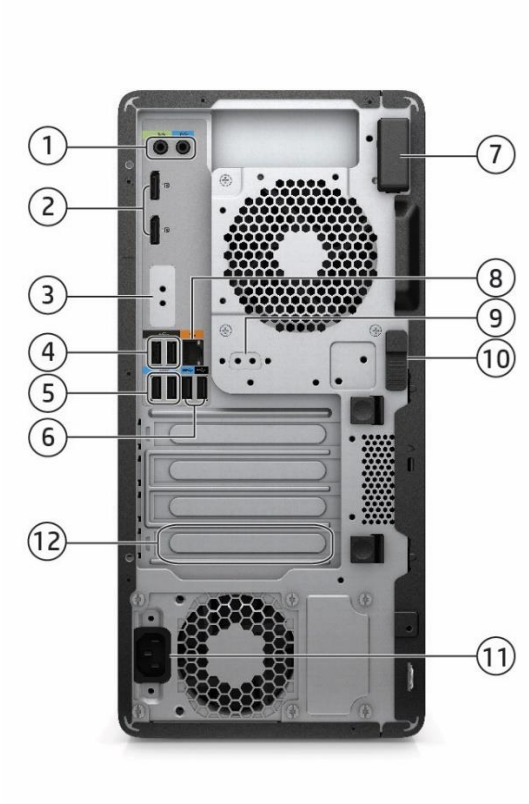
Overview

HP Z2 Tower G8 Workstation

front

1. HDD Activity LED
2. Power button
3. Universal audio jack (with CTIA & OMTP headset support)
4. (2) Type-A SuperSpeed USB 5Gbps signaling rate port (1 charge port supports up to 5V/2.1A)
5. (2) Type-A SuperSpeed USB 10Gbps signaling rate port
6. (1) Type-C® SuperSpeed USB 20Gbps signaling rate port (optional, charge supports up to 5V/3A)
7. SD card reader 4.0 (optional)
8. Slim ODD bay
9. External 5.25" bay

Overview



rear

1. (1) Audio Line-in jack
   (1) Audio Line-out jack
2. (2) DisplayPort 1.4
3. Flex I/O module: choose one from the following:
   (1) DisplayPort 1.4, (1) HDMI 2.0b, (1) VGA, (1) Dual Type-A SuperSpeed USB 5Gbps signaling rate port, (1) Type-C® SuperSpeed USB 10Gbps signaling rate port (Power Delivery 15W, Alt Mode DisplayPort), (1) 2nd GbE LAN, (1) Thunderbolt 3 with Type-C® SuperSpeed USB4 40Gbps signaling rate* (cabled to PCIe AIC)
4. (2) Hi-Speed USB 480Mbps signaling rate port
5. (2) Type-A SuperSpeed USB 10Gbps signaling rate port
6. (1) Type-A SuperSpeed USB 5Gbps signaling rate port
   (1) Hi-Speed USB 480Mbps signaling rate port
7. WLAN Antenna (optional)
8. RJ-45
9. 2nd serial port (optional)
10. Release latch
11. Power connector
12. Type-C® Thunderbolt™ 3 port (optional)

*Maximum speed requires DisplayPort™ and PCIe aggregation.
Note: All onboard Display support DP1.4/HBR2 when video output is via Intel Graphics.
Note: Flex I/O module Display support DP1.4/HBR3, resolution support up to 5120x3200 24bpp @60Hz
NOTE: TBT 3 will be available in Q3, 2021

Form Factor Tower

Operating Systems Preinstalled:

- Windows 10 Pro 64[1]
- Windows 10 Pro 64 High End[1]
- Windows 10 Pro 64 Workstation Plus[1]
- Windows 10 Home 64 Plus[1]
- Windows 10 Home 64 Advanced[1]

Overview

- Linux®-ready[2]
- Ubuntu Linux 20.04 LTS[3]
- Red Hat® Enterprise Linux® (RHEL) Workstation – paper license (1 yr) only (not preinstalled)
-

Web-supported only:
- Windows 10 Enterprise 64[1]

Supported Version:
- HP tested Windows 10, versions 1909, 2004, and 20H2 on this platform. For testing information on newer versions of Windows 10, please see: https://support.hp.com/document/c05195282.

[1] 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 10 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.

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

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

[3] Ubuntu Linux 20.04 LTS available Q3, 2021

Processors

Name	Cores	Clock Speed (GHz)	Cache (MB)	Memory Speed (MT/s)	Hyper-Threading	Integrated Graphics	Intel® Turbo Boost Technology[3]	Featuring Intel® vPro® Technology[4]	16GB Intel® Optane™ memory[2]	TDP (W)
Intel® Core™ i9 11900K Processor	8	3.5	16	3200	TRUE	Intel® UHD Graphics 750	5.2	TRUE	Y	125
Intel® Core™ i9 11900F Processor	8	2.5	16	3200	TRUE	N/A	5.2	N/A	Y	65
Intel® Core™ i9 11900 Processor	8	2.5	16	3200	TRUE	Intel® UHD Graphics 750	5.2	TRUE	Y	65
Intel® Core™ i7 11700K Processor	8	3.6	16	3200	TRUE	Intel® UHD Graphics 750	5	TRUE	Y	125
Intel® Core™ i7 11700 processor	8	2.5	16	3200	TRUE	Intel® UHD Graphics 750	4.9	TRUE	Y	65
Intel® Core™ i5 11600K processor	6	3.9	12	3200	TRUE	Intel® UHD Graphics 750	4.9	TRUE	Y	125
Intel® Core™ i5 11600 processor	6	2.8	12	3200	TRUE	Intel® UHD Graphics 750	4.8	TRUE	Y	65
Intel® Core™ i5 11500 processor	6	2.7	12	3200	TRUE	Intel® UHD Graphics 750	4.6	TRUE	Y	65
Intel® Core™ i5 11400F processor	6	2.6	12	3200	TRUE	N/A	4.4	N/A	Y	65
Intel® Core™ i5 11400 processor	6	2.6	12	3200	TRUE	Intel® UHD Graphics 730	4.4	N/A	Y	65

Overview

Intel® Xeon® W-1390P processor	8	3.5	16	3200	TRUE	Intel® UHD Graphics	5.2	TRUE	Y	125
Intel® Xeon® W-1390 processor	8	2.8	16	3200	TRUE	Intel® UHD Graphics	5.1	TRUE	Y	80
Intel® Xeon® W-1370P processor	8	3.6	16	3200	TRUE	Intel® UHD Graphics	5.2	TRUE	Y	125
Intel® Xeon® W-1370 processor	8	2.9	16	3200	TRUE	Intel® UHD Graphics	5.1	TRUE	Y	80
Intel® Xeon® W-1350P processor	6	4	12	3200	TRUE	Intel® UHD Graphics	5.1	TRUE	Y	125
Intel® Xeon® W-1350 processor	6	3.3	12	3200	TRUE	Intel® UHD Graphics	5	TRUE	Y	80

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. Intel's numbering, branding and/or naming is not a measurement of higher performance.

2. Intel® Optane™ memory is sold separately. Intel® Optane™ memory system acceleration does not replace or increase the DRAM in your system. Available for HP commercial desktops and notebooks and for select HP workstations (HP Z240 Tower/SFF, Z2 Mini, ZBook Studio, 15 and 17 G5) and requires a SATA HDD, 7th Gen or higher Intel® Core™ processor or Intel ® Xeon® processor E3-1200 V6 product family or higher, BIOS version with Intel® Optane™ supported, Windows 10 version 1703 or higher, M.2 type 2280-S1-B-M connector on a PCH Remapped PCIe Controller and Lanes in a x2 or x4 configuration with B-M keys that meet NVMeTM Spec 1.1, and an Intel® Rapid Storage Technology (Intel® RST) 15.5 driver.

3. The specifications shown in the Intel® Turbo Boost Technology column represent the maximum turbo frequency with one core active. Turbo boost stepping occurs in 100MHz increments. Processors that do not have turbo functionality are denoted as N/A. Intel® Turbo Boost performance varies depending on hardware, software and overall system configuration. See http://www.intel.com/technology/turboboost for more information

4. For full Intel® vPro® functionality, Windows 10 Pro 64 bit, a vPro supported processor, vPro enabled chipset, vPro enabled wired LAN and/or WLAN card and TPM 2.0 are required. Some functionality requires additional 3rd party software in order to run. See http://intel.com/vpro

Color	Black
Convertibility	No
Expansion Slots (see system board section for more details)	Slot 1: PCIe Gen4 x16 Slot 2: PCIe Gen3 x1 - with x4 Connector Slot 3: PCIe Gen3 x4 - with x16 Connector Slot 4: PCIe Gen3 x4
Expansion Bays (see storage section for more details)	(2) Internal 3.5" bays (1) External 5.25" bay (1) Internal 2.5" bay (for SSD only) (1) Dedicated 9.5mm slim optical disk drive bay

Overview

Front I/O	(2) Type-A SuperSpeed USB 5Gbps signaling rate port (1 charge port supports up to 5V/2.1A), (2) Type-A SuperSpeed USB 10Gbps signaling rate port, (1) Type-C SuperSpeed® USB 20Gbps signaling rate port (charge supports up to 5V/3A, optional) , (1) SD card reader (optional), (1) universal audio jack
Internal I/O	(1) Hi-Speed USB 480Mbps signaling rate port (1) serial port
Rear I/O	(2) DisplayPort 1.4*, (1) Audio Line out, (1) Audio Line in, (1) RJ-45, (3) Hi-Speed USB 480Mbps signaling rate port, (2) Type-A SuperSpeed USB 10Gbps signaling rate port, (1) Type-A SuperSpeed USB 5Gbps signaling rate port, (1) serial (optional), (1) Flex I/O port (VGA, HDMI 2.0b, DisplayPort 1.4, Type-C® SuperSpeed USB 10Gbps signaling rate port (Power Delivery 15W, Alt Mode DisplayPort), Dual Type -A SuperSpeed USB 5Gbps signaling rate port, 2nd 1GbE LAN, Thunderbolt 3** with SuperSpeed USB4 Type-C® 40Gbps signaling rate*** (cabled to PCIe AIC)) *All onboard Display support DP1.4/HBR2 when video output is via Intel Graphics. **TBT 3 will be available in Q3, 2021 ***Maximum speed requires DisplayPort™ and PCIe aggregation.
Interfaces Supported	SD card reader (optional)
On-board RAID Support	RAID 0 RAID 1
Chassis Dimensions (H x W x D)	H: 14" [356mm] W: 6.7" [169mm] D: 15.2" [385mm]
Packaged Dimensions	H: 20.39" (518mm) W: 11.61" (295mm) D: 19.29" (490mm)
Rack Dimensions	5U
Weight	Exact weights depend upon configuration (System weight only). Starting at 7kg (15.43lbs.)
Temperature	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
Humidity	Operating: 10% to 85% RH, non-condensing, 35° C maximum wet bulb Non-operating: 10% to 90% RH, non-condensing, 35° C maximum wet bulb
Maximum Altitude (non-pressurized)[6]	Operating (with Rotational Hard Drives): 3,048 m (10,000 feet) 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.
Power Supply	700W wide-ranging, active Power Factor Correction, 92% Efficiency. 500W wide-ranging, active Power Factor Correction, 90% Efficiency. 350W wide-ranging, active Power Factor Correction, 92% Efficiency. **NOTE:** The Power Supply Efficiency Report for the 700W 92% Efficiency, 500W 90% Efficiency and 350W 92% Efficiency Power Supply may be found at the following links: 700W PSU: https://www.plugloadsolutions.com/80PlusPowerSuppliesDetail.aspx?id=0&type=2 500W PSU: https://www.plugloadsolutions.com/80PlusPowerSuppliesDetail.aspx?id=0&type=2

Overview

	350W PSU: https://www.plugloadsolutions.com/80PlusPowerSuppliesDetail.aspx?id=0&type=2
Backup Devices	For a complete listing of compatible DAT tape drives, LTO tape drives and RDX Removable Disk Backup System offerings, please visit http://www.hp.com/go/connect
Chipset	Intel® W580 chipset
Memory	4 DIMM slots, supporting up to 128GB ECC/non-ECC, and up to DDR4 3200 MT/s speed

Supported Components

Processors	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
11th Generation Intel® Core™ Processors*				
Intel® Core™ i9 11900K Processor	Y	N		
Intel® Core™ i9 11900F Processor	Y	N		1
Intel® Core™ i9 11900 Processor	Y	N		
Intel® Core™ i7 11700K Processor	Y	N		
Intel® Core™ i7 11700 processor	Y	N		
Intel® Core™ i5 11600K processor	Y	N		
Intel® Core™ i5 11600 processor	Y	N		
Intel® Core™ i5 11500 processor	Y	N		
Intel® Core™ i5 11400F processor	Y	N		1
Intel® Core™ i5 11400 processor	Y	N		
Intel® Xeon® W Processors				
Intel® Xeon® W-1390P processor	Y	N		
Intel® Xeon® W-1390 processor	Y	N		
Intel® Xeon® W-1370P processor	Y	N		
Intel® Xeon® W-1370 processor	Y	N		
Intel® Xeon® W-1350P processor	Y	N		
Intel® Xeon® W-1350 processor	Y	N		

* These processors support only non-ECC memory

NOTE 1: No iGfx. A discrete graphics card must be purchased at the same time.

SATA Hard Drives	Factory Configured	Option Kit	Option Kit Part Number
500GB SATA 7200 rpm 6Gb/s 3.5" HDD	Y	Y	LQ036AA
1TB SATA 7200 rpm 6Gb/s 3.5" HDD	Y	Y	LQ037AA
2TB SATA 7200 rpm 6Gb/s 3.5" HDD	Y		TBD
1TB SATA 7200 rpm 6Gb/s 3.5" HDD (Enterprise Class)	Y	Y	W0R10AA
2TB SATA 7200 rpm 6Gb/s 3.5" HDD (Enterprise Class)	Y	Y	2Z274AA
4TB SATA 7200 rpm 6Gb/s 3.5" HDD (Enterprise Class)	Y	Y	K4T76AA
8TB SATA 7200 rpm 6Gb/s 3.5" HDD (Enterprise Class)	Y	Y	2Z273AA
500GB SATA 7.2K SED SFF HDD	Y	Y	D8N29AA
PCIe Solid State Drives			
HP ZTurbo PCIE-4X4 1TB TLC Z2 G8 TWR/SFF SSDKit	Y	Y	201F5AA/AT
HP ZTurbo PCIE-4X4 256GB SED Z2 G8 TWR/SFF SSDKit	Y	Y	201F6AA
HP ZTurbo PCIE-4X4 256GB TLC Z2 G8 TWR/SFF SSDKit	Y	Y	201F7AA/AT
HP ZTurbo PCIE-4X4 2TB TLC Z2 G8 TWR/SFF SSDKit	Y	Y	201F8AA
HP ZTurbo PCIE-4X4 512GB SED Z2 G8 TWR/SFF SSDKit	Y	Y	201F9AA
HP ZTurbo PCIE-4X4 512GB TLC Z2 G8 TWR/SFF SSDKit	Y	Y	201G0AA/AT
Z Turbo 1TB 2280 PCIe-Gen4x4 Self Encrypted OPAL2 TLC M.2 Z2 SSD	Y	Y	223A3AA/AT

Supported Components

Z Turbo 2TB 2280 PCIe-Gen4x4 Self Encrypted OPAL2 TLC M.2 Z2 SSD	Y	Y	223A4AA/AT

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

Hard Drive Controllers	Factory Configured	Option Kit
Integrated SATA Controller (Z2 G8)		
Integrated SATA Controller, RAID 0,1 supported: 4x 6 Gb/s ports	Y	
Factory integrated RAID on motherboard for SATA drives		
RAID 0 Data Configuration	Y	
RAID 1 Data Configuration	Y	
Factory integrated RAID on motherboard for Z Turbo Drive		
RAID 0 Data Configuration	Y	
RAID 1 Data Configuration	Y	

NOTE: SATA hardware RAID is not supported on Linux® systems. The Linux® kernel, with built-in software RAID, provides excellent functionality and performance. It is a good alternative to hardware-based RAID. All drives must be identical in type and capacity. Boot volume/RAID array must be less than 2 TB
NOTE: Requires identical drives (speeds, capacity, and interface).
NOTE: The HP Z2 Tower G8 Workstation is capable of configuring up to 2 Z Turbo Drives. By default, the Z Turbo Drive configured will be installed in the M.2 storage slot on the system's motherboard.
NOTE: For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36GB (for Windows 10) of system disk is reserved for system recovery software.

Graphics		Factory Configured	Option Kit	Option Kit Part Number	Supported # of cards
Graphics Cable Adapters	HP DisplayPort To HDMI True 4k Adapter	Y	Y	2JA63AA	
	HP Single miniDP-to-DP Adapter Cable	Y	Y	2MY05AA	
	HP DisplayPort To DVI-D Adapter	Y	Y	FH973AA	
	HP DisplayPort To VGA Adapter	Y	Y	AS615AA	
	HP USB-C to DisplayPort Adapter	Y	Y	4SH08AA	
	HP USB-C to HDMI Adapter	Y	Y	4SH07AA	
	HP USB-C to VGA Adapter	Y	Y	4SH06AA	
Entry 3D	NVIDIA® Quadro® P400 2GB Graphics	Y	Y	1ME43AA/AT	2
	NVIDIA® T400 2 GB GDDR6 LP Blower Fan 3mDP PCIe x16 Graphics	Y	Y	340K8AA	2
	NVIDIA® T600 4 GB GDDR6 LP Blower Fan 4mDP PCIe x16 Graphics	Y	Y	340K9AA	2
Mid-range 3D	AMD Radeon™ Pro WX 3200 4GB Graphics	Y	Y	6YT68AA/AT	2
	NVIDIA® T1000 4GB Graphics	Y	Y	20X22AA/AT	2
	NVIDIA RTX A2000 6 GB GDDR6 Blower Fan 4mDP PCIe x16 Graphics	Y	Y	340L0AA	1
High-End 3D	NVIDIA® RTX® A4000 16GB Graphics**	Y	Y	20X24AA/AT	1
	AMD Radeon™ Pro W5500 8GB Graphics**	Y	Y	9GC16AA/AT	1

Supported Components

	AMD Radeon™ Pro W5700 8GB Graphics**	Y	Y	9GC15AA/AT	1
Ultra High-End 3D	NVIDIA® RTX® A5000 24GB Graphics*	Y	Y	20X23AA/AT	1
	AMD Radeon Pro W6600 8 GB GDDR6 4DP Graphics	Y	Y	340K5AA	1
	AMD Radeon Pro W6800 32 GB GDDR6 6mDP Graphics	Y	Y	340K7AA	1

***** Requires 700W chassis.
****** Requires at least 500W chassis.
NOTE : NVIDIA® RTX A5000, NVIDIA® RTX A4000, NVIDIA® T1000 will be available in Q3, 2021

Memory

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP 4GB (1x4GB) DDR4-3200 nECC UDIMM	Y	Y	141J1AA/AT	2,4
HP 8GB (2x4GB) DDR4-3200 nECC UDIMM	Y	N		
HP 8GB (1x8GB) DDR4-3200 nECC UDIMM	Y	Y	141J4AA/AT	2,4
HP 8GB (1x8GB) DDR4-3200 ECC UDIMM	Y	Y	141J3AA/AT	1,2,4
HP 16GB (2x8GB) DDR4-3200 nECC UDIMM	Y	N		
HP 16GB (2x8GB) DDR4-3200 ECC UDIMM	Y	N		1
HP 16GB (1x16GB) DDR4-3200 nECC UDIMM	Y	Y	141H3AA/AT	2,4
HP 16GB (1x16GB) DDR4-3200 ECC UDIMM	Y	Y	141H2AA/AT	1,2,4
HP 24GB (3x8GB) DDR4-3200 nECC UDIMM	Y	N		
HP 24GB (3x8GB) DDR4-3200 ECC UDIMM	Y	N		1
HP 32GB (4x8GB) DDR4-3200 nECC UDIMM	Y	N		3
HP 32GB (4x8GB) DDR4-3200 ECC UDIMM	Y	N		1,3
HP 32GB (2x16GB) DDR4-3200 nECC UDIMM	Y	N		
HP 32GB (2x16GB) DDR4-3200 ECC UDIMM	Y	N		1
HP 32GB (1x32GB) DDR4-3200 nECC UDIMM	Y	N		2
HP 32GB (1x32GB) DDR4-3200 ECC UDIMM	Y	N		1, 2
HP 64GB (4x16GB) DDR4-3200 nECC UDIMM	Y	N		3
HP 64GB (4x16GB) DDR4-3200 ECC UDIMM	Y	N		1,3
HP 64GB (2x32GB) DDR4-3200 nECC UDIMM	Y	N		3
HP 64GB (2x32GB) DDR4-3200 ECC UDIMM	Y	N		1,3
HP 128GB (4x32GB) DDR4-3200 nECC UDIMM	Y	N		3
HP 128GB (4x32GB) DDR4-3200 ECC UDIMM	Y	N		1,3

NOTES:

1. Intel® Xeon® can support either ECC or non-ECC memory; Intel® Core™ i5/i7/i9 processors only support non-ECC memory.
2. Two channels of DDR4 memory are supported. To realize full performance at least one DIMM must be inserted into each channel.
3. The maximum speed supported by Intel on this configuration is 2933 MT/s
4. For Option Kits, only 2666Mhz can be guaranteed.

Note: When more than one memory slot is populated, symmetric configurations are required for 2 DIMMs per channel. Mix of different part numbers or mix of single and dual ranks within a channel is not allowed.

Supported Components

Optical and Removable Storage	Factory Configured	Option Kit	Option Kit Part Number
HP 9.5mm Slim DVD Writer	Y	Y	4L5K0AA
HP DX175 Removable HDD Frame/Carrier	Y	Y	1ZX71AA
HP DX175 Removable HDD Spare Carrier	Y	Y	1ZX72AA
HP SD card reader Z2 TWR	Y	Y	141K3AA/AT
HP 9.5mm Slim DVD-ROM Drive	Y	Y	4L5K1AA
HP QX310 5.25 in Frame/Carrier	Y	Y	4Y7D9AA

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 workstation.

Networking and Communications	Factory Configured	Option Kit	Option Kit Part Number
Integrated Intel® I219LM PCIe GbE Controller (Intel® vPro® with Intel® AMT 15.0)	Y	N	
HP 1GbE LAN Flex Port 2020	Y	Y	141J6AA/AT
Aquantia AQN108 1-Port 5GbE NIC	Y	Y	1PM63AA
Intel Ethernet I350-T4 4-Port 1Gb NIC	N	Y	W8X25AA
Intel X550 10GBASE-T Dual Port NIC	Y	Y	1QL46AA
Intel Ethernet Network Adapter I225-T1*	Y	Y	406L9AA
Intel Ethernet I350-T2 2-Port 1Gb NIC	Y	Y	V4A91AA
Intel Wi-Fi 6 AX201 BT5 M.2 non-vPro	Y	N	

*Planned to be available in Q3,2021

NOTE: The integrated network connection is required to support Intel® vPro® Technology.

NOTE: If AMT is provisioned, then network teaming with the integrated LAN port is not possible.

NOTE: "Gigabit" Ethernet indicates compliance with IEEE standard 802.3ab for Gigabit Ethernet, and does not connote actual operating speed of 1 Gb/sec. For high speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required.

Supported Components

Input Devices	Factory Configured	Option Kit	Option Kit Part Number
HP Premium Wireless Keyboard	Y	Y	Z9N41AA/AT
HP USB 320K Keyboard	Y	Y	9SR37AA
HP USB Business Slim Wired SmartCard CCID Keyboard	Y	N	
HP PS/2 Business Slim Keyboard	N	Y	N3R86AA
HP USB Premium Wired Keyboard PROMO	Y	Y	Z9N40AT
HP 320M Wired Mouse	Y	Y	9VA80AA
HP USB Premium Mouse	Y	Y	1JR32AA
HP Wireless Premium Mouse	Y	Y	1JR31AA
HP Promo PS/2 Mouse	N	Y	QY775AT
HP Wired Desktop 320MK Mouse and Keyboard	N	Y	9SR36AA

Other Hardware	Factory Configured	Option Kit	Option Kit Part Number
HP Single TBT3 Type C and USB4 PCIe x4 Card[1]	Y	Y	3N3C1AA
HP Z2 Internal Serial Port and PS/2 Port	Y	Y	141K9AA/AT
HP Z2 Power Cord Kit	Y	Y	1N1D5AA
HP Z2 2nd serial port adapter	Y	Y	141K8AA/AT
HP Z2 Tower Dust Filter	Y	Y	141L2AA/AT
HP Z2 Tower Dust Filter and bezel	Y	Y	141L3AA/AT
HP Z2 Internal Serial Port and PS/2 Port	Y	Y	141K9AA/AT
HP PCIe x1 Parallel Port Card	Y	Y	N1M40AA
HP DP Flex Port 2020	Y	Y	141J7AA/AT
HP Dual USB-A 3.2 Gen1 Flex 2020	Y	Y	141J8AA/AT
HP Front Type-C SuperSpeed USB 20Gbps port	Y	Y	201F4AA/AT
HP HDMI Flex Port 2020	Y	Y	141K1AA/AT
HP USB-C 3.2 Gen2 Alt Flex Port 2020	Y	Y	141K6AA/AT
HP VGA Flex Port 2020	Y	Y	141K7AA/AT

[1]Available in Q3, 2021

Racking and Physical Security	Factory Configured	Option Kit	Option Kit Part Number
HP Z2 Mini and Z2/Z4/Z6 TWR Depth Adjustable Fixed Rail Rack Kit	Y	Y	2A8Y5AA

Software	Factory Configured	Option Kit	Support Notes
HP Performance Advisor	Y	N	1
HP PC Hardware Diagnostics UEFI (Windows OS only)	Y	N	2
HP PC Hardware Diagnostics Windows	Y	N	
ZCentral Remote Boost	Y	N	
HP Sure Sense	Y	N	
HP Notifications	Y	N	
HP Desktop Support Utility	Y	N	

Supported Components

HP Documentation	Y	N
HP Image Assistant	N	N
HP Support Assistant	N	N
HP QuickDrop	Y	N
myHP	Y	N

Notes:

1. Supports, and preinstalled with Windows 10 only. Also available as a free download from http://www.hp.com/go/performanceadvisor
2. Windows OS only

Operating Systems

Windows 10 Pro 64

Windows 10 Pro 64 High End

Windows 10 Pro 64 Workstation Plus

Windows 10 Home 64 Plus

Windows 10 Home 64 Advanced

Linux®-ready
Ubuntu Linux 20.04 LTS
Red Hat® Enterprise Linux® (RHEL) Workstation – paper license (1yr) only (not preinstalled)

Notes: For detailed OS/hardware information for Linux, see:
http://www.hp.com/support/linux_hardware_matrix

Supported Components

HP BIOS

Key features of the HP BIOS include:

- Deployment and manageability – HP BIOS provides several technologies that help integrate the HP Z2 G8 Workstation into the enterprise, such as PXE, remote recovery, remote configuration, remote control, and BIOS (F10) Setup support for 15 languages.
- Network firmware updates – Update your BIOS via the cloud or standardize on a BIOS version hosted on an Enterprise network.
- Stability – HP BIOS supports the HP stable product roadmap by releasing only critical BIOS changes to the factory and advanced change notification.
- UEFI specification version 2.7
- Absolute Persistence agent – For tracking and tracing services, available in select countries, separate software and purchase of a subscription is required.
- Thermal and power management – The HP BIOS provides and enables thermal and power management technologies so component temperatures are managed for high reliability and to assist in operating the HP Workstation computer in any enterprise environment.
- Acoustic performance – Industry leading acoustic emissions across the range of operating conditions.
- Serviceability – HP BIOS provides diagnostic and detailed service information.
- Upgrades and recovery – HP BIOS provides numerous ways to upgrade HP Workstation computers, including BIOS updates from within Windows (HP Firmware Update and Recovery), Capsule update, HP Client Manager, and fail-safe recovery. In addition, the HP BIOS Configuration Utility enables replication of BIOS settings within Windows while the Replicated Setup feature provides the same capability within BIOS (F10) Setup. The BIOS Configuration Utility is available from the HP support website.
- HP BIOS uses PKI signing of the BIOS for trusted BIOS upgrades and recovery

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

NOTE: HP Sure Start Gen7 is available on HP Workstation products equipped with Intel® 11th generation processors.

SOFTWARE COMPONENTS AND APPLICATIONS WITH WINDOWS

BIOS
HP BIOSphere Gen6[1]
BIOS Update via Network
HP Secure Erase[2]
Absolute Persistence Module[3]
Pre-boot Authentication
HP Wake on WLAN
HP DriveLock & Automatic DriveLock

Software
HP Support Assistant
HP Image Assistant
HP Desktop Support Utility
HP Documentation
HP Notifications
HP PC Hardware Diagnostics UEFI
HP PC Hardware Diagnostics Windows
HP Performance Advisor[4]
ZCentral Remote Boost[5]
My HP
HP QuickDrop

Manageability Features
HP Driver Packs[6]
HP System Software Manager (SSM)
HP BIOS Config Utility (BCU)
HP Manageability Integration Kit Gen4[7]
HP Smart Support[16]

Client Security Software
HP Client Security Manager Gen7[8] including:
(including Credential Manager, HP Password Manager[9], HP Spare Key)
HP Power On Authentication
Microsoft Defender[10]

Security Management
HP Sure Click[11]
HP Sure Start Gen7[12]
HP Sure Run Gen4[13]
HP Sure Sense[14]
HP Sure Recover Gen4[15]
HP Pro Wolf Security

[1] HP BIOSphere Features may vary depending on the platform and configurations.

Supported Components

[2] HP Secure Erase for the methods outlined in the National Institute of Standards and Technology Special Publication 800-88 "Clear" sanitation method. HP Secure Erase does not support platforms with Intel® Optane™.
[3] Absolute agent is shipped turned off, and will be activated when customers activate a purchased subscription. Subscriptions can be purchased for terms ranging multiple years. Service is limited, check with Absolute for availability outside the U.S. The Absolute 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 first sign a Pre-Authorization Agreement and either obtain a PIN or purchase one or more RSA SecurID tokens from Absolute Software.
[4] HP Performance Advisor Software - HP Performance Advisor is ready and waiting to help you get the most out of your HP Workstation from day one—and every day after. Learn more or download at: https://www8.hp.com/us/en/workstations/performance-advisor.html
[5] HP Z Central Remote Boost Software does not come preinstalled on Z Workstations but can be downloaded and run on all Z desktop and laptops without license purchase. With non-Z sender devices, purchase of perpetual individual license or perpetual floating license per simultaneously executing versions and purchase of ZCentral Remote Boost Software Support is required. Zcentral Remote Boost requires Windows, RHEL (7 or 8), UBUNTU 18.04 LTS, or HP ThinPro 7 operating systems. MacOS (10.13 or newer) operating system is only supported on the receiver side. Requires network access. The software is available for download at hp.com/ZCentralRemoteBoost.
[6] HP Driver Packs not preinstalled, however available for download at http://www.hp.com/go/clientmanagement.
[7] HP Manageability Integration Kit can be downloaded from http://www8.hp.com/us/en/ads/clientmanagement/overview.html
[8] HP Client Security Manager Gen6 requires Windows and is available on the select HP Elite and Pro PCs.
[10] Microsoft Defender Opt in and internet connection required for updates.
[11] HP Sure Click requires Windows 10 Pro or Enterprise. See https://bit.ly/2PrLT6A_SureClick for complete details.
[12] HP Sure Start is available on select HP PCs and requires Windows 10.
[13] HP Sure Run is available on HP Workstation products equipped with 8th generation Intel® or AMD® processors.
[14] HP Sure Sense requires Windows 10 Pro or Enterprise. See product specifications for availability.
[15] HP Sure Recover is available on select HP PCs and requires an open network connection. You must back up important files, data, photos, videos, etc. before using HP Sure Recover to avoid loss of data.
[16] HP Smart Support is available to commercial customers through your HP Service Representative and HP Factory Configuration Services; or it can be downloaded at: http://www.hp.com/smart-support. HP Smart Support automatically collects the telemetry necessary upon initial boot of the product to deliver device-level configuration data and health insights.

System Board

System Board Form Factor	Customized PCB 14.197x9.895 inch
Processor Socket	Single LGA-1200
CPU Bus Speed	DMI
Chipset	Intel® PCH W580
Super I/O Controller	Nuvoton SIO18
Memory Expansion Slots	4 DDR4 memory slots
Memory Type Supported	DDR4, UDIMM (Unbuffered), ECC& non-ECC
Memory Modes	Non-Interleaved for single channel. Interleaved when both channels are populated.
Memory Speed Supported	Up to 3200MT/s DDR4
Memory Protection	ECC available on data
Maximum Memory	128GB[1]
Memory Configuration (Supported)	4GB, 8GB, 16GB and 32GB non-ECC/8GB, 16GB and 32GB ECC unbuffered DIMMs are supported. ECC and non-ECC memory DIMMs cannot be mixed in the same system
PCI Express Connectors	(1) PCI Express Gen4 slot x16 mechanical/ x16 electrical (full height, full length) (1) PCI Express Gen3 slot x4 mechanical/ x1 electrical (full height, full length, open-ended) (1) PCI Express Gen3 slot x16 mechanical/ x4 electrical (full height, full length) (1) PCI Express Gen3 slot x4 mechanical/ x4 electrical (full height, full length, open-ended) (1) M.2 2280 Storage (PCIe Gen4 x4)[2] (1) M.2 2280 Storage (PCIe Gen3 x4) [2] (1) M.2 2230 WLAN (PCIe Gen3 x1+ Intel CNVi) [2] **NOTE:** The PCIe Gen 4 x16 slot is meant for HP qualified cards, configured or after market. HP does not provide warranty support for 3rd party cards.
Supported Drive Interfaces	**SATA**: Integrated (4) Serial ATA interfaces (6Gb/s SATA). RAID 0 and 1 supported. Factory integrated RAID for Microsoft Windows only.
	Integrated Graphics: Intel® UHD Graphics 730 (on Core i5-11400 processors); Intel® UHD Graphics 730 (on Core i5/i7/i9-11xxx processors); Intel® UHD Graphics P750 for Xeon processors Based on Unified Memory Architecture (UMA) - a region of system memory is reserved and dedicated to the graphics display. Support for Microsoft DirectX 12, OpenGL 4.6 and OpenCL 3.0 on Intel® UHD Graphics 730/750; Based on Unified Memory Architecture (UMA) - a region of system memory is reserved and dedicated to the graphics display. Support for Microsoft DirectX 12, OpenGL 4.6 and OpenCL 3.0 on Intel® UHD Graphics P750; 3 DP 1.4 graphics ports integrated in motherboard; Supports up to three simultaneous displays across DisplayPort*/HDMI*/DVI outputs. Max. resolution supported on onboard DP 1.4/HBR2 ports: 4096x2304 @ 60Hz, 24bpp Max. resolution supported on flexIO DP 1.4/HBR3 ports: 5120x3200 @ 60Hz, 24bpp

System Technical Specifications

	Network Controller	Integrated Ethernet PHY Connection I219LM. Management capabilities: WOL, PXE 2.1 and AMT 15
	Serial	Yes- requires optional Serial Port Adapter Kit
	2nd Serial	Yes- requires optional Serial Port Adapter Kit
USB Connector(s)	**Front**	2 Type-A SuperSpeed USB 5Gbps signaling rate port (1 charge port supports up to 5V/2.1A); 2 Type-A SuperSpeed USB 10Gbps signaling rate port; 1 Type-C® SuperSpeed USB 20Gbps signaling rate port (optional, charge supports up to 5V/3A)
	Rear	3 High-speed USB 480Mbps signaling rate port; 1 Type-A SuperSpeed USB 5Gbps signaling rate port; 2 Type-A SuperSpeed USB 10Gbps signaling rate port; Flex I/O option: 1 Type-C® SuperSpeed USB 10Gbps signaling rate (Power Delivery 15W, Alt Mode DisplayPort); 1 Dual Type-A SuperSpeed USB 5Gbps signaling rate
	Internal	1 High-speed USB 480Mbps signaling rate port
HD Integrated Audio	Realtek ALC3205	
Flash ROM	Yes	
CPU Fan Header	Yes	
Memory Fan Header	None	
Chassis Fan Header	1 Rear System Chassis Fan Header, 1 Graphic chassis Fan Header.	
Front PCI Fan Header	None	
Front Control Panel/Speaker Header	Yes	
CMOS Battery Holder - Lithium	Yes	
Integrated Trusted Platform Module	Integrated TPM 2.0 (Infineon SLB9670) Convertible to FIPS 140-2 Certified mode through firmware v7.85 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	None	
Keyboard/Mouse	USB or PS/2 (option)	
Power Supply	700W EPA92, 500W EPA90 and 350W EPA92	

[1]Maximum memory capacities assume 64-bit operating systems, such as Genuine Windows® 10 Professional 64 bit, Red Hat Linux 64-bit. 32-bit Windows Operating Systems support up to 4 GB.
[2]M.2 storage supports compatible devices up to 80mm

PCIe Hold-down / Blower Kit Specification

Please refer to section Supported Components - Graphics for supported cards list.

Performance Class	Product Name	Slots space Required	Max Card Count	Number of Cards Require PCIe Hold-down / Blower Kit
Ultra High-End 3D	NVIDIA® RTX® A5000 24GB	2	1	1
High-End 3D	NVIDIA® RTX® A4000 16GB	2	1	1
	AMD Radeon™ Pro W5700 8GB	2	1	1
	AMD Radeon™ Pro W5500 8GB	1	1	1
Mid-range 3D	NVIDIA® T1000 4GB	1	2	2
	AMD Radeon™ Pro WX 3200 4GB	1	2	2
Entry	NVIDIA® Quadro® P400 2GB	1	2	3

NOTE: The PCIe Hold-down / Blower Kit is automatically included when the 700W chassis is configured.

System Configurations		
Example Configuration #1	Processor Info	Intel Core i5- 11400 2.60GHz 6C65W
	Memory Info	8GB (1x 8GB) 3200 MHz DDR4 non-ECC
	Graphics Info	Intel® UHD Integrated Graphics 730
	Disks/Optical/Floppy	1x SATA 1TB 7.2k rpm / 1x 9.5mm Slim ODD
	PSU	350W
	Other	

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)	18.98		19.287		19.175	
	Windows short Idle (S0)	20.713		21.005		20.917	
	Windows Busy Typ (S0)	95.045		96.66		96.118	
	Windows Busy Max (S0)	94.409		93.629		93.654	
	Sleep (S3)	0.887	0.83	0.968	0.853	0.963	0.923
	Off (S5)	0.645	0.604	0.674	0.567	0.655	0.615
	Zero Power Mode (EuP)	0.238		0.298		0.199	

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)	64.75976		65.807244		65.4251	
	Windows short Idle (S0)	70.672756		71.66906		71.368804	

System Technical Specifications

	Windows Busy Typ (S0)	324.29354		329.80392		327.954616	
	Windows Busy Max (S0)	322.123508		319.462148		319.547448	
	Sleep (S3)	3.026444	2.83196	3.302816	2.910436	3.285756	3.149276
	Off (S5)	2.20074	2.060848	2.299688	1.934604	2.23486	2.09838
	Zero Power Mode (EuP)	0.812056		1.016776		0.678988	
Example Configuration #2	**Processor Info**	Intel Core i7- 11700 2.50GHz 8C65W					
	Memory Info	16GB (2x 8GB) 3200MHz DDR4 non-ECC					
	Graphics Info	NVIDIA Quadro T1000 4 GB					
	Disks/Optical/Floppy	1x SATA 256GB SSD / 1x 9.5mm Slim ODD					
	PSU	500W					
	Other						
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)	23.49		23.922		23.695	
	Windows short Idle (S0)	25.186		25.205		24.933	
	Windows Busy Typ (S0)	137.849		138.76		134.09	
	Windows Busy Max (S0)	128.184		129.18		125.28	
	Sleep (S3)	0.994	0.95	0.963	0.853	0.878	0.824
	Off (S5)	0.737	0.706	0.646	0.572	0.74	0.703
	Zero Power Mode (EuP)	0.218		0.299		0.223	

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)	80.14788		81.621864		80.84734	
	Windows short Idle (S0)	85.934632		85.99946		85.071396	
	Windows Busy Typ (S0)	470.340788		473.44912		457.51508	
	Windows Busy Max (S0)	437.363808		440.76216		427.45536	
	Sleep (S3)	3.391528	3.2414	3.285756	2.910436	2.995736	2.811488
	Off (S5)	2.514644	2.408872	2.204152	1.951664	2.52488	2.398636
	Zero Power Mode (EuP)	0.743816		1.020188		0.760876	
Example Configuration #3	**Processor Info**	Intel Core i9- 11900K 3.50GHz 8C125W					
	Memory Info	64GB (2x 32GB) 3200 MHz DDR4 ECC					
	Graphics Info	NVIDIA GeForce RTX 3070 8 GB					
	Disks/Optical/Floppy	1x SATA 512GB SSD					
	PSU	700W					
	Other						
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)	26.2		26.301		26.251	
	Windows short Idle (S0)	27.866		28.087		27.588	

System Technical Specifications

	Windows Busy Typ (S0)	232.415		232.99		230.363	
	Windows Busy Max (S0)	199.344		200.99		198.541	
	Sleep (S3)	1.009	0.973	1.025	0.862	0.951	0.913
	Off (S5)	0.599	0.553	0.651	0.524	0.565	0.507
	Zero Power Mode (EuP)	0.215		0.294		0.227	

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)	89.3944		89.739012		89.568412	
	Windows short Idle (S0)	95.078792		95.832844		94.130256	
	Windows Busy Typ (S0)	792.99998		794.96188		785.998556	
	Windows Busy Max (S0)	680.161728		685.77788		677.421892	
	Sleep (S3)	3.442708	3.319876	3.4973	2.941144	3.244812	3.115156
	Off (S5)	2.043788	1.886836	2.221212	1.787888	1.92778	1.729884
	Zero Power Mode (EuP)	0.73358		1.003128		0.774524	

Example Configuration #4	**Processor Info**	Intel Xeon W- 1370P 3.60G 8C125W
	Memory Info	128GB (4x 32GB) 3200 MHz DDR4 ECC
	Graphics Info	NVIDIA Quadro RTX A4000 16 GB
	Disks/Optical/Floppy	1x SATA 1TB SSD Z Turbo
	PSU	700W
	Other	

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)	TBD		TBD		TBD	
	Windows short Idle (S0)	TBD		TBD		TBD	
	Windows Busy Typ (S0)	TBD		TBD		TBD	
	Windows Busy Max (S0)	TBD		TBD		TBD	
	Sleep (S3)	TBD	TBD	TBD	TBD	TBD	TBD
	Off (S5)	TBD	TBD	TBD	TBD	TBD	TBD
	Zero Power Mode (EuP)	TBD		TBD		TBD	

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)	TBD		TBD		TBD	
	Windows short Idle (S0)	TBD		TBD		TBD	
	Windows Busy Typ (S0)	TBD		TBD		TBD	
	Windows Busy Max (S0)	TBD		TBD		TBD	
	Sleep (S3)	TBD	TBD	TBD	TBD	TBD	TBD
	Off (S5)	TBD	TBD	TBD	TBD	TBD	TBD
	Zero Power Mode (EuP)	TBD		TBD		TBD	

System Technical Specifications

Example Configuration #5	**Processor Info**	Intel Xeon W- 1350 3.30GHz 6C80W
	Memory Info	16GB (2x 8GB) 3200 MHz DDR4 ECC
	Graphics Info	NVIDIA Quadro RTX A5000 24 GB
	Disks/Optical/Floppy	1x SATA 1TB SSD Z Turbo
	PSU	700W
	Other	

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)	TBD		TBD		TBD	
	Windows short Idle (S0)	TBD		TBD		TBD	
	Windows Busy Typ (S0)	TBD		TBD		TBD	
	Windows Busy Max (S0)	TBD		TBD		TBD	
	Sleep (S3)	TBD	TBD	TBD	TBD	TBD	TBD
	Off (S5)	TBD	TBD	TBD	TBD	TBD	TBD
	Zero Power Mode (EuP)	TBD		TBD		TBD	

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)	TBD		TBD		TBD	
	Windows short Idle (S0)	TBD		TBD		TBD	
	Windows Busy Typ (S0)	TBD		TBD		TBD	
	Windows Busy Max (S0)	TBD		TBD		TBD	
	Sleep (S3)	TBD	TBD	TBD	TBD	TBD	TBD
	Off (S5)	TBD	TBD	TBD	TBD	TBD	TBD
	Zero Power Mode (EuP)	TBD		TBD		TBD	

NOTE: The Power Supply Efficiency report may be found at the following links:

https://www.plugloadsolutions.com/80PlusPowerSuppliesDetail.aspx?id=0&type=2

System Technical Specifications

Operating Voltage Range	90-269 VAC
Rated Voltage Range	100-240 VAC
Rated Line Frequency	50-60 Hz
Operating Line Frequency Range	47-66 Hz
Rated Input Current	6A @ 100-240V
Heat Dissipation	Typical: 444 btu/hr (112 kcal/hr) Maximum: 1484 btu/hr (374 kcal/hr)
ENERGY STAR® certified (Config Dependent)	Yes
CECP Compliant @ 220V	Yes
FEMP Standby Power Compliant	Yes, with Wake-on-LAN disabled: <1W in S4/S5 - Power Off
Built-in Self Test (BIST) **LED**	Yes
Surge Tolerant Full Ranging Power Supply (withstands power surges up to 2000V)	Yes
Hood Lock Header	Yes
ErP Lot 6- Tier 1 Compliance @ 230V (<1W in S5 - Power Off)	Yes
ErP Lot 6- Tier 2 Compliance @ 230V (<0.5W in S5 - Power Off)	Yes

Declared Noise Emissions (Entry-level, Mid-level, and High-end configurations; tested on floor)			
System Configuration (Entry level)	**Processor Info**	Intel® Core™ i9-11900 2.5 GHz 8C CPU	
	Memory Info	128GB DDR4-3200 nECC (4x32GB) RAM	
	Graphics Info	Intel® UHD	
	Disks/Optical	1 TB SATA 6Gb/s SSD / No Optical /	
	Power Supply	700W PSU	
Declared Noise Emissions		**Sound Power** (LWAd, bels)	**Deskside Sound Pressure** (LpAm, decibels)
	Idle	3.31	13.8
	Hard drive Operating (random reads)	3.4	15.7
System Configuration (Mid-level)	**Processor Info**	Intel® Xeon® processor W-1290 3.2 GHz 10C CPU	
	Memory Info	128GB DDR4-2933 ECC (4x32GB) RAM	
	Graphics Info	NVIDIA® Quadro® RTX 5000 16GB	
	Disks/Optical	2 x 2TB SATA 7200 rpm 6Gb/s / No Optical	
	Power Supply	700W PSU	
Declared Noise Emissions		**Sound Power** (LWAd, bels)	**Deskside Sound Pressure** (LpAm, decibels)
	Idle	3.55	18.4

System Technical Specifications

	Hard drive Operating (random reads)	3.9	22.4
System Configuration (High-end)	**Processor Info**	Intel® CoreTM i9-11900K 3.5GHz 8C CPU	
	Memory Info	128GB DDR4-2933 nECC (4x32GB) RAM	
	Graphics Info	NVIDIA® Quadro® RTX 5000 16GB	
	Disks/Optical	2 x 2TB SATA 7200 rpm 6Gb/s / No Optical	
	Power Supply	700W PSU	
Declared Noise Emissions		**Sound Power** (LWAd, bels)	**Deskside Sound Pressure** (LpAm, decibels)
	Idle	3.64	18.8
	Hard drive Operating (random reads)	3.85	20.8

Environmental Requirements	**Temperature**	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
	Humidity	Operating: 10% to 85% RH, non-condensing, 35° C maximum wet bulb Non-operating: 10% to 90% RH, non-condensing, 35° C maximum wet bulb
	Maximum Altitude	Operating (with Rotational Hard Drives): 3,048 m (10,000 feet) 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.
	Dynamic	Shock Operating: ½-sine: 40g, 2-3ms (~62 cm/sec) Non-operating: ½-sine: 160 cm/s, 2-3ms (~105g) square: 422 cm/s, 20g Vibration Operating random: 0.5g (rms), 5-300 Hz, up to 0.0025g²/Hz Non-operating random: 2.0g (rms), 5-500 Hz, up to 0.0150 g²/Hz
	Cooling	Above 1524 m (5,000 feet) altitude, the maximum operating temperature is reduced by 1° C (1.8° F) for every 305 m (1,000 feet) increase in elevation, up to 3048 m (10,000 feet)

Physical Security and Serviceability

Access Panel	Tool-less Includes system board and memory information
Optical Drive	Tool-less, except for Screw-In carrier
Hard Drives	Tool-less, except for 2.5" bay
Expansion Cards	Tool-less
Processor Socket	Tool-less, except for the processor heatsink
Blue User Touch Points	Yes, on tool-less internal chassis mechanisms
Color-coordinated Cables and Connectors	Yes
Memory	Tool-less
System Board	Screw-In

System Technical Specifications

Padlock Support	Yes (optional): Locks side cover and secures chassis from theft 0.22-in diameter padlock loop at 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 at rear of system
Universal Chassis Clamp Lock Support	Yes (optional): Locks side cover and locks cables to chassis. Secures chassis from theft and allows multiple units to be chained together when used with optional cable Threaded feature at rear of system
Solenoid Lock and Hood Sensor	Yes (optional) 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 Sensor Kit detects when the access panel has been removed.
Rear Port Control Cover	No
CPUs and Heatsinks	A T-15 Torx or flat blade screwdriver is needed to remove the CPU heatsink before the CPU can be removed. CPU removal is tool-less
Internal Speaker	Yes
Power Supply Fans	70mm x 70mm x 25mm 4-wire PWM (non-serviceable)
Access Panel Key Lock	No
Integrated Chassis Handles	Rear Recessed Handle
Power Supply	Requires T15 Torx or flat blade screwdriver
PCI Card Retention	Yes, rear (all), middle (optional), front (full-length cards with extender)

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 and includes free telephone support[3] 8am - 5pm. Global coverage[2] ensures that any product purchased in one country and transferred to another, non-restricted country will remain fully covered under the original warranty and service offering. 24/7 operation will not void the HP warranty.

NOTE 1: Terms and conditions may vary by country. Certain restrictions and exclusions apply.
NOTE 2: On-site service may be provided pursuant to a service contract between HP and an authorized HP third-party provider, and is not available in certain countries. Global service response times are based on commercially reasonable best effort and may vary by country.
NOTE 3: Technical telephone support applies only to HP-configured, HP and HP-qualified, third-party hardware and software. Toll-free calling and 24x7 support service may not be available in some countries.
HP Care Pack Services extend service contracts beyond the standard warranties. Service starts from date of hardware purchase. To choose the right level of service for your HP product, use the HP Care Pack Services Lookup Tool at: http://www.hp.com/go/lookuptool. Service levels and response times for HP Care Packs may vary depending on your geographic location.

BIOS

BIOS 64-bit Services	BIOS supports 64-bit Operating systems only.
PCI 3.0 Support	Full BIOS support for PCI Express through industry standard interfaces.
ATAPI	ATAPI Removable Media Device BIOS Specification Version 1.0.
BBS	BIOS Boot Specification v1.01.
WMI Support	WMI is Microsoft's implementation of Web-Based Enterprise Management (WBEM) for Windows. WMI is fully compliant with the Distributed Management Task Force (DMTF) Common Information Model (CIM) and WBEM specifications.
BIOS Boot Spec 1.01+	Provides more control over how and from what devices the workstation will boot.
BIOS Power On	Users can define a specific date and time for the system to power on.

System Technical Specifications

ROM Based Computer Setup Utility (F10)	Review and customize system configuration settings controlled by the BIOS.
System/Emergency ROM Flash Recovery with Video	Recovers system BIOS in corrupted Flash ROM.
Replicated Setup	Saves BIOS settings to USB flash device in human readable file (HpSetup.txt). BiosConfigurationUtility.exe utility can then replicate these settings on machines being deployed without entering Computer Configuration Utility (F10 Setup).
SMBIOS	System Management BIOS 3.2, for system management information.
Boot Control	Disables the ability to boot from removable media on supported devices.
Memory Change Alert	Alerts management console if memory is removed or changed.
Thermal Alert	Monitors the temperature state within the chassis. Three modes: • NORMAL - normal temperature ranges. • ALERTED - excessive temperatures are detected. Raises a flag so action can be taken to avoid shutdown or provide for a smoother system shutdown. • SHUTDOWN - excessive temperatures are encountered. Automatically shuts down the computer without warning before hardware component damage occurs.
Remote ROM Flash	Provides secure, fail-safe ROM image management from a central network console.
ACPI (Advanced Configuration and Power Management Interface)	Allows the system to enter and resume from low power modes (sleep states). Enables an operating system to control system power consumption based on the dynamic workload. Makes it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system. Supports ACPI 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. Revision level is digitally encoded into the HW and cannot be modified.
Start-up Diagnostics (Power-on Self-Test)	Assesses system health at boot time with selectable levels of testing.
Auto Setup when new hardware installed	System automatically detects addition of new hardware.
Keyboard-less Operation	The system can be booted without a keyboard.
Localized ROM Setup	Common BIOS image supports System Configuration Utility (F10 Setup) menus in 14 languages with local keyboard mappings.
Asset Tag	The user or MIS to set a unique tag string in non-volatile memory.
Per-slot Control	Allows I/O slot parameters (option ROM enable/disable, bus latency) to be configured individually.
Adaptive Cooling	Control parameters are set according to detected hardware configuration for optimal acoustics.
Pre-boot Diagnostics	(Pre-video) critical errors are reported via beeps and blinks on the power LED.
UEFI Specification Revision	2.7
ACPI	Advanced Configuration and Power Management Interface, Version 6.0
ATA (IDE)	AT Attachment 6 with Packet Interface (ATA/ATAPI-6), Revision 3b
CD Boot	"El Torito" Bootable CD-ROM Format Specification Version 1.0

System Technical Specifications

EDD	Enhanced Disk Drive Specification Version 1.1 BIOS Enhanced Disk Drive Specification Version 3.0
EHCI	Enhanced Host Controller Interface for Universal Serial Bus, Revision 1.0
PCI	PCI Local Bus Specification, Revision 2.3 PCI Power Management Specification, Revision 1.1 PCI Firmware Specification, Revision 3.0, Draft .7
PCI Express	PCI Express Base Specification, Revision 2.0 PCI Express Base Specification, Revision 3.0 PCI Express Base Specification, Revision 4.0
PMM	POST Memory Manager Specification, Version 1.01
SATA	Serial ATA Specification, Revision 1.0a Serial ATA 3 Gb/s: Serial ATA Specification, Revision 2.5 Serial ATA 6 Gb/s: Serial ATA Specification, Revision 3.0
SPD	PC SDRAM Serial Presence Detect (SPD) Specification, Revision 1.2B
TPM	Trusted Computing Group TPM Specification Version 2.0 (Infineon SLB 9670). Common Criteria EAL4+ certified. FIPS 140-2 Certification TCG TPM Certified products list: http://www.trustedcomputinggroup.org/certification/tpm-certified-products/
UHCI	Universal Host Controller Interface Design Guide, Revision 1.1
USB	Universal Serial Bus Revision 1.1 Specification Universal Serial Bus Revision 2.0 Specification Universal Serial Bus Revision 3.1 Specification
SMBIOS	System Management BIOS Reference Specification, Version 3.2 External BIOS simulator found at: http://csrsml.itcs.hp.com/

Social and Environmental Responsibility

Eco-Label Certifications & Declarations

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

- 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
- Japan PC Green label*

Sustainable Impact Specifications

- 45% post-consumer recycled plastic
- External Power Supply 90% Efficiency
- Low halogen
- Outside Box and corrugated cushions are 100% sustainably sourced and recyclable
- Molded Paper Pulp Cushion inside box is 100% sustainably sourced and recyclable

System Technical Specifications

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**
Normal Operation (Sort idle)	40.30 W	40.88 W	38.25 W
Normal Operation (Long idle)	38.70 W	38.89 W	38.7 W
Sleep	2.56 W	2.77 W	2.75 W
Off	0.81 W	0.81 W	0.81 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)	140 BTU/hr	140 BTU/hr	140 BTU/hr
Normal Operation (Long idle)	132 BTU/hr	135 BTU/hr	132 BTU/hr
Sleep	9 BTU/hr	9 BTU/hr	9 BTU/hr
Off	3 BTU/hr	3 BTU/hr	3 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	3.42	24.5
Fixed Disk – Random writes	3.59	25.4
Optical Drive – Sequential reads	4.15	32.7

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 94.2% recycle-able when properly disposed of at end of life.

Packaging Materials

External:	PAPER/Corrugated	1158 g
Internal:	PAPER/Molded pulp	390 g
	PLASTIC/Polyethylene low density	28 g

The plastic packaging material contains at least 80% recycled content.

The corrugated paper packaging materials contains at least 100% 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/supplychain/gen_specifications.html):

- 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)

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

- Recycled plastic content percentage is based on the definition set in the IEEE 1680.1-2018 standard.
- External power supplies, WWAN modules, power cords, cables and peripherals excluded.
- 100% outer box packaging and corrugated cushions made from sustainably sourced certified and recycled fibers.
- Fiber cushions made from 100% recycled wood fiber and organic materials.
- Plastic cushions are made from >90% recycled plastic.

Technical Specifications - Processors

Name	Cores	Clock Speed (GHz)	Intel® Turbo Boost Technology[3]	Cache (MB)	Memory Speed (MT/s)	Hyper-Threading	Integrated Graphics	Featuring Intel® vPro® Technology[4]	16GB Intel® Optane™ memory[2]	TDP (W)
Intel® Core™ i9 11900K Processor	8	3.5	5.2	16	3200	Y	Intel® UHD Graphics 750	Y	Y	125
Intel® Core™ i9 11900F Processor	8	2.5	5.1	16	3200	Y	N/A	N/A	Y	65
Intel® Core™ i9 11900 Processor	8	2.5	5.1	16	3200	Y	Intel® UHD Graphics 750	Y	Y	65
Intel® Core™ i7 11700K Processor	8	3.6	5	16	3200	Y	Intel® UHD Graphics 750	Y	Y	125
Intel® Core™ i7 11700 processor	8	2.5	4.9	16	3200	Y	Intel® UHD Graphics 750	Y	Y	65
Intel® Core™ i5 11600K processor	6	3.9	4.9	12	3200	Y	Intel® UHD Graphics 750	Y	Y	125
Intel® Core™ i5 11600 processor	6	2.8	4.8	12	3200	Y	Intel® UHD Graphics 750	Y	Y	65
Intel® Core™ i5 11500 processor	6	2.7	4.6	12	3200	Y	Intel® UHD Graphics 750	Y	Y	65
Intel® Core™ i5 11400F processor	6	2.6	4.4	12	3200	Y	N/A	N/A	Y	65
Intel® Core™ i5 11400 processor	6	2.6	4.4	12	3200	Y	Intel® UHD Graphics 730	N/A	Y	65
Intel® Xeon® W-1390P processor	8	3.5	5.2	16	3200	Y	Intel® UHD Graphics P750	Y	Y	125
Intel® Xeon® W-1390 processor	8	2.8	5.1	16	3200	Y	Intel® UHD Graphics P750	Y	Y	80
Intel® Xeon® W-1370P processor	8	3.6	5.2	16	3200	Y	Intel® UHD Graphics P750	Y	Y	125
Intel® Xeon® W-1370 processor	8	2.9	5.1	16	3200	Y	Intel® UHD Graphics P750	Y	Y	80
Intel® Xeon® W-1350P processor	6	4	5.1	12	3200	Y	Intel® UHD Graphics P750	Y	Y	125
Intel® Xeon® W-1350 processor	6	3.3	5	12	3200	Y	Intel® UHD Graphics P750	Y	Y	80

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. Intel's numbering, branding and/or naming is not a measurement of higher performance.

2. Intel® Optane™ memory is sold separately. Intel® Optane™ memory system acceleration does not replace or increase the DRAM in your system. Available for HP commercial desktops and notebooks and for select HP workstations (HP Z240 Tower/SFF, Z2 Mini, ZBook Studio, 15 and 17 G5) and requires a SATA HDD, 7th Gen or higher Intel® Core™ processor or Intel ® Xeon® processor E3-1200 V6 product family or higher, BIOS version with Intel® Optane™ supported, Windows 10 version 1703 or higher, M.2 type 2280-S1-B-M connector on a PCH Remapped PCIe Controller and Lanes in a x2 or x4 configuration with B-M keys that meet NVMeTM Spec 1.1, and an Intel® Rapid Storage Technology (Intel® RST) 15.5 driver.

Technical Specifications - Processors

3. The specifications shown in the Intel® Turbo Boost Technology column represent the maximum turbo frequency with one core active. Turbo boost stepping occurs in 100MHz increments. Processors that do not have turbo functionality are denoted as N/A. Intel® Turbo Boost performance varies depending on hardware, software and overall system configuration. See http://www.intel.com/technology/turboboost for more information

4. For full Intel® vPro® functionality, Windows 10 Pro 64 bit, a vPro supported processor, vPro enabled chipset, vPro enabled wired LAN and/or WLAN card and TPM 2.0 are required. Some functionality requires additional 3rd party software in order to run. See http://intel.com/vpro

Technical Specifications - Hard Drives

SATA Hard Drives for HP Workstations	**500GB SATA 7200 rpm 6Gb/s 3.5" HDD**	**Capacity**	500GB	
		Protocol	SATA	
		Form Factor	3.5"	
		Controller	AHCI	
		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	32MB	
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	2 ms *
			Average	11 ms *
			Full Stroke	21 ms *
		Rotational Speed	7,200 rpm	
		Logical Blocks	976,773,168	
		Operating Temperature	41° to 131° F (5° to 55° C)	
		*Actual performance may vary. **NOTE:** For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36 GB (for Windows 10) of system disk is reserved for the system recovery software.		
	1TB SATA 7200 rpm 6Gb/s 3.5" HDD	**Capacity**	1TB	
		Protocol	SATA	
		Form Factor	3.5"	
		Controller	AHCI	
		Height	1 in; 2.54 cm	
		Width	**Media Diameter**	3.5 in; 8.9 cm
			Physical Size	4 in; 10.17 cm
		Interface	Serial ATA (6.0Gb/s), NCQ enabled	
		Synchronous Transfer Rate (Maximum)	Up to 600 MB/s *	
		Buffer	64MB	
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	2 ms *
			Average	11 ms *
			Full Stroke	21 ms *
		Rotational Speed	7,200 rpm	
		Logical Blocks	1,953,525,168	
		Operating Temperature	41° to 131° F (5° to 55° C)	
		*Actual performance may vary. **NOTE:** For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36 GB (for Windows 10) of system disk is reserved for the system recovery software.		
	2TB SATA 7200 rpm 6Gb/s 3.5" HDD	**Capacity**	2TB	
		Protocol	SATA	
		Form Factor	3.5"	

Technical Specifications - Hard Drives

	Controller	AHCI	
	Annualized Failure Rate (based on Rated POH)	<0.62%	
	Height	1 in; 2.54 cm	
	Width	**Media Diameter**	3.5 in; 8.9 cm
		Physical Size	4 in; 10.17 cm
	Interface	Serial ATA (6.0 Gb/s), NCQ Enabled	
	Synchronous Transfer Rate (Maximum)	Up to 600MB/s *	
	Buffer	64MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	2.0 ms *
		Average	11 ms *
		Full Stroke	21 ms *
	Rotational Speed	7,200 rpm	
	Logical Blocks	3,907,029,168	
	Operating Temperature	41° to 131° F (5° to 55° C)	
	*Actual performance may vary.		
	NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36 GB (for Windows 10) of system disk is reserved for the system recovery software.		
1TB SATA 7200 rpm 6Gb/s 3.5" HDD (Enterprise Class)	**Capacity**	1TB	
	Height	1 in; 2.54 cm	
	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%	
	Width	**Media Diameter**	3.5 in; 8.9 cm
		Physical Size	4 in; 10.17 cm
	Interface	Serial ATA (6.0 Gb/s), NCQ Enabled	
	Synchronous Transfer Rate (Maximum)	Up to 600MB/s *	
	Buffer	128MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.32ms*
		Average	7.45ms*
		Full Stroke	14.2ms*
	Rotational Speed	7,200 rpm	
	Operating Temperature	41° to 140° F (5° to 60° C)	
	Performance	**Sequential Read**	up to 226MB/s*
		Sequential Write	up to 226MB/s*
	Enterprise Class Features	High Reliability	
	*Actual performance may vary.		

Technical Specifications - Hard Drives

NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36 GB (for Windows 10) of system disk is reserved for the system recovery software.

2TB SATA 7200 rpm 6Gb/s 3.5" HDD (Enterprise Class)	**Capacity**	2TB	
	Protocol	SATA	
	Form Factor	3.5"	
	Controller	AHCI	
	Reliability (MTBF)	2.0M hours	
	Rated Power On Hours	8760/yr	
	Annualized Failure Rate (based on Rated POH)	<0.62%	
	Rated for 24/7/365 Operation		
	Physical Size (Height)	1 in; 2.54 cm	
	Physical Size (Width)	4 in; 10.17 cm	
	Media Diameter	3.5 in; 8.9 cm	
	Interface	Serial ATA (6Gb/s), NCQ enabled	
	Synchronous Transfer Rate (Maximum)	Up to 600MB/s*	
	Buffer	128MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.7ms*
		Average	8.5ms*
		Full Stroke	15.7ms*
	Rotational Speed	7,200 rpm	
	Operating Temperature	41° to 131° F (5° to 55° C)	
	Performance	**Sequential Read**	up to 226MB/s*
		Sequential Write	up to 226MB/s*
	Enterprise Class Features	High Reliability	

*Actual performance may vary.

NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36 GB (for Windows 10) of system disk is reserved for the system recovery software.

4TB SATA 7200 rpm 6Gb/s 3.5" HDD (Enterprise Class)	**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	
	Physical Size (Height)	1 in; 2.54 cm
	Physical Size (Width)	4 in; 10.17 cm
	Media Diameter	3.5 in; 8.9 cm

Technical Specifications - Hard Drives

	Physical Size	4 in; 10.17 cm	
	Interface	Serial ATA (6Gb/s), NCQ enabled	
	Synchronous Transfer Rate (Maximum)	Up to 600MB/s*	
	Buffer	256MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.7ms*
		Average	8.5ms*
		Full Stroke	15.7ms*
	Rotational Speed	7,200 rpm	
	Operating Temperature	41° to 131° F (5° to 55° C)	
	Performance	**Sequential Read**	up to 226MB/s*
		Sequential Write	up to 226MB/s*
	Enterprise Class Features	High Reliability	

*Actual performance may vary.

NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36 GB (for Windows 10) of system disk is reserved for the system recovery software.

8TB SATA 7200 rpm 6Gb/s 3.5" HDD (Enterprise Class)	**Capacity**	8TB	
	Protocol	SATA	
	Form Factor	3.5"	
	Controller	AHCI	
	Reliability	2.0M hours	
	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 [1]	
	Buffer	256MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.7ms*
		Average	8.5ms*
		Full Stroke	15.7ms*
	Rotational Speed	7,200 rpm	
	Operating Temperature	41° to 140° F (5° to 60° C)	
	Performance	**Sequential Read**	up to 226MB/s[1]
		Sequential Write	up to 226MB/s[1]
	Enterprise Class Features	High Reliability	

*Actual performance may vary.

NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36 GB (for Windows 10) of system disk is reserved for the system recovery software.

500GB SATA 7.2K SED 2.5" HDD	**Capacity**	500GB	
	Protocol	SATA	
	Form Factor	2.5"	
	Height	0.275 in; 0.7 cm	
	Width	Media Diameter	2.5 in; 6.36 cm

Technical Specifications - Hard Drives

		Physical Size	2.75 in; 6.99 cm
	Interface	Serial ATA (6.0Gb/s), NCQ enabled	
	Synchronous Transfer Rate (Maximum)	Up to 600MB/s*	
	Buffer	64MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	1ms*
		Average	4.2ms*
		Full Stroke	25ms (Typical)*
	Rotational Speed	7,200 rpm	
	Operating Temperature	32° to 131° F (0° to 60° C)	
	Self-Encrypting Drive Support	Yes	

*Actual performance may vary.
NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36 GB (for Windows 10) of system disk is reserved for the system recovery software.

HP Z Turbo Drv PCIE-4X4 256GB TLC PCIe SSD (Z2G8)	**Capacity**	256GB	
	Protocol	PCIe	
	Form Factor	M.2 in native Slot on motherboard	
	Controller	NVMe	
	NAND Type	3D TLC	
	Endurance	75TBW (TB Written)	
	Reliability	1.5M Hours	
	Interface	PCI Express 4.0 x4 electrical	
	Operating Temperature	32° to 178° F (0° to 81° C)	
	Performance	**Sequential Read**	5500MB/s*
		Sequential Write	2300MB/s*
		Random Read	400K IOPS*
		Random Write	400K IOPS*

*Actual performance may vary.
NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36 GB (for Windows 10) of system disk is reserved for the system recovery software.

HP Z Turbo Drv PCIE-4X4 512GB TLC PCIe SSD (Z2G8)	**Capacity**	512GB	
	Protocol	PCIe	
	Form Factor	M.2 in native Slot on motherboard	
	Controller	NVMe	
	NAND Type	3D TLC	
	Endurance	150TBW (TB Written)	
	Reliability (MTBF)	1.5M hours	
	Interface	PCI Express 4.0 x4 electrical	
	Operating Temperature	32° to 178° F (0° to 81° C)	
	Performance	**Sequential Read**	6400MB/s*
		Sequential Write	3400MB/s*
		Random Read	600K IOPS*

	Random Write	600K IOPS*

*Actual performance may vary.
NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36 GB (for Windows 10) of system disk is reserved for the system recovery software.

HP Z Turbo Drv PCIE-4X4 1TB TLC PCIe SSD (Z2G8)	**Capacity**	1TB	
	Protocol	PCIe	
	Form Factor	M.2 in native Slot on motherboard	
	Controller	NVMe	
	NAND Type	3D TLC	
	Endurance	300TBW (TB Written)	
	Reliability	1.5M Hours	
	Interface	PCI Express 4.0 x4 electrical	
	Operating Temperature	32° to 178° F (0° to 81° C)	
	Performance	**Sequential Read**	6500MB/s*
		Sequential Write	5000MB/s*
		Random Read	800K IOPS*
		Random Write	800K IOPS*

*Actual performance may vary.
NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36 GB (for Windows 10) of system disk is reserved for the system recovery software.

HP Z Turbo Drv PCIE-4X4 2TB TLC PCIe SSD (Z2G8)	**Capacity**	2TB	
	Protocol	PCIe	
	Form Factor	M.2 in native Slot on motherboard	
	Controller	NVMe	
	NAND Type	3D TLC	
	Endurance	600TBW (TB Written)	
	Reliability	1.5M Hours	
	Interface	PCI Express 4.0 x4 electrical	
	Operating Temperature	32° to 178° F (0° to 81° C)	
	Performance	**Sequential Read**	6500MB/s*
		Sequential Write	5000MB/s*
		Random Read	800K IOPS*
		Random Write	800K IOPS*

*Actual performance may vary.
NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36 GB (for Windows 10) of system disk is reserved for the system recovery software.

HP Z Turbo Drv 256GB TLC PCIe SED OPAL2 (Z2G8)	**Capacity**	256GB
	Protocol	PCIe
	Form Factor	M.2 in native Slot on motherboard
	Controller	NVMe
	NAND Type	3D TLC

Technical Specifications - Hard Drives

	Endurance	75TBW (TB Written)	
	Reliability	1.5M Hours	
	Interface	PCI Express 4.0 x4 electrical	
	Operating Temperature	32° to 178° F (0° to 81° C)	
	Performance	**Sequential Read**	5500MB/s*
		Sequential Write	2300MB/s*
		Random Read	400K IOPS*
		Random Write	400K IOPS*
	Self-Encrypting Drive Support	OPAL2	

*Actual performance may vary.
NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36 GB (for Windows 10) of system disk is reserved for the system recovery software.

HP Z Turbo Drv 512GB TLC PCIe SED OPAL2 (Z2G8)	**Capacity**	512GB	
	Protocol	PCIe	
	Form Factor	M.2 in native Slot on motherboard	
	Controller	NVMe	
	NAND Type	3D TLC	
	Endurance	150TBW (TB Written)	
	Reliability	1.5M Hours	
	Interface	PCI Express 4.0 x4 electrical	
	Operating Temperature	32° to 178° F (0° to 81° C)	
	Performance	**Sequential Read**	6400MB/s*
		Sequential Write	3400MB/s*
		Random Read	600K IOPS*
		Random Write	600K IOPS*
	Self-Encrypting Drive Support	OPAL2	

*Actual performance may vary.
NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36 GB (for Windows 10) of system disk is reserved for the system recovery software.

HP Z Turbo Drv 1TB TLC PCIe SED OPAL2 (Z2G8)	**Capacity**	1TB	
	Protocol	PCIe	
	Form Factor	M.2 in native Slot on motherboard	
	Controller	NVMe	
	NAND Type	3D TLC	
	Endurance	300TBW (TB Written)	
	Reliability	1.5M Hours	
	Interface	PCI Express 4.0 x4 electrical	
	Operating Temperature	32° to 178° F (0° to 81° C)	
	Performance	**Sequential Read**	6500MB/s*
		Sequential Write	5000MB/s*
		Random Read	800K IOPS*

		Random Write	800K IOPS*
	Self-Encrypting Drive Support	OPAL2	

*Actual performance may vary.
NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36 GB (for Windows 10) of system disk is reserved for the system recovery software.

HP Z Turbo Drv 2TB TLC PCIe SED OPAL2 (Z2G8)	**Capacity**	2TB	
	Protocol	PCIe	
	Form Factor	M.2 in native Slot on motherboard	
	Controller	NVMe	
	NAND Type	3D TLC	
	Endurance	600TBW (TB Written)	
	Reliability	1.5M Hours	
	Interface	PCI Express 4.0 x4 electrical	
	Operating Temperature	32° to 178° F (0° to 81° C)	
	Performance	**Sequential Read**	6500MB/s*
		Sequential Write	5000MB/s*
		Random Read	800K IOPS*
		Random Write	800K IOPS*
	Self-Encrypting Drive Support	OPAL2	

*Actual performance may vary.
NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36 GB (for Windows 10) of system disk is reserved for the system recovery software.

256GB M.2 2280 PCIE TLC SSD (Z2G8)	**Capacity**	256GB	
	Protocol	PCIe	
	Form Factor	M.2 in native Slot on motherboard	
	Controller	NVMe	
	NAND Type	3D TLC	
	Endurance	200TBW (TB Written)	
	Reliability	1.5M Hours	
	Interface	PCI Express 3.0 x4 electrical	
	Operating Temperature	32° to 158° F (0° to 70° C)	
	Performance	**Sequential Read**	3100MB/s*
		Sequential Write	1400MB/s*
		Random Read	200K IOPS*
		Random Write	400K IOPS*

*Actual performance may vary.
NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36 GB (for Windows 10) of system disk is reserved for the system recovery software.

512GB M.2 2280 PCIE TLC SSD (Z2G8)	**Capacity**	512GB
	Protocol	PCIe

Technical Specifications - Hard Drives

	Form Factor	M.2 in native Slot on motherboard	
	Controller	NVMe	
	NAND Type	3D TLC	
	Endurance	300TBW (TB Written)	
	Reliability	1.5M Hours	
	Interface	PCI Express 3.0 x4 electrical	
	Operating Temperature	32° to 158° F (0° to 70° C)	
	Performance	**Sequential Read**	3400MB/s*
		Sequential Write	2500MB/s*
		Random Read	380K IOPS*
		Random Write	430K IOPS*

*Actual performance may vary.
NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36 GB (for Windows 10) of system disk is reserved for the system recovery software.

1TB M.2 2280 PCIE TLC SSD (Z2G8)	**Capacity**	1TB	
	Protocol	PCIe	
	Form Factor	M.2 in native Slot on motherboard	
	Controller	NVMe	
	NAND Type	3D TLC	
	Endurance	400TBW (TB Written)	
	Reliability	1.5M Hours	
	Interface	PCI Express 4.0 x4 electrical	
	Operating Temperature	32° to 158° F (0° to 70° C)	
	Performance	**Sequential Read**	3400MB/s*
		Sequential Write	2500MB/s*
		Random Read	500K IOPS*
		Random Write	440K IOPS*

*Actual performance may vary.
NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36 GB (for Windows 10) of system disk is reserved for the system recovery software.

2TB M.2 2280 PCIE TLC SSD (Z2G8)	**Capacity**	2TB	
	Protocol	PCIe	
	Form Factor	M.2 in native Slot on motherboard	
	Controller	NVMe	
	NAND Type	3D TLC	
	Endurance	600TBW (TB Written)	
	Reliability	1.5M Hours	
	Interface	PCI Express 3.0 x4 electrical	
	Operating Temperature	32° to 158° F (0° to 70° C)	
	Performance	**Sequential Read**	3400MB/s*
		Sequential Write	2500MB/s*
		Random Read	430K IOPS*

Technical Specifications - Hard Drives

Random Write	500K IOPS*

*Actual performance may vary.

NOTE: For hard drives and solid state drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 36 GB (for Windows 10) of system disk is reserved for the system recovery software.

Technical Specifications - Graphics

Integrated Intel® UHD Graphics (Z2 G8)	**Form Factor**	Integrated in select Intel® Xeon® , Intel® Core™ i9/i7, and Intel® Core™ i5 processors. Check specific platform specifications for selections.
	Graphics Controller	Intel® UHD Graphics
	Memory	Unified Memory Architecture (UMA) frame buffer. Graphics memory is shared with system memory. Size selectable between 64 MB to 1024 MB via BIOS setting. Default size is 64 MB. Additional memory is allocated for graphics as needed using Intel's Dynamic Video Memory Technology (Intel® DVMT 5.0), to provide an optimal balance between graphics and system memory use.
	Connectors	Check system platform specifications where Intel® UHD Graphics are available.
	Maximum Resolution	Display Port: 4096 x 2160 (5120x3200 could be achieved if output from FlexIO ports - DP/USB-C/TBT) HDMI: 4096 x 2160 DVI: 1920x1200 VGA: 2048x1536 **NOTE:** For HDMI, DVI and VGA outputs, separate adapters may be required.
	Shading Architecture	Shader Model 6 compiler support
	Supported Graphics APIs	OpenGL 4.6 DirectX 12
	Available Graphics Drivers	Windows 10

NVIDIA® Quadro® P400 2GB Graphics	**Form Factor**	Single Slot, Low Profile (2.713" H x 5.7" L)
	Graphics Controller	NVIDIA® Quadro® P400 Graphics Card Max Power: 30 Watts Cooling Solution: Active fan heatsink
	Bus Type	PCI Express 3.0 x16
	Memory	Size: 2 GB GDDR5
	Maximum Resolution	DisplayPort™ 1.4: - up to 3x 5120 x 2880 x 24 bpp @ 60Hz - supports Multi-Stream Transport (MST)
	Display Output	3 mDP (Mini DisplayPort™) 1.4 Connectors
	Shading Architecture	Full Microsoft DirectX 12 Shader Model 5.1
	Supported Graphics APIs	OpenGL 4.5 DirectX 12 Vulkan 1.0 API support includes: CUDA, OpenCL 1.x
	Available Graphics Drivers	Microsoft Windows 10 64-bit Linux® 64-bit (selected Enterprise distributions) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html

Technical Specifications - Graphics

	Notes	*P400 only have mini-DisplayPort™ (mDP) video ports. **Note :** AMO kits for P400 Adapters • Two mDP-to-DP Adapters are included in the P400 AMO kits. • If more mDP-to-DP Adapters are needed, Adapters can be ordered separately: - 2MY05AA - HP Single miniDP-to-DP Adapter Cable
NVIDIA® T400 2GB Graphics	**Form Factor**	Dimensions: 2.713" H x 6.137" L Single Slot, Low Profile Weight: 124g
	Graphics Controller	NVIDIA® T400 Graphics Card GPU: 384 CUDA cores Power: 30 Watts Cooling: Active
	Bus Type	PCI Express 3.0 x16
	Memory	Size: 2 GB GDDR6 Memory Interface: 64-bit Memory Bandwidth: 80 GB/s
	Connectors	3x mDP
	Maximum Resolution	3x 5120 x 2880 x 24 bpp @ 60Hz
	Supported Graphics APIs	OpenGL 4.5 DirectX 12 Vulkan 1.0 API support includes: CUDA, OpenCL 1.x
	Available Graphics Drivers	Windows 10 Linux HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
NVIDIA® T600 4GB Graphics	**Form Factor**	Dimensions: 2.713" H x 5.7" L Single Slot, Low Profile
	Graphics Controller	NVIDIA® T600 Graphics Card GPU: 640 CUDA cores Power: 40 Watts Cooling: Active
	Bus Type	PCI Express 3.0 x16
	Memory	Size: 4 GB GDDR6 Memory Interface: 128-bit Memory Bandwidth: 160 GB/s
	Connectors	4x mDP
	Maximum Resolution	7680 x 432- @ 60Hz
	Display Output	4x mDP

Technical Specifications - Graphics

	Supported Graphics APIs	OpenGL 4.5 DirectX 12 Vulkan 1.0 API support includes: CUDA C, CUDA C++, DirectCompute , OpenCL
	Available Graphics Drivers	Windows 10 Linux HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
AMD Radeon™ Pro WX 3200 4GB Graphics	**Form Factor**	Low-Profile Single Slot (2.75 "H x 6.6" L)
	Graphics Controller	Radeon™ Pro WX 3200 Power: 56 Watts Cooling Solution: Active fan heatsink
	Memory	4GB GDDR5 memory
	Maximum Resolution	DisplayPort™ 1.4: - up to 4x 4096 x 2160 x 24 bpp @ 60Hz - supports Multi-Stream Transport (MST)
	Shading Architecture	Full Microsoft DirectX 12 Shader Model 5.1
	Display Outputs	4 mDP (Mini DisplayPort™) 1.4 Connectors
	Supported Graphics APIs	DirectX® 12 OpenGL® 4.6 OpenCL™ 2.0 Vulkan™ 1.0
	Available Graphics Drivers	Windows 10 64-bit (Windows® 7 64-bit available from AMD) Linux® 64-bit (selected Enterprise distributions) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
	Notes	1. HDR content requires that the system be configured with a fully HDR-ready content chain, including: graphics card, monitor/TV, graphics driver and application. Video content must be graded in HDR and viewed with an HDR-ready player. Windowed mode content requires operating system support. 2. WX 3200 only has mini-DisplayPort™ (mDP) video ports. Two mDP-to-DP Adapters are included in the WX 3200 AMO kit. If more mDP-to-DP Adapters are needed, Adapters can be ordered separately: • 2MY05AA HP Single miniDP-to-DP Adapter Cable
AMD Radeon™ Pro W5500 8GB Graphics	**Form Factor**	Single slot, full-height, 9.5" length
	Graphics Controller	Radeon™ Pro W5500 Power: 120 Watts Cooling Solution: Active Fan Heatsink

Technical Specifications - Graphics

	Memory	8GB GDDR6
	Maximum Resolution	DisplayPort™ 1.4: - up to 4x 5120 x 2880 x 24 bpp @ 60Hz - supports Multi-Stream Transport (MST)
	Display Outputs	DisplayPort™ 1.4 Connectors FreeSync support
	Shading Architecture	Full Microsoft DirectX 12 Shader Model 5.1
	Supported Graphics APIs	DirectX® 12 (12_1) OpenGL® 4.6 OpenCL™ 2.0 Vulkan™ 1.1
	Available Graphics Drivers	Windows 10 64-bit Linux® 64-bit (selected Enterprise distributions) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
NVIDIA® T1000 4GB Graphics	**Form Factor**	Low-Profile Single Slot (6.13” Length)
	Graphics Controller	NVIDIA® T1000 4GB Graphics Power: 50 Watts Cooling: Active Fan Heatsink
	Memory	4GB GDDR6 memory
	Maximum Resolution	DisplayPort™ 1.4a: - up to 4x 5210 x 3200 x 24 bpp @ 60Hz, uncompressed - 7680 x 4320 x 36 bpp @ 60Hz, compressed - supports Multi-Stream Transport (MST)
	Display Output	4 mDP (Mini DisplayPort™) 1.4 Connectors
	Shading Architecture	Shader Model 5.1
	Supported Graphics APIs	DirectX®12.1 OpenGL® 4.6 OpenCL™ 1.2 Vulkan™ 1.2
	Available Graphics Drivers	Windows 10 64-bit Linux® 64-bit (selected Enterprise distributions) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html

Technical Specifications - Graphics

AMD Radeon™ Pro W5700 8GB Graphics	**Form Factor**	Full-Height Dual Slot (10.5” Length)
	Graphics Controller	Radeon™ Pro W5700 Power: 210 Watts Cooling Solution: Active Fan Heatsink
	Memory	8GB GDDR6
	Maximum Resolution	DisplayPort™ 1.4: - up to 4x 5120 x 2880 x 24 bpp @ 60Hz - supports Multi-Stream Transport (MST)
	Display Output	4 DisplayPort™ 1.4 Outputs FreeSync support
	Supported Graphics APIs	DirectX® 12 (12_1) OpenGL® 4.6 OpenCL™ 2.0 Vulkan™ 1.0
	Available Graphics Drivers	Windows 10 64-bit Linux® 64-bit (selected Enterprise distributions) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html

Technical Specifications - Optical and Removable Storage

HP 9.5mm Slim DVD Writer	**Description**	9.5mm height, tray-load	
	Mounting Orientation	Either horizontal or vertical	
	Interface Type	SATA/ATAPI	
	Dimensions (WxHxD)	128 x 9.5 x 127mm	
	Supported Media Types	DVD+R DVD+RW DVD+R DL DVD-R DL DVD-R DVD-RW CD-R CD-RW	
	Disc Capacity	**DVD-ROM**	8.5 GB DL or 4.7 GB standard
	Access Times	**Full Stroke DVD**	< 200 ms (seek)
		Full Stroke CD	< 200 ms (seek)
	Maximum Data Transfer Rates	**CD ROM Read**	CD-ROM, CD-R Up to 24X CD-RW Up to 24X
		DVD ROM Read	DVD+RW Up to 8X DVD-RW Up to 8X DVD+R DL Up to 8X DVD-R DL Up to 8X DVD-ROM Up to 8X DVD-ROM DL Up to 8X DVD+R Up to 8X DVD-R Up to 8X
	Power	**Source**	SATA DC power receptacle
		DC Power Requirements	5 VDC ± 5%-100 mV ripple p-p
		DC Current	5 VDC -< 800 mA typical, <1600 mA maximum
	Operating Environmental (all conditions non-condensing)	**Temperature**	41° to 122° F (5° to 50° C)
		Relative Humidity	10% to 80%
		Maximum Wet Bulb Temperature	84° F (29° C)
	Operating Systems Supported	Windows 10, Windows 7 Professional 64-bit, Windows Vista Business 64*, Windows 2000. Linux®.	
	Kit Contents	HP SATA DVD Writer drive, installation guide.	
	Approvals	USB-IF, WHQL, Compliant with USB Mass Storage Class Bulk only Transport Specification Rev. 1.0, Compliant Intel Front Panel I/O Connectivity Design Guide V. 1.3, FCC, CE, BSMI, C-Tick, VCCI, MIC, cUL, TUVT	

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.

Technical Specifications - Optical and Removable Storage

HP 9.5mm Slim DVD-ROM Drive	**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 Double layer: Up to 8.5 GB
	Access Times	**DVD-ROM Single Layer**	< 110 ms (typical)
		CD-ROM Mode 1	< 110 ms (typical)
		Full Stroke DVD	< 230 ms (typical)
		Full Stroke CD	< 220 ms (typical)
	Power	**Source**	SATA DC power receptacle
		DC Power Requirements	5 VDC ± 5%-100 mV ripple p-p
		DC Current	5 VDC – <800mA typical, < 1600 mA maximum
	Operating Environmental (all conditions non-condensing)	**Temperature**	41° to 122° F (5° to 50° C)
		Relative Humidity	10% to 80%
		Maximum Wet Bulb Temperature	84° F (29° C)
	Operating Systems Supported	Windows 10, Windows 7 Professional 64-bit, Windows Vista Business 64*, Windows 2000. Linux®.	
	Kit Contents	9.5mm Slim DVD-ROM Drive, slim SATA data/power cable, installation guide	
	Approvals	USB-IF, WHQL, Compliant with USB Mass Storage Class Bulk only Transport Specification Rev. 1.0, Compliant Intel Front Panel I/O Connectivity Design Guide V. 1.3, FCC, CE, BSMI, C-Tick, VCCI, MIC, cUL, TUVT	

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.

Technical Specifications - Controller Cards

HP Thunderbolt™ 3/USB4 PCIe 3 Single-port I/O Card	**Data Transfer Rate**	Supports up to 40 Gb/s* 40,000 Mb/s)
	Devices Supported	Thunderbolt™ certified devices
	Bus Type	PCIe card, full height PCIe slot
	Ports	One USB4 Type-C® connector (Rear)
	Internal Connectors	Two wire-to-board connectors
	System Requirements	Windows 10 64-bit, Intel® i5 series or higher processor, available on PCIe slot4.
	Temperature - Operating	50° to 131° F (10° to 55° C)
	Temperature - Storage	-22° to 140° F (-30° to 60° C)
	Relative Humidity - Operating	20% to 80%
	Compliances	FCC Part 15B, cULus, CE Mark EN55032B/EN55024, Taiwan BSMI, Korea KCC
	Operating Systems Supported	Windows 10 64-bit.
	Kit Contents	HP Thunderbolt™ 3/USB4 PCIe 3 Single-port I/O Card, Flex IO wire-to-board module, One full height and One Low-Profile brackets, One power cable, One DisplayPort™ and GPIO (General-Purpose Input/Output) cable, Installation documentation and warranty card.

*Maximum speed requires DisplayPort™ and PCIe aggregation.

Technical Specifications - Networking and Communications

Integrated Intel® I219LM PCIe GbE Controller (Intel® vPro® with Intel® AMT 15.0)	**Connector**	RJ-45
	Cabling	Twin Axial Cabling up to 10m
	Controller	Intel® I219LM GbE platform LAN connect networking controller
	Memory	3 KB Tx and 3KB Rx FIFO packet buffer memory
	Data Rates Supported	10/100/1000 Mbps
	Compliance	802.1as/1588, 802.1p, 802.1Q, 802.3, 802.3ab, 802.3az, 802.3i, 802.3u, 802.3z
	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 (Sx low power state)
	Power Requirement	Requires 3.3V (integrated regulators for core Vdc)
	Boot ROM Support	Yes
	Network Transfer Mode	Full-duplex; Half-duplex (not supported for the 1000BASE-T transceiver)
	Network Transfer Rate	10BASE-T (half-duplex) 10 Mbps 10BASE-T (full-duplex) 10 Mbps 100BASE-TX (half-duplex) 100 Mbps 100BASE-TX (full-duplex) 100 Mbps 1000BASE-T (full-duplex) 1000 Mbps
	Management Capabilities	vPro®, WOL, auto MDI crossover, PXE, Muti-port teaming, RSS, ACPI, Advanced cable diagnostic, loopback modes, AMT 15.0 support, Circuit Breaker, VLAN, Multicast Listener Discovery (MLD)

HP 1-Port 1GbE Flex IO NIC	**Connector**	RJ-45
	Cabling	1GbE over Category 5e (or better) up to 100m
	Controller	Realtek RTL8153
	Data Rates Supported	10/100/1000 Mbps
	Compliance	802.3 (LAN) 802.3u (100BASE-TX) 802.3ab (1000BASE-T) 802.3x (Ethernet Flow Control) 802.1Q (Virtual LAN) 802.3az (Energy Efficient Ethernet)
	Bus Architecture	USB
	Power Requirement	Requires 3.3V (integrated regulators for core Vdc)
	Boot ROM Support	Yes
	Network Transfer Mode	Full-duplex; Half-duplex
	Network Transfer Rate	10BASE-T (half-duplex) 10 Mbps 10BASE-T (full-duplex) 10 Mbps 100BASE-TX (half-duplex) 100 Mbps 100BASE-TX (full-duplex) 100 Mbps 1000BASE-T (full-duplex) 1000 Mbps
	Operating Temperature	32° to 131° F (0° to 55° C)
	Dimensions (HxW)	1.5 in x 1.5 in. x 0.75 in (3.81 cm x 3.81 cm x 1.9 cm)

Technical Specifications - Networking and Communications

	Operating System Driver Support	Windows 10 64-bit Linux®
HP 10GbE SFP+ SR Transceiver	**Operating Temperature**	32°F to 113°F (0°C to 45°C)
	Operating Humidity	0% to 85%, noncondensing
	Dimensions (HxWxD)	0.47 x 0.54 x 2.19 inches
	Kit Contents	HP 10GbE SFP+ SR Transceiver
Intel® X550-T2 2-Port 10GbE NIC	**Connector**	2 RJ-45
	Cabling	10GbE: Cat6a (or better) up to 100m 5GbE and below: Cat5e (or better) up to 100m
	Controller	Intel® Ethernet Controller X550
	Network Transfer Rates Supported	10GbE, 5GbE, 2.5GbE, 1GbE, 100MbE
	Data Path Width	PCIe Gen3x4
	Power Requirement	11.2W (typical)
	Operating Temperature	32° to 131° F (0° to 55° C)
	Dimensions (HxW)	5.1 x 2.7 in (without brackets)
	Operating System Driver Support	Windows 10 64-bit Linux®
	Kit Contents	• Intel® X550-T2 2-Port 10GbE NIC with standard height bracket attached • Low-profile bracket • Product Literature
Aquantia® AQN-108 1-Port 5GbE NIC	**Connector**	1 RJ-45
	Cabling	Cat5e (or better) up to 100m
	Controller	Aquantia® AQC108
	Network Transfer Rates Supported	5Gbe, 2.5GbE, 1GbE, 100MbE
	Data Path Width	PCIe Gen3x1
	Power Requirement	3.5W (typical)
	Operating Temperature	32° to 131° F (0° to 55° C)
	Dimensions (HxW)	3.72 x 3.18 inches (without brackets)
	Operating System Driver Support	Windows 10 64-bit Linux®
	Kit Contents	• Aquantia AQN-108 1-Port 5GbE NIC with standard height bracket attached • Low-profile bracket • Product Literature
Intel® I350-T2 2-Port 1GbE NIC	**Connector**	2 RJ-45
	Cabling	Cat5e (or better) up to 100m
	Controller	Intel® Ethernet I350 Controller

Technical Specifications - Networking and Communications

	Network Transfer Rates Supported	1GbE, 100MbE, 10MbE
	Data Path Width	PCIe Gen2.1x4
	Power Requirement	4.4W (typical)
	Operating Temperature	32° to 131° F (0° to 55° C)
	Dimensions (HxW)	2.75 x 5.5 inches (without brackets)
	Operating System Driver Support	Windows 10 64-bit Linux®
	Kit Contents	• Intel® I350-T2 2-Port 1GbE NIC with standard height bracket attached • Low-profile bracket • Product Literature
Intel® I350-T4 4-Port 1GbE NIC	**Connector**	4 RJ-45
	Cabling	Cat5e (or better) up to 100m
	Controller	Intel® Ethernet I350 Controller
	Network Transfer Rates Supported	1GbE, 100MbE, 10MbE
	Data Path Width	PCIe Gen2.1x4
	Power Requirement	5W (typical)
	Operating Temperature	32° to 131° F (0° to 55° C)
	Dimensions (HxW)	2.75 x 5.5 inches (without brackets)
	Operating System Driver Support	Windows 10 64-bit Linux®
	Kit Contents	• Intel® I350-T4 4-Port 1GbE NIC with standard height bracket attached • Low-profile bracket • Product Literature
Intel® I225-T1 1-Port 2.5GbE NIC ***Planned to be available in Q3,2021**	**Connector**	1 RJ-45
	Cabling	Cat5e (or better) up to 85m
	Controller	Intel® Ethernet I225 Controller
	Network Transfer Rates Supported	2.5GbE, 1GbE, 100MbE, 10MbE
	Data Path Width	PCIe Gen3.1x1
	Power Requirement	2W (typical)
	Operating Temperature	32° to 158° F (0°C to 70°C)
	Operating System Driver Support	Windows 10 64-bit Linux®
	Kit Contents	• Intel® I225-T1 1-Port 2.5GbE NIC with standard height bracket attached • Low-profile bracket • Product Literature
Intel® Wi-Fi 6 AX201 802.11ax, BT 5.1, M.2	**WLAN Standards**	802.11-2016 and select amendments (selected feature coverage) 802.11 a,b,d,e,g,h,i,k,n,r,u,v,w,ac,ax; Fine Measuermant based on 802.11-2016

Technical Specifications - Networking and Communications

Antenna	2x2 Dual-Band
Bluetooth Standards	5.1
Operating Temperature	32° to 176° F (0° to 80° C)
Interface	M.2 CNVio2
Dimensions	M.2 2230
Kit Contents	Not Available

NOTE: Wireless access point and internet service required and sold separately. Availability of public wireless access points limited. Wi-Fi 5 (802.11 ax) is backwards compatible with prior 802.11 specs.

Z2 G8 Tower Bezel w/ Dust Filter option

Part Number 141L3AA

Overview

Workstations are deployed in a variety of different ways and in different environments, from under a desk to manufacturing floors. HP Workstations designed a dust filter option to further protect the system against the ingress of dust and other particles over the life of the system. Test have shown a reduction of dust ingress of up to 32% for the HP Z2 Tower G8 Workstation platform and is cleanable and serviceable by customers. There is also a BIOS setting that will warn customer when it is time to check and clean their filters.

Cleaning and servicing the dust filter

1. After removing the filter from the system bezel (dust filter can be removed without the use of tools from the front bezel), either blow it with and wash with water or use a delicate duster (feather duster)to brush off the filter then rinse it with water.
2. Allow the filter half a day to dry at room temperature (25C at 30%-50% humidity)
3. Temperature of water can be 0-70C, due to the dust filter meeting the SQTM 70C humidity test. Suggested water temperature for best user experience is 0-50C.
4. Normal tap water (and most other types of water) can be used to rinse the filter. Any type of corrosive liquid is restricted.

Enabling the Check Filter warning in the BIOS:

1. Customers must enable the BIOS setting once they receive their filter.
2. To enable, do the following once you see the boot screen for your system: F10 > Advanced > Built-In Device Options > Dust Filter
3. Select to enable the Dust Filter replacement reminder, which can be set for 15, 30, 60, 90, 120, or 180 days. The Reminder will show during POST after the reminder timer has expired.
4.

NOTE: customers who anticipate more dust ingress in their environments should set the reminder for a shorter window. Customers anticipating longer ingress can set the reminder for a longer window.

BIOS Warnings

Large enterprise customers deploying multiple systems can centrally enable/control the BIOS warning using the WMI/BCU tool remotely to set the options below:

Dust Filter

- Disable*
- Enable

Dust Filter Reminder (Days)

15, 30, 60*, 90, 120, and 180

Technical Specifications - Networking and Communications

Z2 G8 Tower Dust Filter (Filter Only)	**Part Number**	141L2AA
		This is intended to be a replacement filter for the HP Z2 Tower G8 Workstation in the event that the original filter would need to be replaced.
HP Z2 Tower PCIe Card Holder/Blower Kit	**Part Number**	2B1D4AA
	Features	This card holder/blower kit is required to enable added mechanical stability when configuring select graphics cards on the HP Z2 Tower G8 Workstation. The kit enables added mechanical stability when configuring: • 2x AMD Radeon™ Pro WX 3200 4GB • 1x AMD Radeon™ Pro W5500 8GB • 1x AMD Radeon™ Pro W5700 8GB • 2x NVIDIA® Quadro® P400 • 2x NVIDIA® T1000 4GB • 1x NVIDIA® RTX® A5000 24GB • 1x NVIDIA® RTX® A4000 16GB **NOTE:** If one of the above graphics cards is configured with the Z2 G8 TWR at time of purchase or the 700W chassis is configured, the Card Holder/Blower is automatically included. • If one of the above graphics cards is added as an aftermarket option, the Card holder/Blower Kit (2B1D4AA) is required, as a separate purchase, for installation of the graphics card.

MISCELLANEOUS FEATURES

Management Features

- Advanced Configuration and Power Management Interface (ACPI). Allows the system to wake from a low power mode. Controls system power consumption, making it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system.
- Intel® Wired for Management support; industry wide initiative to make Intel® architecture based PCs, servers and mobile computers more inherently manageable out-of-the-box and over the network
- Dual State Power Button; acts as both an on/off button and a suspend-to-sleep button

Serviceability Features

- Dual colored power LED on front of computer to indicate either normal or fault condition
- Diagnostic LED Explanation Table:
  - Power LED will blink red 2 to 5 times, then blink white 2 or more times, then repeat (with beep tones for each blink initially):
    - 2 red + 2 white User must provide file for BIOS recovery (USB storage typically)
    - 2 red + 3 white User must enter a key sequence to proceed with recovery by policy
    - 2 red + 4 white BIOS recovery is in progress
    - 3 red + 2 white Memory could not be initialized
    - 3 red + 3 white Graphics adaptor could not be found
    - 3 red + 4 white Power supply failure / not connected
    - 3 red + 5 white Processor not installed
    - 3 red + 6 white Current processor does not support an enabled feature
    - 3 red + 7 white Computer cover has been removed since last system startup
    - 4 red + 2 white Processor has exceeded its temperature threshold / system thermal shutdown
    - 4 red + 3 white System internal temperature has exceeded its threshold
    - 5 red + 2 white System controller firmware is not valid
    - 5 red + 3 white System controller detected BIOS is not executing
    - 5 red + 4 white BIOS could not complete initialization / PCA failure
    - 5 red + 5 white System controller rebooted the system after a health or recovery timer triggered
- HP PC Hardware Diagnostics UEFI:
  - This utility 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
- System/Emergency ROM
- Flash ROM
- CMOS Battery Holder for easy replacement
- Flash Recovery with Video Configuration Record Software5 Aux Power LED on System PCA
- Processor ZIF Socket for easy Upgrade
- Over-Temp Warning on Screen (Requires IM Agents)
- DIMM Connectors for easy Upgrade
- Clear CMOS Button
- NIC LEDs (integrated) (Green & Amber)
- Color coordinated cables and connectors
- Tool-less Hood Removal
- Front power switch
- System memory can be upgraded without removing the system board or any internal components
- Tool-less Hard Drive, CD & Diskette Removal
- Blue Pull Tabs, and Quick Release Latches for easy Identification

Summary of Changes

Date of change:	Version History:		Description of change:
May 3, 2021	From v1 to v2	Changed	Format page 2
May 13, 2021	From v2 to v3	Added	Intel Xeon W-1300 series
May 26, 2021	From v3 to v4	Changed	SOFTWARE COMPONENTS AND APPLICATIONS WITH WINDOWS and Social and Environmental Responsibility sections
June 11, 2021	From v4 to v5	Changed	Hard Drive Controllers section
July 15, 2021	From v5 to v6	Changed	Memory section
August 1, 2021	From v6 to v7	Changed	Graphics section
August 11, 2021	From v7 to v8	Changed	Social and Environmental Responsibility section
September 1, 2021	From v8 to v9	Changed	Processors Matrix, Memory, Optical and Removable Storage sections
September 20, 2021	From v9 to v10	Changed	Graphics section
October 1, 2021	From v10 to v11	Changed	Graphics, Optical and Removable Storage sections