memory** | Size: 4 GB GDDR5, 2500 MHz<br>Memory Interface: 128-bit memory interface<br>Memory Bandwidth: 80 GB/s memory bandwidth |
| | **Connectors** | 4mDP Outputs |
| | **Maximum Resolution** | DisplayPort™ 1.4:<br>- up to 4x 5120 x 2880 x 24 bpp @ 60Hz<br>- supports Multi-Stream Transport (MST) |
| | **Image Quality Features** | 10-bit internal display processing pipeline<br>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<br>DirectX® 12 |

## Technical Specifications - Graphics

|  |  |  |
|---|---|---|
|  |  | Vulkan™ 1.0<br>API support includes:<br>CUDA C, CUDA C++, DirectCompute , OpenCL™ |
|  | **Available Graphics Drivers** | Windows 11<br>Windows 10<br>Windows 7 (via nvidia.com)<br>Linux®<br><br>HP qualified drivers may be preloaded or available from the HP support Web site:<br>http://welcome.hp.com/country/us/en/support.html |
|  | **Notes** |  |
| **AMD Radeon™ Pro WX 3200 4GB Graphics** | **Form Factor** | Low-Profile Single Slot (2.75 "H x 6.6" L) |
|  | **Graphics Controller** | Radeon™ Pro WX 3200 Graphics Card<br>GPU: 640 Stream Processors organized into 8 Compute Units<br>Power: 56 Watts<br>Cooling: Active |
|  | **Memory** | 4GB GDDR5 memory<br>Memory Bandwidth: 6 Gbps / 96 GB/s<br>Memory Width: 128 bit |
|  | **Connectors** | 2x Mini DisplayPort™ 1.4 plus 1x DisplayPort™ 1.4 – HDR ready connectors with HBR3 and MST support.<br><br>Factory Configured:  No adapters included<br>After market option kit:  One mDP-to-DP cable adapters included<br><br>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<br>    • 1x single-cable 5K monitor, or 2x dual-cable 5K monitors<br>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<br>FreeSync support |
|  | **GPU Architecture** | Polaris |
|  | **Supported Graphics APIs** | DirectX®12<br>OpenGL® 4.5<br>OpenCL™ 2.0<br>Vulkan™ 1.0 |
|  | **Available Graphics Drivers** | Windows 11<br>Windows 10<br>(Windows® 7 64-bit available from AMD)<br>Linux® 64-bit (selected Enterprise distributions) |

## Technical Specifications - Graphics

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

| | | |
|---|---|---|
| | **Notes** | 1. HDR content requires that the system be configured with a fully HDR-ready content chain, including: graphics card, monitor/TV, graphics driver and application. Video content must be graded in HDR and viewed with an HDR-ready player. Windowed mode content requires operating system support. |
| | | 2. AMD PowerTune and AMD ZeroCore Power are technologies offered by certain FirePro™ and Radeon™ Pro products, which are designed to intelligently manage GPU power consumption in response to certain GPU load conditions. |
| | | 3. As of September 2016, certified for DisplayPort™ 1.4 HBR3 and ready for DisplayPort™ 1.4 HDR based on independent verification by DisplayPort™ testing authority. HDR content requires that the system be configured with a fully HDR-ready content chain, including: graphics card, monitor/TV, graphics driver and application. Video content must be graded in HDR and viewed with an HDR-ready player. Windowed mode content requires operating system support. |

| | | |
|---|---|---|
| **NVIDIA® T1000 4GB Graphics** | **Form Factor** | Dimensions: 2.713" H x 6.137" L<br>Single Slot<br>Weight: 132.6 grams |
| | **Graphics Controller** | NVIDIA® T1000 Graphics Card<br>Power: 50W<br>Cooling: Active |
| | **Bus Type** | PCI Express 3.0 x16 |
| | **Memory** | Size: 4GB GDDR6<br>Memory Bandwidth: Up to 160 GB/s<br>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<br>Windows 10<br>Windows 8.1<br>Windows 7 Professional<br>Linux® - Full OpenGL® implementation, complete with NVIDIA® Quadro® and ARB extensions<br><br>HP qualified drivers may be preloaded or available from the HP support Web site:<br>http://welcome.hp.com/country/us/en/support.html |

| | | |
|---|---|---|
| **NVIDIA® T1000 8GB and NVIDIA® Long-Life T1000E 8GB** | **Form Factor** | Dimensions: 2.713" H x 6.137" L<br>Single Slot<br>Weight: 132.6 grams |

## Technical Specifications - Graphics

| | | |
|---|---|---|
| | **Graphics Controller** | NVIDIA® T1000 Graphics Card<br>Power: 50W<br>Cooling: Active |
| | **Bus Type** | PCI Express 3.0 x16 |
| | **Memory** | Size: 8GB GDDR6<br>Memory Bandwidth: Up to 160 GB/s<br>Memory Width: 128-bit |
| | **Connectors** | 4x mini DisplayPort™ 1.4a |
| | **Maximum Resolution** | 7680 x 4320 @ 120Hz |
| | **Display Output** | Maximum number of displays: 4 displays |
| | **Architecture** | NVIDIA® Turing™ |
| | **Available Graphics Drivers** | Windows 11<br>Windows 10<br>Windows 8.1<br>Windows 7 Professional<br>Linux® - Full OpenGL® implementation, complete with NVIDIA® Quadro® and ARB extensions<br><br>HP qualified drivers may be preloaded or available from the HP support Web site:<br>http://welcome.hp.com/country/us/en/support.html |
| **NVIDIA® RTX A2000 6GB Graphics** | **Form Factor** | Dimensions: 2.713" H x 6.6" L<br>Dual slot, half-height<br>Weight: 295 grams (without extender) |
| | **Graphics Controller** | NVIDIA® RTX A2000 Graphics Card<br>Power: 70W<br>Cooling: Active |
| | **Bus Type** | PCI Express 4.0 x16 |
| | **Memory** | Size: 6GB GDDR6<br>Memory Bandwidth: Up to 288 GB/s<br>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<br>Windows 10<br>Linux® 64-bit (selected Enterprise distributions)<br>HP qualified drivers may be preloaded or available from the HP support Web site:<br>http://welcome.hp.com/country/us/en/support.html |
| | **Notes** | 1. RTX A2000 offered as Factory Configured Option does not include a video cable adapter. Video cable adapters must be ordered separately as AMO:<br>    a. 2MY05AA - HP Single miniDP-to-DP Adapter Cable<br>    b. 2KW87A6 - HP (Bulk 12) miniDP-to-DP Adapter Cables<br>2. Two mDP-to-DP adapters are included with the RTX A2000 when it is ordered as an AMO kit. |

## Technical Specifications - Graphics

| **NVIDIA® RTX A4000 16GB Graphics** | **Form Factor** | Full-Height Single Slot (4.4" Height x 9.5" Length) |
|---|---|---|
| | **Graphics Controller** | NVIDIA® RTX A4000 Graphics<br>GPU: 6144 NVIDIA® CUDA® Parallel Processing Cores<br>Power: 140 Watts<br>Cooling: Active |
| | **Memory** | 16GB GDDR6 memory<br>Memory Bandwidth: Up to 448 GB/s<br>Memory Width: 256 bit |
| | **Connectors** | 4x DP<br>One 6-pin auxiliary power connector<br><br>Factory configured option: No video cable adapter included with card.<br>After market option Kit: No video cable adaptor included with card.<br><br>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<br>Developer API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL™, Java, Python, and Fortran |
| | **Available Graphics Drivers** | Windows 11<br>Windows 10<br>Linux® 64-bit<br><br>HP qualified drivers may be preloaded or available from the HP support Web site:<br>http://welcome.hp.com/country/us/en/support.html |
| **NVIDIA® RTX A4500 20GB Graphics** | **Form Factor** | Full-Height Dual Slot (4.4" Height x 10.5" Length) |
| | **Graphics Controller** | NVIDIA® RTX A4500 Graphics<br>GPU: 7168 NVIDIA® CUDA® Parallel Processing Cores<br>Power: 200 Watts<br>Cooling: Active |
| | **Memory** | 20GB GDDR6 memory<br>Memory Bandwidth: Up to 640 GB/s<br>Memory Width: 320 bit |

## Technical Specifications - Graphics

| | | |
|---|---|---|
| | **Connectors** | 4x DP<br>One 8-pin auxiliary power connector<br><br>Factory configured option: No video cable adapter included with card.<br>After market option Kit: No video cable adaptor included with card.<br><br>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<br>Developer API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL™, Java, Python, and Fortran |
| | **Available Graphics Drivers** | Windows 11<br>Windows 10<br>Linux® 64-bit<br><br>HP qualified drivers may be preloaded or available from the HP support Web site:<br>http://welcome.hp.com/country/us/en/support.html |
| **NVIDIA® RTX A5000 24GB Graphics** | **Form Factor** | Full-Height Dual Slot (4.4" Height x 10.5" Length)<br>Weight: 1049 grams + 80 grams extender |
| | **Graphics Controller** | NVIDIA® RTX A5000<br>GPU: 8192 CUDA Cores<br>Power: 230W<br>Cooling: Active |
| | **Memory** | 24GB GDDR6<br>Memory Bandwidth: Up to 768GB/s<br>ECC Memory (disabled by default) |
| | **Connectors** | DP (x4) with HDR support<br>One 8-pin auxiliary power connector<br><br>After market option Kit: no power adapter included with card.<br><br>DisplayPort™ to VGA, DisplayPort™ to DVI (single-link and dual-link), and DisplayPort™ to HDMI adapters available as accessories. |
| | **Maximum Resolution** | DisplayPort™ 1.4a:<br>7680x4320 @ 120Hz |

# QuickSpecs

## Technical Specifications - Graphics

| | |
|---|---|
| **Display Outputs** | 4x DP1.4a HDR2 outputs (up to 7680x4320 @ 120Hz) |
| **GPU Architecture** | NVIDIA® Ampere™ |
| **Supported Graphics APIs** | DirectX®12, OpenGL® 4.5<br>Developer API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL™, Java, Python, and Fortran |
| **Available Graphics Drivers** | Windows 11<br>Windows 10<br>Windows 7<br>HP qualified drivers may be preloaded or available from the HP support Web site:<br>http://welcome.hp.com/country/us/en/support.html<br><br>Factory Configured (Z4/Z6/Z8 G4 Workstation): No adapters included<br>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)<br>Weight: 1230 grams / 2.71 lbs (with extender) |
| | **Graphics Controller** | NVIDIA® RTX™ A6000 Graphics<br>GPU: 10752 NVIDIA® CUDA® Parallel Processing Cores<br>Power: 300 Watts<br>Cooling: Active |
| | **Memory** | 48GB GDDR6 memory<br>ECC optional<br>Memory Bandwidth: Up to 768 GB/s<br>Memory Width: 384 bit |
| | **Connectors** | 4x DP 1.4a<br>Quadro Sync II connector<br>Ampere NVLink®<br>Stereo Sync<br>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<br>Developer API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL™, Java, Python, and Fortran™ |
| | **Available Graphics Drivers** | Windows 11<br>Windows 10<br>Linux® 64-bit |

# QuickSpecs

## Technical Specifications - Graphics

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

| NVIDIA® Quadro® GV100 32GB Graphics | Form Factor | Dual Slot (4.4" Height x 10.5" Length)<br>Weight: 980 grams + 72 gram extender |
|---|---|---|
| | Graphics Controller | NVIDIA® QUADRO® GV100<br>GPU: 5120 NVIDIA® CUDA® Parallel Processing Cores<br>Power: 250 Watts<br>Cooling: Active |
| | Memory | 32GB HBM2 memory<br>Memory Bandwidth: Up to 870 GB/s<br>Memory Width: 5120-bit<br>ECC Memory (disabled by default) |
| | Connectors | DP (x4) with HDR support<br>3-pin mini-DIN connector via optional bracket<br>4-pin header for stereo signal<br>Quadro Sync connector (compatible with Quadro II Sync)<br>One 8-pin auxiliary power connector<br>(2x) NVLink for GV100 connectors (via optional kit)<br><br>After market option Kit: no power adapter included with card.<br><br>DisplayPort™ to VGA, DisplayPort™ to DVI (single-link and dual-link), and DisplayPort™ to HDMI adapters available as accessories. |
| | Maximum Resolution | 5K support @ 60Hz<br>1x single-cable 5K monitor, or 2x dual-cable 5K monitors |
| | Image Quality Features | HDR support over DisplayPort™ 1.4 (SMPTE 2084/2086, BT. 2020) (4K @ 60 Hz 10b/12b HEVC Decode, 4K @ 60 Hz 10b HEVC Encode)<br>HDCP 2.2 support over DisplayPort™ and HDMI connectors<br>NVIDIA 3D Vision™ technology<br>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<br>Developer API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL™, Java, Python, and Fortran |

# QuickSpecs

## Technical Specifications - Graphics

| | | |
|---|---|---|
| **Available Graphics Drivers** | | Windows 11<br>Windows 10<br>Windows 7 (via nvidia.com)<br>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

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| **AMD Radeon™ Pro W5700 8GB Graphics** | **Form Factor** | Dual Slot (4.4" Height x 10.5" Length) |
|---|---|---|
| | **Graphics Controller** | Radeon™ Pro W5700 graphics<br>GPU: 2304 Stream Processors<br>Power: 205 Watts<br>Cooling: Active |
| | **Memory** | 8GB GDDR6 memory<br>Memory Bandwidth: Up to 448 GB/s<br>Memory Width: 256 bit |
| | **Connectors** | 5x MiniDisplayPort 1.4 + USB-C – HDR ready and MST support<br><br>Factory Configured: No video cable adapter included<br>After market option kit: 2x mDP-to-DP adapters included<br><br>Additional DisplayPort-to-VGA or DisplayPort-to-DVI adapters are available as Factory Configuration or Option Kit accessories. |
| | **Maximum Resolution** | 8K support @ 60Hz<br>Single monitor, single or dual-cable |
| | **Image Quality Features** | Advanced support for 8-bit, 10-bit, and 16-bit per RGB color component.<br>High bandwidth scaler for high quality up and downscaling |
| | **Display Output** | 5 full physical mDP 1.4 + USB-c with DP signaling<br>FreeSync support |
| | **GPU Architecture** | RDNA™ |
| | **Supported Graphics APIs** | DirectX® 12.1 |

## Technical Specifications - Graphics

|  |  |  |
|---|---|---|
|  |  | OpenGL® 4.6 <br> OpenCL™ 2.0 <br> Vulkan™ 1.1 |
|  | **Available Graphics Drivers** | Windows 11 <br> Windows 10 <br><br> Linux® 64-bit <br><br> HP qualified drivers may be preloaded or available from the HP support Web site: <br> 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 <br> GPU: 1408 Stream Processors <br> Power: 125 Watts <br> Cooling: Active |
|  | **Memory** | 8GB GDDR6 memory <br> Memory Bandwidth: Up to 224 GB/s <br> Memory Width: 128 bit |
|  | **Connectors** | 4x DisplayPort 1.4 – HDR ready and MST support <br><br> Factory Configured: No video cable adapter included <br> After market option kit: No video cable adapter included <br><br> Additional DisplayPort-to-VGA or DisplayPort-to-DVI adapters are available as Factory Configuration or Option Kit accessories. |
|  | **Maximum Resolution** | 8K support @ 60Hz <br> Single monitor, single or dual-cable |
|  | **Image Quality Features** | Advanced support for 8-bit, 10-bit, and 16-bit per RGB color component. <br> High bandwidth scaler for high quality up and downscaling |
|  | **Display Output** | 4 full physical DP 1.4 <br> FreeSync support |
|  | **GPU Architecture** | RDNA™ |
|  | **Supported Graphics APIs** | DirectX® 12.1 <br> OpenGL® 4.6 <br> OpenCL™ 2.0 <br> Vulkan™ 1.1 |

## Technical Specifications - Graphics

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

## Technical Specifications - Graphics

| | |
|---|---|
| **Memory** | 32GB GDDR6 memory<br>ECC Capable: Yes<br>Memory Bandwidth: up to 512 GB/s<br>Memory Interface: 256-bit |
| **Display Output** | Max Displays: 6<br>Video Output: 6x Mini-DisplayPort™ 1.4 with DSC<br>Display Configurations:<br>　　　5K Resolution: 6x @ 5120 x 2880 resolution @ 60Hz<br>　　　8K Resolution: 2x @ 7680 x 4320 resolution @60Hz<br><br>HDR Support: Yes<br>8K Support: Yes<br><br>Notes: W6800 only has mini-DisplayPort™ (mDP) video ports<br>• Configure-to-order must specify AV options to add any required mDP-to-DP Adapters<br>• Two mDP-to-DP Adapters are included in the RTX W6800 AMO kits<br>• If more mDP-to-DP Adapters are needed, Adapters can be ordered separately as AMO:<br>　　o 2MY05AA - HP Single miniDP-to-DP Adapter Cable<br>　　o 2KW87A6 - HP (Bulk 12) miniDP-to-DP Adapter Cables |
| **Bus Type** | PCI Express x16 Gen4 |
| **Software API Support** | DirectX®: 12<br>OpenGL® : 4.6,<br>OpenCL™ : 2.1<br>Vulkan: 1.2 |
| **Available Graphics Drivers** | Windows 11<br>Windows 10<br><br>HP qualified drivers may be preloaded or available from the HP support Web site:<br>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<br>NVIDIA® Quadro® P5000<br>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.<br>BNC Connector for external house synchronization. |
| | **Internal Connectors** | 6 NVIDIA SLI® style edge fingers for connection to compatible GPUs |

## Technical Specifications - Graphics

|  |  |
|---|---|
|  | • 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<br>Must be used with NVIDIA Quadro P4000, P5000 or P6000 graphics cards.<br>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<br>Windows 10<br>Windows 7<br>Linux® 64-bit |
| **Kit Contents** | Contains:<br>• Quadro Sync II Card<br>• 4 x 12-Inch Short Sync Cables<br>• 2 x 24-Inch Long Sync Cables (Two)<br>• Quick Start Guide |

Technical Specifications – Optical and Removable Storage

# OPTICAL AND REMOVABLE STORAGE

| HP 9.5mm Slim DVD Writer | Description | 9.5mm height, tray-load | |
|---|---|---|---|
| | Mounting Orientation | Either horizontal or vertical | |
| | Interface Type | SATA/ATAPI | |
| | Dimensions (WxHxD) | 128 x 9.5 x 127mm | |
| | Supported Media Types | DVD+R<br>DVD+RW<br>DVD+R DL<br>DVD-R DL<br>DVD-R<br>DVD-RW<br>CD-R<br>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<br>CD-RW  Up to 24X |
| | | DVD ROM Read | DVD+RW  Up to 8X<br>DVD-RW  Up to 8X<br>DVD+R DL  Up to 8X<br>DVD-R DL  Up to 8X<br>DVD-ROM  Up to 8X<br>DVD-ROM DL  Up to 8X<br>DVD+R  Up to 8X<br>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.<br>Red Hat® Enterprise Linux® (RHEL) 6, 7 Desktop/Workstation<br>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<br>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<br>Red Hat® Enterprise Linux® (RHEL) 6, 7 Desktop/Workstation<br>SUSE Linux® Enterprise Desktop 12<br><br>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<br>DVD+RW<br>DVD+R DL<br>DVD-R DL<br>DVD-R<br>DVD-RW<br>CD-R<br>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<br>CD-RW  Up to 24X |
| | | DVD ROM Read     DVD+RW Up to 13X<br>DVD-RW Up to 13X<br>DVD+R DL Up to 12X<br>DVD-R DL Up to 12X<br>DVD-ROM Up to 12X |

## Technical Specifications – Optical and Removable Storage

| | | DVD-ROM DL Up to 12X<br>DVD+R Up to 16X<br>DVD-R Up to 16X |
|---|---|---|
| **Power** | Source | SATA DC power receptacle |
| | DC Power Requirements | 5 VDC ± 5% -100 mV ripple p-p<br>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<br>BD-R<br>BD-RE<br>DVD+R<br>DVD+RW<br>DVD+R DL<br>DVD-R DL<br>DVD-R<br>DVD-RW<br>CD-R<br>CD-RW | |
| | **Disc Capacity** | DVD-ROM | 8.5 GB DL or 4.7 GB standard |
| | | Blu-ray | 25 GB (single-layer)<br>50 GB (dual-layer)<br>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)<br>BD-ROM (SL/DL)    25S / 28S<br>BD-R (SL/DL)      25S / 28S<br>BD-RE (SL/DL)     25S / 28S<br>DVD-ROM (SL/DL)   18S / 18S<br>DVD-R (SL/DL)     25S / 25S<br>DVD-RW          25S<br>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)

Technical Specifications - Controller Cards

## CONTROLLER CARDS

| HP Thunderbolt-3 Dual Port2 PCIe 1-port I/O Card | Data Transfer Rate | Supports up to 40 Gb/s (40,000 Mb/s) |
|---|---|---|
| | Devices Supported | Thunderbolt™, Thunderbolt™ 2 and Thunderbolt™ 3 certified for Windows devices |
| | Bus Type | PCIe card, full height PCIe slots |
| | Ports | Two Thunderbolt™ 3 external USB type-C output connectors (Rear)<br>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



**HP Z6 Gen4 and HP Z8 Gen 4 Integrated Network Architecture**
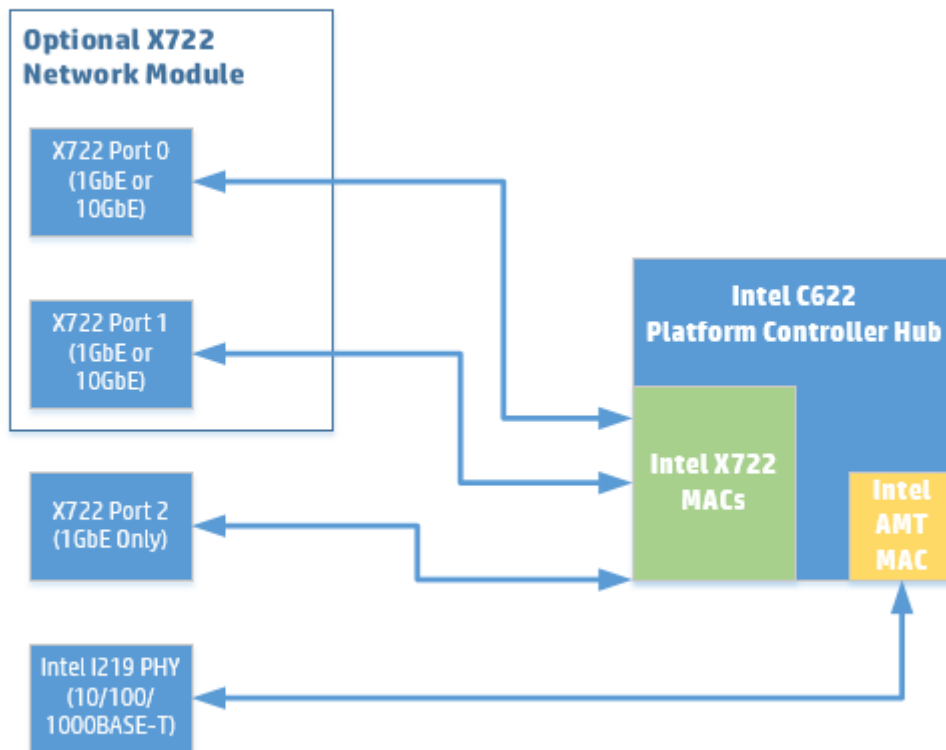
**Note:** When an optional X722 network module is not installed in the system, a "dummy" port is enumerated as Function 0 of the Intel X722 MACs, which allows for the X722 Port 2 on the Motherboard to enumerate.

| Integrated Intel I219LM | Connector | RJ-45 |
|---|---|---|
| | Controller | Intel I219LM |
| | Data Rates Supported | 10/100/1000 Mbps |
| | Boot ROM Support | PXE, UEFI |
| | Connect Speed LED Indicators | Link/Activity LED |

- 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<br>• Off = No link<br>• Blinking = Activity<br>Speed LED<br>• Off = No Link<br>• 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<br>Cat6a (or higher) for 10Gbps |
| | **Power Consumption (active-typical)** | 5.5W at 1Gbps<br>11.2W at 10Gbps |
| | **Physical Dimensions** | 0.875 in x 3 in x 2.75 in |
| | **Connect Speed LED Indicators** | Link/Activity LED<br>• Off = No link<br>• Blinking = Activity<br>Speed LED<br>• Amber = 1Gbps<br>• 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<br>Cat5 (or higher) for 100Mbps<br>Cat5e (or higher) for 1Gbps |
| | **Power Consumption (active-typical)** | 0.81W |
| | **Physical Dimensions** | Length: 6.7cm (2.64 inches)<br>(Bracket) Width: 1.8cm (0.709 inches)<br>Full-height end bracket: 12.07cm (4.755 inches)<br>Low-profile end bracket: 8cm (3.15 inches) |

## Technical Specifications - Networking and Communications

| | | |
|---|---|---|
| | **Connect Speed LED Indicators** | Link/Activity LED<br>• Off = No link<br>• Blinking = Activity<br>Speed LED<br>• Off = 10Mbps<br>• Green = 100Mbps<br>• Amber = 1Gbps |
| | **Operating Temperature** | 0 °C to 55 °C (32 °F to 131 °F) |
| | **Hardware Certifications** | USA: FCC B,<br>EU: UL CE,<br>Japan: VCCI,<br>Taiwan: BSMI,<br>Australia/New Zealand: CTICK,<br>Korea: KCC,<br>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<br>Cat5 (or higher) for 100Mbps<br>Cat5e (or higher) for 1Gbps |
| | **Power Consumption (active-typical)** | 4.4W |
| | **Physical Dimensions** | Length: 13.54cm (5.33 inches)<br>Width: 6.89 (2.71 inches)<br>Full-height end bracket: 12.0cm (4.725 inches)<br>Low-profile end bracket: 7.92cm (3.117 inches) |
| | **Connect Speed LED Indicators** | Link/Activity LED<br>• Off = No link<br>• Blinking = Activity<br>Speed LED<br>• Off = 10Mbps<br>• Green = 100Mbps<br>• Amber = 1Gbps |
| | **Operating Temperature** | 0 °C to 55 °C (32 °F to 131 °F) |
| | **Hardware Certifications** | USA: FCC B,<br>EU: UL CE,<br>Japan: VCCI,<br>Taiwan: BSMI,<br>Australia/New Zealand: CTICK,<br>Korea: KCC,<br>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<br>Cat5 (or higher) for 100Mbps<br>Cat5e (or higher) for 1Gbps |
| **Power Consumption (active-typical)** | 5W |
| **Physical Dimensions** | Length: 13.54cm (5.33 inches)<br>Width: 6.89 (2.71 inches)<br>Full-height end bracket: 12.0cm (4.725 inches)<br>Low-profile end bracket: 7.92cm (3.117 inches) |
| **Connect Speed LED Indicators** | Link/Activity LED<br>• Off = No link<br>• Blinking = Activity<br>Speed LED<br>• Off = 10Mbps<br>• Green = 100Mbps<br>• Amber = 1Gbps |
| **Operating Temperature** | 0 °C to 55 °C (32 °F to 131 °F) |
| **Hardware Certifications** | USA: FCC B,<br>EU: UL CE,<br>Japan: VCCI,<br>Taiwan: BSMI,<br>Australia/New Zealand: CTICK,<br>Korea: KCC,<br>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<br>• Off = No link<br>• Blinking = Activity<br>Speed LED<br>• Off = No link<br>• Amber = <5Gbps<br>• Green = 5Gbps |
| | **Operating Temperature** | 0 °C to 55 °C (32 °F to 131 °F) |
| | **Hardware Certifications** | USA: FCC B,<br>EU: UL CE,<br>Japan: VCCI,<br>Taiwan: BSMI,<br>Australia/New Zealand: CTICK,<br>Korea: KCC,<br>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<br>Cat5e (or higher) for 1Gbps, 2.5Gbps, or 5Gbps<br>Cat6a (or higher) for 10Gbps |
| | **Power Consumption (active-typical)** | 3.9W at 100Mbps<br>5.5W at 1Gbps<br>11.2W at 10Gbps |
| | **Physical Dimensions** | 5.2 in x 2.7 in (without bracket) |
| | **Connect Speed LED Indicators** | Link/Activity LED<br>• Off = No link<br>• Blinking = Activity<br>Speed LED<br>• Off = No link<br>• Amber = <10Gbps<br>• Green = 10Gbps |
| | **Operating Temperature** | 0 °C to 55 °C (32 °F to 131 °F) |
| | **Hardware Certifications** | USA: FCC B,<br>EU: UL CE,<br>Japan: VCCI,<br>Taiwan: BSMI,<br>Australia/New Zealand: CTICK,<br>Korea: KCC,<br>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<br>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)<br>RoHS, UL, FCC/EN55022 Class A, TUV, EN55024, CE, C-TICK, VCCI |

| | | |
|---|---|---|
| **Allied Telesis AT-2911T/2-901** | **Networking Interface** | 2 RJ-45 |
| | **System Interface** | PCI Express 3 x1 |

## Technical Specifications - Networking and Communications

| | |
|---|---|
| **Networking Speeds Supported** | 10Mbps, 100Mbps, 1Gbps |
| **Cabling (up to 100m)** | Cat3 (or higher) for 10Mbps<br>Cat5 (or higher) for 100Mbps<br>Cat5e (or higher) for 1Gbps |
| **Power Consumption (active-typical)** | 2.4W |
| **Physical Dimensions** | Length: 8.8cm (3.5 inches)<br>Width: 6.89 (2.71 inches)<br>Full-height end bracket: 12.0cm (4.725 inches)<br>Low-profile end bracket: 7.92cm (3.117 inches) |
| **Connect Speed LED Indicators** | Link/Activity LED<br>• Off = No link<br>Blinking = Activity |
| **Operating Temperature** | 0 °C to 40 °C (32 °F to 104 °F) |
| **Hardware Certifications** | USA: FCC B,<br>EU: UL CE, UKCA<br>Japan: VCCI,<br>Taiwan: BSMI,<br>Australia/New Zealand: CTICK,<br>Korea: KCC,<br>Canada: ICES-003/NMB-003 |

| | | |
|---|---|---|
| **Intel® X710-DA2 10GBASE-SR Converged Network Adapter** | **Networking Interface** | 2 SFP+ Ports for LC SFP+ Transceivers |
| | **System Interface** | PCI Express 3.0 x8 |
| | **Networking Speeds Supported** | 10Gbps (or 1Gbps with 3rd party transceiver) |
| | **Cabling** | LC fiber optic cabling with LC SFP+ Transceivers |
| | **Power Consumption (active-typical)** | 4.3W |
| | **Physical Dimensions** | 6.578 in x 2.703 in |
| | **Connect Speed LED Indicators** | Link/Activity LED<br>• Off = No link<br>• Blinking = Activity<br>Speed LED<br>• Off = 10Mbps<br>• Green = 100Mbps<br>• Amber = 1Gbps |
| | **Operating Temperature** | 0 °C to 55 °C (32 °F to 131 °F) |
| | **Hardware Certifications** | USA: FCC B,<br>EU: UL CE,<br>Japan: VCCI,<br>Taiwan: BSMI,<br>Australia/New Zealand: CTICK,<br>Korea: KCC,<br>Canada: ICES-003/NMB-003 |

**NOTE:** Windows 7 is NOT supported

## Technical Specifications - Networking and Communications

| | | |
|---|---|---|
| **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<br>(1.19 x 1.38 x 5.57 cm) |
| | Operating Temperature | 0C to 45C (32F to 113F) |
| | Operating Humidity | 0% to 85%, noncondensing |

| | | |
|---|---|---|
| **NVIDIA® Mellanox® ConnectX-6 DX Dual Port 10/25GbE SFP28 NIC** | **Connector** | 2 x SFP28 Transceiver Cage (Dual Port)* |
| | **Cabling** | Depends on transceiver pairing. Typically OM4 or higher MMF LC fiber optic cabling with LC SFP28 Transceivers. |
| | **Controller** | ConnectX6-DX |
| | **Memory** | 256Mbit SPI Quad Flash Device |
| | **Data Rates Supported** | 1/10/25GbE |
| | **Compliance** | – IEEE 802.3by 25 Gigabit Ethernet<br>– IEEE 802.3ae 10 Gigabit Ethernet<br>– IEEE 802.3ap based auto-negotiation and KR startup<br>– IEEE 802.3ad, 802.1AX Link Aggregation<br>– IEEE 802.1Q, 802.1P VLAN tags and priority<br>– IEEE 802.1Qau (QCN)<br>– Congestion Notification<br>– IEEE 802.1Qaz (ETS)<br>– IEEE 802.1Qbb (PFC)<br>– IEEE 802.1Qbg<br>– IEEE 1588v2<br>– Jumbo frame support (9.6KB)<br>– Safety: CB/cTUVus/CE<br>– EMC: CE/FCC/VCCI/ICES/RCM<br>– RoHS Compliant |
| | **Bus Architecture** | PCIe Gen 4 x8 |
| | **Data Transfer Mode** | PCI Express - stores and accesses Ethernet fabric connection information and packet data |
| | **Power Requirements** | 11.5 Watts (typical) |
| | **Network Transfer Rate** | 1Gbps, 10Gbps, 25Gbps |
| | | **NOTE:** Network Transfer Rate depends on transceiver model.* |
| | **Kit Contents** | NVIDIA® Mellanox® ConnectX-6 DX Dual Port 10/25GbE SFP28 NIC |

*Transceivers sold separately. You must have a transceiver installed in order to connect this card to a network.

| | | |
|---|---|---|
| **Intel® 8265 WLAN** | **Networking Speeds** | 802.11ac MU-MIMO (up to 867 Mbps)<br>Bluetooth 4.2 |

## Technical Specifications - Networking and Communications

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

# QuickSpecs

## 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 |
| April 1, 2022 | From v49 to v50 | Changed | Processors, Graphics and Stable & Consistent Offerings sections |
| May 2, 2022 | From v50 to v51 | Changed | Graphics section |
| June 1, 2022 | From v51 to v52 | Changed | SATA Hard Drives, Graphics, Networking and Communications sections |
| July 1, 2022 | From v52 to v53 | Changed | Graphics section |
| August 1, 2022 | From v53 to v54 | Changed | NETWORKING AND COMMUNICATIONS section |
| September 1, 2022 | From v54 to v55 | Changed | Format page 18 |
| October 1, 2022 | From v55 to v56 | Changed | Graphics section |
| December 1, 2022 | From v56 to v57 | Changed | Input Devices section |
| December 9, 2022 | From v57 to v58 | Changed | Optical and Removable Storage section |
| January 1, 2023 | From v58 to v59 | Changed | Networking and Communications, GRAPHICS sections |
| February 22, 2023 | From v59 to v60 | Changed | Graphics section |
| March 1, 2023 | From v60 to v61 | Changed | Manageability section |
| April 1, 2023 | From v61 to v62 | Changed | Processors and Graphics sections |
| May 1, 2023 | From v62 to v63 | Changed | Other Hardware section |
| June 1, 2023 | From v63 to v64 | Changed | Graphics section |
| July 1, 2023 | From v64 to v65 | Changed | Networking and Communications, Other Hardware sections |
| August 1, 2023 | From v65 to v66 | Changed | Social and Environmental Responsibility section |
| November 1, 2023 | From v66 to v67 | Changed | Social and Environmental Responsibility section |