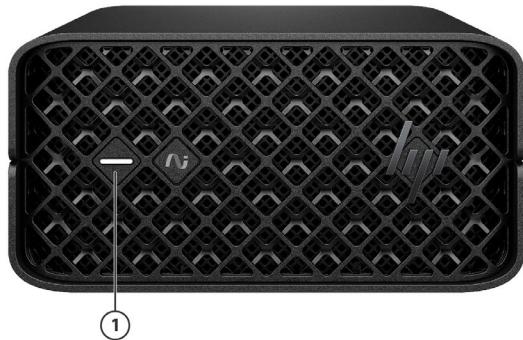


### Overview

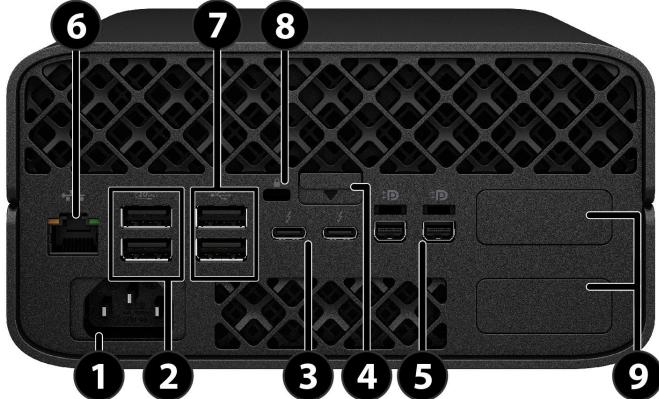
#### HP Z2 Mini G1a Workstation



#### Front-Side View

1. Power button
2. headphone/microphone combo
3. 1 SuperSpeed USB Std-A 10Gbps (charge supports up to 5V/2.1A)
4. 1 SuperSpeed USB Type-C® 10Gbps (Alt mode DisplayPort™ 2.1 with 15W output)

### Overview



#### Rear View

1. Power connector	5. 2 Mini DisplayPort™ 2.1
2. 2 SuperSpeed USB Std-A 10Gbps	6. 1 RJ-45
3. 2 Thunderbolt™ 4 USB Type-C (40Gbps)	7. 2 Hi-Speed USB Std-A 480Mbps ports
4. Cover release latch	8. Security cable slot
	9. 1st Flex IO (top side) – choose one of the following options: 1 Dual SuperSpeed USB Std-A 5Gbps, 1 Dual SuperSpeed USB Type-C® 10Gbps <sup>1</sup> , (1) 1GbE NIC, (1) 1Gbps Fiber LC NIC <sup>1</sup> , (1) 2.5GbE NIC <sup>1</sup> , HP 10GBase-T Flex IO, (1) 10GbE NIC <sup>*1,3</sup> , USB-based Serial port option; 2nd Flex IO (bottom side) – choose one of the following options: 1) 1GbE NIC, Serial port option, External Power Button, HP Remote System Controller

### Overview

<b>Form Factor</b>	Mini
<b>Operating Systems</b>	Preinstalled: <ul style="list-style-type: none"><li>Windows 11 Pro 64<sup>1</sup></li><li>Windows 11 Home 64<sup>1</sup></li><li>Linux®-ready<sup>2</sup></li><li>Ubuntu® 24.04<sup>4,5</sup></li></ul> Supported: <ul style="list-style-type: none"><li>SUSE Linux® Enterprise Desktop 15<sup>2</sup></li></ul>

<sup>1</sup> 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 11 is automatically updated, which is always enabled. ISP fees may apply and additional requirements may apply over time for updates. See <http://www.windows.com>.

<sup>2</sup>For detailed OS/hardware support information for Linux, see:

[http://www.hp.com/support/linux\\_hardware\\_matrix](http://www.hp.com/support/linux_hardware_matrix)

<sup>3</sup> Please refer to NETWORKING / COMMUNICATION for Modern Standby feature compatibility settings.

<sup>4</sup> Some features may not be available in all editions or versions of Ubuntu®. To enjoy the full functionality, systems may require additional or upgraded hardware, drivers, software or BIOS updates (sold separately).

<sup>5</sup> Ubuntu updates automatically. ISP charges may apply. Over time, additional requirements may also be needed for updates or upgrades.

**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	Cores	CPU CLK GHz (Max Boost/base)	Cache (MB)	Memory Speed (MT/s)	Threads	Integrated Graphics	GPU CLK GHz (Max)	NPU	TDP (W)
AMD Ryzen™ AI MAX+ PRO 395	16	5.10/3.00	64	8000	32	Radeon 8060S	2.9	Yes	120
AMD Ryzen™ AI MAX PRO 390	12	5.00/3.20	64	8000	24	Radeon 8050S	2.8	Yes	85
AMD Ryzen™ AI MAX PRO 385	8	5.00/3.60	32	8000	16	Radeon 8050S	2.8	Yes	65



### Overview

AMD Ryzen™ AI MAX PRO 380	6	4.90/3.60	16	8000	12	Radeon 8040S	2.8	Yes	55
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<sup>1</sup> 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 higher performance.

<sup>2</sup> 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>.

<b>Color</b>	Black
<b>Side I/O</b>	1 headphone/microphone combo 1 SuperSpeed USB Std-A 10Gbps (charge supports up to 5V/2.1A) 1 SuperSpeed USB Type-C® 10Gbps (Alt mode DisplayPort™ 2.1 with 15W output)
<b>Internal I/O</b>	Internal Slot M.2-E: 1 PCIe Gen 3 x2 Internal Slot M.2-M: 2 PCIe Gen4 x4
<b>Rear I/O</b>	1 RJ-45; 2 Mini DisplayPort™ 2.1; 2 SuperSpeed USB Std-A 10Gbps ports; 2 Hi-Speed USB Std-A 480Mbps ports; 2 Thunderbolt™ 4 USB Type-C (40Gbps)
<b>Optional I/O</b>	1st Flex IO (top side) – choose one of the following options: 1 Dual SuperSpeed USB Std-A 5Gbps, 1 Dual SuperSpeed USB Type-C® 10Gbps, 1 GbE LAN, USB-based Serial port option, (1) 1GbE NIC, (1) 1Gbps Fiber LC NIC, (1) 2.5GbE NIC, (1) 10GbE NIC;  2nd Flex IO (bottom side) – choose one of the following options: (1) 1GbE NIC, (1) 2.5GbE NIC, Serial port option, External Power Button, HP Remote System Controller
<b>Interfaces Supported</b>	2 PCIe Gen4 x4 interface
<b>On-board RAID Support</b>	Factory integrated RAID 0, 1 for NVME drives
<b>Chassis Dimensions (H x W x D)</b>	Footprint: H: 3.4" [8.55cm] W: 6.6" [16.8cm] D: 7.9" [20cm] (Standard desktop orientation)
<b>Packaged Dimensions</b>	L: 19.6" (49.9cm) W: 7.35" (18.5cm) H: 11.9" (30.1cm)
<b>Rack Dimensions</b>	4U, 5 units per shelf
<b>Weight</b>	Exact weights depend upon configuration (System weight only). Starting at 2.3kg (5.07lbs.) Exact weights depend upon configuration (Packaged weight). Starting at 4.1kg (9.0lbs.)



### Overview

<b>Temperature</b>	Operating: 5° to 35° C (40° to 95° F) Above 1524 m (5,000 feet) altitude, the maximum operating temperature is reduced by 1° C (1.8° F) for every 305 m (1,000 feet) increase in elevation Non-operating: -40° to 60° C (-40° to 140° F) Maximum rate of change: 10°C/hr
<b>Humidity</b>	Operating: 8% to 85% RH, non-condensing, 35° C maximum wet bulb Non-operating: 8% to 90% RH, non-condensing, 35° C maximum wet bulb
<b>Maximum Altitude (non-pressurized)</b>	Operating (with only Solid-State Drives): 5,000 m (16,404 feet) Non-operating: 12,192 m (40,000 feet) Maximum operating temperature is reduced as altitude increases. See Temperature for details.
<b>Power Supply</b>	300W 92% Efficiency wide-range, active Power Factor Correction.
<b>Memory</b>	Solder-down LPDDR5x, up to 128GB depending on APU selection , up to 8000MT/s speed

## Supported Components

Processors	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
<b>AMD Ryzen™ AI MAX Processors</b>				
AMD Ryzen™ AI MAX+ PRO 395	Y	N		
AMD Ryzen™ AI MAX PRO 390	Y	N		
AMD Ryzen™ AI MAX PRO 385	Y	N		
AMD Ryzen™ AI MAX PRO 380	Y	N		
PCIe Solid State Drives	Factory Configured	Option Kit	Option Kit Part Number	
Z Turbo 512GB 2280 PCIe-4x4 TLC M.2 Z2 Mini Kit SSD	Y	Y	4M9Z5AA	
Z Turbo 1TB 2280 PCIe-4x4 TLC M.2 Z2 Mini Kit SSD	Y	Y	4M9Z6AA	
HP Z Turbo 2TB 2280 PCIe-4x4 TLC M.2 Z2 Mini Kit SSD	Y	Y	4M9Z7AA	
Z Turbo 512GB 2280 PCIe-4x4 SED OPAL2 TLC M.2 Z2 Mini Kit SSD	Y	Y	4M9Z9AA	
Z Turbo 1TB 2280 PCIe-4x4 SED OPAL2 TLC M.2 Z2 Mini Kit SSD	Y	Y	4N000AA	
Z Turbo 2TB 2280 PCIe-4x4 SED OPAL2 TLC M.2 Z2 Mini Kit SSD	Y	Y	4N001AA	
HP 512GB 2280 PCIe-4x4 Value M.2 Z2 MINI Kit SSD	Y	Y	4N008AA	
HP 256GB 2280 PCIe-4x4 Value M.2 Z2 MINI Kit SSD	Y	Y	4N009AA	
HP 1TB 2280 PCIe-4x4 Value M.2 Z2 MINI Kit SSD	Y	Y	4N010AA	
Z Turbo 4TB 2280 PCIe-4x4 TLC M.2 Z2 MINI Kit SSD	Y	Y	5S493AA	
Z Turbo 4TB 2280 PCIe-4x4 SED OPAL2 TLC M.2 Z2 MINI Kit SSD	Y	Y	5S499AA	
256GB 2280 PCIe-4x4 NVMe Value M.2 China Z2 MINI Kit SSD	Y	Y	906J8AA	
512GB PCIe-3x4 2280 NVMe SED OPAL2 FIPS 140-2 TLC M.2 SSD	Y	N		
Citadel 512GB PCIe-3x4 2280 NVMe SED OPAL2 FIPS 140-2 TLC M.2 SSD	Y	N		
512GB 2280 PCIe-4x4 NVMe Value M.2 China Z2 MINI Kit SSD	Y	Y	906K0AA	
Z Turbo 512GB 2280 PCIe-4x4 TLC M.2 China Z2 MINI Kit SSD	Y	Y	906H3AA	
Z Turbo 512GB PCIe-4x4 2280 SED OPAL2 TLC M.2 SSD	Y	N		
Z Turbo 512GB PCIe-4x4 2280 SED OPAL2 TLC M.2 China SSD	Y	N		
Z Turbo 512GB PCIe-4x4 2280 TLC M.2 SSD	Y	N		
1TB PCIe-3x4 2280 NVMe SED OPAL2 FIPS 140-2 TLC M.2 SSD	Y	N		
Citadel 1TB PCIe-3x4 2280 NVMe SED OPAL2 FIPS 140-2 TLC M.2 SSD	Y	N		
HP 1TB 2280 PCIe-4x4 NVMe Value M.2 China Z2 MINI Kit SSD	Y	Y	906J9AA	
Z Turbo 1TB PCIe-4x4 TLC M.2 China Z2 MINI Kit SSD	Y	Y	906H9AA	
Z Turbo 1TB PCIe-4x4 2280 SED OPAL2 TLC M.2 China SSD	Y	N		



### Supported Components

Citadel 2TB PCIe-3x4 2280 NVMe SED OPAL2 FIPS 140-2 TLC M.2 SSD	Y	N	
2TB PCIe-3x4 2280 NVMe SED OPAL2 FIPS 140-2 TLC M.2 SSD	Y	N	
HP Z Turbo 2TB 2280 PCIe-4x4 TLC M.2 China Z2 MINI Kit SSD	Y	Y	906J2AA
Z Turbo 2TB PCIe-4x4 2280 SED OPAL2 TLC M.2 SSD	Y	N	
Z Turbo 2TB PCIe-4x4 2280 SED OPAL2 TLC M.2 China SSD	Y	N	
HP Z Turbo 4TB PCIe-4x4 2280 M.2 China Solid State Drive	Y	N	
HP Z Turbo 8TB PCIe-4x4 2280 NVMe M.2 Solid State Drive	Y	N	
HP Z Turbo 8TB PCIe-4x4 2280 NVMe M.2 NMIC Solid State Drive	Y	N	

Graphics	Factory Configured	Option Kit	Option Kit Part Number	Supported # of cards
Graphics Cable				
HP DisplayPort to DVI Adapter	N	Y	FH973AA	
Adapters				
HP DisplayPort To VGA Adapter	N	Y	AS615AA	
HP USB-C to DisplayPort Adapter G2	N	Y	8Y8Y1AA	
HP USB-C to HDMI Adapter	N	Y	4SH07AA	
HP USB-C to VGA Adapter	N	Y	4SH06AA	
HP Single miniDP-to-DP Adapter Cable	Y	Y	2MY05AA	

Memory	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
16GB LPDDR5x ( 4x4GB) FBGA315	Y	N		
32GB LPDDR5x ( 8x4GB) FBGA315	Y	N		
64GB LPDDR5x ( 8x8GB) FBGA315	Y	N		
128GB LPDDR5x ( 8x16GB) FBGA315	Y	N		

Networking and Communications	Factory Configured	Option Kit	Option Kit Part Number
HP 1GbE LAN Flex Port 2020	Y	Y	141J6AA
HP Z2 2.5GbE LAN Flex Port	Y	Y	B96W7AA
MediaTek Wi-Fi 7 MT7925 BT 5.4 wireless card M.2 AIM-T	Y	N	
HP 10GBase-T Flex IO	Y	Y	56Q71AA

**NOTE:** Modern Standby Network Feature Support Limitation

The HP 10GBase-T Flex IO NIC does not support Modern Standby. For systems equipped with network cards that are not compatible with Modern Standby, the system may not fully enter the Modern Standby state when the display is turned off, impacting wake event functionality.



### Supported Components

As an alternative, customers are advised to use the onboard LAN to support wake events. This is recommended instead of relying on legacy Wake-on-LAN (WOL) functionality, as certain third-party network components may not meet the required compliance standards for Modern Standby system configurations.

#### HP Remote System Controller

	Factory Configured	Option Kit	Option Kit Part Number
HP Z2 Mini Remote System Controller	Y	Y	7K6E4AA
HP Z2 Mini Remote System Controller Main Board Adapter	Y	Y	A6QT4AA

#### Racking and Physical Security

	Factory Configured	Option Kit	Option Kit Part Number
HP Z2 G1A Mini Rail Rack Kit	N	Y	A6QT3AA
HP Rack Cable Management Arm	N	Y	35Z34AA

#### Input Devices

	Factory Configured	Option Kit	Option Kit Part Number
HP 685 Comfort Dual-Mode Keyboard	N	Y	8T6L9UT
HP 725 Multi-Device Rechargeable Wireless Keyboard	N	Y	9T5B2AA
HP Bus Slim v2 Smart Card USB Keyboard	Y	Y	A71J9AA
HP 125 G2 USB Wired Keyboard	Y	Y	AY2Y7AA
HP 320K G2 USB Wired Keyboard	Y	Y	9SR37UT
HP 685 Comfort Dual-Mode Keyboard and Mouse Combo	N	Y	8T6L7UT
HP 725 Multi-Device Rechargeable Wireless Keyboard and Mouse Combo	Y	Y	9T5BOUT
HP 655 Wireless Keyboard and Mouse Combo G2	N	Y	4R009UT
HP Wired Desktop 320MK Mouse and Keyboard G2	N	Y	9SR36UT
HP Wired 320M Mouse	Y	Y	9VA80AA
HP Creator 935 Black Wireless Mouse	N	Y	1D0K8AA
HP 128 LSR Wired Mouse	Y	Y	265D9AA
HP 125 Wired Mouse	Y	Y	265A9AA/AT/UT

#### Other Hardware

	Factory Configured	Option Kit	Option Kit Part Number
HP Z2 Mini G1a Serial Port Adapter	Y	Y	A6QT1AA



### Supported Components

HP B550 Z Display PC Mounting Bracket	N	Y	16U00AA
HP B560 PC Mounting Bracket	N	Y	763U8AA
HP Z Display B600 PC Mounting Bracket	N	Y	529H3AA
HP Z2 G1A Mini Arm/Wall VESA Mount Solution	N	Y	A6QT2AA
HP Rack Cable Management Arm	N	Y	35Z34AA
HP Serial Port v3 Flex IO	Y	Y	5B895AA
HP Dual Type-C 3.2 Gen2 15W Out v3 Flex IO	Y	Y	B6BT5AA
HP Z2 Mini G1a Flex 1GbE Fiber LC Single Port	Y	Y	B98H6AA
C13-C14 2.0m 15A 100-127V Countries Straight Rack Power Cord	Y	Y	8R881AA

Software	Factory Configured	Option Kit	Support Notes
HP AI Companion	Y	N	
HP PC Hardware Diagnostics UEFI	Y	N	1
HP PC Hardware Diagnostics Windows	Y	N	
HP Wolf Security	Y	N	
HP Notifications	Y	N	
HP Desktop Support Utility	Y	N	
HP Documentation	Y	N	
myHP	Y	N	
Kingsoft WPS Office	Y	N	2
Z by HP Data Science Stack Manager	Y	N	3
HP Image Assistant	N	N	
HP Support Assistant	N	N	

<sup>1</sup> Windows OS only

<sup>2</sup> Only available in China

<sup>3</sup> Optional software

### Supported Components

#### Operating Systems Windows 11 Home<sup>1</sup>

Windows 11 Pro<sup>1</sup>

Linux Ready<sup>2</sup>

Ubuntu 24.04 LTS<sup>3,4</sup>

<sup>1</sup> 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 11 is automatically updated, which is always enabled. ISP fees may apply and additional requirements may apply over time for updates. See <http://www.windows.com>.

<sup>2</sup>For detailed OS/hardware support information for Linux, see:

[http://www.hp.com/support/linux\\_hardware\\_matrix](http://www.hp.com/support/linux_hardware_matrix)

<sup>3</sup>Some features may not be available in all editions or versions of Ubuntu®. To enjoy the full functionality, systems may require additional or upgraded hardware, drivers, software or BIOS updates (sold separately).

<sup>4</sup>Ubuntu updates automatically. ISP charges may apply. Over time, additional requirements may also be needed for updates or upgrades

### Supported Components

#### HP BIOS

##### Additional HP BIOS Features:

- Power-On password – Helps prevent an unauthorized user from powering on the system.
- Administrator password – Also known as the BIOS Setup password, this helps prevent unauthorized changes to the system configuration. If the administrator password is not known, the BIOS cannot be updated and changes cannot be made to BIOS settings using BIOS Setup or under the OS.
- S4/S5 Maximum Power Savings setting supports EU Lot6 requirement and allows the computer to power down below 0.5W in S4/S5 (when turned off). When S4/S5 Maximum Power Savings feature is enabled below features are turned off:
  - Power to expansion connectors / slots
  - Most Wake events other than power buttons and WOL (Wake on LAN supported by embedded Lan controller under S4/S5 Maximum Power Saving Enabled)

#### USB charging ports

#### HP Sure Start Gen7 Start

- BIOS Integrity checking – Sure Start protection ensures that only trusted BIOS code is executed and not rootkits, viruses and malware. Verification is done upon boot up, shutdown and while the system is on.
- Sure Start is set by default to automatically repair the BIOS if corrupted or compromised but is policy driven for better manageability. Start is set by default to automatically repair the BIOS if corrupted or compromised but is policy driven for better manageability.
- Protecting beyond BIOS – Integrity checking and repair is extended to other data that should be protected such as network configuration parameters, platform specific information (i.e. system IDs), secure boot credentials, and other code the system needs to boot.
- Audit enabled – System Audit via Sure Start Event Logs capture data such as incident, repair date and time for troubleshooting and investigating.

#### HP Performance Control Modes

HP Z Desktop Workstations offers Performance Control Modes in the F10 BIOS menu. Z2 G1a offers Quiet Mode, Performance Mode, Rack Mode, and High-Performance Mode. HP recommends using High Performance Mode unless you have concerns about acoustics in an open office environment. Customers can achieve CPU performance gains in multithreaded workloads using High Performance Mode over Performance Mode\*. High Performance Mode is configured as default from the factory."

#### How to Set HP Performance Control Modes:

**In the F10 BIOS Menu**, the setting titled "Performance Control" is adjustable to High Performance Mode, Performance Mode, Rack Mode or Quiet Mode. These modes are choice points for performance and acoustic trade-offs based on user needs or recommended balanced conditions in performance and noise optimization.

At startup, push the F10 key while system is booting to get to the BIOS Menu. Go to → Advanced -> System Options -> scroll down and choose "Performance Control"



### Supported Components

Set the Performance Mode you desire and then go back to Main->Save Changes and Exit -> Yes

**In HP Performance Advisor software**, select BIOS Settings -> Advanced -> System Options -> Performance Controls

The machine will restart in the mode you've chosen.

You can change these modes anytime you prefer to prioritize acoustics (Quiet Mode), want a balance between performance and acoustics (Performance or Rack Mode) or prefer to prioritize performance (High Performance Mode).

For more information on performance control modes, please see the white paper called, HP Performance Control Modes for Z Desktop Workstations.

## SOFTWARE COMPONENTS AND APPLICATIONS WITH WINDOWS

### Software

[HP AI Companion](#)  
[HP Support Assistant](#)<sup>1</sup>  
[HP Image Assistant](#)  
[HP Desktop Support Utility](#)  
[HP Documentation](#)  
[HP Notifications](#)  
[HP PC Hardware Diagnostics UEFI](#)  
[HP PC Hardware Diagnostics Windows](#)  
[myHP](#)  
[WSL/Ubuntu Data Science Stack](#)  
[HP Privacy Settings](#)

### Manageability Features

[HP Driver Packs](#)<sup>2</sup>  
[HP UWP Pack](#)  
[HP System Software Manager \(SSM\)](#)  
[HP Manageability Integration Kit Gen4](#)<sup>3</sup>  
[HP Client Catalog \(download\)](#)  
[HP Image Assistant \(download\)](#)  
[HP Cloud Recovery](#)  
[HP Client Management Script Library \(download\)](#)



### Supported Components

HP BIOSphere Gen6<sup>4</sup>

HP BIOS Configuration Utility (download)

#### Client Security Software

HP Client Security Suite Gen7<sup>5</sup> including: (including Credential Manager, HP Password Manager<sup>6</sup>, HP Spare Key)

HP Power On Authentication

Microsoft Defender<sup>7</sup>

#### Security Management

HP Secure Erase<sup>8</sup>

HP Wolf Pro Security Edition (optional)<sup>9</sup>

HP Wolf Security for Business<sup>10</sup> Includes:

HP Sure Click<sup>11</sup>

HP Sure Sense<sup>12</sup>

HP Sure Run Gen5<sup>13</sup>

HP Sure Recover Gen6<sup>14</sup>

HP Sure Start Gen7<sup>15</sup>

HP Tamper Lock

HP Sure Admin<sup>16</sup>

HP Client Security Manager Gen 7<sup>5,17</sup>

Hood Sensor Optional Kit

<sup>1</sup> HP Support Assistant requires Windows and Internet access.

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

<sup>3</sup>HP Manageability Integration Kit can be downloaded from <http://www8.hp.com/us/en/ads/clientmanagement/overview.html>

<sup>4</sup> HP BIOSphere features may vary depending on the platform and configurations.

<sup>5</sup> HP Client Security Manager requires Windows and is available on the select HP PCs.

<sup>6</sup> HP Password Manager requires Internet Explorer or Chrome or FireFox. Some websites and applications may not be supported. User may need to enable or allow the add-on / extension in the internet browser.

<sup>7</sup> Microsoft Defender Opt in and internet connection required for updates.

<sup>8</sup> HP Secure Erase - --or the methods outlined in the National Institute of Standards and Technology Special Publication 800-88 "C"ear" "anituation method. HP Secure Erase does not support platforms with Intel® Optane.

<sup>9</sup> HP Wolf Pro Security Edition is available preloaded on select SKUs, and, depending on the HP product purchased, includes a license with a term length communicated to you at purchase and in your order confirmation email. 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](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 is effective upon 4 months after the date the HP Product was shipped by HP and will continue for the term communicated to you at



### Supported Components

purchase and in your order confirmation email (“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 future software updates or HP Support. Notwithstanding the foregoing, the license shall expire no later than one year after the fixed term of the subject license ends.

<sup>10</sup> HP Wolf Security for Business requires Windows 10 or higher, includes various HP security features and is available on HP Pro, Elite, RPOS and Workstation products. See product details for included security features

<sup>11</sup> HP Sure Click requires Windows 10 Pro or higher or Enterprise. See [https://bit.ly/2PrLT6A\\_SureClick](https://bit.ly/2PrLT6A_SureClick) for complete details.

<sup>12</sup> HP Sure Sense requires Windows 11 Pro or Enterprise and supports Microsoft Internet Explorer, Google Chrome™, and Chromium™. Supported attachments include Microsoft Office (Word, Excel, PowerPoint) and PDF files in read only mode, when Microsoft Office or Adobe Acrobat are installed.

<sup>13</sup> HP Sure Run is available on select Windows 11 based HP Pro, Elite and Workstation PCs with select Intel® or AMD processors

<sup>14</sup> HP Sure Recover is available on select HP PCs and requires Windows 10 and an open network connection. You must back up important files, data, photos, videos, etc. before using HP Sure Recover to avoid loss of data. Network based recovery using Wi-Fi is only available on PCs with Intel Wi-Fi Module

<sup>15</sup> HP Sure Start is available on select HP PCs and workstations. See product specifications for availability.

<sup>16</sup> HP Sure Admin requires Windows 11, 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.

<sup>17</sup> HP Client Security Manager requires Windows and is available on the select HP PCs.



### System Technical Specifications

#### System Board

**System Board Form Factor** 182 x 160.57 mm

**Processor Socket** Single BGA-2077

**Super I/O Controller** Nuvoton SI024

**Memory Type Supported** LPDDR5x, Solder-down

**Memory Modes** LPDDR5x 256b (up to 8x 32b Channels)

**Memory Speed Supported** 8000MT/s LPDDR5x

**Memory Protection** Link ECC (default enabled, user configurable)

**Maximum Memory** 128GB

**Memory Configuration (Supported)** 16GB, 32GB, 64GB, 128GB depending on APU selection

<b>Supported Interfaces</b>	<b>Integrated RAID</b>	RAID 0/1
	<b>Integrated Graphics</b>	AMD Radeon™ 8060S Graphics for AMD Ryzen™ AI MAX+ PRO 395 processor; AMD Radeon™ 8050S Graphics (on AMD Ryzen™ AI MAX+ PRO 390/ AMD Ryzen™ AI MAX+ PRO 385 processors) ; AMD Radeon™ 8040S Graphics for AMD Ryzen™ AI MAX+ PRO 380 processor. Based on Unified Memory Architecture (UMA) - a region of system memory is reserved and dedicated to the graphics display. Support for Microsoft DirectX 12 and OpenGL 4.6 ; 2x Mini DisplayPort™ 2.1 ports (mDP), 1x USB Type-C® port (USB-C), and 2x Thunderbolt™ 4 (TBT4) TBT4 ports integrated in motherboard; Supports up to four simultaneous displays with Multiple Stream Transport (MST) across VGA*/DVI*/HDMI* outputs. Max resolution with DSC supported on mDP / USB-C ports: 7680*4320 (8K) @60Hz and TBT4 port:7680*4320 (8K) @120Hz (* The 8K output requires the additional 8K adapters or cables.); non-DSC supported on mDP / USB-C ports: 3840x2160 (4K) @120Hz and TBT4 port: 3840*2160 @240Hz.
	<b>Network Controller</b>	2.5GbE controller RTL8125BPH Management capabilities: WOL and AIM-T
	<b>Serial</b>	1 internal header requires optional Serial Port Adapter Kit
	<b>HD Integrated Audio</b>	Yes
	<b>USB Connector(s)</b>	1 headphone/microphone combo; 1 SuperSpeed USB Std-A 10Gbps (charge supports up to 5V/2.1A); 1 SuperSpeed USB Type-C® 10Gbps (Alt mode DisplayPort™ 2.1 with 15W Output)

### System Technical Specifications

	<b>Rear</b>	1 RJ-45; 2 Mini DisplayPort™ 2.1; 2 SuperSpeed USB Std-A 10Gbps ports; 2 Hi-Speed USB Std-A 480Mbps ports; 2 Thunderbolt™ 4 USB Type-C (40Gbps) 1st Flex IO (top side) – choose one of the following options: 1 Dual SuperSpeed USB Std-A 5Gbps, 1 Dual SuperSpeed USB Type-C® 10Gbps, 1 GbE LAN; 2nd Flex IO (bottom side) – choose one of the following options: 1 GbE LAN, Serial port option, External Power Button, Remote Manageability kit
<b>HD Integrated Audio</b>	Yes	
<b>Flash ROM</b>	Yes	
<b>CPU Fan Header</b>	Yes	
<b>Memory Fan Header</b>	None	
<b>Chassis Fan Header</b>	None	
<b>Front PCI Fan Header</b>	None	
<b>Front Control</b>	Yes	
<b>Panel/Speaker Header</b>		
<b>CMOS Battery Holder –</b> <b>Lithium</b>	Yes	
<b>Integrated Trusted</b> <b>Platform Module</b>	Integrated TPM 2.0 Convertible to FIPS 140-2 Certified mode The TPM module disabled where restricted by law	
<b>Power Supply Headers</b>	Yes	
<b>Power Switch, Power LED</b>	Yes; 1 Header for power switch and power LED	
<b>&amp; Hard Drive LED Header</b>		
<b>Keyboard/Mouse</b>	USB or PS/2 (option)	
<b>Power Supply</b>	300W internal power supply	

### System Technical Specifications

#### System Configurations

<b>HP Z2 Mini G1a Configuration #1</b>	Processor Info	AMD Ryzen AI MAX PRO 380 APU 6C 3.6G					
	Memory Info	1x 16GB LPDDR5X					
	Graphics Info	Integrated graphics					
	Disks/Optical/Floppy	1x 512GB PCIe 2280 Val M.2 SSD					
	Power Supply	300W					
<b>Energy Consumption (Watts)</b>		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows long Idle (S0)	5.2		5.82		4.98	
	Windows short Idle (S0)	5.56		6.40		5.75	
	Windows Busy Typ (S0)	80.31		83.38		81.27	
	Windows Busy Max (S0)	97.41		109.66		93.73	
	Sleep (S3)	2.31	2.31	2.28	2.28	2.32	2.32
	Off (S5)	0.64	0.49	0.65	0.5	0.64	0.49
<b>Heat Dissipation (Btu/hr)</b>		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Enabled	LAN Disabled	LAN Enabled
	Windows long Idle (S0)	17.74		19.86		16.69	
	Windows short Idle (S0)	18.97		21.84		19.62	
	Windows Busy Typ (S0)	274.03		284.5		277.3	
	Windows Busy Max (S0)	332.38		374.18		319.82	
	Sleep (S3)	7.88	7.88	7.78	7.78	7.92	7.92
	Off (S5)	2.18	1.67	2.22	1.71	2.18	1.67
<b>HP Z2 Mini G1a Configuration #2</b>		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Enabled	LAN Disabled	LAN Enabled
		Windows long Idle (S0)		19.59		5.23	
		Windows short Idle (S0)		6.84		6.55	
		Windows Busy Typ (S0)		93.12		107.7	
<b>Energy Consumption (Watts)</b>		Windows Busy Max (S0)		125.78		125.36	
		Sleep (S3)		1.36	1.36	1.35	1.35
		Off (S5)		0.59	0.49	0.61	0.51
		Zero Power Mode (ErP)		0.26		0.28	
		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Enabled	LAN Disabled	LAN Enabled
		Windows long Idle (S0)		19.59		17.85	
		Windows short Idle (S0)		23.34		22.35	
<b>Heat Dissipation (Btu/hr)</b>		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Enabled	LAN Disabled	LAN Enabled
		Windows long Idle (S0)		19.59		17.85	
<b>Processor Info</b>		Windows short Idle (S0)		23.34		22.35	
		Windows Busy Typ (S0)		274.03		284.5	
<b>Memory Info</b>		Windows Busy Max (S0)		332.38		374.18	
		Sleep (S3)		7.88	7.88	7.78	7.78
<b>Graphics Info</b>		Off (S5)		2.18	1.67	2.22	1.71
		Zero Power Mode (ErP)		0.26		0.28	
<b>Disks/Optical/Floppy</b>		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Enabled	LAN Disabled	LAN Enabled
<b>Power Supply</b>		Windows long Idle (S0)		19.59		17.85	
		Windows short Idle (S0)		23.34		22.35	



### System Technical Specifications

	Windows Busy Typ (S0)	317.74		367.49		378.82	
	Windows Busy Max (S0)	429.18		427.75		437.37	
	Sleep (S3)	4.64	4.64	4.61	4.61	4.64	4.64
	Off (S5)	2.01	1.67	2.08	1.74	2.01	1.67
	Zero Power Mode (ErP)	0.89		0.96		0.89	

<b>HP Z2 Mini G1a Configuration #3</b>	Processor Info	AMD Ryzen AI MAX PRO 395 APU 16C 2.9G					
	Memory Info	1x 128GB LPDDR5X					
	Graphics Info	Integrated graphics					
	Disks/Optical/Floppy	2x 4TB 2280 PCIe-4x4 OPAL2 M.2 SSD					
	Power Supply	300W					

Energy Consumption (Watts)		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows long Idle (S0)	4.98		5.54		4.76	
	Windows short Idle (S0)	5.54		7.05		5.57	
	Windows Busy Typ (S0)	128.85		129.36		121.32	
	Windows Busy Max (S0)	177.73		176.62		177.3	
	Sleep (S3)	1.34	1.32	1.35	1.33	1.34	1.31
	Off (S5)	0.54	0.46	0.59	0.49	0.51	0.45
	Zero Power Mode (ErP)	0.24		0.28		0.23	

Heat Dissipation (Btu/hr)		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Enabled	LAN Disabled	LAN Enabled
	Windows long Idle (S0)	16.99		18.9		16.24	
	Windows short Idle (S0)	18.9		24.06		19.01	
	Windows Busy Typ (S0)	439.65		441.39		413.96	
	Windows Busy Max (S0)	606.44		602.65		604.97	
	Sleep (S3)	4.57	4.5	4.61	4.54	4.57	4.47
	Off (S5)	1.84	1.57	2.01	1.67	1.74	1.54
	Zero Power Mode (ErP)	0.82		0.96		0.78	

### Declared Noise Emissions

<b>System Configuration (Entry level)</b>	Processor Info	AMD FP11 Strix Halo 55W		
	Memory Info	Hynix 32G		
	Disks/Optical	PHISON 4TB x2		
	Power Supply	300W		
<b>Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)</b>		Sound Power (LWAd, bels)	Deskside Sound Pressure (LpAm, decibels)	
	Idle	2.7	16.7	
	Hard drive Operating (random reads)	3.3	24.4	



### System Technical Specifications

	<b>Hard drive Operating (active mode)</b>	3.4	25.3
<b>System Configuration (Mid-level)</b>	<b>Processor Info</b>	AMD FP11 Strix Halo 85W	
	<b>Memory Info</b>	Samsung 64G	
	<b>Disks/Optical</b>	PHISON 4TB x2	
	<b>Power Supply</b>	300W	
<b>Declared Noise Emissions</b> (in accordance with ISO 7779 and ISO 9296)		<b>Sound Power</b> (LWAd, bels)	<b>Deskside Sound Pressure</b> (LpAm, decibels)
	<b>Idle</b>	2.7	16.2
	<b>Hard drive Operating (random reads)</b>	3.3	24.6
	<b>Hard drive Operating (active mode)</b>	3.5	25.8
<b>System Configuration (High-level)</b>	<b>Processor Info</b>	AMD FP11 Strix Halo 120W	
	<b>Memory Info</b>	Samsung 128G	
	<b>Disks/Optical</b>	PHISON 4TB x2	
	<b>Power Supply</b>	300W	
<b>Declared Noise Emissions</b> (in accordance with ISO 7779 and ISO 9296)		<b>Sound Power</b> (LWAd, bels)	<b>Deskside Sound Pressure</b> (LpAm, decibels)
	<b>Idle</b>	2.7	16.8
	<b>Hard drive Operating (random reads)</b>	3.4	25.3
	<b>Hard drive Operating (active mode)</b>	3.5	26.5



### System Technical Specifications

<b>Environmental Requirements</b>	<b>Temperature</b>	Operating: 5° to 35° C (40° to 95° F) Non-operating: -40° to 60° C (-40° to 140° F) Maximum rate of change: 10°C/hr
	<b>Humidity</b>	Operating: 8% to 85% RH, non-condensing, 35° C maximum wet bulb Non-operating: 8% to 90% RH, non-condensing, 35° C maximum wet bulb
	<b>Maximum Altitude</b>	Operating (with only Solid-State Drives): 5,000 m (16,404 feet) Non-operating: 12,192 m (40,000 feet) Maximum operating temperature is reduced as altitude increases. See Cooling for details.
	<b>Dynamic</b>	Shock Operating: ½-sine: 40g, 2ms Non-operating: ½-sine: 165 cm/s, 2-3ms square: 422 cm/s, 30g
		Vibration Operating random: 0.5g (rms), 5-300 Hz, up to 0.00025g <sup>2</sup> /Hz Non-operating random: 2.0g (rms), 5-500 Hz, up to 0.0150 g <sup>2</sup> /Hz
<b>Cooling</b>		Above 1524 m (5,000 feet) altitude, the maximum operating temperature is reduced by 1° C (1.8° F) for every 305 m (1,000 feet) increase in elevation, up to 3048 m (10,000 feet)

### System Technical Specifications

#### Physical Security and Serviceability

<b>Access Panel</b>	Tool-less for Top Panel (Includes replacement storage and remote system controller information) #1 Philip screwdriver is needed for Bottom Panel
<b>Optical Drive</b>	None
<b>Hard Drives</b>	None
<b>Expansion Cards</b>	M.2 module requires a screwdriver to be serviced and replaced.
<b>Processor Socket</b>	None
<b>Blue User Touch Points</b>	None
<b>Color-coordinated Cables and Connectors</b>	Yes
<b>Memory</b>	Solder-down
<b>System Board</b>	Screw-In
<b>Dual Color Power and SSD LED</b>	The Power LED is on the front of the system, and the SSD LED is located on the rear of the system(inside)
<b>Restore CD/DVD Set</b>	None
<b>Dual Function Front Power Switch</b>	Yes, causes a fail-safe power off when held for 4 seconds or 15 seconds (can be configured by F10 BIOS setup\Advanced\System Options\Power button override)
<b>Cable Lock Support</b>	Yes, Kensington Cable Lock (optional): Locks top cover and secures chassis from theft 3 mm x 7 mm slot at rear of system
<b>Solenoid Lock and Hood Sensor</b>	Only Hood Sensor(optional)
<b>Serial, USB, Audio, Network, Enable/Disable Port</b>	Yes, enables or disables serial, USB, audio, and network ports
<b>Removable Media Write/Boot Control</b>	Yes, prevents ability to boot from removable media on supported devices (and can disable writes to media)
<b>Power-On Password</b>	Yes, prevents an unauthorized person from booting up the workstation
<b>Admin Password</b>	Yes, prevents an unauthorized person from changing the workstation configuration
<b>3.3V Aux Power LED on System PCA</b>	Yes
<b>NIC LEDs (integrated) (Green &amp; Amber)</b>	Yes

### System Technical Specifications

<b>CPUs and Heatsinks</b>	A T-15 Torx or flat blade screwdriver is needed to remove the APU heatsink
<b>Power Supply Diagnostic LED</b>	Yes (rear side)
<b>Front Power Button</b>	Yes, ACPI multi-function
<b>Front Power LED</b>	Yes, white (normal), red (fault)
<b>Internal Speaker</b>	Yes
<b>System/Emergency ROM Flash Recovery</b>	Recovers corrupted system BIOS.
<b>Cooling Solution</b>	Air cooled forced convection
<b>HP PC Hardware Diagnostics UEFI</b>	HP PC Hardware Diagnostics (UEFI) enables hardware level testing outside the operating system on many components. The diagnostics can be invoked by pressing F2 at POST and is available as a download from HP Support.
<b>Access Panel Key Lock</b>	The Kensington lock slot on the chassis serves this purpose
<b>ACPI-Ready Hardware</b>	Advanced Configuration and Power Management Interface (ACPI). <ul style="list-style-type: none"><li>Allows the system to wake from a low power mode.</li><li>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.</li></ul>
<b>Integrated Chassis Handles</b>	None
<b>Power Supply</b>	Requires T15 Torx or flat blade screwdriver
<b>Flash ROM</b>	Yes
<b>Diagnostic Power Switch LED on board</b>	Yes
<b>Clear Password Jumper</b>	None
<b>Clear CMOS Button</b>	Yes
<b>CMOS Battery Holder</b>	Yes
<b>BIOS</b>	
<b>BIOS 64-bit Services</b>	BIOS supports 64-bit Operating systems.
<b>PCI 4.0 Support</b>	Full BIOS support for PCI Express through industry standard interfaces.
<b>WMI Support</b>	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.

### System Technical Specifications

<b>BIOS Power On</b>	Users can define a specific date and time for the system to power on.
<b>ROM Based Computer</b>	Review and customize system configuration settings controlled by the BIOS.
<b>Setup Utility (F10)</b>	
<b>System/Emergency ROM</b>	
<b>Flash Recovery with Video</b>	Recovers system BIOS in corrupted Flash ROM.
<b>Replicated Setup</b>	Saves BIOS settings to USB flash device in human readable file (HpSetup.txt). BiosConfigurationUtility.exe utility can then replicate these settings on machines being deployed without entering Computer Configuration Utility (F10 Setup).
<b>SMBIOS</b>	System Management BIOS 3.4, for system management information.
<b>Boot Control</b>	Disables the ability to boot from removable media on supported devices.
<b>Thermal Alert</b>	Monitors the temperature state within the chassis. Three modes: <ul style="list-style-type: none"><li>• <b>NORMAL</b> - normal temperature ranges.</li><li>• <b>ALERTED</b> - excessive temperatures are detected. Raises a flag so action can be taken to avoid shutdown or provide for a smoother system shutdown.</li><li>• <b>SHUTDOWN</b> - excessive temperatures are encountered. Automatically shuts down the computer without warning before hardware component damage occurs.</li></ul>
<b>Remote ROM Flash</b>	Provides secure, fail-safe ROM image management from a central network console.
<b>ACPI (Advanced Configuration and Power Management Interface)</b>	Allows the system to enter and resume from low power modes (sleep states). Enables an operating system to control system power consumption based on the dynamic workload. Makes it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system. Supports ACPI 5.0 for full compatibility with 64-bit operating systems.
<b>Ownership Tag</b>	A user-defined string stored in non-volatile memory that is displayed in the BIOS splash screen.
<b>Remote Wakeup/Remote Shutdown</b>	System administrators can power on, restart, and power off a client computer from a remote location.
<b>Remote System Installation via F12 (PXE 2.1) (Remote Boot from Server)</b>	Allows a new or existing system to boot over the network and download software, including the operating system.
<b>ROM revision levels</b>	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.
<b>Start-up Diagnostics (Power-on Self-Test)</b>	Assesses system health at boot time with selectable levels of testing.
<b>Auto Setup when new hardware installed</b>	System automatically detects addition of new hardware.
<b>Keyboard-less Operation</b>	The system can be booted without a keyboard.
<b>Localized ROM Setup</b>	Common BIOS image supports System Configuration Utility (F10 Setup) menus in 14 languages with local keyboard mappings.
<b>Asset Tag</b>	The user or MIS to set a unique tag string in non-volatile memory.

### System Technical Specifications

<b>Per-slot Control</b>	Allows I/O slot parameters (option ROM enable/disable, bus latency) to be configured individually.
<b>Adaptive Cooling</b>	Control parameters are set according to detected hardware configuration for optimal acoustics.
<b>Pre-boot Diagnostics</b>	(Pre-video) critical errors are reported via beeps and blinks on the power LED.
<b>UEFI Specification</b>	
<b>Revision</b>	2.8
<b>ACPI</b>	Advanced Configuration and Power Management Interface, Version 6.0
<b>xHCI</b>	eXtensible Host Controller Interface for Universal Serial Bus, Revision 1.2
<b>PCI</b>	PCI Local Bus Specification, Revision 2.3
	PCI Power Management Specification, Revision 1.1
	PCI Firmware Specification, Revision 3.0
<b>PCI Express</b>	PCI Express Base Specification, Revision 3.0
	PCI Express Base Specification, Revision 4.0
<b>TPM</b>	Trusted Computing Group TPM Specification Version 2.0 (Nuvoton NPCT760HACYX or Infineon SLB9672). Common Criteria EAL4+ certified. FIPS 140-2 Certification TCG TPM Certified products list: <a href="http://www.trustedcomputinggroup.org/certification/tpm-certified-products/">http://www.trustedcomputinggroup.org/certification/tpm-certified-products/</a>
<b>USB</b>	Universal Serial Bus Revision 1.1 Specification Universal Serial Bus Revision 2.0 Specification Universal Serial Bus Revision 3.2 Specification Universal Serial Bus Revision 4.0 Specification
<b>SMBIOS</b>	System Management BIOS Reference Specification, Version 3.4

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

### Service, Support, and Warranty

On-site Warranty and Service<sup>1</sup>: One-year (1-1-1), limited warranty and service offering delivers on-site, next business-day<sup>2</sup> service for parts and labor and includes free telephone support<sup>3</sup> 8am - –5pm. Global coverage<sup>2</sup> ensures that any product purchased in one country and transferred to another, non-restricted country will remain fully covered under the original warranty and service offering. 24/7 operation will not void the HP warranty. 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 is not available in certain countries. Global service response times are based on commercially reasonable best effort and may vary by country.

**NOTE 3:** Technical telephone support applies only to HP-configured, HP and HP-qualified, third-party hardware and software. Toll-free calling and 24x7 support service may not be available in some countries. HP Care Pack Services extend service contracts beyond the standard warranties. Service starts from date of hardware purchase. To choose the right level of service for your HP product, use the HP Care Pack Services Lookup Tool at: <http://www.hp.com/go/lookuptool>. Service levels and response times for HP Care Packs may vary depending on your geographic location.



### System Technical Specifications

#### 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](mailto: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](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](mailto:techregshelp@hp.com)

#### Social and Environmental Responsibility

##### Eco-Label Certifications & declarations

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

- 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 Certified
- China Energy Conservation Program (CECP)
- China State Environmental Protection Administration (SEPA)
- Taiwan Green Mark
- Korea Eco-label



### System Technical Specifications

#### Sustainable Impact Specifications

- Japan PC Green label\*
- [Product Carbon Footprint](#)
- At least 25% ITE-Derived closed loop plastic<sup>2</sup>
- At least 65% post-consumer recycled plastic<sup>2</sup>
- At least 15% recycled metal<sup>3</sup>
- Low Halogen<sup>4</sup>
- 100% of HP paper-based packaging is from recycled or certified sustainable sources<sup>5</sup>
- Bulk packaging available

#### System Configuration

The configuration used for the Energy Consumption and Declared Noise Emissions data for the Workstation model is based on a “Typically Configured Workstation”.

#### Energy Consumption (in accordance with US ENERGY STAR® test method)

	<b>115VAC, 60Hz</b>	<b>230VAC, 50Hz</b>	<b>100VAC, 50Hz</b>
Normal Operation (Short idle)	4.63 W	4.60 W	4.38 W
Normal Operation (Long idle)	4.05 W	3.88 W	4.27 W
Sleep	1.14 W	1.12 W	2.06 W
Off	0.55 W	0.85 W	0.85 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\*

	<b>115VAC, 60Hz</b>	<b>230VAC, 50Hz</b>	<b>100VAC, 50Hz</b>
Normal Operation (Short idle)	16 BTU/hr	16 BTU/hr	15 BTU/hr
Normal Operation (Long idle)	14 BTU/hr	13 BTU/hr	15 BTU/hr
Sleep	3.9 BTU/hr	4 BTU/hr	7 BTU/hr
Off	1.9 BTU/hr	3 BTU/hr	2.9 BTU/hr



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**\*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 <sub>WA</sub> , bels)	Sound Pressure (L <sub>PA</sub> , decibels)
Typically Configured – Idle	2.7	16.8
Fixed Disk – Random writes	3.4	25.3
Optical Drive – Sequential reads	3.5	26.5
<b>Longevity and Upgrading</b>	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.	
<b>Additional Information</b>	<ul style="list-style-type: none"><li>This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive – 2011/65/EC.</li><li>This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive – 2002/96/EC.</li><li>This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).</li><li>This product is in compliance with the IEEE 1680.1 (EPEAT) standard at the Gold level, see <a href="http://www.epeat.net">www.epeat.net</a></li><li>Plastics parts weighing over 25 grams used in the product are marked per ISO11469 and ISO1043.</li><li>This product is 96.8% recycle-able when properly disposed of at end of life.</li></ul>	
<b>Packaging Materials</b>	<b>External:</b> PAPER/Corrugated PAPER/Molded Pulp	730 g 378 g
	<b>Internal:</b> PLASTIC/Polyethylene low density – LDPE	18 g
	The plastic packaging material contains at least 0.0% recycled content. The corrugated paper packaging materials contains at least 93.0% recycled content.	
<b>RoHS Compliance</b>	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—	



### System Technical Specifications

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

<https://h20195.www2.hp.com/v2/GetDocument.aspx?docname=c05998906>):

- 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:

<https://h20195.www2.hp.com/V2/GetDocument.aspx?docname=c05403198>

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: [HP Product Disassembly Instruction Website](#). 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:

- Sustainable Impact Report
  - <https://h20195.www2.hp.com/v2/GetDocument.aspx?docname=c06040843>
- Eco-label certifications
  - [https://www.hp.com/us-en/sustainable-impact/document-reports.html#filters\\_documents\\_reports--document\\_type-type\\_energy\\_star,type\\_epeat,type\\_tcolISO](https://www.hp.com/us-en/sustainable-impact/document-reports.html#filters_documents_reports--document_type-type_energy_star,type_epeat,type_tcolISO)
- ISO 14001 certificates
  - <https://h20195.www2.hp.com/v2/GetDocument.aspx?docname=c04777932>

#### footnotes

2. Recycled plastic is expressed as a percentage of the total weight plastic. Post-consumer recycled is based on the definition set in the EPEAT standard for computers, IEEE 1680.1-2018 standard.
3. 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.
4. External power supplies, WWAN modules, power cords, cables and peripherals excluded. Service parts obtained after purchase may not be Low Halogen.
5. HP paper and fiber-based packaging for PCs, displays, home and office print, and supplies is reported by suppliers as recycled or certified, with a minimum of 97% by volume verified by HP. Packaging is the box that comes with the product and all paper-based materials inside the box. Packaging for personal systems accessories and spare parts is not included. Plastic cushions are made from >90% recycled plastic.



### Technical Specifications - Storage Drives

#### STORAGE

##### PCIe SSDs for HP Workstations

<b>HP Z Turbo Drv PCIE-4X4</b>	<b>Capacity</b>	512GB
<b>512GB</b>	<b>Protocol</b>	PCIe
<b>TLC PCIe SSD</b>	<b>Form Factor</b>	M.2 in native Slot on motherboard
	<b>Controller</b>	NVMe
	<b>NAND Type</b>	3D TLC
	<b>Endurance</b>	150TBW (TB Written)
	<b>Reliability</b>	1.5M Hours
	<b>Interface</b>	PCI Express 4.0 x4 electrical
	<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)
	<b>Performance</b>	
	<b>Sequential Read</b>	6400MB/s*
	<b>Sequential Write</b>	3400MB/s*
	<b>Random Read</b>	600K IOPS*
	<b>Random Write</b>	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.

<b>HP Z Turbo Drv PCIE-4X4 1TB</b>	<b>Capacity</b>	1TB
<b>TLC PCIe SSD</b>	<b>Protocol</b>	PCIe
	<b>Form Factor</b>	M.2 in native Slot on motherboard
	<b>Controller</b>	NVMe
	<b>NAND Type</b>	3D TLC
	<b>Endurance</b>	300TBW (TB Written)
	<b>Reliability</b>	1.5M Hours
	<b>Interface</b>	PCI Express 4.0 x4 electrical
	<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)
	<b>Performance</b>	
	<b>Sequential Read</b>	6500MB/s*
	<b>Sequential Write</b>	5000MB/s*
	<b>Random Read</b>	800K IOPS*
	<b>Random Write</b>	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.

<b>HP Z Turbo Drv PCIE-4X4 2TB</b>	<b>Capacity</b>	2TB
<b>TLC PCIe SSD</b>	<b>Protocol</b>	PCIe



### Technical Specifications - Storage Drives

<b>Form Factor</b>	M.2 in native Slot on motherboard
<b>Controller</b>	NVMe
<b>NAND Type</b>	3D TLC
<b>Endurance</b>	600TBW (TB Written)
<b>Reliability</b>	1.5M Hours
<b>Interface</b>	PCI Express 4.0 x4 electrical
<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)
<b>Performance</b>	
<b>Sequential Read</b>	6500MB/s*
<b>Sequential Write</b>	5000MB/s*
<b>Random Read</b>	800K IOPS*
<b>Random Write</b>	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 Drv PCIE-4X4 4TB TLC PCIe SSD

<b>Capacity</b>	4TB
<b>Protocol</b>	PCIe
<b>Form Factor</b>	M.2 in native Slot on motherboard
<b>Controller</b>	NVMe
<b>NAND Type</b>	3D TLC
<b>Endurance</b>	600TBW (TB Written)
<b>Reliability</b>	1.5M Hours
<b>Interface</b>	PCI Express 4.0 x4 electrical
<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)
<b>Performance</b>	
<b>Sequential Read</b>	6500MB/s*
<b>Sequential Write</b>	5000MB/s*
<b>Random Read</b>	800K IOPS*
<b>Random Write</b>	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 Drv PCIE Gen4x4 512GB TLC PCIe SED OPAL2

<b>Capacity</b>	512GB
<b>Protocol</b>	PCIe
<b>Form Factor</b>	M.2 in native Slot on motherboard
<b>Controller</b>	NVMe
<b>NAND Type</b>	3D TLC
<b>Endurance</b>	150TBW (TB Written)
<b>Reliability</b>	1.5M Hours



### Technical Specifications - Storage Drives

<b>Interface</b>	PCI Express 4.0 x4 electrical
<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)
<b>Performance</b>	
<b>Sequential Read</b>	6400MB/s*
<b>Sequential Write</b>	3400MB/s*
<b>Random Read</b>	600K IOPS*
<b>Random Write</b>	600K IOPS*
<b>Self-Encrypting Drive Support</b>	OPAL2

\*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 Drv PCIE Gen4x4

1TB

TLC PCIe SED OPAL2

<b>Capacity</b>	1TB
<b>Protocol</b>	PCIe
<b>Form Factor</b>	M.2 in native Slot on motherboard
<b>Controller</b>	NVMe
<b>NAND Type</b>	3D TLC
<b>Endurance</b>	300TBW (TB Written)
<b>Reliability</b>	1.5M Hours
<b>Interface</b>	PCI Express 4.0 x4 electrical
<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)
<b>Performance</b>	
<b>Sequential Read</b>	6500MB/s*
<b>Sequential Write</b>	5000MB/s*
<b>Random Read</b>	800K IOPS*
<b>Random Write</b>	800K IOPS*
<b>Self-Encrypting Drive Support</b>	OPAL2

\*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 Drv PCIE Gen4x4

2TB

TLC PCIe SED OPAL2

<b>Capacity</b>	2TB
<b>Protocol</b>	PCIe
<b>Form Factor</b>	M.2 in native Slot on motherboard
<b>Controller</b>	NVMe
<b>NAND Type</b>	3D TLC
<b>Endurance</b>	600TBW (TB Written)
<b>Interface</b>	PCI Express 4.0 x4 electrical
<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)
<b>Performance</b>	
<b>Sequential Read</b>	6500MB/s*



### Technical Specifications - Storage Drives

<b>Sequential Write</b>	5000MB/s*
<b>Random Read</b>	800K IOPS*
<b>Random Write</b>	800K IOPS*
<b>Self-Encrypting Drive Support</b>	OPAL2

\*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.

<b>HP Z Turbo Drv PCIE Gen4x4</b>	<b>Capacity</b>	4TB
<b>4TB</b>	<b>Protocol</b>	PCIe
<b>TLC PCIe SED OPAL2</b>	<b>Form Factor</b>	M.2 in native Slot on motherboard
	<b>Controller</b>	NVMe
	<b>NAND Type</b>	3D TLC
	<b>Endurance</b>	600TBW (TB Written)
	<b>Interface</b>	PCI Express 4.0 x4 electrical
	<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)
	<b>Performance</b>	
	<b>Sequential Read</b>	6500MB/s*
	<b>Sequential Write</b>	5000MB/s*
	<b>Random Read</b>	800K IOPS*
	<b>Random Write</b>	800K IOPS*
	<b>Self-Encrypting Drive Support</b>	OPAL2

\*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.

<b>256GB 2280 PCIe-4x4 Value</b>	<b>Capacity</b>	256GB
<b>M.2 SSD</b>	<b>Protocol</b>	PCIe
	<b>Form Factor</b>	M.2 in native Slot on motherboard
	<b>Controller</b>	NVMe
	<b>NAND Type</b>	3D TLC
	<b>Endurance</b>	200TBW (TB Written)
	<b>Reliability</b>	1.5M Hours
	<b>Interface</b>	PCI Express 4.0 x4 electrical
	<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)
	<b>Performance</b>	
	<b>Sequential Read</b>	3100MB/s*
	<b>Sequential Write</b>	1400MB/s*
	<b>Random Read</b>	200K IOPS*
	<b>Random Write</b>	400K IOPS*

\*Actual performance may vary.



### Technical Specifications - Storage Drives

**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.

#### 512GB 2280 PCIe-4x4 Value M.2 SSD

<b>Capacity</b>	512GB
<b>Protocol</b>	PCIe
<b>Form Factor</b>	M.2 in native Slot on motherboard
<b>Controller</b>	NVMe
<b>NAND Type</b>	3D TLC
<b>Endurance</b>	300TBW (TB Written)
<b>Reliability</b>	1.5M Hours
<b>Interface</b>	PCI Express 4.0 x4 electrical
<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)
<b>Performance</b>	
<b>Sequential Read</b>	3400MB/s*
<b>Sequential Write</b>	2500MB/s*
<b>Random Read</b>	380K IOPS*
<b>Random Write</b>	430K 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.

#### 1TB 2280 PCIe-4x4 Value M.2 SSD

<b>Capacity</b>	1TB
<b>Protocol</b>	PCIe
<b>Form Factor</b>	M.2 in native Slot on motherboard
<b>Controller</b>	NVMe
<b>NAND Type</b>	3D TLC
<b>Endurance</b>	400TBW (TB Written)
<b>Reliability</b>	1.5M Hours
<b>Interface</b>	PCI Express 4.0 x4 electrical
<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)
<b>Performance</b>	
<b>Sequential Read</b>	3400MB/s*
<b>Sequential Write</b>	2500MB/s*
<b>Random Read</b>	500K IOPS*
<b>Random Write</b>	440K 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.

<b>Capacity</b>	512GB
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### Technical Specifications - Storage Drives

<b>512GB TLC PCIE Gen3x4 SED FIPS 140-2</b>	<b>Protocol</b>	PCIe
	<b>Form Factor</b>	M.2 in native Slot on motherboard
	<b>Controller</b>	NVMe
	<b>NAND Type</b>	3D TLC
	<b>Endurance</b>	320 TBW (TB Written)
	<b>Reliability</b>	1.5M Hours
	<b>Interface</b>	PCI Express 3.0 x4 electrical
	<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)
	<b>Performance</b>	
	<b>Sequential Read</b>	up to 3400MB/s [1]
	<b>Sequential Write</b>	up to 2500MB/s [1]
	<b>Random Read</b>	420K IOPS [1]
	<b>Random Write</b>	635K IOPS[1]
	<b>Self-Encrypting Drive Support</b>	OPAL2/FIPS 140-2

\*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.

<b>1TB TLC PCIE Gen3x4 SED FIPS 140-2</b>	<b>Capacity</b>	1TB
	<b>Protocol</b>	PCIe
	<b>Form Factor</b>	M.2 in native Slot on motherboard
	<b>Controller</b>	NVMe
	<b>NAND Type</b>	3D TLC
	<b>Endurance</b>	1620 TBW (TB Written)
	<b>Reliability</b>	1.5M Hours
	<b>Interface</b>	PCI Express 3.0 x4 electrical
	<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)
	<b>Performance</b>	
	<b>Sequential Read</b>	3400MB/s* [1]
	<b>Sequential Write</b>	3000MB/s* [1]
	<b>Random Read</b>	720K IOPS* [1]
	<b>Random Write</b>	690K IOPS* [1]
	<b>Self-Encrypting Drive Support</b>	OPAL2/FIPS 140-2

\*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.

<b>2TB TLC PCIE Gen3x4 SED FIPS 140-2</b>	<b>Capacity</b>	2TB
	<b>Protocol</b>	PCIe
	<b>Form Factor</b>	M.2 in native Slot on motherboard
	<b>Controller</b>	NVMe



### Technical Specifications - Storage Drives

<b>NAND Type</b>	3D TLC
<b>Endurance</b>	3140 TBW (TB Written)
<b>Interface</b>	PCI Express 3.0 x4 electrical
<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)
<b>Performance</b>	
<b>Sequential Read</b>	3400MB/s*
<b>Sequential Write</b>	3000MB/s*
<b>Random Read</b>	720K IOPS*
<b>Random Write</b>	690K IOPS*
<b>Self-Encrypting Drive Support</b>	OPAL2/FIPS 140-2

\*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.

#### Citadel 512GB TLC PCIE Gen3x4 Advence FIPS 140-2

<b>Capacity</b>	512GB
<b>Protocol</b>	PCIe
<b>Form Factor</b>	M.2 in native Slot on motherboard
<b>Controller</b>	NVMe
<b>NAND Type</b>	3D TLC
<b>Endurance</b>	320 TBW (TB Written)
<b>Reliability</b>	1.5M Hours
<b>Interface</b>	PCI Express 3.0 x4 electrical
<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)
<b>Performance</b>	
<b>Sequential Read</b>	up to 3400MB/s [1]
<b>Sequential Write</b>	up to 2500MB/s [1]
<b>Random Read</b>	420K IOPS [1]
<b>Random Write</b>	635K IOPS[1]
<b>Self-Encrypting Drive Support</b>	OPAL2/FIPS 140-2

\*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.

#### Citadel 1TB TLC PCIE Gen3x4 Advence FIPS 140-2

<b>Capacity</b>	1TB
<b>Protocol</b>	PCIe
<b>Form Factor</b>	M.2 in native Slot on motherboard
<b>Controller</b>	NVMe
<b>NAND Type</b>	3D TLC
<b>Endurance</b>	1620 TBW (TB Written)
<b>Reliability</b>	1.5M Hours
<b>Interface</b>	PCI Express 3.0 x4 electrical



### Technical Specifications - Storage Drives

<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)
<b>Performance</b>	
<b>Sequential Read</b>	3400MB/s* [1]
<b>Sequential Write</b>	3000MB/s* [1]
<b>Random Read</b>	720K IOPS* [1]
<b>Random Write</b>	690K IOPS* [1]
<b>Self-Encrypting Drive Support</b>	OPAL2/FIPS 140-2

\*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

<b>Citadel 2TB TLC PCIE Gen3x4</b>	<b>Capacity</b>	2TB
<b>Advence FIPS 140-2</b>	<b>Protocol</b>	PCIe
	<b>Form Factor</b>	M.2 in native Slot on motherboard
	<b>Controller</b>	NVMe
	<b>NAND Type</b>	3D TLC
	<b>Endurance</b>	3140 TBW (TB Written)
	<b>Interface</b>	PCI Express 3.0 x4 electrical
	<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)
	<b>Performance</b>	
	<b>Sequential Read</b>	3400MB/s*
	<b>Sequential Write</b>	3000MB/s*
	<b>Random Read</b>	720K IOPS*
	<b>Random Write</b>	690K IOPS*
	<b>Self-Encrypting Drive Support</b>	OPAL2/FIPS 140-2

*\*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 - Networking and Communications

#### NETWORKING / COMMUNICATION

<b>Realtek RTL 8125BP (Integrated)</b>	<b>Connector</b>	RJ-45 (Single Port)
	<b>Cabling</b>	Twisted Pair Cabling, up to 100 meter, 2.5GbE on CAT 5e UTP and up, 1GbE/10Mbps on CAT 5 UTP and up
	<b>Controller</b>	Realtek RTL8125BP-CG 2.5GbE platform LAN networking controller
	<b>Memory</b>	512 bit Tx Buffer, 1024 bit Rx buffer
	<b>Data Rates Supported</b>	10/100/1000 M/2500 Mbps
	<b>Compliance</b>	802.1as/1588, 802.1p, 802.1Qav, 802.1Q, 802.3, 802.3ab, 802.1ad, 802.3az, 802.3x, 802.3u, 802.3bz
		NDIS5, NDIS6 (IPv4, IPv6, TCP, UDP) Checksum and Segmentation Task-offload, PCIe 3.0 LTR
	<b>Bus Architecture</b>	PCI Express, USB 2.0 interface, and SMBus
	<b>Data Transfer Mode</b>	PCIe-based interface for active state operation (S0 state) and SMBus for host and management traffic (Sx and low power states)
	<b>Power Requirement</b>	3.3V supplied by platform
	<b>Boot ROM Support</b>	Yes
	<b>Network Transfer Mode</b>	Full-duplex; Half-duplex
	<b>Network Transfer Rate</b>	2500BASE-T Full-Duplex 1000BASE-T Full-Duplex 100BASE-TX Full-Duplex 100BASE-TX Half-Duplex 10BASE-T Full-Duplex 10BASE-T Half-Duplex
	<b>Management Capabilities</b>	WOL, PXE, UEFI, ASF 2.0, DASH
	<b>Notes</b>	onboard LAN support RDP Wake on LAN function, if some networking device does not support Modern standby feature for WOL limitation, suggest using this Function for alternate solution for WOL G3-S5/ S5/S4/MSC wake.

<b>HP Flex 1GbE Single Port NIC</b>	<b>Connector</b>	RJ-45 (Single Port)
	<b>Cabling</b>	Twisted Pair Cabling, up to 100 meter, 2.5GbE on CAT 5e UTP and up, 1GbE/10Mbps on CAT 5 UTP and up
	<b>Controller</b>	Realtek 8153 Ethernet Controller
	<b>Data Rates Supported</b>	10/100/1000 Mbps
	<b>Compliance</b>	802.3 (LAN) 802.3u (100BASE-TX) 802.3ab (1000BASE-T) 802.3x (Ethernet Flow Control) 802.1Q (Virtual LAN) 802.1P Layer 2 Priority Encoding 802.3az (Energy Efficient Ethernet)
	<b>Bus Architecture</b>	USB
	<b>Power Requirement</b>	3.8 Watts
	<b>Boot ROM Support</b>	Yes



### Technical Specifications - Networking and Communications

<b>Network Transfer Mode</b>	Full duplex; Half-duplex
<b>Network Transfer Rate</b>	2500BASE-T Full-Duplex 1000BASE-T Full-Duplex 100BASE-TX Full-Duplex 100BASE-TX Half-Duplex 10BASE-T Full-Duplex 10BASE-T Half-Duplex
<b>HP 2.5GbE LAN Flex Port</b>	
<b>Connector</b>	RJ-45 (Single Port)
<b>Cabling</b>	Twisted Pair Cabling, up to 100 meter, 2.5GbE on CAT 5e UTP and up, 2.5GbE/1GbE/10Mbps on CAT 5 UTP and up
<b>Controller</b>	I226
<b>Data Rates Supported</b>	10/100/1000Mbps and 2.5Gbps BASE-T
<b>Compliance</b>	IEEE: 802.3 (Ethernet Interface for 2500BASE-T, 1000BASE-T, 100BASE-TX, and 10BASE-TE) 802.1AS-Rev 802.1Q (Virtual LAN) 802.1Qav 802.1Qbu 802.1Qbv 1588 802.1AS-REV 802.1p/Q 802.3br 802.3az (Energy Efficient Ethernet) 802.3x (Ethernet Flow Control) 802.3z CB Certification (International Safety) NRTL UL Certification (North America Safety) FCC Class B (USA) CE (European Union) ICES-003 Class B (Canada) BSMI (Taiwan) VCCI (Japan) KCC (Korea) CTICK (Australia/New Zealand) UKCA (UK) UL (Safety) RoHS (Restricted or Hazardous Substances)
<b>Bus Architecture</b>	PCIe-based interface for active state operation (S0 state) and SMBus for host and management traffic (Sx and low power states)
<b>Power Requirement</b>	2.5W
<b>Network Transfer Mode</b>	Full-duplex; Half-duplex
<b>Network Transfer Rate</b>	2500BASE-T Full-Duplex 1000BASE-T Full-Duplex 100BASE-TX Full-Duplex 100BASE-TX Half-Duplex 10BASE-T Full-Duplex 10BASE-T Half-Duplex
<b>HP 10GBase-T Flex IO</b>	
<b>Connector</b>	RJ-45 (Single Port)
<b>Cabling</b>	10GbE over Category 6a (or better) up to 100m 5GbE over Category 5e (or better) up to 100m
<b>Controller</b>	Marvell AQC113C
<b>Data Rates Supported</b>	10/100/1000 Mbps and 2.5/5/10 Gbps
<b>Compliance</b>	802.3-2018 Clauses 55 and 126 802.3az (Energy Efficient Ethernet) 1588 v2 (Precision Clock Synchronization) NBASE-T™ Alliance PHY Specification CB Certification (International Safety)

### Technical Specifications - Networking and Communications

	NRTL UL Certification (North America Safety) FCC Class B (USA) CE (European Union) ICES-003 Class B (Canada) BSMI (Taiwan) VCCI (Japan) KCC (Korea) CTICK (Australia/New Zealand) UKCA (UK) UL (Safety) RoHS (Restricted or Hazardous Substances)
<b>Bus Architecture</b>	PCIe-based interface for active state operation (S0 state) and SMBus for host and management traffic (Sx and low power states)
<b>Power Requirement</b>	6.5W
<b>Network Transfer Mode</b>	Full-duplex; Half-duplex
<b>Network Transfer Rate</b>	10G BASE-T 5G BASE-T 2.5G BASE-T 2.5GBASE-T 1000BASE-T 100BASE-TX 10 BASE-T Te
<b>Notes</b>	<ol style="list-style-type: none"><li>1. The HP 10GBase-T Flex IO NIC does <b>NOT</b> support Modern Standby or wake from S4/S5 states. To ensure reliable wake functionality, customers are advised to use the <b>onboard LAN</b> for Remote Power-On (Wake event) instead of relying on the Flex IO NIC. This approach is recommended to avoid limitations associated with the Flex IO module in Modern Standby configurations</li><li>2. There is a known issue when using the LAN connection through the Flex IO module. In some cases, the system may automatically resume from S4/S5 states unexpectedly. To reduce this risk, customers can manually disable the wake function of the HP 10GBase-T Flex IO NIC by adjusting the driver settings: Go to <b>Device Manager &gt; Network Adapter &gt; Advanced Tab</b>, and set <b>“Wake from power off state” to Disabled</b>.</li></ol>

<b>HP Flex 1GbE Fiber LC Single Port</b>	<b>Connector</b> 1 LC Optical Fiber Port (Little Connector)
	<b>Cabling</b> Optical Multi Mode Fiber OM2 or better
	<b>Controller</b> AT-29M2
	<b>Data Rates Supported</b> 1GbE
	<b>Compliance</b> IEEE 802.3 IEEE 802.3u IEEE 802.3ab IEEE 802.1q VLAN Tagging IEEE 802.1AS IEEE 1588 IEEE 802.3az Energy Efficient Ethernet CB Certification (International Safety) NRTL UL Certification (North America Safety) FCC Class B (USA) CE (European Union) ICES-003 Class B (Canada) BSMI (Taiwan) VCCI (Japan) KCC (Korea) CTICK

### Technical Specifications - Networking and Communications

		(Australia/New Zealand) UKCA (UK) UL (Safety) RoHS (Restricted or Hazardous Substances)
<b>Bus Architecture</b>		USB 3.1 interface,, USB 2.0 interface,
<b>Power Requirement</b>		Requires 3.3V (integrated regulators for core Vdc) Up to 3W
<b>MediaTek Wi-Fi 7 MT7925</b>	<b>WLAN Standards</b>	IEEE 802.11 a/b/g/n/ac/ax/be compliant
<b>802.11be AIM-T BT 5.4</b>		Support 20/40 MHz bandwidth in 2.4 GHz band
		Support 20/40/80/160 MHz bandwidth in 5 GHz band and 6 GHz band
		Support MU-MIMO RX
		Security support for WFA WPA/WPA2/WPA3 personal / enterprise,WPS2.0, FIPS
	<b>Antenna</b>	2x2 Dual-Band
	<b>Bluetooth Standards</b>	5.4
	<b>Operating Temperature</b>	14° to 158° F (-10° to 70°C)
	<b>Interface</b>	M.2 PCIe
	<b>Dimensions</b>	M.2 2230
	<b>Kit Contents</b>	Not Available

Date of change	Version History		Description of change
April 16, 2025	From v1 to v2	Changed	Social and Environmental Responsibility section
May 27, 2025	From v2 to v3	Changed	NETWORKING / COMMUNICATION section
June 1, 2025	From v3 to v4	Changed	Format
June 5, 2025	From v4 to v5	Changed	NETWORKING / COMMUNICATION section
August 1, 2025	From v5 to v6	Changed	Operating Systems, PCIe Solid State Drives, Networking and Communications, Other Hardware sections
		Changed	Optical and Removable Storage section
August 1, 2025	From v6 to v7	Changed	Processors section
September 1, 2025	From v7 to v8	Changed	Graphics section

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