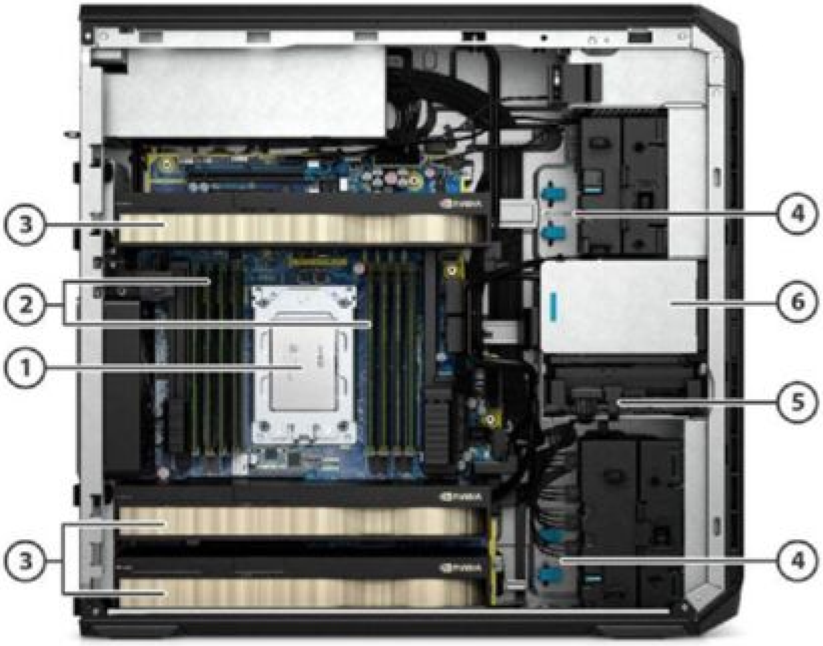
## HP Z6 G5 A Workstation

### Front View

1. Integrated Front Handle
2. Power Button
3. HDD Activity Light
4. CTIA Headset Jack
5. Front I/O Premium:
   1 USB 3.2 Gen2x2 Type-C®, 2 USB 3.1 Gen1 Type-A (left-most Type-A port has Charging Capability)[1]

   Front I/O Entry:
   4 USB 3.1 Gen1 Type-A (left-most Type-A port has Charging Capability)
6. SD Card Reader
7. 1 External 5.25" bay

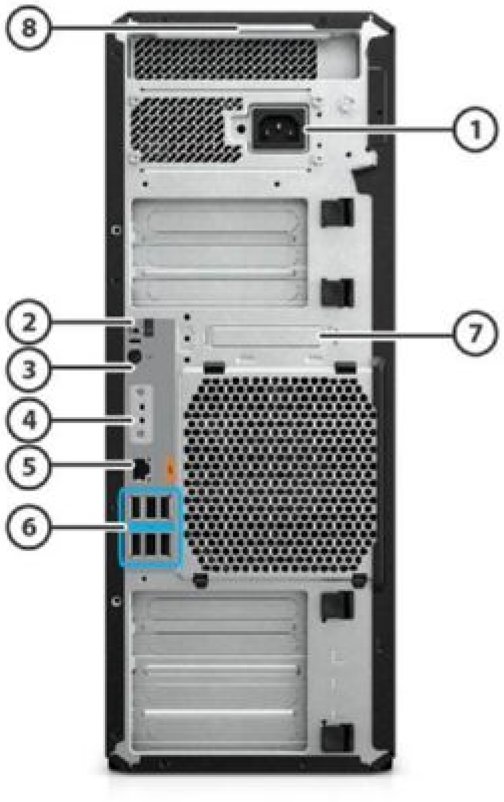
[1] Premium Front IO is shown on photography



**Internal View**

1. 1 AMD Ryzen$^{TM}$ Threadripper$^{TM}$ PRO 7000WX Series Processor
2. 8 DIMM slots for DDR5 ECC Memory
3. 
    - Slot 1: PCIe Gen5 x16
    - Slot 2: PCIe Gen5 x16
    - Slot 3: PCIe Gen5 x16
    - Slot 4: PCIe Gen5 x16
    - Slot 5: PCIe Gen4 x16
    - Slot 6: PCIe Gen4 x4
4. 4 internal onboard M.2 SSDs (2 PCIe x4 Gen5 and 2 PCIe x4 Gen4 system board connections)
5. 1 Internal 5.25" bay
6. 1 External 5.25" bay

**NOTE:** Not shown in photography:
- 2x internal NVMe connectors to front removable M.2 carrier
- 2x internal USB Ports (1x single USB2.0 port, 1x USB3.0 port for SD card reader)
- 2x SATA ports



**Rear View**

1. Choice of 775W, 1125W or 1450W, 90% Efficient Power Supplies
2. Rear Power Button
3. Universal Audio Jack
4. Flex I/O Module (optional)
5. 1xRJ-45 integrated LAN port (1 GbE DASH)
6. 6 SuperSpeed USB3.2 Gen1 Type-A 5 Gbps signaling rate
7. 2x10GbE LAN ports (optional)
8. Integrated Rear Handle

**Form Factor** Tower

**Operating Systems**

Preinstalled:
- Windows 11 Pro High End[2]
- Ubuntu 22.04 LTS[4]
- HP Linux®-ready (minimal OS ready for customer OS installation)[5]

License Only:
- Red Hat® Enterprise Linux® Desktop Workstation (includes paper license with 1 year support; no preinstalled OS)[6]

Supported:

- Windows 10 Pro for Workstations[2,3]
- Red Hat® Enterprise Linux® Workstation 8 & 9 [6]
- Ubuntu 22.04 LTS[5]

[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] Win10 cannot be configured with 7995WX (96C) processor

[4] 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.

[5] A certified preloaded version of Ubuntu® 20.04 LTS is available from HP for this platform. 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 upgrades.

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

**NOTE:** Your product does not support Windows 8 or Windows 7. In accordance with Microsoft's support policy, HP does not support the Windows® 8 or Windows 7 operating system on products configured with Intel® and AMD® 7th generation and forward processors or provide any Windows® 8 or Windows 7 drivers on http://www.support.hp.com. A full list of HP products and the Windows 10 versions tested is available on the HP support website. https://support.hp.com/us-en/document/c05195282

## Processors

| Name[1] | Cores | Frequency (GHz) | | L3 Cache (MB) | Memory Speed (MT/s) | TDP (W) |
|---|---|---|---|---|---|---|
| | | Base Clock Speed | Boost Technology | | | |
| AMD Ryzen™ Threadripper™ PRO 7995WX | 96 | 2.5 | 5.1 | 384 | 5200 | 350 |
| AMD Ryzen™ Threadripper™ PRO 7985WX | 64 | 3.2 | 5.1 | 256 | 5200 | 350 |
| AMD Ryzen™ Threadripper™ PRO 7975WX | 32 | 4.0 | 5.3 | 128 | 5200 | 350 |
| AMD Ryzen™ Threadripper™ PRO 7965WX | 24 | 4.2 | 5.3 | 128 | 5200 | 350 |
| AMD Ryzen™ Threadripper™ PRO 7955WX | 16 | 4.5 | 5.3 | 64 | 5200 | 350 |
| AMD Ryzen™ Threadripper™ PRO 7945WX | 12 | 4.7 | 5.3 | 64 | 5200 | 350 |

**NOTE:**
- AMD Ryzen™ Threadripper™ PRO 7000WX Series processors do not offer integrated graphics
- AMD Ryzen™ Threadripper™ PRO 7000WX Series processors support ECC memory

[1] 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. AMD's numbering is not a measurement of clock speed.

| | |
|---|---|
| **Color** | Black |
| **Convertibility** | No |
| **Expansion Slots** (see system board section for more details) | Slot 1: PCIe Gen5 x16<br>Slot 2: PCIe Gen5 x16<br>Slot 3: PCIe Gen5 x16 |

| | |
|---|---|
| | • Slot 4: PCIe Gen5 x16<br>• Slot 5: PCIe Gen4 x16<br>• Slot 6: PCIe Gen4 x4 |
| **Expansion Bays**<br>(see storage section for more details) | 1x internal 3.5" bays (includes acoustic damping rail assembly)<br>1x external 5.25" bays (175mm depth limit) |
| **Front I/O** | Front I/O Premium: 1x SuperSpeed USB Type-C® 20 Gbps signaling rate (USB Power Delivery 3.0), 2x SuperSpeed USB Type-A 5 Gbps signaling rate, 1x headphone/microphone combo, SD card reader (optional). [left-most Type-A ports supports BC1.2 (Battery Charging)]<br><br>Front I/O Entry: 4x SuperSpeed USB Type-A 5 Gbps signaling rate, 1x CTIA headset jack, SD card reader (optional). [left-most Type-A ports supports BC1.2 (Battery Charging)] |
| **Internal I/O [5]** | 2 USB ports and 2 SATA ports. |
| **Rear I/O** | 1x Universal Audio Jack, 6x SuperSpeed USB Type-A 5 Gbps signaling rate, 1x RJ-45 integrated LAN port (1 GbE, DASH), 2x10GbE Network Module (optional), Flex I/O (optional) |
| **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:<br>H: 17.5" [444.5 mm]<br>W: 6.65" [169 mm]<br>D: 18.3" [465 mm] (measured to the rear panel)<br>Maximum:<br>H: 17.5" [444.5 mm]<br>W: 6.65" [169 mm]<br>D: 18.51" [470.2 mm] (measured to the rear system fan) |
| **Packaged Dimensions** | H: 24.0" [630mm]<br>W: 12.3" [313mm]<br>D: 23.3" [593mm] |
| **Palletization Profile** | 6 units x 3 layers = 18 units per pallet<br>1200x1000x1836mm (pallet included) |
| **Rack Dimensions** | 4U |
| **Weight** | Exact weights depend upon configuration (System weight only).<br>Minimum: 13.2.4kg (29.1lbs.)<br>Typical: 14.8kg (32.6lbs.)<br>Maximum: 23.1kg (50.9lbs.) |
| **Power Supply** | Choice of 80 Plus Gold (90% efficiency at 50% load) Power Supplies:<br>• 1450W @230V (Delta Efficiency Report)<br>• 1125W @110V (Delta Efficiency Report)<br>• 775W (Delta Efficiency Report) (LiteOn Efficiency Report)<br>• 525W (LiteOn Efficiency Report)<br>**NOTE:** not all configurations are supported on all power supplies. Configuration support depends on total system power budget and having sufficient number or type of PCIe supplemental power connectors. Confirm power supply and configuration support using configurator on hp.com.<br>• 1450W supports up to 900W of auxiliary graphics power (dependent on system configuration)<br>• 1125W supports up to 600W of auxiliary graphics power (dependent on system configuration)<br>• 775W supports up to 230W of auxiliary graphics power (dependent on system configuration)<br>**NOTE:** updating graphics after purchase may require additional power distribution cables and/or auxiliary graphics adapters to support the new graphics configuration. |

| | |
|---|---|
| **Workstation ISV Certifications** | See the latest list of certifications at http://www.hp.com/united-states/campaigns/workstations/partnerships.html |
| **Chipset** | AMD PRO 695 Chipset |
| **Memory** | 8 DIMM slots, supporting up to 1TB, DDR5 5200 MT/s speed depending on the system configuration |

| Processors | Factory Configured | Option Kit | Option Kit Part Number | Support Notes |
|---|---|---|---|---|
| AMD Ryzen$^{\text{TM}}$ Threadripper$^{\text{TM}}$ PRO 7995WX | Y | N | | |
| AMD Ryzen$^{\text{TM}}$ Threadripper$^{\text{TM}}$ PRO 7985WX | Y | N | | |
| AMD Ryzen$^{\text{TM}}$ Threadripper$^{\text{TM}}$ PRO 7975WX | Y | N | | |
| AMD Ryzen$^{\text{TM}}$ Threadripper$^{\text{TM}}$ PRO 7965WX | Y | N | | |
| AMD Ryzen$^{\text{TM}}$ Threadripper$^{\text{TM}}$ PRO 7955WX | Y | N | | |
| AMD Ryzen$^{\text{TM}}$ Threadripper$^{\text{TM}}$ PRO 7945WX | Y | N | | |

| SATA Hard Drives | Factory Configured | Option Kit | Option Kit Part Number |
|---|---|---|---|
| 1TB 7200 SATA 3.5" HDD | Y | Y | |
| 1TB 7200 SATA 3.5" Enterprise HDD | Y | Y | W0R10AA |
| 2TB 7200RPM SATA 3.5in Enterprise HDD | Y | Y | 2Z274AA |
| 4TB 7200 RPM SATA 3.5in Enterprise HDD | Y | Y | K4T76AA/AT |
| 8TB 7200RPM SATA 3.5in Enterprise HDD | Y | Y | 2Z273AA |
| 12TB 7200 RPM SATA-6G 3.5in Enterprise HDD | Y | Y | 5S461AA |
| HP 2.5in to 3.5in HDD Adapter Kit | N | Y | J5T63AA |
| HP 2.5in to 3.5in HDD Adapter Kit | N | Y | J5T63AA |

**NOTE:** Starting November 1, 2023, HP PCs with Windows require Windows to be installed on SSD. HDD can only configured as additional data drives and not as the boot drive.

**NOTE:** For internal bay install, HDD option kits require separate purchase of 74Y88AA HP Z6 A HDD Cable Kit.

**NOTE:** For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 35GB system disk (for Windows) is reserved for system recovery software.

## Supported Components

| PCIe Solid State Drives | | Factory Configured | Option Kit | Option Kit Part Number |
|---|---|---|---|---|
| | Z Turbo 512GB PCIe-4x4 2280 TLC M.2 SSD Module | Y | Y | 38T80AA |
| | Z Turbo 512GB PCIe-4x4 2280 SED OPAL2 TLC M.2 SSD Module | Y | Y | 38T81AA |
| | Z Turbo 512GB PCIe-4x4 2280 TLC Z4/Z6 Kit SSD | N | Y | 56Q73AA |
| | Z Turbo 512GB PCIe-4x4 2280 SED OPAL2 TLC M.2 Z4/Z6 Kit SSD | N | Y | 56Q74AA |
| | Z Turbo 1TB PCIe-4x4 2280 TLC SSD Module | Y | Y | 38T77AA |
| | Z Turbo 1TB PCIe-4x4 2280 SED OPAL2 TLC M.2 SSD Module | Y | Y | 38T76AA |
| | Z Turbo 1TB PCIe-4x4 2280 TLC Z4/Z6 Kit SSD | N | Y | 56Q75AA |
| | Z Turbo 1TB PCIe-4x4 2280 SED OPAL2 TLC M.2 Z4/Z6 Kit SSD | N | Y | 5Z7E7AA |
| | Z Turbo 2TB PCIe-4x4 2280 TLC SSD Module | Y | Y | 38T75AA |
| | Z Turbo 2TB PCIe-4x4 2280 SED OPAL2 TLC M.2 SSD Module | Y | Y | 38T79AA |
| | Z Turbo 2TB PCIe-4x4 2280 SED OPAL2 TLC M.2 Z4/Z6 Kit SSD | N | Y | 56Q77AA |
| | Z Turbo 4TB PCIe-4x4 2280 TLC M.2 SSD Module | Y | Y | 5S496AA/AT |
| | Z Turbo 4TB PCIe-4x4 2280 SED OPAL2 TLC M.2 SSD Module | Y | Y | 5S497AA/AT |
| | Z Turbo 4TB PCIe-4x4 2280 SED OPAL2 TLC M.2 Z4/Z6 Kit SSD | N | Y | 5S4A1AA |
| | **HP Z Turbo Drive Quad Pro** | | | |
| | HP Z Turbo Drive Quad Pro PCIe-4x4 NVMe Carrier[1] | Y | Y | 7H9Z3AA |
| | HP Z Turbo Drive Quad Pro 512GB TLC SSD | Y | N | |
| | HP Z Turbo Drive Quad Pro 1TB TLC SSD | Y | N | |
| | HP Z Turbo Drive Quad Pro 2TB TLC SSD | Y | N | |
| | HP Z Turbo Drive Quad Pro 4TB TLC SSD | Y | N | |
| | **HP Z Turbo Drive Dual Pro** | | | |
| | HP Z Turbo Drive Dual Pro PCIe-4x4 NVMe Carrier[2] | Y | Y | 56Q86AA |
| | HP Z Turbo Drive Dual Pro 512GB TLC SSD | Y | N | |
| | HP Z Turbo Drive Dual Pro 1TB TLC SSD | Y | N | |
| | HP Z Turbo Drive Dual Pro 2TB TLC SSD | Y | N | |
| | HP Z Turbo Drive Dual Pro 4TB TLC SSD | Y | N | |

**Note 1:** Kit includes dual pro carrier and heatsink. Requires separate purchase of Z Turbo PCIe 4x4 M.2 SSD modules.
**Note 2:** Kit includes quad pro carrier and heatsink. Requires separate purchase of Z Turbo PCIe 4x4 M.2 SSD modules.

**NOTE:** For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 35GB system disk (for Windows) is reserved for system recovery software.

## Supported Components

| **Graphics** | | **Factory Configured** | **Option Kit** | **Option Kit Part Number** | **Supported # of cards** |
|---|---|---|---|---|---|
| **Graphics Cable Adapters** | HP DisplayPort to HDMI Adapter | Y | Y | 2JA63AA | |
| | HP DisplayPort to DVI Adapter (Bulk 90) | N | Y | FH973A6 | |
| | HP DisplayPort to VGA Adapter | N | Y | AS615AA/AT | |
| | HP DisplayPort to VGA Adapter | N | Y | F7W97AA | |
| | HP miniDP-to-DP Adapter Cable (single) | Y | Y | 2MY05AA | |
| | HP miniDP-to-DP Adapter Cable (2-pack) | Y | N | | |
| | HP miniDP-to-DP Adapter Cable (4-pack) | Y | N | | |
| | HP miniDP-to-DP Adapter Cable (8-pack) | Y | N | | |
| | HP miniDP-to-DP Adapter Cable (Bulk 12) | N | Y | 2KW87A6 | |
| | HP Graphics Power Cable CPU-8p to CPU-8p [4] | N | Y | 6J6H7AA | |
| | HP Graphics Power Cable CPU-8p to x2 PCIe 8p(6+2)[4] | N | Y | 6J6H8AA | |
| | NVIDIA 3D Stereo Bracket | N | Y | K0A25AA | |
| | NVIDIA Quadro Sync II | N | Y | 1WT20AA | |
| **Ultra High-End Graphics** | NVIDIA® RTX 6000 Ada 48GB [1,3] | Y | Y | 79C23AA | 3 |
| | AMD® Radeon™ Pro W7900 48GB [1,6] | Y | Y | 8F699AA | 1 |
| | NVIDIA® RTX 5000 Ada 24GB [1] | Y | Y | 8D6B6AA | 3 |
| | NVIDIA Quadro Sync II | N | Y | 1WT20AA | |
| **High-End Graphics** | NVIDIA® RTX 4500 Ada 20GB [1,6] | Y | | | 3 |
| | NVIDIA® RTX A4500 20GB [1] | Y | Y | 5S458AA/AT | 3 |
| | NVIDIA® RTX 4000 Ada 16GB [1,5,6] | Y | | | 3 |
| | NVIDIA® RTX A4000 16GB [1,5] | Y | Y | 20X24AA/AT | 3 |
| | NVIDIA® RTX A2000 12GB [1] | Y | Y | 5Z7D9AA/AT | 3 |
| **Mid-range Graphics** | NVIDIA® T1000 8GB [2] | Y | Y | 5Z7D8AA/AT | 3 |
| | AMD® Radeon™ Pro W7600 8GB [1] | Y | Y | 8D6B9AA | 3 |
| | AMD® Radeon™ Pro W7500 8GB [1] | Y | Y | 8D6C2AA | 3 |
| **Entry Graphics** | NVIDIA® T400 4GB [2] | Y | Y | 5Z7E0AA/AT | 3 |
| | AMD® Radeon™ RX 6400 4GB | Y | Y | 6Q3U4A | 1 |

**Note 1:** Single, dual, or triple graphics configurations require the HP Z6 Fan and Front Card Guide. If configured as an after-market option, a separate purchase of the HP Z6 Fan and Front Card Guide 56Q80AA is required. If factory configured, the fan and front card guide is included.
**Note 2:** Dual or triple graphics configurations require the HP Z6 Fan and Front Card Guide. If configured as an after-market option, a separate purchase of the HP Z6 Fan and Front Card Guide 56Q80AA is required. If factory configured, the fan and front card guide is included.
**Note 3:** Triple graphics configuration requires the HP Z6 PCIe Retainer with Fans. If configured as an after-market option, a separate purchase of the HP Z6 PCIe Retainer with Fans 56Q85AA is required. If factory configured, the PCIe retainer with fans is included.
**Note 4**: Required for select graphics configurations.
**Note 5:** Only supported with 1125W and 1450W PSUs
**Note 6:** Not available at launch; available early 2024

## Supported Components

| Memory | | Factory Configured | Option Kit | Option Kit Part Number | Support Notes |
|---|---|---|---|---|---|
| | 32GB (2x16GB) DDR5 5600 DIMM ECC REG Memory | Y | N | | |
| | 64GB (4x16GB) DDR5 5600 DIMM ECC REG Memory | Y | N | | |
| | 64GB (2x32GB) DDR5 5600 DIMM ECC REG Memory[2] | Y | N | | |
| | 128GB (8x16GB) DDR5 5600 DIMM ECC REG Memory[2] | Y | N | | |
| | 128GB (4x32GB) DDR5 5600 DIMM ECC REG Memory[2] | Y | N | | |
| | 256GB (8x32GB) DDR5 5600 DIMM ECC REG Memory[2] | Y | N | | |
| | 256GB (4x64GB) DDR5 5600 DIMM ECC REG Memory[2] | Y | N | | |
| | 256GB (2x128GB) DDR5 5600 DIMM ECC REG Memory[1,2,3] | Y | N | | |
| | 512GB (8x64GB) DDR5 5600 DIMM ECC REG Memory[2] | Y | N | | |
| | 512GB (4x128GB) DDR5 5600 DIMM ECC REG Memory[1,2,3] | Y | N | | |
| | 1TB (8x128GB) DDR5 5600 DIMM ECC REG Memory[1,2,3] | Y | N | | |
| | **After Market Options** | | | | |
| | 16GB (1x16GB) DDR5 5600 DIMM ECC REG Memory | Y | Y | 760N2AA | |
| | 32GB DDR5 (1x32GB) 5600 DIMM ECC REG Memory[2] | N | Y | 760R7AA | |
| | 64GB DDR5 (1x64GB) 5600 DIMM ECC REG Memory[2] | N | Y | 760R8AA | |
| | 128GB (1x128GB) DDR5 5600 DIMM ECC REG Memory[1,2,3] | N | Y | 760R9AA | |

**Note 1:** This memory configuration requires the 1125W/1450W PSU
**Note 2:** Configurations with 32GB DIMMs or greater come with memory fan installed
**Note 3:** Not available at launch; available early 2024

| Multimedia and Audio Devices | | Factory Configured | Option Kit | Option Kit Part Number |
|---|---|---|---|---|
| | Poly Savi 8210/8220 Universal Power Supply - 9V 500mA | N | Y | 783M9AA |
| | Poly Savi 7310 Headset | N | Y | 783N0AA |
| | Poly Savi 7320 Headset | N | Y | 783N1AA |
| | Poly Savi 7310 Headset (Teams) | N | Y | 783N2AA |
| | Poly Savi 7320 Headset (Teams) | N | Y | 783N3AA |
| | Poly Savi 7210 Headset | N | Y | 783Q5AA |
| | Poly Savi 7220 Headset | N | Y | 783Q6AA |
| | Poly BT700 USB-A Bluetooth Adapter | N | Y | 786C4AA |
| | Poly BT700 USB-C Bluetooth Adapter | N | Y | 786C5AA |
| | Poly DA75 USB to QD Adapter | N | Y | 786C6AA |
| | Poly DA85 USB to QD Adapter | N | Y | 786C7AA |
| | Poly DA85-M USB to QD Adapter | N | Y | 786C8AA |
| | Poly Voyager Office Base | N | Y | 786C9AA |
| | Poly Voyager Office Base Teams | N | Y | 786D0AA |
| | HyperX Cloud MIX Wireless GAM HEADSET | N | Y | 4P5K9AA |
| | HyperX Cloud Core Black Gaming Headset | N | Y | 4P4F2AA |

## Supported Components

| | | | |
|---|---|---|---|
| HyperX Cloud Flight - Wireless Gaming Headset (Black-Red) (HX-HSCF-BK/AM) | N | Y | 4P5L4AA |
| HyperX Cloud Stinger Core GAM HEADSET PC | N | Y | 4P4F4AA |
| HyperX Cloud II Core Wireless GAM HEADSET | N | Y | 6Y2G8AA |
| HyperX SoloCast - USB Microphone (Black) (HMIS1X-XX-BK/G) | N | Y | 4P5P8AA |

**Optical and Removable Storage**

| | Factory Configured | Option Kit | Option Kit Part Number |
|---|---|---|---|
| HP 9.5mm Slim DVD-ROM Drive | Y | Y | K3R63AA |
| HP 9.5mm Slim Blu-Ray BDXL Writer Drive | Y | Y | K3R65AA |
| HP 9.5mm Slim DVD Writer | Y | Y | K3R64AA |

**NOTE:** Duplication of copyrighted material is strictly prohibited. Actual speeds may vary. Double Layer media compatibility will widely vary with some home DVD players and DVD-ROM drives. No support for DVD RAM.

**NOTE:** 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 Desktop PC.

**Networking and Communications**

| | Factory Configured | Option Kit | Option Kit Part Number |
|---|---|---|---|
| NVIDIA Mellanox ConnectX-6 DX Dual Port 10/25GbE SFP28 NIC | Y | Y | 436M8AA |
| HP 10GbE SFP+ SR/SW LC Fiber Optic Transceiver | Y | Y | 860T8AA |
| HP 25GbE SFP28 LC Fiber Optic Transceiver | Y | Y | 860T9AA |
| HP Dual Port 10GbE NIC G2 [1] | Y | Y | 360K6AA |
| Intel® X550 Dual Port 10GbE NIC | Y | Y | 1QL46AA |
| Intel® I226-T1 2.5GbE NIC | Y | Y | |
| Allied Telesis AT-2911T/2-901 Dual Port 1GbE NIC | Y | Y | 6E3Y9A |
| AT-2914SX/LC-901 Single Port 1GbE NIC | Y | Y | 1C7Q2AA |
| Intel® I350-T4 4-Port 1GbE NIC | N | Y | W8X25AA |
| HP Flex 10GbE Single Port | Y | Y | 56Q71AA |
| HP Flex 2.5GbE LAN Single Port | Y | Y | 169K0AA/AT |
| HP Flex 1GbE Fiber Single Port LC | Y | Y | 20J15AA |
| HP Flex 1GbE Single Port NIC | Y | N | |
| HP Flex MediaTek RZ616 Wi-Fi 6 +Bluetooth® 5.3 WLAN wireless card with Internal Antenna | Y | N | |
| Intel® AX210 Wi-Fi 6E non-vPro + Bluetooth® 5.2 wireless card with External Antenna WLAN | Y | Y | 340L7AA |

**Note1:** installation of component does not require PCIe slot

## Supported Components

| HP Anyware Remote System Controller | | Factory Configured | Option Kit | Option Kit Part Number |
|---|---|---|---|---|
| | HP Anyware Remote System Controller | Y | Y | 7K6D7AA |
| | HP Anyware Remote System Controller Main Board Adapter | Y | Y | 7K6D8AA |
| | HP Anyware Integrated Remote System Controller | Y | Y | 7K6D9AA |
| | HP Anyware Remote System Controller for Universal KVM | N | Y | 7K7N2AA |

**NOTE:**
HP Anyware Remote System Controller is an IT Manager targeted manageability feature.
HP Anyware Remote access software is an End User centric and available as a separate AMO accessory.

| Racking and Physical Security | | Factory Configured | Option Kit | Option Kit Part Number |
|---|---|---|---|---|
| | Z2 Mini/Z2 Tower/Z4/Z6 Depth Adjustable Fixed Rail Rack Kit | N | Y | 2A8Y5AA |
| | HP Keyed Cable Lock | N | Y | T1A62AA |
| | HP Master Keyed Cable Lock 10mm | N | Y | T1A63AA |

| Input Devices | | Factory Configured | Option Kit | Option Kit Part Number |
|---|---|---|---|---|
| | **Mouse and Keyboard Combo** | | | |
| | HP 655 Wireless Keyboard and Mouse Combo | N | Y | 4R009AA/ET/UT/A6 |
| | HP Wired Desktop 320MK Mouse and Keyboard | N | Y | 9SR36AA/ET/UT |
| | **Keyboard only** | | | |
| | HP 320K Wired Keyboard | Y | Y | 9SR37AA/ET/UT |
| | HP 125 Wired Keyboard | Y | Y | 266C9AA/ET/UT |
| | HP 975 USB+BT Dual-Mode Wireless Keyboard | N | Y | 3Z726AA/UT |
| | HP 455 Programmable Wireless Keyboard | N | Y | 4R177AA/ET/UT/A6 |
| | HP Business Slim Smartcard Keyboard | Y | Y | Z9H48AA/AT |
| | HyperX MKW100 Red Gaming Keyboard | N | Y | 4P5E1AA |
| | **Mouse only** | | | |
| | HP Wired 320M Mouse | Y | Y | 9VA80AA/ET/UT |
| | HP Creator 935 Black Wireless Mouse | N | Y | 1D0K8AA/UT |
| | HP 128 LSR Wired Mouse | Y | Y | 265D9AA/ET/UT |
| | HP 125 Wired Mouse | N | Y | 265A9AA/ET/UT |
| | HyperX Pulsefire Core Black USB Gaming Mouse | N | Y | 4P4F8AA |
| | HyperX Pulsefire Haste White Wireless Gaming Mouse 2 | N | Y | 6N0A9AA |
| | HyperX Pulsefire Haste Black Wireless Gaming Mouse 2 | N | Y | 6N0B0AA |

**NOTE:** Keyboard and Mouse are optional or add on features.

## Supported Components

| **Other Hardware** | **Factory Configured** | **Option Kit** | **Option Kit Part Number** |
|---|---|---|---|
| HP Flex USB-C 3.2 Gen2 | Y | Y | 141K6AA/AT |
| HP Flex Dual USB-A 3.2 Gen1 | Y | Y | 141J8AA/AT |
| HP Flex Serial Port v3 | Y | Y | 5B895AA |
| HP Dual Thunderbolt4 PCIe x4 Low Profile Card[4] | Y | Y | 340L1AA |
| HP Type-C SuperSpeed USB 20Gbps Front v3 Premium Module | Y | Y | 8R3X3AA |
| HP Internal Serial+PS/2 Port | Y | Y | 56Q78AA |
| HP USB 2.0 Type-A Port Adapter Kit[1] | N | Y | 79C24AA |
| HP SD Card Reader Zx G4 | Y | Y | 2VK54AA |
| HP Z6 G5 A Fan and Front Card Guide Kit[3] | Y | Y | 760N5AA |
| HP Z6 G5 A Memory Cooling Solution[2] | Y | Y | 760N6AA |
| HP Z6 G5 A PCIe Retainer with Fans[3] | Y | | 760N7AA |
| HP C13 1.83m Power Cord Kit (halogen-free) | Y | N | |
| HP C13 1.83m Power Cord Kit | Y | Y | 6Z1T9AA |
| HP C13-C14 2.0m Power Cord Kit | Y | N | |
| C13-C14 2.0m 15A 100-127V Countries Straight Desktop Power Cord | Y | N | 8R881AA |
| C13-C14 2.0m 10A 200-240V Countries Straight Desktop Power Cord | Y | N | 8R882AA |
| HP Z4/Z6 A HDD Cable Kit | N | Y | 74Y88AA |

**Note 1:** USB 2.0 Type-A Port Adapter Kit has a single USB 2.0 type A connector.
**Note 2:** HP Z6 G5 A Memory Cooling Solution 760N6AA is required as a separate purchase for after-market memory configurations using 32GB Registered DIMMs or greater. If configured from the factory, configurations using 32GB Registered DIMMs or greater will include a memory cooling solution.
**Note 3**: HP Z6 G5 A Fan and Front Card Guide Kit 760N5AA and HP Z6 G5 A PCIe Retainer with Fans 760N7AA are required for specific graphics configurations (see Graphics section).
**Note 4:** Not available at launch; available early 2024

| **Software** | **Factory Configured** | **Option Kit** | **Support Notes** |
|---|---|---|---|
| HP Performance Advisor | Y | N | 1 |
| HP PC Hardware Diagnostics UEFI | Y | N | 2 |
| HP PC Hardware Diagnostics Windows | Y | N | |
| HP Wolf Security | Y | N | 4 |
| HP Notifications | Y | N | |
| HP Desktop Support Utility | Y | N | |
| HP Documentation | Y | N | |
| myHP | Y | N | |
| Kingsoft WPS Office | Y | N | 5 |
| Z by HP Data Science Stack Manager | Y | N | 3,6 |
| WSL2/Ubuntu Data Science Stack | Y | N | 3 |
| HP Image Assistant | N | N | |
| HP Support Assistant | N | N | |

**Note 1:** Also available as a free download from http://www.hp.com/go/performanceadvisor

**Note 2:** Windows OS only
**Note 3:** Only available with NVIDIA graphics
**Note 4:** HP Wolf Security for Business requires Windows 10 or 11 Pro higher, includes various HP security features and is available on HP Pro, Elite, RPOS and Workstation products. See product details for included security features.
**Note 5:** Not available in China
**Note 6:** Z by HP Data Science Stack Manager requires Windows 10 version 21H2 (Build 19044) and higher or 64-bit Ubuntu 20.04 and is available on select Z workstations.

| | |
|---|---|
| **Operating Systems** | Windows 11 Pro High End[2] |
| | Windows 10 Pro for Worskations[2,5] |
| | Ubuntu 22.04 LTS[4] |
| | HP Linux®-ready |
| | Red Hat® Enterprise Linux® (RHEL) Workstation - paper |

[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] This system is preinstalled with Windows 10 Pro software and also comes with a license for Windows 11 Pro software and provision for recovery software. You may only use one version of the Windows software at a time. Switching between versions will require you to uninstall one version and install the other version. You must back up all data (files, photos, etc.) before uninstalling and installing operating systems to avoid loss of your data.
[4] 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.
[5] Not available as factory image, support only.

**NOTE:** Your product does not support Windows 8 or Windows 7. In accordance with Microsoft's support policy, H does not support the Windows® 8 or Windows 7 operating system on products configured with Intel® and AMD® 7th generation and forward processors or provide any Windows® 8 or Windows 7 drivers on http://www.support.hp.com. A full list of HP products and the Windows 10 versions tested is available on the HP support website. https://support.hp.com/us-en/document/c05195282

## SOFTWARE COMPONENTS AND APPLICATIONS WITH WINDOWS

**Software**
HP Anyware
HP Performance Advisor[1]
HP PC Hardware Diagnostics UEFI
HP PC Hardware Diagnostics Windows
HP Wolf Security[22]
HP Notifications
HP Desktop Support Utility
HP Documentation
myHP
HP Privacy Settings
HP Easy Clean
Kingsoft WPS Office (China only)
WSL2/Ubuntu Data Science Stack
HP Image Assistant (Supported)

## Supported Components

HP Support Assistant (Supported)
HP Services Scan[25]

**Security Management**
HP Secure Erase[16]
HP Wolf Pro Security Edition (paid option)[18]
HP Wolf Security for Business[22]
HP Sure Click[5]
HP Sure Sense[6]
HP Sure Run GenX[9]
HP Sure Recover GenX[10]
HP Sure Start GenX[8]
HP Tamper Lock[12]
HP Sure Admin[11]
HP Client Security Manager GenX[4]

[1] HP Performance Advisor Software - HP Performance Advisor is ready to help you get the most out of your HP Workstation from day one-and every day after. Learn more or download at: http://hp.com/PerformanceAdvisor

[2] HP Driver Packs not preinstalled, however available for download at http://www.hp.com/go/clientmanagement.

[3] HP Manageability Integration Kit can be downloaded from https://ftp.ext.hp.com/pub/caps-softpaq/cmit/HPMIK.html

[4] HP Client Security Manager Gen7 requires Windows and is available on the select HP PCs.

[5] HP Sure Click requires Windows 11 Pro or Enterprise. See https://bit.ly/2PrLT6A_SureClick for complete details.

[6] HP Sure Sense requires Windows 11 Pro or Enterprise and supports Microsoft Internet Explorer, Google Chrome$^{\text{TM}}$, and Chromium$^{\text{TM}}$. Supported attachments include Microsoft Office (Word, Excel, PowerPoint) and PDF files in read only mode, when Microsoft Office or Adobe Acrobat are installed.

[7] Microsoft Defender Opt in and internet connection required for updates.

[8] HP Sure Start Gen 7 is available on select HP PCs and workstations. See product specifications for availability.

[9] HP Sure Run Gen5 is available on select Windows 11 based HP Pro, Elite and Workstation PCs with select Intel® or AMD processor
[10] HP Sure Recover Gen4 is available on select HP PCs and requires Windows 10 and an open network connection. You must back u important files, data, photos, videos, etc. before using HP Sure Recover to avoid loss of data. Network based recovery using Wi-Fi only available on PCs with Intel Wi-Fi Module
[11] HP Sure Admin requires Windows 10 or higher, HP BIOS, HP Manageability Integration Kit from http://www.hp.com/go/clientmanagement and HP Sure Admin Local Access Authenticator smartphone app from the Android or Apple store.
[12] Enable/disable by customers or IT administrator with administrator authority.
[13] HP BIOSphere Gen6 features may vary depending on the platform and configurations.
[16] Secure Erase - For the methods outlined in the National Institute of Standards and Technology Special Publication 800-88 "Clea sanitation method. HP Secure Erase does not support platforms with Intel® Optane.
[18] HP Wolf Pro Security Edition is available preloaded on select SKUs and, depending on the HP product purchased, includes a paid year or 3-year license. The HP Wolf Pro Security Edition software is licensed under the license terms of the HP Wolf Security Software - End-User license Agreement (EULA) that can be found at: https://support.hp.com/us-en/document/ish_3875769-3873014-16 as that EULA is modified by the following: "7. Term. Unless otherwise terminated earlier pursuant to the terms contained in this EULA, the license for the HP Wolf Pro Security Edition (HP Sure Sense Pro and HP Sure Click Pro) is effective upon activation and will continue for either a twelve (12) month or thirty-six (36) month license term ("Initial Term"?). At the end of the Initial Term you may either (a) purchase a renewal license for the HP Wolf Pro Security Edition from HP.com, HP Sales or an HP Channel Partner, or (b) continue using the standard versions of HP Sure Click and HP Sure Sense at no additional cost with no futu software updates or HP Support.
[22] HP Wolf Security for Business requires Windows 10 or 11 Pro higher, includes various HP security features and is available on H Pro, Elite, RPOS and Workstation products. See product details for included security features.
[23] Absolute agent is shipped turned off, and will be activated when customers activate a purchased subscription. Subscriptions ca be purchased for terms ranging multiple years. Service is limited, check with Absolute for availability outside the U.S. The Absolut Recovery Guarantee is a limited warranty. Certain conditions apply. For full details visit: http://www.absolute.com/company/legal/agreements/computrace-agreement. Data Delete is an optional service provided by Absolute Software. If utilized, the Recovery Guarantee is null and void. In order to use the Data Delete service, customers must fir sign a Pre-Authorization Agreement and either obtain a PIN or purchase one or more RSA SecurID tokens from Absolute Software

Supported Components

[24] Firmware TPM is version 15.23 and version 7.2.3.1 for Infineon and Nuvoton chips, respectively. Hardware TPM is v2.0.

[25] HP Services Scan is provided with Windows Update on select products and will check entitlement on each hardware device to determine if an HP TechPulse-enabled service has been purchased, and will download applicable software automatically. HP TechPulse is a telemetry and analytics platform that provides critical data around devices and applications. For full system requirements or to disable this feature, please visit http://www.hpdaas.com/requirements . Not applicable in China.

## System Board

| | |
|---|---|
| **System Board Form Factor** | Tower |
| **Processor Socket** | AMD Socket SP6 |
| **Chipset** | AMD PRO 695 Chipset |
| **Super I/O Controller** | Nuvoton SIO21 |
| **Memory Expansion Slots** | 8 DDR5 memory slots |
| **Memory Type Supported** | DDR5 RDIMM (Registered), RDIMMs and 3DS RDIMMs |
| **Memory Modes** | Non-Interleaving for single channel, Interleaving when multiple channels are populated |
| **Memory Speed Supported** | 5200MT/s DDR5. The memory will run at the slowest supported speed that either the CPU or the memory modules support. For example, if the CPU only supports 5200MHz speed, 5600MHz will only run at 5200MHz' |
| **Memory Protection** | ECC on data |
| **Maximum Memory** | 1TB when 128GB are available |
| **Memory Configuration** (Supported) | 16GB, 32GB, 64GB RDIMMs, 128GB 3DS RDIMMs when available. RDIMMs and 3DS RDIMMs cannot be mixed in the same system. |
| **NVDIMM Memory** | N/A |
| **PCI Express Connectors** | Standard PCIe Slots:<br>• 4 PCI Express Gen5 slot x16 mechanical/ x16 electrical (full height, full length)<br>• 1 PCI Express Gen4 slot x16 mechanical/ x16 electrical (full height, full length)<br>• 1 PCI Express Gen4 slot x4 mechanical/ x4 electrical (full height, half length)<br>M.2 Slots:<br>• 2 PCI Express Gen5 slot x4.<br>• 2 PCI Express Gen4 slot x4.<br>Other PCIe Connections:<br>• 2 Front NVMe Storage (SlimSAS PCIe Gen4 x8) (each PCIe connection supports two x4 M.2 devices for a total system support of four x4 M.2 devices via QX448)<br>1 Connector for HP Dual Port 10GbE NIC G2 (PCIe Gen4 x4) |

| | | |
|---|---|---|
| **Supported Drive Interfaces** | **SATA** | Integrated (2) Serial ATA interfaces (6Gb/s SATA). |
| | **Integrated RAID** | AMD Express SATA RAID 0 and 1 supported on Windows 11<br>AMD Express NVMe RAID 0, 1, 5, and 10 supported on Windows 11 |
| | **Integrated Graphics** | None |
| | **Network Controller** | Integrated Realtek RTL8111EPP<br>Interface: 1GbE RJ-45 Port (10/100/1000Mbps)<br>Management Capabilities: WOL, PXE, DASH Manageability |
| | **External SATA (eSATA)** | None |
| | **Serial** | 1 internal header (requires optional Serial Port Adapter Kit) |
| | **2nd Serial** | Flex IO Module |
| | **HD Integrated Audio** | Yes |
| **USB Connector(s)** | **Front** | Front I/O Entry:<br>4 USB 3.1 Gen1 Type-A (left-most port supports Battery Charging 1.2)<br>Front I/O Premium: |

| | | |
|---|---|---|
| | | 1x USB 3.2 Gen2x2 Type-C® (Power Delivery 3.0)<br>2x USB 3.1 Gen1 Type-A (left-most port supports Battery Charging 1.2)<br>• USB Type-C® Ports provide 3 Amps @ 5 Volts<br>• Charging USB Type-A port provides 1.5 Amps @ 5 Volts<br>• Standard USB Type-A Ports provide 900mA @ 5 Volts |
| | **Rear** | 4x USB 3.1 Gen1 Type-A with USB hub and 2x USB 3.2 Gen 1 Type-A without hub.<br>(Optional: 2x USB 3.0 Type-A (optional via Flex module) or 1x USB 3.1 Gen2 Type-C® charging port (optional via Flex module). |
| | **Internal** | 1 USB 3.2 Gen1 header, with a single 12-pin shrouded connector. This header supports a USB Media Card reader.<br>1 USB 2.0 single port header |

| | |
|---|---|
| **HD Integrated Audio** | Yes |
| **Flash ROM** | Yes |
| **CPU Fan Header** | Yes |
| **Memory Fan Header** | Yes |
| **Chassis Fan Header** | Yes (Rear, Front Upper, Front Lower) |
| **Front PCI Fan Header** | Yes (Lower and Upper) |
| **Front Control Panel/Speaker Header** | Yes |
| **CMOS Battery Holder - Lithium** | Yes |
| **Integrated Trusted Platform Module** | Integrated TPM 2.0<br>The TPM module disabled where restricted by law, i.e. Russia. |
| **Power Supply Headers** | Yes |
| **Power Switch, Power LED & Hard Drive LED Header** | Yes |
| **Clear Password Jumper** | Yes |
| **Keyboard/Mouse** | USB or PS/2 (option) |
| **Power Supply** | 1125W and 775W |

| **System Configurations** | | |
|---|---|---|
| **Example Configuration #1** | **Processor Info** | AMD Ryzen$^{TM}$ Threadripper$^{TM}$ PRO 7945WX |
| | **Memory Info** | 32GB DDR5 (2x16GB) RegRAM |
| | **Graphics Info** | 1x NVIDIA® A2000 |
| | **Disks/Optical/Floppy** | 1x 4TB Internal M.2 SSD + 1x DVDRW SATA |
| | **PSU** | 775W |
| | **Other** | N/A |

| **Energy Consumption (Watts)** | | 115 VAC | | 230 VAC | | 100 VAC | |
|---|---|---|---|---|---|---|---|
| | | LAN Enabled | LAN Disabled | LAN Enabled | LAN Disabled | LAN Enabled | LAN Disabled |
| | Windows Idle (S0) | 57.382 | 56.779 | 57.761 | 56.668 | TBD | TBD |
| | Windows Busy Typ (S0) | 367.6 | | 361.6 | | 364.79 | |
| | Windows Busy Max (S0) | 385.28 | | 380.22 | | 382.32 | |
| | Sleep (S3) | 6.557 | 6.483 | 6.976 | 6.543 | 6.574 | 6.492 |
| | Off (S5) | 1.969 | 1.949 | 2.448 | 2.059 | 2.032 | 1.957 |
| | Zero Power Mode (EuP) | 0.247 | | 0.286 | | 0.248 | |

| **Heat Dissipation (Btu/hr)** | | 115 VAC | | 230 VAC | | 100 VAC | |
|---|---|---|---|---|---|---|---|
| | | LAN Enabled | LAN Disabled | LAN Enabled | LAN Disabled | LAN Enabled | LAN Disabled |
| | Windows Idle (S0) | 195.787 | 193.729 | 197.081 | 193.351 | 198.506 | 193.703 |
| | Windows Busy Typ (S0) | 1254.251 | | 1233.779 | | 1244.263 | |
| | Windows Busy Max (S0) | 1314.576 | | 1297.311 | | 1304.476 | |
| | Sleep (S3) | 22.372 | 22.120 | 23.802 | 22.324 | 22.430 | 22.151 |
| | Off (S5) | 6.718 | 6.650 | 8.352 | 7.025 | 6.933 | 6.677 |
| | Zero Power Mode (EuP) | 0.843 | | 0.976 | | 0.846 | |

| ***Example Configuration #2*** | ***Processor Info*** | AMD Ryzen™ Threadripper™ PRO 7955WX |
|---|---|---|
| | **Memory Info** | 64GB DDR5 (4x16GB) RegRAM |
| | **Graphics Info** | 1x NVIDIA® A4000 |
| | **Disks/Optical/Floppy** | 1x 4TB Internal SATA HDD + 2x 4TB Internal M.2 SSD |
| | **PSU** | 1125W |
| | **Other** | N/A |

| **Energy Consumption (Watts)** | | 115 VAC | | 230 VAC | | 100 VAC | |
|---|---|---|---|---|---|---|---|
| | | LAN Enabled | LAN Disabled | LAN Enabled | LAN Disabled | LAN Enabled | LAN Disabled |
| | Windows Idle (S0) | 75.011 | 72.431 | 75.639 | 73.246 | 74.745 | 72.687 |
| | Windows Busy Typ (S0) | 533.61 | | 526.80 | | 535.71 | |
| | Windows Busy Max (S0) | 605.35 | | 588.25 | | 606.37 | |
| | Sleep (S3) | 6.708 | 6.657 | 6.825 | 6.627 | 6.712 | 6.664 |
| | Off (S5) | 2.475 | 2.401 | 2.512 | 2.436 | 2.481 | 2.406 |
| | Zero Power Mode (EuP) | 0.257 | | 0.296 | | 0.255 | |

| **Heat Dissipation (Btu/hr)** | | 115 VAC | | 230 VAC | | 100 VAC | |
|---|---|---|---|---|---|---|---|
| | | LAN Enabled | LAN Disabled | LAN Enabled | LAN Disabled | LAN Enabled | LAN Disabled |
| | Windows Idle (S0) | 255.938 | 247.134 | 258.080 | 249.915 | 255.030 | 248.008 |
| | Windows Busy Typ (S0) | 1820.677 | | 1797.442 | | 1827.843 | |
| | Windows Busy Max (S0) | 2065.454 | | 2007.109 | | 2068.934 | |
| | Sleep (S3) | 22.888 | 22.714 | 23.287 | 22.611 | 22.901 | 22.738 |
| | Off (S5) | 8.445 | 8.192 | 8.571 | 8.312 | 8.465 | 8.209 |
| | Zero Power Mode (EuP) | 0.877 | | 1.010 | | 0.871 | |

## System Technical Specifications

| | | |
|---|---|---|
| ***Example Configuration #3*** | ***Processor Info*** | AMD Ryzen™ Threadripper™ PRO 7975WX |
| | **Memory Info** | 128GB DDR5 (8x16GB) RegRAM |
| | **Graphics Info** | 2x NVIDIA® A4000 |
| | **Disks/Optical/Floppy** | 2x 1TB Internal SATA HDD + 2x 4TB Internal M.2 SSD + 1x DVDRW SATA |
| | **PSU** | 1125W |
| | **Other** | N/A |

| **Energy Consumption (Watts)** | | 115 VAC | | 230 VAC | | 100 VAC | |
|---|---|---|---|---|---|---|---|
| | | LAN Enabled | LAN Disabled | LAN Enabled | LAN Disabled | LAN Enabled | LAN Disabled |
| | Windows Idle (S0) | 108.546 | 105.36 | 109.341 | 105.884 | 108.451 | 104.874 |
| | Windows Busy Typ (S0) | 716.74 | | 700.56 | | 718.32 | |
| | Windows Busy Max (S0) | 780.421 | | 759.67 | | 776.841 | |
| | Sleep (S3) | 8.295 | 8.034 | 8.455 | 8.237 | 8.311 | 8.287 |
| | Off (S5) | 2.289 | 2.271 | 2.297 | 2.281 | 2.288 | 2.274 |
| | Zero Power Mode (EuP) | 0.231 | | 0.293 | | 0.233 | |

| **Heat Dissipation (Btu/hr)** | | 115 VAC | | 230 VAC | | 100 VAC | |
|---|---|---|---|---|---|---|---|
| | | LAN Enabled | LAN Disabled | LAN Enabled | LAN Disabled | LAN Enabled | LAN Disabled |
| | Windows Idle (S0) | 370.359 | 359.489 | 373.071 | 361.276 | 370.035 | 357.831 |
| | Windows Busy Typ (S0) | 2445.516 | | 2390.311 | | 2450.908 | |
| | Windows Busy Max (S0) | 2662.796 | | 2591.994 | | 2650.581 | |
| | Sleep (S3) | 28.302 | 27.412 | 28.848 | 28.105 | 28.357 | 28.275 |
| | Off (S5) | 7.811 | 7.748 | 7.837 | 7.783 | 7.806 | 7.759 |
| | Zero Power Mode (EuP) | 0.788 | | 0.999 | | 0.794 | |

| | | |
|---|---|---|
| ***Example Configuration #4*** | ***Processor Info*** | AMD Ryzen™ Threadripper™ PRO 7995WX |
| | **Memory Info** | 256GB DDR5 (8x32GB) RegRAM |
| | **Graphics Info** | 2x NVIDIA® A6000 |
| | **Disks/Optical/Floppy** | 2x 4TB Internal SATA HDD + 2x 4TB Internal M.2 SSD |
| | **PSU** | 1450W/200V |
| | **Other** | N/A |

| **Energy Consumption (Watts)** | | 115 VAC | | 230 VAC | | 100 VAC | |
|---|---|---|---|---|---|---|---|
| | | LAN Enabled | LAN Disabled | LAN Enabled | LAN Disabled | LAN Enabled | LAN Disabled |
| | Windows Idle (S0) | N/A | | 179.521 | 157.249 | N/A | |
| | Windows Busy Typ (S0) | N/A | | 925.96 | | N/A | |
| | Windows Busy Max (S0) | N/A | | 1003.71 | | N/A | |
| | Sleep (S3) | N/A | N/A | 10.674 | 10.514 | N/A | N/A |
| | Off (S5) | N/A | N/A | 2.886 | 2.871 | N/A | N/A |
| | Zero Power Mode (EuP) | TBD | | 0.312 | | N/A | |

## System Technical Specifications

| **Heat Dissipation (Btu/hr)** | | 115 VAC | | 230 VAC | | 100 VAC | |
|---|---|---|---|---|---|---|---|
| | | LAN Enabled | LAN Disabled | LAN Enabled | LAN Disabled | LAN Enabled | LAN Disable |
| | Windows Idle (S0) | N/A | | 612.526 | 536.533 | N/A | |
| | Windows Busy Typ (S0) | N/A | | 3159.376 | | N/A | |
| | Windows Busy Max (S0) | N/A | | 3424.658 | | N/A | |
| | Sleep (S3) | N/A | N/A | 36.419 | 35.873 | N/A | N/A |
| | Off (S5) | N/A | N/A | 9.847 | 9.795 | N/A | N/A |
| | Zero Power Mode (EuP) | N/A | | 1.0645 | | N/A | |

| | |
|---|---|
| **Operating Voltage Range** | TBD |
| **Rated Voltage Range** | TBD |
| **Rated Line Frequency** | TBD |
| **Operating Line Frequency Range** | TBD |
| **ENERGY STAR® certified** (Config Dependent) | TBD |
| **CECP Compliant @ 220V** | TBD |
| **FEMP Standby Power Compliant** | TBD |
| **Built-in Self Test** (BIST) **LED** | TBD |
| **Surge Tolerant Full Ranging Power Supply** (withstands power surges up to 2000V) | TBD |
| **Hood Lock Header** | TBD |
| **ErP Lot 6- Tier 1 Compliance @ 230V** (<1W in S5 - Power Off) | TBD |
| **ErP Lot 6- Tier 2 Compliance @ 230V** (<0.5W in S5 - Power Off) | TBD |

| **Declared Noise Emissions** (Entry-level, Mid-level, and High-end configurations; tested on floor) | | |
|---|---|---|
| **System Configuration (Entry level)** | **Processor Info** | AMD Ryzen™ Threadripper™ PRO 7945WX |
| | **Memory Info** | 32GB DDR5 (2x16GB) RegRAM |
| | **Graphics Info** | 1x NVIDIA Quadro A2000 |
| | **Disks/Optical** | 1x 4TB M.2 + 1x DVDRW SATA |
| | **Power Supply** | 775W |

| **Declared Noise Emissions** | | **Sound Power** (LWAd, bels) | **Deskside Sound Pressure** (LpAm, decibels) |
|---|---|---|---|
| | **Idle** | 3.33 | 15.9 |
| | **Hard drive Operating (Drive Random Seek)** | 4.10 | 23.9 |
| | **Active mode** | 3.94 | 21.8 |

## System Technical Specifications

| | | |
|---|---|---|
| **System Configuration (Mid-level)** | **Processor Info** | AMD Ryzen$^{TM}$ Threadripper$^{TM}$ PRO 7955WX |
| | **Memory Info** | 64GB DDR5 (4x16GB) RegRAM |
| | **Graphics Info** | 1x NVIDIA Quadro A4000 |
| | **Disks/Optical** | 2x 512GB M.2 SSD + 1x 4TB SATA HDD |
| | **Power Supply** | 1125W |

| **Declared Noise Emissions** | | **Sound Power** (LWAd, bels) | **Deskside Sound Pressure** (LpAm, decibels) |
|---|---|---|---|
| | **Idle** | 3.51 | 18.6 |
| | **Hard drive Operating (Drive Random Seek)** | 4.08 | 24 |
| | **Active mode** | 4.55 | 27.4 |

| | | |
|---|---|---|
| **System Configuration (High-end)** | **Processor Info** | AMD Ryzen$^{TM}$ Threadripper$^{TM}$ PRO 7995WX |
| | **Memory Info** | 512GB DDR5 (8x64GB) RegRAM |
| | **Graphics Info** | 2x NVIDIA Quadro A6000 |
| | **Disks/Optical** | 1x 4TB SATA HDD + 4x 4TB M.2 + 1x DVDRW |
| | **Power Supply** | 1125W |

| **Declared Noise Emissions** | | **Sound Power** (LWAd, bels) | **Deskside Sound Pressure** (LpAm, decibels) |
|---|---|---|---|
| | **Idle** | 3.19 | 19.1 |
| | **Hard drive Operating (Drive Random Seek)** | 3.71 | 22.8 |
| | **Active mode** | 3.22 | 19.1 |
| | | | |

| | | |
|---|---|---|
| **Environmental Requirements** | **Temperature** | Operating: 5° to 40°C (40° to 104°F)[1]<br>Non-operating: -40° to 60°C (-40° to 140°F)<br>Above 1524 m (5,000 feet) altitude, the maximum operating temperature reduced by 1° C (1.8° F) for every 305 m (1,000 feet) increase in elevatio<br>Maximum rate of change: 10 °C/hr<br>No direct sustained sunlight<br><br>[1] 40°C has been validated for configs up to a 350W CPU, 2x NVIDIA® RTX A40 graphics cards, 8x64GB RAM, 4x 4TB M.2 storage, 1x 2TB HDD storage, and 1125W PSU |
| | **Humidity** | Operating: Operating: 8% to 85% RH, non-condensing, 35° C maximum wet b<br>Non-operating: 8% to 90% relative humidity, non-condensing, 35° C maximu wet bulb |
| | **Maximum Altitude (non-pressurized)**[6] | Operating (with Rotational Hard Drives): 3,048 m (10,000 feet)<br>Operating (with only Solid-State Drives): 5,000 m (16,404 feet)<br><br>Non-operating: 12,192 m (40,000 ft)<br>**NOTE:** Above 1524 m (5,000 feet) altitude, maximum operating temperature reduced by 1° C (1.8° F) per 305 m (1,000 feet) increase in elevation. |
| | **Dynamic** | Shock<br>Operating: ½-sine: 40g, 2-3ms (~62 cm/sec)<br>Non-operating: ½-sine: 160 cm/s, 2-3ms (~105g) |

| | |
|---|---|
| | square: 422 cm/s, 20g<br>**NOTE:** Values represent individual shock events and do not indicate repetitiv<br>shock events<br><br>Vibration<br>Operating random: 0.5g (rms), 5-300 Hz, up to 0.0025g²/Hz<br>Non-operating random: 2.0g (rms), 5-500 Hz, up to 0.0150 g²/Hz<br>**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 3048 m (10,000 feet) |

## Physical Security and Serviceability

| | |
|---|---|
| **Access Panel** | Tool-less<br>Includes system board and memory information |
| **Optical Drive** | Tool-less, Optical Drive requires a 5.25" bay carrier |
| **Hard Drives** | Tool-less |
| **Expansion Cards** | Tool-less |
| **Processor Socket** | Screw-in Retention for Processor and Cooler |
| **Blue User Touch Points** | Yes, on tool-less internal chassis mechanisms |
| **Color-coordinated Cables and Connectors** | Yes |
| **Memory** | Tool-less |
| **System Board** | Screw-in |
| **Power and HD LED on Front of Computer** | Yes |
| **Over-Temp Warning on Screen** | Yes |
| **Dual Function Front Power Switch** | Yes, causes a fail-safe power off when held for 4 seconds |
| **Padlock Support** | Yes (optional): Locks side cover and secures chassis from theft 7.0 mm (0.2756 in) diameter padlock loop rear of system |
| **Cable Lock Support** | Yes, Kensington Cable Lock (optional): Locks side cover and secures chassis from theft 3 mm x 7 mm slot rear of system |
| **Universal Chassis Clamp Lock Support** | Yes (optional): Locks side cover and locks cables to chassis. Secures chassis from theft and allows multipl units to be chained together when used with optional cable with threaded feature at rear of system |
| **Solenoid Lock and Hood Sensor** | Yes (optional)<br>The Solenoid Hood Lock eliminates the need for a physical key by making the chassis lockable through software and a password. You can also lock and unlock the chassis remotely over the network. The Sens detects when the access panel has been removed |
| **Rear Port Control Cover** | No |
| **Serial, USB, Audio, Network, Enable/Disable Port Control** | Yes |
| **Removable Media Write/Boot Control** | Yes |
| **Power-On Password** | Yes |
| **Setup Password** | Yes, prevents an unauthorized person from changing the workstation configuration. |

## System Technical Specifications

| | |
|---|---|
| **3.3V Aux Power LED on System PCA** | No |
| **NIC LEDs (integrated) (Green & Amber)** | Yes |
| **CPUs and Heatsinks** | A T-20 Torx screwdriver is needed to remove the cooler and CPU. |
| **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** | Yes |
| **Cooling Solutions** | Air cooled forced convection |
| **Power Supply Fans** | 80 mm x 80 mm x 25 mm (non-serviceable) |
| **CPU Heatsink Fan** | 108 mm x 108 mm x 25 mm |
| **Chassis Fan** | Rear: 120 mm x 120 mm x 38mm 4-wire PWM<br>Front Upper: 80 mm x 80 mm x 25 mm 4-wire PWM (Option based on System Config)<br>Front Lower: 120 mm x 120 mm x 25 mm 4-wire PWM (Option based on System Config)<br>Side Panel Upper: Dual 70 mm x 20 mm (Option based on System Config)<br>Side Panel Lower: Dual 80 mm x 80 mm x 20 mm (Option based on System config) |
| **Memory Heatsink Fan** | Dual 60 mm x 60 mm x 25 mm Blindmate (optional based on configuration) |
| **HP PC Hardware Diagnostics UEFI** | Yes |
| **Access Panel Key Lock** | Yes, side panel barrel keylock (optional from the factory only) |
| **ACPI-Ready Hardware** | Advanced Configuration and Power Management Interface (ACPI).<br>• Allows the system to wake from a low power mode.<br>• 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. |
| **Integrated Chassis Handles** | Yes, Front handle and dedicated rear recess |
| **Power Supply** | Requires T15 Torx or flat blade screwdriver |
| **PCI Card Retention** | Yes, rear (all), middle (all), front (full-length cards with extender, using Fan and Front Card Guide Kit) |
| **Flash ROM** | Yes |
| **Diagnostic Power Switch LED on board** | Yes |
| **Clear Password Jumper** | Yes |
| **Clear CMOS Button** | Yes |
| **CMOS Battery Holder** | Yes |
| **DIMM Connectors** | Yes |

## Service, Support, and Warranty

On-site Warranty and Service[1]: Three-years, limited warranty and service offering delivers on-site, next business-day[2] service for parts and labor. 24/7 operation will not void the HP warranty. Storage devices are not covered under warranty for 24/7 operation except for Enterprise class HDDs.

**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 i not available in certain countries. Global service response times are based on commercially reasonable best effort and may vary by country.

HP Care Pack Services extend service contracts beyond the standard warranties. Service starts from date of hardware purchase. To choose the right level of service for your HP product, use the HP Care Pack Services Lookup Tool at: http://www.hp.com/go/lookuptool. Service levels and response times for HP Care Packs may vary depending on your geographic location.

### 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

## BIOS

| | |
|---|---|
| **PCIe 5.0 Support** | Full BIOS support for PCI Express through industry standard interfaces. Supported speeds and slot information vary. |
| **ATA/ATAPI** | AT Attachment 6 with Packet Interface (ATA/ATAPI-6), Revision 3b |
| **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 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. |
| **AMD ROM Armor v3** | AMD Platform Secure Processor enforced BIOS ROM access. |

## System Technical Specifications

| | |
|---|---|
| **AMD Transparent Secure Memory Encryption (TSME)** | Physical encryption of all system memory decoupled from the Operating System. Provides encryption without requiring software modification. |
| **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 Reference Specification, Version 3.5 |
| **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 6.0 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 15 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, bifurcation, speed) 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. |
| **UEFI Specification Revision** | 2.7 |
| **ACPI** | Advanced Configuration and Power Management Interface, Version 6.0 |
| **CD Boot** | "El Torito" Bootable CD-ROM Format Specification Version 1.0 |

## System Technical Specifications

| | |
|---|---|
| **EHCI** | Enhanced Host Controller Interface for Universal Serial Bus, Revision 1.0 |
| **PCI Express** | PCI Express Base Specification, Revision 2.0<br>PCI Express Base Specification, Revision 3.0<br>PCI Express Base Specification, Revision 4.0<br>PCI Express Base Specification, Revision 5.0 |
| **SATA** | Serial ATA Specification, Revision 1.0a<br>Serial ATA 3 Gb/s: Serial ATA Specification, Revision 2.5<br>Serial ATA 6 Gb/s: Serial ATA Specification, Revision 3.0 |
| **SPD** | JEDEC JESD300-5 |
| **TPM** | Trusted Computing Group TPM Specification Version 2.0 (Infineon SLB 9672).<br>Common Criteria EAL4+ certified.<br>FIPS 140-2 Certification<br>TCG TPM Certified products list:<br>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<br>Universal Serial Bus Revision 2.0 Specification<br>Universal Serial Bus Revision 3.1 Specification<br>Universal Serial Bus Revision 3.2 Specification<br>USB Battery Charging specification, Revision 1.2<br>USB Power Delivery specification Revision 3.0 |

## Social and Environmental Responsibility

**Eco-Label Certifications & Declarations**

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

- IT ECO declaration
- US ENERGY STAR®
- US Federal Energy Management Program (FEMP)
- EPEAT[?] Gold registered in the United States. See http://www.epeat.net for registration status in your country.
- TCO or TCO Certified Edge: certified in all markets except North America
- China Energy Conservation Program (CECP)
- China State Environmental Protection Administration (SEPA)
- Taiwan Green Mark
- Korea Eco-label
- Japan PC Green label*

**Sustainable Impact Specifications**

- Product Carbon Footprint
- Ocean-bound plastic in system fan, CPU fan[1]
- 35% post-consumer recycled plastic[2]
- 10% recycled metal[7]
- Low halogen[3]
- Outside Box and corrugated cushions are 100% sustainably sourced and recyclable[4]
- Recycled Plastic cushions[5,6].

**System Configuration**

The configuration used for the Energy Consumption and Declared Noise Emissions data for the Notebook model is based on a "Typically Configured Notebook"?.

| **Energy Consumption (in accordance with US ENERGY STAR® test method)** | **115VAC, 60Hz** | **230VAC, 50Hz** | **100VAC, 50Hz** |
|---|---|---|---|

## System Technical Specifications

| | | | |
|---|---|---|---|
| Normal Operation (Sort idle) | 71.717 W | 70.346 W | 70.622 W |
| Normal Operation (Long idle) | 69.41 W | 68.18 W | 68.87 W |
| Sleep | 6.91 W | 6.86 W | 6.92 W |
| Off | 2.35 W | 2.19 W | 2.25 W |

**NOTE:**
Energy efficiency data listed is for an ENERGY STAR® compliant product if offered within the model family . HP computers marked with the ENERGY STAR® Logo are compliant with the applicable U.S. Environmental Protection Agency (EPA) ENERGY STAR® specifications for computers. If a model family does not offer ENERGY STAR® compliant configurations, then energy efficiency data listed is for a typically configured PC featuring a hard disk drive, a high efficiency power supply, and a Microsoft Windows® operating system.

| **Heat Dissipation*** | **115VAC, 60Hz** | **230VAC, 50Hz** | **100VAC, 50Hz** |
|---|---|---|---|
| Normal Operation (Short idle) | 245.27 BTU/hr | 240.58 BTU/hr | 241.53 BTU/hr |
| Normal Operation (Long idle) | 237.40 BTU/hr | 233.19 BTU/hr | 235.55 BTU/hr |
| Sleep | 23.66 BTU/hr | 23.46 BTU/hr | 23.67 BTU/hr |
| Off | 8.0 BTU/hr | 7.49 BTU/hr | 7.70 BTU/hr |

***NOTE:** Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.

| **Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)** | **Sound Power ($L_{WAd}$, bels)** | **Sound Pressure ($L_{pAm}$, decibels)** |
|---|---|---|
| Typically Configured - Idle | 3.33 | 15.9 |
| Fixed Disk - Drive Random Seek | 4.1 | 23.9 |
| Optical Drive - Active Mode | 3.94 | 21.8 |

**Longevity and Upgrading**

This product can be upgraded, possibly extending its useful life by several years. Upgradeable features and/or components contained in the

Spare parts are available throughout the warranty period and or for up to "5"? years after the end of production.

**Additional Information**

- This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2011/65/EC.
- This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive - 2002/96/EC.
- This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).
- This product is in compliance with the IEEE 1680 (EPEAT) standard at the Gold level, see www.epeat.net
- Plastics parts weighing over 25 grams used in the product are marked per ISO11469 and ISO1043.
- This product is 94.6% recycle-able when properly disposed of at end of life.

## System Technical Specifications

| | | | |
|---|---|---|---|
| **Packaging Materials** | **External:** | PAPER/Corrugated | 1560 g |
| | | PAPER/Paperboard | 70 g |
| | **Internal:** | PLASTIC/EPE (Expanded Polyethylene) | 636 g |
| | | PLASTIC/Polyethylene low density - LDPE | 50 g |

The plastic packaging material contains at least 92.7% recycled content.

The corrugated paper packaging materials contains at least 35% recycled content.

**RoHS Compliance**

HP Inc. complies fully with materials regulations. We were among the first companies to extend the restrictions in the European Union (EU) Restriction of Hazardous Substances (RoHS) Directive to our products worldwide through the HP GSE. HP has contributed to the development of related legislation in Europe, as well as China, India, and Vietnam.

We believe the RoHS directive and similar laws play an important role in promoting industry-wide elimination of substances of concern. We have supported the inclusion of additional substances-including PVC, BFRs, and certain phthalates-in future RoHS legislation that pertains to electrical and electronics products.

We met our voluntary objective to achieve worldwide compliance with the new EU RoHS requirements for virtually all relevant products by July 2013, and we will continue to extend the scope of the commitment to include further restricted substances as regulations continue to evolve.

To obtain a copy of the HP RoHS Compliance Statement, see HP RoHS position statement.

**Material Usage**

This product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/gse.pdf):

- Asbestos
- Certain Azo Colorants
- Certain Brominated Flame Retardants - may not be used as flame retardants in plastics
- Cadmium
- Chlorinated Hydrocarbons
- Chlorinated Paraffins
- Bis(2-Ethylhexyl) phthalate (DEHP)
- Benzyl butyl phthalate (BBP)
- Dibutyl phthalate (DBP)
- Diisobutyl phthalate (DIBP)
- Formaldehyde
- Halogenated Diphenyl Methanes
- Lead carbonates and sulfates
- Lead and Lead compounds
- Mercuric Oxide Batteries
- Nickel - finishes must not be used on the external surface designed to be frequently handled or carried by the user.
- Ozone Depleting Substances
- Polybrominated Biphenyls (PBBs)
- Polybrominated Biphenyl Ethers (PBBEs)
- Polybrominated Biphenyl Oxides (PBBOs)
- Polychlorinated Biphenyl (PCB)
- Polychlorinated Terphenyls (PCT)
- Polyvinyl Chloride (PVC) - except for wires and cables, and certain retail packaging has been voluntarily removed from most applications.
- Radioactive Substances
- Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)

## System Technical Specifications

**Packaging Usage**

HP follows these guidelines to decrease the environmental impact of product packaging:

- Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials.
- Eliminate the use of ozone-depleting substances (ODS) in packaging materials.
- Design packaging materials for ease of disassembly.
- Maximize the use of post-consumer recycled content materials in packaging materials.
- Use readily recyclable packaging materials such as paper and corrugated materials.
- Reduce size and weight of packages to improve transportation fuel efficiency.
- Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.

**End-of-life Management and Recycling**

HP 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/go/reuse-recycle or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.

The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: http://www.hp.com/go/recyclers. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

**HP, Inc. Corporate Environmental Information**

For more information about HP's commitment to the environment:

Global Citizenship Report

http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html

Eco-label certifications

http://www8.hp.com/us/en/hp-information/environment/ecolabels.html

ISO 14001 certificates:
http://h20195.www2.hp.com/V2/GetDocument.aspx?docname=c04755842
and
http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/cert.pdf

**footnotes**

1. Percentage of ocean-bound plastic contained in each component varies by product
2. Recycled plastic content percentage is based on the definition set in the IEEE 1680.1-2018 standard.
3. External power supplies, WWAN modules, power cords, cables and peripherals excluded.
4. 100% outer box packaging and corrugated cushions made from sustainably sourced certified and recycled fibers.
5. Fiber cushions made from 100% recycled wood fiber and organic materials.
6. Plastic cushions are made from >90% recycled plastic.
7. Disclaimer: recycled metal is expressed as a percentage of the total weight of the metal according to ISO 14021 definitions for metal parts over 25 grams.

## Manageability

| | |
|---|---|
| **Industry Standard Specifications** | This product meets the following industry standard specifications for manageability functionality:<br>• DASH 1.2 (via Realtek LAN on motherboard) |
| **AMD DASH Manageability** | Provides AMD DASH Manageability functions and features including: Power Management (on, off, reset, graceful shutdown, sleep and hibernate)<br>• Support in Max Power Savings (Shutdown and Hibernate Modes)<br>• Hardware Inventory (includes BIOS)<br>• Indications and Events Alerting<br>• Text Redirection (SOL)<br>• USB Redirection<br>• KVM Redirection<br>• Wake-on-LAN (WOL), even with Maximum Power Savings Enabled<br>• DASH 1.2 compliance |
| **AMD Pro Technology** | The HP Z6A G5 supports AMD Pro Technology for its manageability solution. |
| **Remote Manageability Software Solutions** | The HP Z6A G5 Workstation is supported on the following remote manageability software consoles:<br>• Realtek Management Console<br>• Microsoft System Center Configuration Manager with AMPS plugin.<br>• AMD Management Console<br>• DASH CLI Command Line Tool<br>For questions or support for manageability needs, please visit http://www.hp.com/go/clientmanagemer |
| **HP Anyware Remote System Controller** | Supported |

## STORAGE/HARD DRIVES

| | | | | |
|---|---|---|---|---|
| **Performance PCIe SSDs for HP Workstations** | Z Turbo 512GB 2280 PCIe-4x4 TLC SSD | Capacity | 512GB | |
| | | Protocol | PCIe | |
| | | Form Factor | M.2 | |
| | | Controller | NVMe | |
| | | **NAND Type** | 3D TLC | |
| | | **Endurance** | 300TBW (TB Written) | |
| | | **Reliability** | 1.5M hours | |
| | | **Rated for 24/7/365 operation** | No | |
| | | Interface | PCI Express 4.0 x4 electrical | |
| | | Operating Temperature | 32° to 158° F (0° to 70° C) | |
| | | Performance | **Sequential Read** | up to 6400MB/s* |
| | | | **Sequential Write** | up to 3400MB/s* |
| | | | **Random Read** | up to 600K IOPS* |
| | | | **Random Write** | up to 600K IOPS* |

*Actual performance may vary.

**NOTE:** For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36GB of system disk (for Windows) is reserved for system recovery software.

| | | | |
|---|---|---|---|
| Z Turbo 512GB 2280 PCIe-4x4 SED OPAL2 TLC M.2 SSD | Capacity | 512GB | |
| | Protocol | PCIe | |
| | Form Factor | M.2 | |
| | Controller | NVMe | |
| | **NAND Type** | 3D TLC | |
| | **Endurance** | 300TBW (TB Written) | |
| | **Reliability** | 1.5M hours | |
| | **Rated for 24/7/365 operation** | No | |
| | Interface | PCI Express 4.0 x4 electrical | |
| | Operating Temperature | 32° to 158° F (0° to 70° C) | |
| | Performance | **Sequential Read** | up to 6400MB/s* |
| | | **Sequential Write** | up to 3400MB/s* |
| | | **Random Read** | up to 600K IOPS* |
| | | **Random Write** | up to 600K IOPS* |
| | **Self-Encrypting Drive Support** | OPAL 2 | |

*Actual performance may vary.

**NOTE:** For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36GB of system disk (for Windows) is reserved for system recovery software.

## Technical Specifications - Storage Drives

| | | | |
|---|---|---|---|
| **Z Turbo 1TB 2280 PCIe-4x4 SED OPAL2 TLC M.2 SSD Module** | **Capacity** | 1TB | |
| | **Protocol** | PCIe | |
| | **Form Factor** | M.2 | |
| | **Controller** | NVMe | |
| | **NAND Type** | 3D TLC | |
| | **Endurance** | 400TBW (TB Written) | |
| | **Reliability** | 1.5M hours | |
| | **Rated for 24/7/365 operation** | No | |
| | **Interface** | PCI Express 4.0 x4 electrical | |
| | **Operating Temperature** | 32° to 158° F (0° to 70° C) | |
| | **Performance** | **Sequential Read** | up to 6500MB/s* |
| | | **Sequential Write** | up to 5000MB/s* |
| | | **Random Read** | up to 800K IOPS* |
| | | **Random Write** | up to 800K IOPS* |
| | **Self-Encrypting Drive Support** | OPAL 2 | |

*Actual performance may vary.

**NOTE:** For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36GB of system disk (for Windows) is reserved for system recovery software.

| | | | |
|---|---|---|---|
| **Z Turbo 1TB 2280 PCIe-4x4 TLC SSD** | **Capacity** | 1TB | |
| | **Protocol** | PCIe | |
| | **Form Factor** | M.2 | |
| | **Controller** | NVMe | |
| | **NAND Type** | 3D TLC | |
| | **Endurance** | 400TBW (TB Written) | |
| | **Reliability** | 1.5M hours | |
| | **Rated for 24/7/365 operation** | No | |
| | **Interface** | PCI Express 4.0 x4 electrical | |
| | **Operating Temperature** | 32° to 158° F (0° to 70° C) | |
| | **Performance** | **Sequential Read** | up to 6500MB/s* |
| | | **Sequential Write** | up to 5000MB/s* |
| | | **Random Read** | up to 800K IOPS* |
| | | **Random Write** | up to 800K IOPS* |

*Actual performance may vary.

**NOTE:** For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36GB of system disk (for Windows) is reserved for system recovery software.

## Technical Specifications - Storage Drives

| | | | |
|---|---|---|---|
| **Z Turbo 2TB 2280 PCIe-4x4 SED OPAL2 TLC M.2 SSD** | **Capacity** | 2TB | |
| | **Protocol** | PCIe | |
| | **Form Factor** | M.2 | |
| | **Controller** | NVMe | |
| | **NAND Type** | 3D TLC | |
| | **Endurance** | 500TBW (TB Written) | |
| | **Reliability** | 1.5M hours | |
| | **Rated for 24/7/365 operation** | No | |
| | **Interface** | PCI Express 4.0 x4 electrical | |
| | **Operating Temperature** | 32° to 158° F (0° to 70° C) | |
| | **Performance** | **Sequential Read** | up to 6500MB/s* |
| | | **Sequential Write** | up to 5000MB/s* |
| | | **Random Read** | up to 800K IOPS* |
| | | **Random Write** | up to 800K IOPS* |
| | **Self-Encrypting Drive Support** | OPAL 2 | |

*Actual performance may vary.

**NOTE:** For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36GB of system disk (for Windows) is reserved for system recovery software.

| | | | |
|---|---|---|---|
| **Z Turbo 2TB 2280 PCIe-4x4 TLC SSD** | **Capacity** | 2TB | |
| | **Protocol** | PCIe | |
| | **Form Factor** | M.2 | |
| | **Controller** | NVMe | |
| | **NAND Type** | 3D TLC | |
| | **Endurance** | 500TBW (TB Written) | |
| | **Reliability** | 1.5M hours | |
| | **Rated for 24/7/365 operation** | No | |
| | **Interface** | PCI Express 4.0 x4 electrical | |
| | **Operating Temperature** | 32° to 158° F (0° to 70° C) | |
| | **Performance** | **Sequential Read** | up to 6500MB/s* |
| | | **Sequential Write** | up to 5000MB/s* |
| | | **Random Read** | up to 800K IOPS* |
| | | **Random Write** | up to 800K IOPS* |

*Actual performance may vary.

**NOTE:** For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36GB of system disk (for Windows) is reserved for system recovery software.

## Technical Specifications - Storage Drives

| | | | |
|---|---|---|---|
| **Z Turbo 4TB 2280 PCIe-4x4 TLC M.2 SSD** | **Capacity** | 4TB | |
| | **Protocol** | PCIe | |
| | **Form Factor** | M.2 | |
| | **Controller** | NVMe | |
| | **NAND Type** | 3D TLC | |
| | **Endurance** | 600TBW (TB Written) | |
| | **Reliability** | 1.5M hours | |
| | **Rated for 24/7/365 operation** | No | |
| | **Interface** | PCI Express 4.0 x4 electrical | |
| | **Operating Temperature** | 32° to 158° F (0° to 70° C) | |
| | **Performance** | **Sequential Read** | up to 6500MB/s* |
| | | **Sequential Write** | up to 5000MB/s* |
| | | **Random Read** | up to 700K IOPS* |
| | | **Random Write** | up to 700K IOPS* |

*Actual performance may vary.

**NOTE:** For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36GB of system disk (for Windows) is reserved for system recovery software.

| | | | |
|---|---|---|---|
| **Z Turbo 4TB 2280 PCIe-4x4 SED OPAL2 TLC M.2 SSD** | **Capacity** | 4TB | |
| | **Protocol** | PCIe | |
| | **Form Factor** | M.2 | |
| | **Controller** | NVMe | |
| | **NAND Type** | 3D TLC | |
| | **Endurance** | 600TBW (TB Written) | |
| | **Reliability** | 1.5M hours | |
| | **Rated for 24/7/365 operation** | No | |
| | **Interface** | PCI Express 4.0 x4 electrical | |
| | **Operating Temperature** | 32° to 158° F (0° to 70° C) | |
| | **Performance** | **Sequential Read** | up to 6500MB/s* |
| | | **Sequential Write** | up to 5000MB/s* |
| | | **Random Read** | up to 700K IOPS* |
| | | **Random Write** | up to 700K IOPS* |
| | **Self-Encrypting Drive Support** | OPAL 2 | |

*Actual performance may vary.

**NOTE:** For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36GB of system disk (for Windows) is reserved for system recovery software.

## Technical Specifications - Storage Drives

**Performance PCIe SSDs for HP Quad Pro Carrier**

**HP Z Turbo Drive Quad Pro 512GB SSD**

| | | |
|---|---|---|
| **Capacity** | 512GB | |
| **Protocol** | PCIe | |
| **Form Factor** | M.2 | |
| **Controller** | NVMe | |
| **NAND Type** | 3D TLC | |
| **Endurance** | 300TBW (TB Written) | |
| **Reliability** | 1.5M hours | |
| **Rated for 24/7/365 operation** | No | |
| **Interface** | PCI Express 4.0 x4 electrical | |
| **Operating Temperature** | 32° to 158° F (0° to 70° C) | |
| **Performance** | **Sequential Read** | up to 6400MB/s* |
| | **Sequential Write** | up to 3400MB/s* |
| | **Random Read** | up to 600K IOPS* |
| | **Random Write** | up to 600K IOPS* |

*Actual performance may vary.

**NOTE:** For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36GB of system disk (for Windows) is reserved for system recovery software.

**HP Z Turbo Drive Quad Pro 1TB SSD**

| | | |
|---|---|---|
| **Capacity** | 1TB | |
| **Protocol** | PCIe | |
| **Form Factor** | M.2 | |
| **Controller** | NVMe | |
| **NAND Type** | 3D TLC | |
| **Endurance** | 400TBW (TB Written) | |
| **Reliability** | 1.5M hours | |
| **Rated for 24/7/365 operation** | No | |
| **Interface** | PCI Express 4.0 x4 electrical | |
| **Operating Temperature** | 32° to 158° F (0° to 70° C) | |
| **Performance** | **Sequential Read** | up to 6500MB/s* |
| | **Sequential Write** | up to 5000MB/s* |
| | **Random Read** | up to 800K IOPS* |
| | **Random Write** | up to 800K IOPS* |

*Actual performance may vary.

**NOTE:** For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36GB of system disk (for Windows) is reserved for system recovery software.

## Technical Specifications - Storage Drives

| | | | |
|---|---|---|---|
| **HP Z Turbo Drive Quad Pro 2TB SSD** | **Capacity** | 2TB | |
| | **Protocol** | PCIe | |
| | **Form Factor** | M.2 | |
| | **Controller** | NVMe | |
| | **NAND Type** | 3D TLC | |
| | **Endurance** | 500TBW (TB Written) | |
| | **Reliability** | 1.5M hours | |
| | **Rated for 24/7/365 operation** | No | |
| | **Interface** | PCI Express 4.0 x4 electrical | |
| | **Operating Temperature** | 32° to 158° F (0° to 70° C) | |
| | **Performance** | **Sequential Read** | up to 6500MB/s* |
| | | **Sequential Write** | up to 5000MB/s* |
| | | **Random Read** | up to 800K IOPS* |
| | | **Random Write** | up to 800K IOPS* |

*Actual performance may vary.

**NOTE:** For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36GB of system disk (for Windows) is reserved for system recovery software.

| | | | |
|---|---|---|---|
| **HP Z Turbo Drive Quad Pro 4TB SSD** | **Capacity** | 4TB | |
| | **Protocol** | PCIe | |
| | **Form Factor** | M.2 | |
| | **Controller** | NVMe | |
| | **NAND Type** | 3D TLC | |
| | **Endurance** | 500TBW (TB Written) | |
| | **Reliability** | 1.5M hours | |
| | **Rated for 24/7/365 operation** | No | |
| | **Interface** | PCI Express 4.0 x4 electrical | |
| | **Operating Temperature** | 32° to 158° F (0° to 70° C) | |
| | **Performance** | **Sequential Read** | up to 6500MB/s* |
| | | **Sequential Write** | up to 5000MB/s* |
| | | **Random Read** | up to 800K IOPS* |
| | | **Random Write** | up to 800K IOPS* |

*Actual performance may vary.

**NOTE:** For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36GB of system disk (for Windows) is reserved for system recovery software.

## Technical Specifications - Storage Drives

| | | | | |
|---|---|---|---|---|
| **Performance PCIe SSDs for HP Dual Pro Carrier** | **HP Z Turbo Drive Dual Pro 512GB SSD** | **Capacity** | 512GB | |
| | | **Protocol** | PCIe | |
| | | **Form Factor** | M.2 | |
| | | **Controller** | NVMe | |
| | | **NAND Type** | 3D TLC | |
| | | **Endurance** | 300TBW (TB Written) | |
| | | **Reliability** | 1.5M hours | |
| | | **Rated for 24/7/365 operation** | No | |
| | | **Interface** | PCI Express 4.0 x4 electrical | |
| | | **Operating Temperature** | 32° to 158° F (0° to 70° C) | |
| | | **Performance** | **Sequential Read** | up to 6400MB/s* |
| | | | **Sequential Write** | up to 3400MB/s* |
| | | | **Random Read** | up to 600K IOPS* |
| | | | **Random Write** | up to 600K IOPS* |

*Actual performance may vary.

**NOTE:** For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36GB of system disk (for Windows) is reserved for system recovery software.

| | | | | |
|---|---|---|---|---|
| | **HP Z Turbo Drive Dual Pro 1TB SSD** | **Capacity** | 1TB | |
| | | **Protocol** | PCIe | |
| | | **Form Factor** | M.2 | |
| | | **Controller** | NVMe | |
| | | **NAND Type** | 3D TLC | |
| | | **Endurance** | 400TBW (TB Written) | |
| | | **Reliability** | 1.5M hours | |
| | | **Rated for 24/7/365 operation** | No | |
| | | **Interface** | PCI Express 4.0 x4 electrical | |
| | | **Operating Temperature** | 32° to 158° F (0° to 70° C) | |
| | | **Performance** | **Sequential Read** | up to 6500MB/s* |
| | | | **Sequential Write** | up to 5000MB/s* |
| | | | **Random Read** | up to 800K IOPS* |
| | | | **Random Write** | up to 800K IOPS* |

*Actual performance may vary.

**NOTE:** For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36GB of system disk (for Windows) is reserved for system recovery software.

## Technical Specifications - Storage Drives

| **HP Z Turbo Drive Dual Pro 2TB SSD** | | | |
|---|---|---|---|
| | **Capacity** | 2TB | |
| | **Protocol** | PCIe | |
| | **Form Factor** | M.2 | |
| | **Controller** | NVMe | |
| | **NAND Type** | 3D TLC | |
| | **Endurance** | 500TBW (TB Written) | |
| | **Reliability** | 1.5M hours | |
| | **Rated for 24/7/365 operation** | No | |
| | **Interface** | PCI Express 4.0 x4 electrical | |
| | **Operating Temperature** | 32° to 158° F (0° to 70° C) | |
| | **Performance** | **Sequential Read** | up to 6500MB/s* |
| | | **Sequential Write** | up to 5000MB/s* |
| | | **Random Read** | up to 800K IOPS* |
| | | **Random Write** | up to 800K IOPS* |

*Actual performance may vary.

**NOTE:** For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36GB of system disk (for Windows) is reserved for system recovery software.

| **HP Z Turbo Drive Dual Pro 4TB SSD** | | | |
|---|---|---|---|
| | **Capacity** | 4TB | |
| | **Protocol** | PCIe | |
| | **Form Factor** | M.2 | |
| | **Controller** | NVMe | |
| | **NAND Type** | 3D TLC | |
| | **Endurance** | 500TBW (TB Written) | |
| | **Reliability** | 1.5M hours | |
| | **Rated for 24/7/365 operation** | No | |
| | **Interface** | PCI Express 4.0 x4 electrical | |
| | **Operating Temperature** | 32° to 158° F (0° to 70° C) | |
| | **Performance** | **Sequential Read** | up to 6500MB/s* |
| | | **Sequential Write** | up to 5000MB/s* |
| | | **Random Read** | up to 800K IOPS* |
| | | **Random Write** | up to 800K IOPS* |

*Actual performance may vary.

**NOTE:** For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36GB of system disk (for Windows) is reserved for system recovery software.

## Technical Specifications - Storage Drives

| | | | | |
|---|---|---|---|---|
| **SATA Hard Drives for HP Workstations** | **1TB 7200RPM SATA 3.5in Enterprise HDD** | **Capacity** | 1TB | |
| | | **Protocol** | SATA | |
| | | **Form Factor** | 3.5" | |
| | | **Controller** | AHCI | |
| | | **Reliability** | 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 | |
| | | **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** | 128MB | |
| | | **Cache** | Adaptive | |
| | | **Seek Time** (typical reads, includes controller overhead, including settling) | **Single Track** | 0.32 ms * |
| | | | **Average** | 7.45 ms * |
| | | | **Full Stroke** | 14.2 ms * |
| | | **Rotational Speed** | 7,200 rpm | |
| | | **Logical Blocks** | 1,953,525,168 | |
| | | **Operating Temperature** | 41° to 131° F (5° to 55° C) | |
| | | **Performance** | **Sequential Read** | up to 226MB/s* |
| | | | **Sequential Write** | up to 226MB/s* |

*Actual performance may vary.

**NOTE:** For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36GB of system disk (for Windows) is reserved for system recovery software.

## Technical Specifications - Storage Drives

| | | | |
|---|---|---|---|
| **2TB 7200RPM SATA 3.5in Enterprise HDD** | **Capacity** | 2TB | |
| | **Protocol** | SATA | |
| | **Form Factor** | 3.5" | |
| | **Controller** | AHCI | |
| | **Reliability** | 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 | |
| | **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** | 128MB | |
| | **Cache** | Adaptive | |
| | **Seek Time** (typical reads, includes controller overhead, including settling) | **Single Track** | 0.7 ms * |
| | | **Average** | 8.5 ms * |
| | | **Full Stroke** | 15.7 ms * |
| | **Rotational Speed** | 7,200 rpm | |
| | **Logical Blocks** | 3,907,029,168 | |
| | **Operating Temperature** | 41° to 131° F (5° to 55° C) | |
| | **Performance** | **Sequential Read** | up to 226MB/s* |
| | | **Sequential Write** | up to 226MB/s* |

*Actual performance may vary.

**NOTE:** For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36GB of system disk (for Windows) is reserved for system recovery software.

## Technical Specifications - Storage Drives

| | | | |
|---|---|---|---|
| **4TB 7200 RPM SATA 3.5in Enterprise HDD** | **Capacity** | 4TB | |
| | **Protocol** | SATA | |
| | **Form Factor** | 3.5" | |
| | **Controller** | AHCI | |
| | **Reliability** | 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 | |
| | **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** | 256MB | |
| | **Cache** | Adaptive | |
| | **Seek Time** (typical reads, includes controller overhead, including settling) | **Single Track** | 0.7 ms * |
| | | **Average** | 8.5 ms * |
| | | **Full Stroke** | 15.7 ms * |
| | **Rotational Speed** | 7,200 rpm | |
| | **Logical Blocks** | 7,814,037,168 | |
| | **Operating Temperature** | 41° to 131° F (5° to 55° C) | |
| | **Performance** | **Sequential Read** | up to 226MB/s* |
| | | **Sequential Write** | up to 226MB/s* |

*Actual performance may vary.

**NOTE:** For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36GB of system disk (for Windows) is reserved for system recovery software.

## Technical Specifications - Storage Drives

| | | | |
|---|---|---|---|
| **8TB 7200RPM SATA 3.5in Enterprise HDD** | **Capacity** | 8TB | |
| | **Protocol** | SATA | |
| | **Form Factor** | 3.5" | |
| | **Controller** | AHCI | |
| | **Reliability** | 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 | |
| | **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** | 256MB | |
| | **Cache** | Adaptive | |
| | **Seek Time** (typical reads, includes controller overhead, including settling) | **Single Track** | 0.7 ms * |
| | | **Average** | 8.5 ms * |
| | | **Full Stroke** | 15.7 ms * |
| | **Rotational Speed** | 7,200 rpm | |
| | **Logical Blocks** | 15,628,053,168 | |
| | **Operating Temperature** | 41° to 140° F (5° to 60° C) | |
| | **Performance** | **Sequential Read** | up to 226MB/s* |
| | | **Sequential Write** | up to 226MB/s* |

*Actual performance may vary.

**NOTE:** For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36GB of system disk (for Windows) is reserved for system recovery software.

## Technical Specifications - Storage Drives

| | | | | |
|---|---|---|---|---|
| **12TB 7200 RPM SATA-6G 3.5in Enterprise HDD** | **Capacity** | 12TB | | |
| | **Protocol** | SATA | | |
| | **Form Factor** | 3.5" | | |
| | **Controller** | AHCI | | |
| | **Reliability** | 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 | | |
| | **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** | 256MB | | |
| | **Cache** | Adaptive | | |
| | **Seek Time** (typical reads, includes controller overhead, including settling) | | **Single Track** | 0.7 ms * |
| | | | **Average** | 8.5 ms * |
| | | | **Full Stroke** | 15.7 ms * |
| | **Rotational Speed** | 7,200 rpm | | |
| | **Logical Blocks** | 23,437,770,752 | | |
| | **Operating Temperature** | 41° to 140° F (5° to 60° C) | | |
| | **Performance** | | **Sequential Read** | up to 226MB/s* |
| | | | **Sequential Write** | up to 226MB/s* |

*Actual performance may vary.

**NOTE:** For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36GB of system disk (for Windows) is reserved for system recovery software.

## GRAPHICS

| | | |
|---|---|---|
| **NVIDIA® RTX™ 6000 Ada 48GB** | **Form Factor** | Full-Height Dual Slot (4.4"? Height x 10.5"? Length)<br>Weight: 1230 grams / 2.71 lbs (with extender) |
| | **Max Power Consumption** | Power: 300 Watts<br>Cooling: Active |
| | **GPU Memory** | 48GB GDDR6 memory ECC<br>Memory Bandwidth: Up to 960 GB/s<br>Memory Width: 384 bits |
| | **Connectors** | 4x DisplayPort 1.4a<br>Quadro Sync II connector<br>Stereo Sync<br>Requires CEM 5.0 16-pin auxiliary power adapter |
| | **Maximum Resolution** | 7680x4320 @ 120Hz |
| | **Bus Type** | PCI Express 4.0 x16 |
| | **Available Graphics Drivers** | Windows 11<br>Windows 10<br>Linux® 64-bit |

| | | |
|---|---|---|
| **NVIDIA® RTX™ 5000 Ada 32GB** | **Form Factor** | Full-Height Dual Slot (5.0"? Height x 13.85"? Length)<br>Weight: 1130 grams / 2.49 lbs (excluding extender) |
| | **Max Power Consumption** | Power: 250 Watts<br>Cooling: Active |
| | **GPU Memory** | 32GB GDDR6 memory ECC<br>Memory Bandwidth: Up to 576 GB/s<br>Memory Width: 256 bits |
| | **Connectors** | 4x DisplayPort 1.4a<br>Quadro Sync II connector<br>Stereo Sync<br>Requires CEM 5.0 16-pin auxiliary power adapter |
| | **Maximum Resolution** | 7680x4320 @ 120Hz |
| | **Bus Type** | PCI Express 4.0 x16 |
| | **Available Graphics Drivers** | Windows 11<br>Windows 10<br>Linux® 64-bit |

## Technical Specifications - Graphics

| | | |
|---|---|---|
| **NVIDIA® RTX 4500 Ada 24GB** | **Form Factor** | Full-Height Dual Slot (4.4"? Height x 10.5"? Length) |
| | **Max Power Consumption** | 210W |
| | **GPU Memory** | 24GB GDDR6<br>Memory Bandwidth: 432 GB/s<br>Memory Width: 192-bit |
| | **Connectors** | 4x DisplayPort 1.4a<br>Requires: 1x 16-pin CEM 5 power connector (adapter may be needed) |
| | **Maximum Resolution** | 4x @ 4096 x 2160 @ 120Hz<br>4x @ 5120 x 2880 @ 60Hz<br>2x @ 7680 x 4320 @ 60Hz |
| | **Bus Type** | PCI Express 4.0 x16 |
| | **Available Graphics Drivers** | Windows 10<br>Windows 11 |
| | **NOTE:** Not available at launch; available early 2024 | |

| | | |
|---|---|---|
| **NVIDIA® RTX A4500 20GB** | **Form Factor** | Full-Height Dual Slot (4.4"? Height x 10.5"? Length)<br>Weight: 1049 grams + 80 grams extender |
| | **Max Power Consumption** | Power: 200W<br>Cooling: Active |
| | **GPU Memory** | 20GB GDDR6 memory<br>Memory Bandwidth: Up to 640 GB/s<br>Memory Width: 320 bit |
| | **Connectors** | 4x DisplayPort 1.4a<br>Quadro Sync II connector<br>NVLink®<br>Stereo Sync<br>Requires 8-pin auxiliary power |
| | **Maximum Resolution** | 7680x4320 @ 120Hz |
| | **Bus Type** | PCI Express 4.0 x16 |
| | **Available Graphics Drivers** | Windows 11<br>Windows 10<br>Linux® 64-bit |

## Technical Specifications - Graphics

| | | |
|---|---|---|
| **NVIDIA® RTX 4000 Ada 20GB** | **Form Factor** | Full-Height Triple Slot (4.4"? Height x 11.5"? Length) |
| | **Max Power Consumption** | 130W |
| | **GPU Memory** | 20GB GDDR6<br>Memory Bandwidth: 360 GB/s<br>Memory Width: 160-bit |
| | **Connectors** | 4x DisplayPort 1.4a<br>Requires: 1x 16-pin CEM 5 power connector (adapter may be needed) |
| | **Maximum Resolution** | 4x @ 4096 x 2160 @ 120Hz<br>4x @ 5120 x 2880 @ 60Hz<br>2x @ 7680 x 4320 @ 60Hz |
| | **Bus Type** | PCI Exress 4.0 x16 |
| | **Available Graphics Drivers** | Windows 10<br>Windows 11 |

**NOTE:** Not available at launch; available early 2024

| | | |
|---|---|---|
| **NVIDIA® RTX A4000 16GB** | **Form Factor** | Full-Height Single Slot (4.4"? Height x 9.5"? Length)<br>Weight: 500 grams |
| | **Max Power Consumption** | Power: 140W<br>Cooling: Active |
| | **GPU Memory** | 16GB GDDR6 memory<br>Memory Bandwidth: Up to 448 GB/s<br>Memory Width: 256 bit |
| | **Connectors** | 4x DisplayPort 1.4a<br>Quadro Sync II connector<br>Stereo Sync<br>Requires 6-pin auxiliary power |
| | **Maximum Resolution** | 7680x4320 @ 120Hz |
| | **Bus Type** | PCI Express 4.0 x16 |
| | **Available Graphics Drivers** | Windows 11<br>Windows 10<br>Linux® 64-bit |

## Technical Specifications - Graphics

| | | |
|---|---|---|
| **NVIDIA® RTX A2000 12GB** | **Form Factor** | Half-Height Dual Slot (2.713"? Height x 6.6"? Length)<br>Weight: 306 grams |
| | **Max Power Consumption** | Power: 70W<br>Cooling: Active |
| | **GPU Memory** | 12GB GDDR6 memory<br>Memory Bandwidth: Up to 288 GB/s<br>Memory Width: 192 bit |
| | **Connectors** | 4x mini-DisplayPort 1.4a |
| | **Maximum Resolution** | 7680x4320 @ 120Hz |
| | **Bus Type** | PCI Express 4.0 x16 |
| | **Available Graphics Drivers** | Windows 11<br>Windows 10<br>Linux® 64-bit |
| **NVIDIA® T1000 8GB** | **Form Factor** | Half-Height Single Slot (2.713"? Height x 6.137"? Length)<br>Weight: 132.6 grams |
| | **Max Power Consumption** | Power: 50W<br>Cooling: Active |
| | **GPU Memory** | 8GB GDDR6 memory<br>Memory Bandwidth: Up to 160 GB/s<br>Memory Width: 128 bit |
| | **Connectors** | 4x mini-DisplayPort 1.4a |
| | **Maximum Resolution** | 7680x4320 @ 120Hz |
| | **Bus Type** | PCI Express 3.0 x16 |
| | **Available Graphics Drivers** | Windows 11<br>Windows 10<br>Linux® 64-bit |

| | | |
|---|---|---|
| **NVIDIA® T400 4GB Graphics** | **Form Factor** | Half-Height Single Slot (2.713"? Height x 6.137"? Length)<br>Weight: 123.5 grams |
| | **Max Power Consumption** | Power: 30W<br>Cooling: Active |
| | **GPU Memory** | 4GB GDDR6 memory<br>Memory Bandwidth: Up to 80 GB/s<br>Memory Width: 64 bit |
| | **Connectors** | 3x mini-DisplayPort 1.4a |
| | **Maximum Resolution** | 7680x4320 @ 120Hz |
| | **Bus Type** | PCI Express 3.0 x16 |
| | **Available Graphics Drivers** | Windows 11<br>Windows 10<br>Linux® 64-bit |

## Technical Specifications - Graphics

| | | |
|---|---|---|
| **AMD® Radeon™ Pro W7900 48GB** | **Form Factor** | Full-Height Triple Slot (4.38"? Height x 11.0"? Length) |
| | **Max Power Consumption** | 295W |
| | **GPU Memory** | 48GB GDDR6<br>Memory Bandwidth: 864 GB/s<br>Memory Width: 384-bit |
| | **Connectors** | 3x DP 2.1 + 1x Enhanced Mini DP 2.1<br>Requires: 2x 8-pin PCIe Aux Power |
| | **Maximum Resolution** | 4x @ 4096 x 2160 (4K DCI) @ 120Hz with DSC<br>2x @ 6144 x 3456 (6K) 12-bit HDR @ 60Hz Uncompressed<br>1x @ 7680 x 4320 (8K) 12-bit HDR @ 60Hz Uncompressed<br>1x @ 12288 x 6912 (12K) @ 120Hz with DS |
| | **Bus Type** | PCI Express 4.0 x16 |
| | **Available Graphics Drivers** | Windows 10<br>Windows 11 |
| | **NOTE:** Not available at launch; available early 2024 | |
| **AMD® Radeon™ Pro W7600 8GB** | **Form Factor** | Full-Height Single Slot (4.38" Height x 9.5" Length) |
| | **Max Power Consumption** | 130W |
| | **GPU Memory** | 8GB GDDR6<br>Memory Bandwidth: 288 GB/s<br>Memory Width: 128-bit |
| | **Connectors** | 4x DP 2.1<br>Requires: 1x 6-pin PCIe Aux Power |
| | **Maximum Resolution** | 4x @ 3840x2160 (4K)<br>4x @ 5120x2880 (5K)<br>2x @ 7680x4320 (8K) |
| | **Bus Type** | PCI Express 4.0 x8 |
| | **Available Graphics Drivers** | Windows 10<br>Windows 11 |
| **AMD® Radeon™ Pro W7500 8GB** | **Form Factor** | Full-Height Single Slot (4.38" Height x 8.5" Length) |
| | **Max Power Consumption** | 70W |
| | **GPU Memory** | 8 GB GDDR6<br>Memory Bandwidth: 173 GB/s<br>Memory Width: 128-bit |
| | **Connectors** | 4x DP 2.1 |
| | **Maximum Resolution** | 4x @ 3840x2160 (4K)<br>4x @ 5120x2880 (5K)<br>2x @ 7680x4320 (8K) |
| | **Bus Type** | PCI Express 4.0 x8 |
| | **Available Graphics Drivers** | Windows 10<br>Windows 11 |

## Technical Specifications - Graphics

| | | |
|---|---|---|
| **AMD® Radeon™ RX 6400 4GB** | **Form Factor** | Half-Height Single Slot (4.4"? Height x 10.5"? Length)<br>Weight: 155 grams |
| | **Max Power Consumption** | Power: 50W<br>Cooling: Active |
| | **GPU Memory** | 4GB GDDR6 memory<br>Memory Bandwidth:<br>Memory Width: |
| | **Connectors** | 1x DisplayPort 1.4a<br>1x HDMI |
| | **Maximum Resolution** | 7680x4320 @ 60Hz |
| | **Bus Type** | PCI Express 4.0 x4 |
| | **Available Graphics Drivers** | Windows 11<br>Windows 10<br>Linux® 64-bit |

Notes for all graphics cards:

- Some graphics and GPU compute cards can consume a great deal of power, thus combinations of cards with other components may exceed a particular power supply's output capability.
- Some graphics and GPU compute cards require supplemental power cables.
- Not all chassis/PSU configurations have enough supplemental power cables of the correct type for all graphics configurations.

Refer to the Power Supply section within Overview for more information.

## OPTICAL AND REMOVABLE STORAGE

| | | | |
|---|---|---|---|
| **HP 9.5mm Slim 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<br>DVD+RW 25S<br>CD-ROM 15S |
| | **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 |
| | | **Blu-ray** | BD-ROM Up to 6X<br>BD-ROM DL Up to 6X<br>BD-R Up to 6X<br>BD-R DL Up to 6X<br>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,<br>Red Hat® Enterprise Linux® (RHEL) 8, 9 Desktop/Workstation<br>SUSE Linux® Enterprise Desktop 15<br>Ubuntu 20.04, 22.04 LTS<br>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<br>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. | |

**NOTE:** HD-DVD disks cannot be played on the DVD-ROM drive. No support for DVD-RAM. Actual speeds may vary. Don't copy copyright-protected materials. Double Layer discs can store more data than single layer discs. Discs burned with this drive may not be compatible with many existing single-layer DVD drive and players. Flawless playback on all systems is not guaranteed.

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| | | | |
|---|---|---|---|
| **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 |

| | | |
|---|---|---|
| | | 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,<br>Windows Vista Business 64*, Windows 2000.<br>Red Hat® Enterprise Linux® (RHEL) 8, 9 Desktop/Workstation<br>SUSE Linux® Enterprise Desktop 15<br>Ubuntu 20.04, 22.04 LTS<br><br>* No driver is required for this device. Native support is provided by the operating system | |
| **Kit Contents** | HP SATA DVD Writer drive, installation guide. | |

**NOTE:** 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.

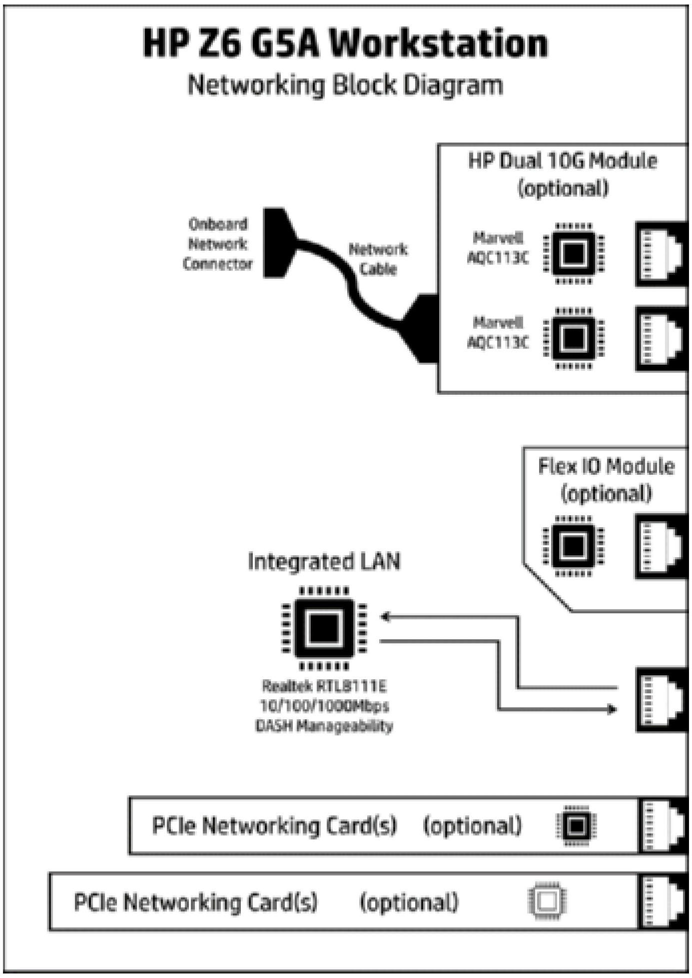
| | | | |
|---|---|---|---|
| **HP 9.5mm Slim DVD-ROM** | **Description** | 9.5mm height, tray-load | |
| | **Mounting Orientation** | Either horizontal or vertical | |
| | **Interface Type** | SATA/ATAPI | |
| | **Dimensions** (WxHxD) | 128 x 9.5 x 127mm | |
| | **Disc Capacity** | **DVD-ROM** | Single layer: Up to 4.7 GB<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 -< 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) |

## Technical Specifications - Optical and Removable Storage

| | |
|---|---|
| **Operating Systems Supported** | Windows 11, Windows 10, Windows 8.1, Windows 7 Professional 64-bit<br>Red Hat® Enterprise Linux® (RHEL) 8, 9 Desktop/Workstation<br>SUSE Linux® Enterprise Desktop 15<br>Ubuntu 20.04, 22.04 LTS<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 |

**NOTE:** 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.

## NETWORKING AND COMMUNICATIONS



| | | |
|---|---|---|
| **Realtek RTL 8111EPP (Integrated)** | **Connector** | RJ45 |
| | **Cabling** | Up to 100m with Cat 5e or better |
| | **Controller** | Realtek RTL8111EPP |
| | **Data Rates Supported** | 10/100/1000Mbps |
| | **Compliance** | IEEE 802.3, 802.3ab, 802.3u, 802.3x, 802.3az-2010 (EEE)<br>Microsoft NDIS5, NDIS6 (IPv4, IPv6, TCP, UDP) Chesum and Segmentation Task-offload, RSS, Auto-negotiation<br>IEEE 802.1P Layer 2 priority encoding, IEEE 802.1Q VLAN<br>PCI MSI and MSI-X<br>Jumbo Frames up to 9Kb<br>USB Redirection |
| | **Bus Architecture** | PCIe |
| | **Data Transfer Mode** | BASE-T |
| | **Network Transfer Rate** | 10/100/1000Mbps |
| | **Management Capabilities** | DASH System Manageability, Wake-On-LAN, PXE, UEFI |
| | **Kit Contents** | Integrated into system |

## Technical Specifications - Networking and Communications

| | | |
|---|---|---|
| **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 * |
| | | IEEE 802.3by, 802.3ae, 802.3ap, 802.3ad, 802.1AX, 802.1Q, 802.1P, 802.1Qau (QCN), 802.1Qaz (ETS), 802.1Qbb (PFC), 802.1Qbg, 1588v2<br>Jumbo frame support (9.6KB)<br>CB/cTUVus/CE Compliant<br>CE/FCC/VCCI/RCM Compliant<br>RoHS/KCC/CAN ICES-3 (B)/NM EN 55035/55032 (Morocco)/UKCA 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 *<br>**NOTE:** Network Transfer Rate depends on transceiver model.* |
| | **Kit Contents** | NVIDIA® Mellanox® ConnectX-6 DX Dual Port 10/25GbE SFP28 NIC |

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

| | | |
|---|---|---|
| **HP 25GbE SFP28 LC Fiber Optic Transceiver** | **Connector** | LC Fiber Optic Connector |
| | **Cabling** | Typically OM4 or higher MMF LC fiber optic cabling, up to 100m on OM4, up to 70m on OM3 |
| | **Data Rates Supported** | 25Gbps |
| | **Compliance** | SFF-8472 and 8431, Hot pluggable SFP+ footprint |
| | **Compatibility** | Intended for use with NVIDIA Mellanox ConnectX-6 DX Dual Port 10/25GbE NIC |
| | **Wavelength** | 850nm |
| | **Kit Contents** | 25GbE SFP28 Transceiver |
| **HP 10GbE SFP+ SR/SW LC Fiber Optic Transceiver** | **Connector** | LC Fiber Optic Connector |
| | **Cabling** | Typically OM4 or higher MMF LC fiber optic cabling, up to 300m on MMF |
| | **Data Rates Supported** | 10Gbps |
| | **Compliance** | SFF-8472 and 8431, Hot pluggable SFP+ footprint |
| | **Compatibility** | Intended for use with NVIDIA Mellanox ConnectX-6 DX Dual Port 10/25GbE NIC |
| | **Wavelength** | 850nm |
| | **Kit Contents** | 10GbE SFP+ Transceiver |

## Technical Specifications - Networking and Communications

| | | |
|---|---|---|
| **HP Dual Port 10GBase-T NIC Module G2** | **Networking Interface** | 2 x RJ-45 (Dual Port) |
| | **System Interface** | Cabled from Dedicated Rear I/O Slot |
| | **Controller** | Marvell AQC113C |
| | **Memory** | 128KB Tx Buffer, 192KB Rx Buffer on-chip |
| | **Networking Speeds Supported** | 10Gbps, 5Gbps, 2.5Gbps,1Gbps, 100Mbps, 10Mbps |
| | **Compliance** | IEEE 802.3 - 2018, IEEE 802.1AS-2011 |
| | **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® X550 10GBASE-T Dual Port NIC** | **Connector** | 2 x RJ-45 (Dual Port) |
| | **Cabling** | Cat5 (or higher) for 100Mbps<br>Cat5e (or higher) for 1Gbps, 2.5Gbps, or 5Gbps<br>Cat6 (or higher) for 10Gbps up to 55m<br>Cat6a (or higher) for 10Gbps up to 100m |
| | **Controller** | Intel® X550-AT2 |
| | **Memory** | Jumbo Frames up to 15.5KB, 64 Tx and 64 Rx Queues per port, 160KB/port of programmable memory transmit buffers |
| | **Data Rates Supported** | 100Mbps (BASE-TX), 1Gbps (BASE-T, 2.5Gbps, 5Gbps, 10Gbps |
| | **Compliance** | 802.1q (VLAN), 802.1Qbb, 802.1p, 802.1Qaz |
| | **Bus Architecture** | PCIe 3x4 |
| | **Data Transfer Mode** | PCIe Gen 3 x4 based interface |
| | **Power Requirements** | 3.9W at 100Mbps<br>5.5W at 1Gbps<br>11.2W at 10Gbps |
| | **Boot ROM Support** | Yes |
| | **Network Transfer Mode** | Auto negotiation between 1GbE, 2.5GbE, 5GbE and 10GbE |
| | **Management Capabilities** | DMI 2.0 Support, Windows Management Instrumentation (WMI) and SNMP, PXE 2.0 through boot ROM, Multi-mode I/O Virtualization, VxLAN, VMDq, VLAN support with VLAN tag insertion |
| | **Kit Contents** | Intel® X550 10GBASE-T Dual Port NIC |

## Technical Specifications - Networking and Communications

| | | |
|---|---|---|
| **HP 10GBase-T Flex Port** | **Connector** | RJ45 (Single Port) |
| | **Cabling** | Twisted Pair Cabling, up to 100m<br>Cat5e (or higher) for 1Gbps<br>Cat6a (or higher) for 10Gbps |
| | **Controller** | Marvell AQC113C |
| | **Memory** | 128KB Tx Buffer, 192KB Rx Buffer on-chip |
| | **Data Rates Supported** | 10/100/1000 Mbps and 2.5/5/10 Gbps |
| | **Compliance** | IEEE 802.3 - 2018, IEEE 802.1AS-2011 |
| | **Bus Architecture** | PCI Express and SMBus |
| | **Data Transfer Mode** | PCIe-based interface for active state operation (S0 state) and SMBus for host and management traffic |
| | **Power Consumption (typical)** | 5.5W at 1Gbps<br>11.2W at 10Gbps |
| | **Network Transfer Mode** | Full-duplex, Half-duplex |
| | **Network Transfer Rate** | 10GBASE-T<br>5GBASE-T<br>2.5GBASE-T<br>1000BASE-T<br>100BASE-TX<br>10BASE-Te |
| | **Management Capabilities** | WOL, PXE, UEFI, |
| | **Kit Contents** | HP 10GBase-T Flex Port NIC Module |
| | **NOTE:** Not available at launch; available early 2024 | |
| **Intel® I226-T1 1 port 2.5GbE NIC** | **Connector** | 1xRJ-45 |
| | **Cabling** | Cat5e (or higher) for 2.5Gbps up to 100m |
| | **Controller** | Intel® I226 |
| | **Memory** | Jumbo Frames up to 9.5KB, 4 Tx and Rx Queues |
| | **Data Rates Supported** | 10Mbps, 100Mbps, 1Gbps, 2.5Gbps |
| | **Compliance** | IEEE 802.3 auto negotiation, 802.3, 802.3u, 802.3ab, 802.3x, 802.3z, IEEE1588 protocol and 802.1AS implementation, 802.3az EEE |
| | **Bus Architecture** | PCI Express 2.1 x4 |
| | **Data Transfer Mode** | PCIe-based interface for active state operation |
| | **Power Requirements** | 1.4W typical at 2.5Gbps |
| | **Network Transfer Mode** | Multi-speed, full, and half-duplex |
| | **Network Transfer Rate** | 10BASE-T 100BASE-Tx 1000BASE-T |
| | **Management Capabilities** | WOL, PXE 2.1, UEFI, Power Management Protocol Offload (proxying), MAC Power Management, Active State Power Management, ACPI |
| | **Kit Contents** | Intel® I226-T1® Adapter |

## Technical Specifications - Networking and Communications

| | | |
|---|---|---|
| **HP 2.5GbE LAN Flex Port** | **Connector** | RJ45 (Single Port) |
| | **Cabling** | Copper twisted pair, Cat5e up to 100 meters |
| | **Controller** | Intel® I225-V |
| | **Memory** | 4 Tx and 4 Rx Queues, Jumbo Frames up to 9KB and without TSN |
| | **Data Rates Supported** | 10/100/1000Mbps and 2.5Gbps BASE-T |
| | **Compliance** | IEEE 802.3, 802.3u (auto-negotiation), 802.3ab, 1588, 802.1AS-Rev, 802.1Qav, 802.1Qbu, 802.1Qbv, 802.3br, 802.3az |
| | **Bus Architecture** | PCIe G2x1 |
| | **Data Transfer Mode** | PCIe-based interface for active state operation (S0 state) and SMBus for host and management traffic (Sx low power state) |
| | **Power Requirements** | 2.2 Watts |
| | **Network Transfer Mode** | Automatic link configuration for speed duplex and flow control |
| | **Network Transfer Rate** | 2500BASE-T<br>1000BASE-T<br>100BASE-TX (Half-duplex supported)<br>10BASE-Te (Half-duplex supported) |
| | **Management Capabilities** | WOL, PXE, UEFI, Intel vPro® support with appropriate Intel Chipset, Error Correcting Memory in packet buffers, UDP/TCP/IP Checksum Offload, SCTP receive and transmit integrity offload |
| | **Kit Contents** | HP 2.5GbE LAN Flex Port Networking Interface Card |

| | | |
|---|---|---|
| **HP 1GbE Fiber LC Single Flex Port** | **Connector** | LC (Little Connector) Fiber (Single Port) |
| | **Cabling** | LC Fiber Cabling |
| | **Controller** | AT-29M2 |
| | **Data Rates Supported** | 1GBASE-SX |
| | **Bus Architecture** | USB 3.1G1 |
| | **Power Requirements** | Up to 3.3 Watts |
| | **Network Transfer Mode** | 1GBASE-SX |
| | **Network Transfer Rate** | 1GBASE-SX |
| | **Management Capabilities** | Wake on LAN, Digital Diagnostic Monitoring |
| | **Kit Contents** | HP 1GbE Fiber LC Single Flex Port NIC |

| | | |
|---|---|---|
| **HP Flex 1GbE Single Port NIC** | **Connector** | RJ45 (Single Port) |
| | **Cabling** | 1GbE over Category 5e (or better) up to 100m |
| | **Controller** | Realtek RTL8153 |
| | **Data Rates Supported** | 10/100/1000 Mbps |
| | **Bus Architecture** | USB3.1G1, USB2 |
| | **Power Requirements** | Requires 3.3V (integrated regulators for core Vdc) |
| | **Network Transfer Mode** | Full-duplex; Half-duplex |
| | **Network Transfer Rate** | 10BASE-T (half-duplex) 10 Mbps<br>10BASE-T (full-duplex) 20 Mbps<br>100BASE-TX (half-duplex) 100 Mbps<br>100BASE-TX (full-duplex) 200 Mbps<br>1000BASE-T (full-duplex) 2000 Mbps |
| | **Management Capabilities** | Wake on LAN, PXE, UEFI |

## Technical Specifications - Networking and Communications

| | | |
|---|---|---|
| | **Kit Contents** | HP 1GbE Single Flex Port |
| **Intel® Ethernet I350-T4V2 4-Port 1Gb NIC (After Market Option Only)** | **Connector** | 4x RJ-45 (Quad Port) |
| | **Cabling** | Cat3 (or higher) for 10Mbps Cat5 (or higher) for 100Mbps Cat5e (or higher) for 1Gbps up to 100m |
| | **Controller** | Intel® I350 |
| | **Memory** | Jumbo Frames up to 9.5KB, 8 Tx/Rx Queue pairs per port, Main Internal memory is Error Code Correcting |
| | **Data Rates Supported** | 10Mbps, 100Mbps, 1Gbps |
| | **Compliance** | IEEE 802.3 auto negotiation, 802.3, 802.3u, 802.3ab, 802.3x, 802.3z, IEEE1588 protocol and 802.1AS implementation, 802.3az EEE |
| | **Bus Architecture** | PCI Express 2.1 x4 |
| | **Data Transfer Mode** | PCIe-based interface for active state operation |
| | **Power Requirements** | 5W |
| | **Network Transfer Mode** | Multi-speed, full, and half-duplex |
| | **Network Transfer Rate** | 10BASE-T 100BASE-Tx 1000BASE-T |
| | **Management Capabilities** | WOL, PXE 2.1, UEFI, Power Management Protocol Offload (proxying), MAC Power Management, Active State Power Management, VLAN, ACPI |
| | **Kit Contents** | Intel® Ethernet I350- T4V2 4-Port 1Gb NIC, installation instructions |
| **Allies Telesis AT-2914SX/LC 1GB LC Fiber NIC** | **Connector** | LC Fiber (Single Port) |
| | **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 |
| | **Memory** | Jumbo Frames up to 9.6KB |
| | **Data Rates Supported** | 1000SX (1GbE Fiber at 850nm Wavelength) |
| | **Compliance** | 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 |
| | **Bus Architecture** | PCIe x1 |
| | **Data Transfer Mode** | PCIe-based interface |
| | **Power Requirements** | 1.5 Watts (typical) |
| | **Network Transfer Rate** | 1000SX only (1GbE Fiber at 850nm Wavelength) |
| | **Management Capabilities** | UEFI, Smart Load Balancing and failover, Link aggregation (IEEE802.3ad), Generic trunking (FEC/GEC) / IEEE 802.3ad-draft static, VLAN Support |
| | **Kit Contents** | Allied Telesis AT-2914SX/LC 1GB LC Fiber NIC with low-profile bracket attached and standard height bracket included |

## Technical Specifications - Networking and Communications

| | | |
|---|---|---|
| **Allied Telesis AT-2911T/2-901 Dual Port 1GbE NIC** | **Connector** | 2 x RJ-45 (Dual Port) |
| | **Cabling** | Cat3 (or higher) for 10Mbps<br>Cat5 (or higher) for 100Mbps<br>Cat5e (or higher) for 1Gbps up to 100m |
| | **Memory** | 17 Rx and 16 Tx queues |
| | **Data Rates Supported** | 10/100/1000 Mbps |
| | **Compliance** | 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), IEEE 802.3ab (10/100/1000T)<br>RoHS, UL, FCC/EN55022 Class A, TUV, EN55024, CE, C-TICK, VCCI |
| | **Bus Architecture** | PCIe 2x1 |
| | **Data Transfer Mode** | PCIe-based interface |
| | **Power Requirements** | 2.4 Watts (typical) |
| | **Management Capabilities** | VLAN support, Link aggregation LACP, Link aggregation smart switch, Failover, Smart Load Balancing (SLB), iSCSI boot support, Windows Management Instrumentation (WMI), PXE 2.1, SNMP |
| | **Kit Contents** | Allied Telesis AT-2911T/2-901 Dual Port 1GbE NIC with low-profile bracket attached and standard bracket included |

| | | |
|---|---|---|
| **MediaTek RZ616 Wi-Fi 6 + Bluetooth® 5.3 wireless card Flex Port NIC with Internal Antenna** | **Connector** | Wireless |
| | **Cabling** | N/A |
| | **Controller** | MediaTek RZ616 |
| | **Data Rates Supported** | Wi-Fi 6 (2.4GHz/5GHz)<br>(20MHz, 40MHz, 80MHz, 160MHz) |
| | **Compliance** | IEEE 802.11 a/b/g/n/ac/ax<br>IEEE 802.11 d/e/h/i/j/k/mc/r/v/w |
| | **Bus Architecture** | PCIe G2.1 for WLAN, USB2.0 for BT |
| | **Capabilities** | Wi-Fi:<br>MU-MIMO TX/RX, STBC, LDPC<br>Greenfield, mixed mode, legacy mode<br>Security support for WFA WPA/WPA2/WPA3 personal, WPS2.0<br>QoS support of WFA WMM, WMM PS<br><br>BT:<br>BT 2.1, 3.0, 5.3<br>Up to 7 BT links and 16BLE links<br>SCO and eSCO link with retransmission<br>Packet Loss Concealment (PLC) for voice quality<br>AES128 and ECC256 |
| | **Kit Contents** | MediaTek RZ616 Wi-Fi 6 + Bluetooth® 5.3 Flex Port NIC<br>Installation Instructions |

* Wireless access point and Internet service required and sold separately. Availability of public wireless access points limited. Wi-Fi 6 (802.11ax) is backwards compatible with prior 802.11 specs.

## Technical Specifications - Networking and Communications

| | | |
|---|---|---|
| **Intel® AX210 Wi-Fi 6E non-vPro + Bluetooth® 5.2 wireless card with External Antenna WLAN** | **Connector** | Wireless |
| | **Cabling** | N/A |
| | **Controller** | Intel® AX210 |
| | **Data Rates Supported** | Wi-Fi 6E (2.4GHz/5GHz/6GHz) |
| | **Compliance** | Wi-Fi Alliance* Wi-Fi Alliance CERTIFIED 6, WiFi CERTIFIED a/b/g/n/ac, WMM, WMM-Power Save, WPA2, WPA3, Wi-Fi Direct, and Wi-Fi Agile Multiband<br>IEEE WLAN Standard 802.11-2016, 802.11a, b, d, e, g, h, I, k, n, r, u, v, w, ac, and ax, Bluetooth® 5.2 |
| | **Bus Architecture** | PCIe G3x1 for WLAN, USB3.1G1 for BT |
| | **Management Capabilities** | Authentication Protocols: 802.1X EAP-TLS, EAP-TTLS/MSCHAPv2, PEAPv0 - MSCHAPv2 (EAP-SIM, EAP-AKA, EAP-AKA')<br>Encryption: 128-bit AES-CCMP, 256-bit AES-GCMP<br>UEFI |
| | **Kit Contents** | Intel® AX210 Wi-Fi 6 + Bluetooth® 5.2 PCIe NIC<br>External Dipole Antenna<br>Installation Instructions |

*Wi-Fi 6E requires a Wi-Fi 6E router, sold separately to function in the 6GHz band. Availability of public wireless access points limited. Wi-Fi 6E is backwards compatible with prior 802.11 specs. And available in countries where Wi-Fi 6E is supported.

## Summary of Changes

| **Date of change:** | **Version History:** | | **Description of change:** |
|---|---|---|---|
| December 1, 2023 | From v1 to v2 | Changed | Other Hardware section |
| January 17, 2024 | From v2 to v3 | Changed | Operating Systems section |
| January 24, 2024 | From v3 to v4 | Changed | Format |

title

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