

### Overview

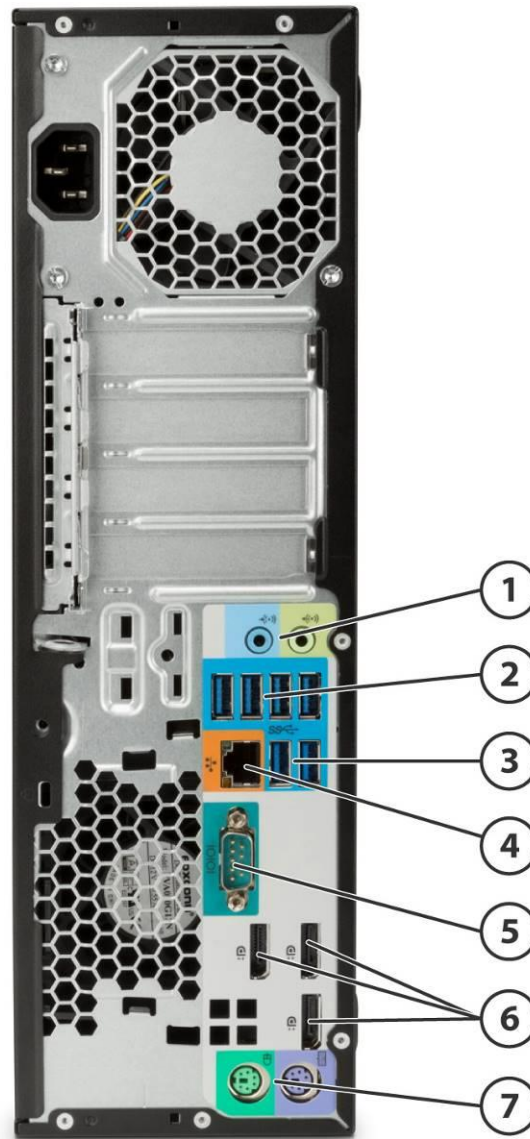
#### HP Z240 SFF Workstation



1. Power button
2. Slim ODD bay
3. External/internal shared 3.5" bay
4. Optional SD Card Reader
5. 1 USB 2.0 battery charging port

6. 1 USB 2.0 port
7. 2 USB 3.0 (blue) ports
8. Microphone/Headphone
9. Headphone

### Overview



1. 1 Audio Line In, 1 Audio Line Out
2. 4 USB 3.0
3. 2 USB 3.0
4. RJ-45 to integrated GBE
5. 1 serial port
6. 3 DisplayPort (DP 1.2) outputs from Intel® HD graphics (available on specific processors only)
7. PS/2 ports (keyboard, mouse)

### Supported Components

**Form Factor**

Small Form Factor

**Operating Systems**

Preinstalled:

- Windows 10 Pro 64\*
- Windows 10 Pro License MSNA\*
- Windows 7 Professional (available through downgrade rights from Windows 10 Pro 64)\*\*
- Windows 10 Home 64
- HP Linux®-ready
- Red Hat® Enterprise Linux® Workstation (1 year paper license available; Preinstall not available)

Supported:

- Windows 10 Enterprise 64
- Windows 8.1 Enterprise 64
- Windows 7 Pro 32 bit<sup>1</sup>
- Windows 7 Pro 64 bit
- Red Hat® Enterprise Linux® Desktop 6, 7
- SUSE Linux® Enterprise Desktop 11 SP4, 12 SP1

\* 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.microsoft.com>.

\*\* This system is preinstalled with Windows 7 Professional software and also comes with a license and media for Windows 10 Pro software. You may only use one version of the Windows software at a time. Switching between versions will require you to uninstall one version and install the other version. You must back up all data (files, photos, etc.) before uninstalling and installing operating systems to avoid loss of your data.

**NOTE:** For detailed OS/hardware support information for Linux®, see: [http://www.hp.com/support/linux\\_hardware\\_matrix](http://www.hp.com/support/linux_hardware_matrix)

**NOTE 1:** Windows 7 Professional 32 bit has limited configuration support on the Z240

**Processors**

Name	Cores	Clock Speed (GHz)	Intel® Turbo Boost Technology <sup>1</sup>	Cache (MB)	Memory Speed (MT/s)	Hyper-Threading	Integrated Graphics	Featuring Intel® vPro™ Technology	TDP (W)
Intel® Xeon® processor E3-1270v6	4	3.8	4.2	8	2400	Y	Intel® HD Graphics P630	Y	80W
Intel® Xeon® processor E3-1245v6	4	3.7	4.1	8	2400	Y	Intel® HD Graphics P630	Y	80W
Intel® Xeon® processor E3-1240v6	4	3.7	4.1	8	2400	Y	Intel® HD Graphics P630	Y	80W
Intel® Xeon® processor E3-1230v6	4	3.5	3.9	8	2400	Y	Intel® HD Graphics P630	Y	80W
Intel® Xeon® processor E3-1225v6	4	3.3	3.7	8	2400	N	Intel® HD Graphics P630	Y	80W

### Supported Components

Intel® Xeon® processor E3-1205v6	4	3.0	N/A	8	2400	N	Intel® HD Graphics P630	Y	65W
Intel® Xeon® processor E3-1280v5	4	3.7	4.0	8	2133	Y	N/A	Y	80W
Intel® Xeon® processor E3-1270v5	4	3.6	4.0	8	2133	Y	N/A	Y	80W
Intel® Xeon® processor E3-1245v5	4	3.5	3.9	8	2133	Y	Intel® HD Graphics P530	Y	80W
Intel® Xeon® processor E3-1240v5	4	3.5	3.9	8	2133	Y	N/A	Y	80W
Intel® Xeon® processor E3-1230v5	4	3.4	3.8	8	2133	Y	N/A	Y	80W
Intel® Xeon® processor E3-1225v5	4	3.3	3.7	8	2133	N	Intel® HD Graphics P530	Y	80W
Intel® Core™ i7-7700 processor	4	3.6	4.2	8	2400	Y	Intel® HD Graphics 630	Y	65W
Intel® Core™ i5-7600 processor	4	3.5	4.1	6	2400	N	Intel® HD Graphics 630	Y	65W
Intel® Core™ i5-7500 processor	4	3.4	3.8	6	2400	N	Intel® HD Graphics 630	Y	65W
Intel® Core™ i3-7100 processor	2	3.9	N/A	3	2400	N	Intel® HD Graphics 630	N	51W
Intel® Pentium® G4560 processor	2	3.5	N/A	3	2400	N	Intel® HD Graphics 630	N	54W
Intel® Core™ i7-6700 processor	4	3.4	4.0	8	2133	Y	Intel® HD Graphics 530	Y	65W
Intel® Core™ i5-6600 processor	4	3.3	3.9	6	2133	N	Intel® HD Graphics 530	Y	65W
Intel® Core™ i5-6500 processor	4	3.2	3.6	6	2133	N	Intel® HD Graphics 530	Y	65W
Intel® Core™ i3-6300 processor	2	3.8	N/A	4	2133	Y	Intel® HD Graphics 530	N	51W
Intel® Core™ i3-6100 processor	2	3.7	N/A	3	2133	N	Intel® HD Graphics 530	N	51W
Intel® Pentium® G4400 processor	2	3.3	N/A	3	2133	N	Intel® HD Graphics 510	N	54W

<sup>1</sup>The specifications shown in this 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.

**NOTES:** Integrated Intel® HD graphics P530 is not supported on all Intel® Xeon E3 processors

Intel® Xeon E3, Intel® Core™ i3 and Intel® Pentium® processors can support either ECC or non-ECC memory; Intel® Core™ i5/i7 processors only support non-ECC memory.

### Supported Components

Processor numbers differentiate features within each processor family, not across different processor families. See: [http://www.intel.com/products/processor\\_number/](http://www.intel.com/products/processor_number/) for details.

Multi-Core 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 is not a measurement of higher performance.

<b>Color</b>	Black
<b>Convertibility</b>	The Z240 SFF can either be placed flat on the desktop or made to stand on the desk with the optional tower stand.
<b>Expansion Slots</b> (see system board section for more details)	1 PCIe Gen3 x16 slot 1 PCIe Gen3 x1 slot /x1 connector 1 PCIe Gen3 x1 slot /x1 connector 1 PCIe Gen3 x4 slot /x16 connector 1 M.2 slot (PCIe Gen3 x4)*  (all slots are Low Profile)  <b>NOTE:</b> The PCIe Gen 3 x16 slot is meant for HP qualified cards, configured or after market. HP does not provide warranty support for 3rd party cards.  * M.2 slot supports compatible devices up to 80mm
<b>Expansion Bays</b>	1 shared internal/external 3.5" bay. 1 internal 3.5" bay 1 internal 2.5" bay (for SSD only)
<b>Front I/O</b>	2 USB 3.0, 1 USB 2.0, 1 USB 2.0 Charging Data Port, 1 Headphone, and 1 Microphone/Headphone;
<b>Internal I/O</b>	1 USB 3.0 and 2 USB 2.0 ports available as 2 separate 2x6(3.0 x1, 2.0 x1) and 1x6(2.0 x1) header: supports one HP Internal USB 2.0 Port Kit and one USB 3.0 Media Card Reader.
<b>Rear I/O</b>	3 DisplayPort (DP 1.2) outputs from Intel® HD graphics (available on specific processors only); 6 USB 3.0 ports, 1 serial port (standard), 2 PS/2, RJ-45 (LoM), 1 Audio Line-in, and 1 Audio Line-out.
<b>Interfaces Supported</b>	SD Media Card Reader (optional)
<b>Chassis Dimensions (H x W x D)</b>	Standard desktop orientation: 100 x 338 x 381 mm (3.95 x 13.3 x 15.0 in); Optional SFF Tower orientation (excluding stand dimension): 338 x 100 x 381 mm (13.3 x 3.95 x 15.0 in)
<b>Weight</b>	Exact weights depend upon configuration  Minimum Weight: 5.7 kg (12.66 lb) Typical Weight*: 6.7 kg (14.86 lb) Maximum Weight: 7.7 kg (16.93 lb)  Max Supported Weight (desktop orientation): 35 kg (77 lb)  * Configured with 2 3.5" hard drives, 1 optical drive, 2 DIMMs and 1 NVIDIA Quadro K620 graphics card
<b>Temperature</b>	Operating: 40° to 95°F (5° to 35°C) Non-operating: -40° to 140°F (-40° to 60°C)

### Supported Components

<b>Humidity</b>	<b>NOTES:</b> Derate the maximum operating temperature by one degree C (1.8 degrees F) for every 305m (1,000 ft) altitude over 1,524m (5,000 ft). Operating: 8% to 85% Non-operating: 8% to 90%
<b>Maximum Altitude (non-pressurized)</b>	Operating: 3,000 m (10,000 ft) Non-operating: 9,100 m (30,000 ft).
<b>Power Supply</b>	240W 92% Efficiency wide-ranging, active Power Factor Correction (PFC)  200W 85% Efficiency wide-ranging, active PFC Power Supply option available in some countries.  <b>NOTE:</b> The Power Supply Efficiency Report for the 240W, 92% efficiency power supply may be found at this link: <a href="#">TBD</a>
<b>Backup Devices</b>	For a complete listing of compatible DAT tape drives, LTO tape drives and RDX Removable Disk Backup System offerings, please visit <a href="http://www.hp.com/go/connect">http://www.hp.com/go/connect</a>
<b>Chipset Memory</b>	Intel® C236 chipset 4 DIMM slots, supporting up to 64GB ECC/non-ECC, DDR4 2133 MT/s
<b>Workstation ISV Certifications</b>	The CPUs determine the speed at which the memory is clocked. If a 2133 MT/s capable CPU is used in the system, the maximum speed the memory will run at is 2133 MT/s regardless of the specified speed of the memory. <b>Note:</b> Transfer rates up to 2133 MT/s See the latest list of certifications at <a href="http://www.hp.com/united-states/campaigns/workstations/partnerships.html">http://www.hp.com/united-states/campaigns/workstations/partnerships.html</a>

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### Supported Components

#### Processors

	Factory Configured	Option Kit
<b>Intel® Xeon® processor E3-1200 v6 family</b>		
Intel® Xeon® E3-1205 v6 3.0 2400 4C SFF CPU	Y	N
Intel® Xeon® E3-1225 v6 3.3 2400 4C SFF CPU	Y	N
Intel® Xeon® E3-1230 v6 3.5 2400 4C SFF CPU	Y	N
Intel® Xeon® E3-1240 v6 3.7 2400 4C SFF CPU	Y	N
Intel® Xeon® E3-1245 v6 3.7 2400 4C SFF CPU	Y	N
Intel® Xeon® E3-1270 v6 3.8 2400 4C SFF CPU	Y	N
<b>Intel® Xeon® processor E3-1200 v5 family*</b>		
Intel® Xeon® E3-1225 v5 3.3 2133 4C CPU	Y	N
Intel® Xeon® E3-1245 v5 3.5 2133 4C CPU	Y	N
Intel® Xeon® E3-1270 v5 3.6 2133 4C CPU	Y	N
Intel® Xeon® E3-1230 v5 3.4 2133 4C CPU	Y	N
Intel® Xeon® E3-1240 v5 3.5 2133 4C CPU	Y	N
Intel® Xeon® E3-1280 v5 3.7 2133 4C CPU	Y	N
<b>7th generation Intel® Core™ processor family</b>		
Intel® Core™ i5-7500 3.4 6M 4C SFF CPU	Y	N
Intel® Core™ i5-7600 3.5 6M 4C SFF CPU	Y	N
Intel® Core™ i7-7700 3.6 8M 4C SFF CPU	Y	N
<b>7th generation Intel® Core™ i3/Pentium processor family</b>		
Intel® Pentium® G4560 3.5 3M 2C CPU	Y	N
<b>6th generation Intel® Core™ processor family</b>		
Intel® Core™ i7-6700 3.4 2133 4C CPU	Y	N
Intel® Core™ i7-6600 3.3 2133 4C CPU	Y	N
Intel® Core™ i7-6500 3.2 2133 4C CPU	Y	N
<b>6th generation Intel® Core™ i3/Pentium processor family</b>		
Intel® Core™ i3-6100 3.7 2133 2C CPU	Y	N
Intel® Core™ i3-6300 3.8 2133 2C CPU	Y	N
Intel® Pentium® G4400 3.3 2133 2C CPU	Y	N

**NOTE 1:** Intel® Integrated Graphics P530 for Xeon processors supports workstation-specific graphics drivers for improved compatibility and performance on select professional applications, compared to Intel® HD Graphics 530.

**NOTE 2:** These processors support either ECC or non-ECC memory

**NOTE 3:** These processors support only non-ECC memory

#### Monitors / Displays

	Factory Configured	Option Kit	Option Kit Part Number
HP Z Display Z30i 30-inch IPS LED Backlit Monitor			
HP Z Display Z27i 27-inch IPS LED Backlit Monitor			
HP Z Display Z24i 24-inch IPS LED Backlit Monitor			
HP Z Display Z23i 23-inch IPS LED Backlit Monitor			
HP Z Display Z22i 21.5-inch IPS LED Backlit Monitor			
HP DreamColor Z24x Professional Display			

### Supported Components

HP DreamColor Z27x Professional Display

#### 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	Y	QB576AA
3TB SATA 7200 rpm 6Gb/s 3.5" HDD	Y	Y	QF298AA
500GB SATA 7.2K SED SFF HDD	Y	N	(N/A as AMO)
1TB SATA 7200 rpm 8GB 3.5" SSHD (hybrid)	Y	Y	M7S54AA
1TB SATA 7200 rpm 6Gb/s 3.5" HDD (Enterprise Class)	Y	Y	WOR10AA

#### SATA Solid State Drives

	Factory Configured	Option Kit	Option Kit Part Number
HP 128GB SATA 6Gb/s SSD	Y	Y	A3D25AA
HP 256GB SATA 6Gb/s SSD	Y	Y	A3D26AA
HP 512GB SATA 6Gb/s SSD	Y	Y	D8F30AA
HP 1TB SATA 6Gb/s SSD	Y	Y	F3C96AA
HP 2TB SATA 6Gb/s SSD	Y	Y	Y6P08AA
HP 256GB SATA 6Gb/s SED Opal 2 SSD	Y	Y	G7U67AA
HP Enterprise Class 240GB SATA SSD	Y	Y	T3U07AA
HP Enterprise Class 480GB SATA SSD	Y	Y	T3U08AA

#### PCIe SSDs

##### PCIe SSDs for HP Workstations

	Factory Configured	Option Kit	Option Kit Part Number
HP Z Turbo Drive G2 128GB SSD*	Y	Y	(N/A as AMO)
HP Z Turbo Drive G2 256GB SSD*	Y	Y	M1F73AA
HP Z Turbo Drive G2 512GB SSD*	Y	Y	M1F74AA
HP Z Turbo Drive G2 1TB SSD*	Y	Y	T9H98AA
HP Z Turbo Drv G2 256GB PCIe SSD (Z240 MB) **	N	Y	T6U42AA
HP Z Turbo Drv G2 512GB PCIe SSD (Z240 MB) **	N	Y	T6U43AA
HP Z Turbo Drv G2 1TB PCIe SSD (Z240 MB) **	N	Y	W6C19AA
HP Z Turbo Drv G2 1TB TLC PCIe SSD (Z2 MB)	Y	Y	Note 1
HP Z Turbo Drv G2 256GB TLC PCIe SSD (Z2 MB)	Y	Y	Note 1
HP Z Turbo Drive G2 512GB SED (Z2 MB)	Y	Y	Note 1
HP Z Turbo Drive G2 256GB SED (Z2 MB)	Y	Y	Note 1
HP Z Turbo Drv G2 512GB TLC PCIe SSD (Z2 MB)	Y	Y	Note 1

\* PCIe card installed in standard PCIe x4 slot

\*\* Installed in native M.2 slot on Z240 motherboard

**NOTE 1:** Installed in native M.2 slot on Z240 motherboard



### Supported Components

**NOTE:** The HP Z240 SFF is capable of configuring up to 2 Z Turbo Drives. By default, the 1st Z Turbo Drive configured will be installed in the M.2 slot on the system's motherboard. The 2nd Z Turbo drive will be installed via PCIe card into the PCIe Gen 3 x4 slot.

The HP Z Turbo Drive G2 (NVMe) is not supported with Windows 7 32-bit.

**NOTE 1:** 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.

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### Supported Components

#### Hard Drive Controllers

##### Integrated SATA Controller (Z240)

Integrated SATA Controller, RAID 0,1 supported:  
4x 6 Gb/s ports

RAID 0 Configuration – Striped Array<sup>1</sup>

RAID 1 Configuration – Mirrored Array<sup>1</sup>

#### Factory Configured

#### Option Kit

Y

N

Y

N

Y

N

**NOTE 1:** Windows OS only; Supported only with two drives of identical type and capacity.

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. Please visit <http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00060684/c00060684.pdf> for RAID capabilities with Linux.

#### Graphics

##### Integrated Graphics

##### Integrated Intel® HD Graphics (Z240)

Intel® HD Graphics P630

Intel® HD Graphics P530

Intel® HD Graphics 630

Intel® HD Graphics 610

Intel® HD Graphics 530

#### Factory Configured

#### Option Kit

#### Option Kit Part Number

#### Supported # of cards

Y

N

1

Y

N

1

Y

N

1

Y

N

1

Y

N

1

##### Professional 2D

NVIDIA® NVS™ 310 1GB Graphics<sup>1</sup>

NVIDIA® NVS™ 315 1GB Graphics

NVIDIA® NVS™ 510 2GB Graphics<sup>2</sup>

Y

Y

M6V51AA

1

Y

Y

E1U66AA

2

Y

Y

C2J98AA

1

##### Graphics DisplayPort Cable Adapters

HP DisplayPort To DVI-D Adapter

HP DisplayPort To DVI-D Adapter (2-Pack)

HP DisplayPort To DVI-D Adapter (4-Pack)

HP DisplayPort To VGA Adapter

HP DisplayPort to Dual Link DVI Adapter

Y

Y

FH973AA

1

Y

N

1

Y

N

1

Y

Y

AS615AA

1

Y

Y

NR078AA

1

##### Entry 3D

AMD FirePro™ W2100 2GB Graphics

NVIDIA® Quadro® K420 2GB Graphics

NVIDIA® Quadro® K620 2GB Graphics

NVIDIA® Quadro® P400 2GB Graphics

NVIDIA® Quadro® P600 2GB Graphics

Y

Y

J3G91AA

1

Y

Y

N1T07AA

1

Y

Y

J3G87AA

1

Y

Y

1ME43AA

2

Y

Y

1ME42AA

2

##### Mid-range 3D

Radeon Pro™ WX4100 4GB 1st GFX Graphics

AMD FirePro™ W4300 4GB Graphics

NVIDIA® Quadro® K1200 4GB Graphics

NVIDIA® Quadro® P1000 4GB Graphics

Y

Y

Z0B15AA

1

Y

Y

T7T58AA

1

Y

Y

L4D16AA

1

Y

Y

1ME01AA

2

### Supported Components

**NOTE 1:** Intermixing integrated Intel® HD Graphics and discrete graphics cards in order to drive more than three displays can be enabled using the Computer (F10) Setup Utility. However, HP recommends using only discrete graphics when four or more displays are required to be supported. Utility.

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### Supported Components

#### Memory

##### **DDR4-2400 ECC Unbuffered DIMMs - CTO**

4GB DDR4-2400 ECC (1x4GB) RAM  
8GB DDR4-2400 ECC (2x4GB) RAM  
8GB DDR4-2400 ECC (1x8GB) RAM  
16GB DDR4-2400 ECC (2x8GB) RAM  
32GB DDR4-2400 ECC (4x8GB) RAM  
32GB DDR4-2400 ECC (2x16GB) RAM  
64GB DDR4-2400 ECC (4x16GB) RAM

##### **DDR4-2400 non-ECC Unbuffered DIMMs - CTO**

4GB DDR4-2400 nECC (1x4GB) RAM  
8GB DDR4-2400 nECC (2x4GB) RAM  
8GB DDR4-2400 nECC (1x8GB) RAM  
16GB DDR4-2400 nECC (2x8GB) RAM  
32GB DDR4-2400 nECC (2x16GB) RAM  
32GB DDR4-2400 nECC (4x8GB) RAM  
64GB DDR4-2400 nECC (4x16GB) RAM

##### **DDR4-2133 ECC Unbuffered DIMMs - CTO**

HP 4GB (1x4GB) DDR4-2133 ECC RAM  
HP 8GB (2x4GB) DDR4-2133 ECC RAM  
HP 8GB (1x8GB) DDR4-2133 ECC RAM  
HP 16GB (2x8GB) DDR4-2133 ECC RAM  
HP 32GB (4x8GB) DDR4-2133 ECC RAM  
HP 32GB (2x16GB) DDR4-2133 ECC RAM  
HP 64GB (4x16GB) DDR4-2133 ECC RAM

##### **DDR4-2133 non-ECC Unbuffered DIMMs - CTO**

HP 4GB (1x4GB) DDR4-2133 nECC RAM  
HP 8GB (2x4GB) DDR4-2133 nECC RAM  
HP 8GB (1x8GB) DDR4-2133 nECC RAM  
HP 16GB (2x8GB) DDR4-2133 nECC RAM  
HP 32GB (4x8GB) DDR4-2133 nECC RAM  
HP 32GB (2x16GB) DDR4-2133 nECC RAM  
HP 64GB (4x16GB) DDR4-2133 nECC RAM

#### **NOTES**

Intel® Xeon® E3, Intel® Core i3 can support either ECC or non-ECC memory; Intel® Core™ i5/i7 processors only support non-ECC memory.

Two channels of DDR4 memory are supported. To realize full performance at least one DIMM must be inserted into each channel.

### Supported Components

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

Transfer rates up to 2400 MT/s

AMO	Option Kit Part Number
<b>DDR4-2400 ECC Unbuffered DIMMs - AMO</b>	
HP 4GB (1x4GB) DDR4-2400 ECC Unbuffered RAM	1CA77AA
HP 8GB (1x8GB) DDR4-2400 ECC Unbuffered RAM	1CA79AA
HP 16GB (1x16GB) DDR4-2400 ECC Unbuffered RAM	1CA75AA
<b>DDR4-2400 non-ECC Unbuffered DIMMs - AMO</b>	
HP 8GB (1x8GB) DDR4-2400 nECC Unbuffered RAM	1CA80AA
PROMO 4GB (1x4GB) DDR4-2400 nECC Unbuffered RAM	1CA78AT
<b>DDR4-2133 ECC Unbuffered DIMMs - AMO</b>	
HP 4GB (1x4GB) DDR4-2133 ECC RAM	NOH86AA
HP 8GB (1x8GB) DDR4-2133 ECC RAM	NOH87AA
HP 16GB (1x16GB) DDR4-2133 ECC RAM	NOH88AA
<b>DDR4-2133 non-ECC Unbuffered DIMMs - AMO</b>	
HP 4GB (1x4GB) DDR4-2133 non-ECC RAM	TOE50AA
HP 8GB (1x8GB) DDR4-2133 non-ECC RAM	TOE51AA
HP 16GB (1x16GB) DDR4-2133 non-ECC RAM	TOE52AA

**NOTE:** Only unbuffered DDR4 DIMMs are supported.

### Multimedia and Audio Devices

Integrated Realtek HD ALC221-VB Audio

Factory Configured	Option Kit	Option Kit Part Number
Y	N	

### Optical and Removable Storage

#### HP SlimTray Optical Drives

HP 9.5mm Slim DVD Writer

Y N K3R64AA

HP 9.5mm Slim DVD-ROM Drive

Y Y K3R63AA

HP 9.5mm Slim BD-XL Blu-Ray Writer

Y Y K3R65AA

#### HP SD Media Card Reader

HP SD Media Card Reader

Y N

#### HDD Frame/Carriers

HP DP25 Removable 2.5" HDD Frame/Carrier

N Y W3J84AA

HP DP25 Removable 2.5" HDD Spare Carrier

Y Y W3J85AA

### Supported Components

Actual speeds may vary. Does not permit copying of commercially available DVD movies or other copyright protected materials. Intended for creation and storage of your original material and other lawful uses. Double Layer discs can store more data than single layer discs. However, double-layer discs burned with this drive may not be compatible with many existing single-layer DVD drives and players. With Blu-ray, certain disc, digital connection, compatibility and/or performance issues may arise, and do not constitute defects in the product. Flawless playback on all systems is not guaranteed. In order for some Blu-ray titles to play, they may require a DVI or HDMI digital connection and your display may require HDCP support. HD-DVD movies cannot be played on this workstation.

#### Controller Cards

	Factory Configured	Option Kit	Option Kit Part Number
HP Thunderbolt™ 2 PCIe 1-port I/O Card	Y	Y	F3F43AA

**Note 1:** Four USB 3.0 ports are available integrated on the motherboard (2 front, 2 rear). Integrated USB 3.0 ports are supported under Microsoft Windows 10, Microsoft Windows 7 or Microsoft Windows 10 operating systems only.

#### Networking and Communications

	Factory Configured	Option Kit	Option Kit Part Number
Integrated Intel® I219LM PCIe GbE Controller (Intel® vPro™ with Intel® AMT 11.0)	Y	N	
Intel® Ethernet I210-T1 PCIe NIC <sup>3,4</sup>	Y	Y	E0X95AA
Intel® 8260 802.11 a/b/g/n/ac with Bluetooth® 4.2 PCIe NIC	N	Y	N0S95AA
Intel® Ethernet I350-T2 2-Port 1Gb NIC	Y	Y	V4A91AA
Intel® Ethernet I350-T4 4-Port 1Gb NIC	Y	Y	W8X25AA

**NOTE 1:** The integrated network connection is required to support Intel® vPro™ Technology.

**NOTE 2:** If AMT is provisioned, then network teaming with the integrated LAN port is not possible.

**NOTE 3:** "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.

**NOTE 4:** The Intel® Ethernet I210-T1 PCIe NIC is supported on the following operating systems:

- Microsoft Windows 7 and Windows 10 64-bit versions
- Red Hat Enterprise Linux(RHEL)

#### Racking and Physical Security

	Factory Configured	Option Kit	Option Kit Part Number
HP Solenoid Lock and Hood (SFF) Sensor	Y	Y	E0X97AA
HP Business PC Security Lock Kit*	N	Y	PV606AA
HP UltraSlim Cable Lock Kit	N	Y	H4D73AA

\* The HP Business PC Security Lock Kit does not work with the Integrated Work Center stand.

#### Input Devices

	Factory Configured	Option Kit	Option Kit Part Number
HP USB 1000dpi Laser Mouse	Y	Y	QY778AA
HP USB Optical 3-Button Mouse	Y	Y	DY651A

### Supported Components

HP USB Optical Mouse	Y	Y	QY777AA
HP PS/2 Mouse	Y	Y	QY775AA
HP USB Hardened Mouse	Y	Y	P1N77AA
3Dconnexion CADMouse	Y	Y	M5C35AA
HP USB CCID SmartCard Keyboard	Y	Y	BV813AA
HP USB Business Slim Keyboard	Y	Y	N3R87AA
HP PS/2 Business Slim Keyboard	Y	Y	N3R86AA
HP Wireless Business Slim Keyboard	Y	Y	

### Other Hardware

	Factory Configured	Option Kit	Option Kit Part Number
HP Power Cord Kit	N	Y	DM293A
HP Workstation Mouse Pad (Japan only)	Y	N	
HP Serial Port Adapter	Y	Y	PA716A
HP ENERGY STAR® Qualified Configuration	Y	N	
HP PCIe x1 Parallel Port Card	N	Y	N1M40AA
HP Internal USB Port Kit	N	Y	EM165AA
HP (SFF) Tower Stand	Y	Y	VN569AA
Z240 SFF Dust Filter	Y	Y	M6W76AA

### Software

	Factory Configured	Option Kit	Support Notes
HP Performance Advisor	Y	N	See Note 1
HP Remote Graphics Software (RGS) 7.1	Y	N	
PDF Complete - Corporate Edition	Y	N	
Cyberlink PowerDVD and Power2Go	Y	N	
HP PC Hardware Diagnostics UEFI (Windows OS only)	Y	N	
HP Client Security Software	Y	Y	

**NOTE 1:** Supports, and preinstalled with, Windows 7 and Windows 10 only. Also available as a free download from <http://www.hp.com/go/performanceadvisor>

**NOTE 2:** Supported Operating Systems:

- Windows 7 Professional
- Windows 10 Pro

### Operating Systems

Windows 10 Pro 64  
 Windows 10 Pro License MSNA  
 Windows 7 Professional (available through downgrade rights from Windows 10 Professional)  
 Windows 10 Home 64  
 HP Linux Installer Kit  
 See <http://www.microsoft.com/windows/windows-7/> for support details.  
 See <http://www.redhat.com/rhel/desktop/>

### Supported Components

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#### HP BIOS

Key features of the HP BIOS include:

- Deployment and manageability – HP BIOS provides several technologies that help integrate the HP Z240 Workstation into the enterprise, such as PXE, remote configuration, remote control, and F10 Setup support for 12 languages.
- Update your BIOS via the cloud or standardize on a BIOS version hosted on Enterprise network.
- Z240 Workstations feature Intel® Standard Manageability or Intel® vPro™ Processor Technology (support varies depending on processor selected)
- Stability – HP BIOS supports the HP stable product roadmap by releasing only critical BIOS changes to the factory and advanced change notification.
- UEFI specification 2.4
- 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 Z240 Workstation 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 Z240 Workstations, including BIOS updates from within DOS (DOSFlash), BIOS updates from within Windows, and fail-safe recovery. In addition, the HP Workstation BIOS Utilities tool enables replicated BIOS setup throughout the Enterprise; it is available from within the BIOS software and from the 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 setup password, this helps prevent unauthorized changes to the system configuration. If the administrator password is not known, the BIOS version cannot be changed and changes cannot be made to BIOS settings using F10 setup or under the OS.
- Advanced Configuration and Power Interface (ACPI) – Represents a significant innovation in power and configuration management, allowing operating systems and applications to manage power based on activity and usage. HP Workstation models use ACPI to provide power conservation features.

S5 Max Power Savings setting supports EU Lot6 requirement and allows the computer to power down below 1W in S5 (when turned off). When S5 Max Power Savings feature is enabled power to slots is turned off along with WOL functionality.

#### Sure 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 on.
- Sure Start is set by default to automatically repair the BIOS if corrupted or compromised but is policy driven for better manageability.



### Supported Components

- Protecting beyond BIOS – Integrity checking and repair is extended to other data that should be protected such as network configuration parameters (network name), platform specific information (i.e. system IDs) 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.
-

### Supported Components

#### SECURITY

Description	Supported
Trusted Platform Module, SLB9670TT1.2FW4.40 (TPM) 1.2 (Common Criteria EAL4+ certified), Field upgradeable to 2.0	X
SATA port disablement (via BIOS)	X
Drive lock	X
RAID configurations	X
Intel® Identify Protection Technology (IPT)1	X
Serial, parallel, USB enable/disable (via BIOS)	X
Optional USB Port Disable at factory (user configurable via BIOS)	X
Removable media write/boot control	X
Power-On password (via BIOS)	X
Setup password (via BIOS)	X
Solenoid Hood Lock	X
Hood Sensor	X
Support for chassis padlocks devices	X
Support for chassis cable lock devices	X

1. Models configured with Intel® Core™ processors have the ability to utilize advanced security protection for online transactions. IPT, used in conjunction with participating web sites, provides double identity authentication by adding a hardware component in addition to the usual user name and password. IPT is initialized through an HP Client Security module.

### System Technical Specifications

#### System Board

<b>System Board Form Factor</b>	ATX 24.38 x 24.38 mm (9.6 x 9.6 inches)
<b>Processor Socket</b>	Single LGA 1151
<b>CPU Bus Speed</b>	DMI
<b>Chipset</b>	Intel® PCH C236
<b>Memory Expansion Slots</b>	4 DDR4 memory slots
<b>Memory Type Supported</b>	DDR4, UDIMM (Unbuffered), ECC& non-ECC
<b>Memory Modes</b>	Non-Interleaved for single channel. Interleaved when both channels are populated.
<b>Memory Speed Supported</b>	2133MT/s DDR4
<b>Memory Protection</b>	ECC available on data
<b>Maximum Memory</b>	64GB
<b>Memory Configuration (Supported)</b>	4GB, 8GB and 16GB non-ECC/ 4GB, 8GB and 16GB ECC unbuffered DIMMs are supported. ECC and non-ECC memory DIMMs cannot be mixed on the same system. <b>NOTE:</b> * Maximum memory capacities assume 64-bit operating systems, such as Windows® 7 Professional 64-Bit or Red Hat® Linux® 64-bit. 32-bit Windows Operating Systems support up to 4 GB.
<b>PCI Express Connectors</b>	<ul style="list-style-type: none"> <li>• 1 PCI Express Gen3 slot x16 mechanical/ x16 electrical (LP, half length)</li> <li>• 1 PCI Express Gen3 slot x1 mechanical/ x1 electrical (LP, half length)</li> <li>• 1 PCI Express Gen3 slot x1 mechanical/ x1 electrical (LP, half length)</li> <li>• 1 PCI Express Gen3 slot x16 mechanical/ x4 electrical (LP, half length)</li> <li>• 1 M.2 slot (PCIe Gen3 x4)<sup>1</sup></li> </ul>

**NOTE:** LP = Low Profile

**NOTE:** In the PCIe Gen3 slot (x16 electrical/x16 mechanical) slot, if it is not being used for a graphics card, only cards certified as After Market Options for this platform are supported.

**NOTE 1:** M.2 slot supports compatible devices up to 80mm

<b>Supported Drive Interfaces</b>	<b>SATA</b>	Integrated (4) Serial ATA interfaces (6Gb/s SATA). RAID 0 and 1 supported. Factory integrated RAID for Microsoft Windows only.
	<b>Serial Attached SCSI</b>	None
	<b>Integrated RAID</b>	<b>NOTE:</b> Requires identical hard drives (speeds, capacity, interface)
	<b>Integrated Graphics</b>	Intel® HD Graphics 530 (on Core i3/i5/i7-6xxx processors); Intel® Integrated Graphics for Xeon E3 processors  Based on Unified Memory Architecture (UMA) – A region of system memory is reserved and dedicated to the graphics display. Support for Microsoft® DirectX 11, OpenGL 4.0 and OpenCL 1.2 on Intel® HD Graphics P530;  3 DP 1.2 graphics ports integrated on motherboard; Supports up to three simultaneous displays across DP outputs. Max. resolution supported: 3840x2160 @60Hz
	<b>Network Controller</b>	Integrated Ethernet PHY Connection I219LM. Management capabilities: WOL, PXE 2.1 and AMT 11.0
	<b>IDE connector</b>	No
	<b>Floppy connector</b>	No

### System Technical Specifications

<b>Serial</b>	1 rear port
<b>2nd Serial</b>	Yes- requires optional Serial Port Adapter Kit

#### IEEE 1394 Connector(s)

<b>USB Connector(s)</b>	<b>Front</b>	2 USB 3.0, 2 USB 2.0
	<b>Rear</b>	6 USB 3.0
	<b>Internal</b>	1 USB 3.0, 2 USB 2.0

<b>HD Integrated Audio</b>	Yes
<b>Flash ROM</b>	Yes
<b>Chassis Fan Header</b>	Not applicable
<b>Front Control Panel/Speaker Header</b>	Yes
<b>CMOS Battery Holder - Lithium</b>	Yes
<b>Integrated Trusted Platform Module</b>	Integrated TPM 1.2.
<b>Power Supply Headers</b>	Yes
<b>Power Switch, Power LED &amp; Hard Drive LED Header</b>	Yes
<b>Clear Password Jumper</b>	Yes
<b>Keyboard/Mouse</b>	USB or PS/2

#### System Configurations

<b>Z240 SFF Configuration #1</b>	<b>Processor Info</b>	1x Intel® Core i3-6100 3.7 3MB 51W CPU
	<b>Memory Info</b>	4GB (1x 4GB) 2133 MHz DDR4 non-ECC
	<b>Graphics Info</b>	Intel® HD Integrated Graphics 530
	<b>Disks/Optical/Floppy</b>	1x SATA 500 GB 7.2k rpm/ 1x 9.5mm Slim ODD
	<b>PSU</b>	200W 85%
	<b>Other</b>	

<b>Energy Consumption (Watts)</b>		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows long Idle (S0)	15.42 W		16.63 W		15.48 W	
	Windows short Idle (S0)	16.31 W		17.137 W		16.39 W	
	Windows Busy Typ (S0)	68.36 W		61.32 W		68.24 W	
	Windows Busy Max (S0)	90.559 W		89.05 W		90.882 W	
	Sleep (S3)	2.46 W	2.41 W	2.624 W	2.598 W	2.47 W	2.46 W
	Off (S5)	1.11 W	1.09 W	1.26 W	1.258 W	1.09 W	1.06 W
	Zero Power Mode (EuP)	0.289 W		0.406 W		0.289 W	

<b>Heat Dissipation (Btu/hr)</b>		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)	52.615 btu/hr		56.744 btu/hr		52.82 btu/hr	
	Windows short Idle (S0)	55.652 btu/hr		58.474 btu/hr		55.925 btu/hr	
	Windows Busy Typ (S0)	233.254 btu/hr		209.232 btu/hr		232.844 btu/hr	
	Windows Busy Max (S0)	309 btu/hr		303.851 btu/hr		310.102 btu/hr	
	Sleep (S3)	8.39 btu/hr	8.22 btu/hr	8.95 btu/hr	8.86 btu/hr	8.43 btu/hr	8.39 btu/hr
	Off (S5)	3.79 btu/hr	3.72 btu/hr	4.3 btu/hr	4.29 btu/hr	3.72 btu/hr	3.62 btu/hr

### System Technical Specifications

	Zero Power Mode (EuP)	0.986 btu/hr		1.385 btu/hr		0.986 btu/hr	
<b>Z240 SFF Configuration #2</b> ENERGY STAR® QUALIFIED	<b>Processor Info</b>	1x Intel® Core i5-6500 3.2 6MB 65W CPU					
	<b>Memory Info</b>	8GB (2x 4GB) 2133 MHz DDR4 ECC					
	<b>Graphics Info</b>	1x NVIDIA Quadro K620 1GB Graphics					
	<b>Disks/Optical/Floppy</b>	1x SATA 1 TB 7.2k rpm/ 1x9.5mm Slim ODD					
	<b>PSU</b>	240W 92%					
	<b>Other</b>						
<b>Energy Consumption (Watts)</b>		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows long Idle (S0)	24.212 W		23.392 W		22.88 W	
	Windows short Idle (S0)	25.092 W		25.463 W		25.24 W	
	Windows Busy Typ (S0)	82.3 W		81.8 W		82.6 W	
	Windows Busy Max (S0)	146.9 W		145.2 W		149.11 W	
	Sleep (S3)	2.892 W	2.652 W	2.907 W	2.884 W	2.69 W	2.652 W
	Off (S5)	1.248 W	1.1 W	1.278 W	1.25 W	1.08 W	1.07 W
	Zero Power Mode (EuP)	0.289 W		0.406 W		0.289 W	
<b>Heat Dissipation (Btu/hr)</b>		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)	82.615 btu/hr		79.817 btu/hr		78.07 btu/hr	
	Windows short Idle (S0)	85.617 btu/hr		79.48 btu/hr		86.122 btu/hr	
	Windows Busy Typ (S0)	280.819 btu/hr		279.113 btu/hr		281.843 btu/hr	
	Windows Busy Max (S0)	501.243 btu/hr		495.443 btu/hr		508.784 btu/hr	
	Sleep (S3)	9.87 btu/hr	9.05 btu/hr	9.92 btu/hr	9.84 btu/hr	9.18 btu/hr	9.05 btu/hr
	Off (S5)	4.26 btu/hr	3.75 btu/hr	4.36 btu/hr	4.27 btu/hr	3.69 btu/hr	3.65 btu/hr
	Zero Power Mode (EuP)	0.996 btu/hr		1.399 btu/hr		0.962 btu/hr	
<b>Z240 SFF Configuration #3</b>	<b>Processor Info</b>	1x Intel® Xeon E3-1280v5 3.7 8MB 80W CPU					
	<b>Memory Info</b>	64GB (4x16GB) 2133 MHz DDR4 ECC					
	<b>Graphics Info</b>	1x NVIDIA Quadro K1200 4GB Graphics					
	<b>Disks/Optical/Floppy</b>	2x 512GB Z Turbo Drive G2 PCIe SSDs / 1x9.5mm Slim ODD					
	<b>PSU</b>	240W 92%					
	<b>Other</b>						
<b>Energy Consumption (Watts)</b>		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows long Idle (S0)	28.374 W		26.488 W		27.438 W	
	Windows short Idle (S0)	28.735 W		28.836 W		28.972 W	
	Windows Busy Typ (S0)	116.51 W		114.42 W		116.92 W	
	Windows Busy Max (S0)	172.488 W		170.592 W		173.808 W	
	Sleep (S3)	3.986 W	3.966 W	4.092 W	4.072 W	4.004 W	3.969 W
	Off (S5)	1.062 W	1.059 W	1.154 W	1.129 W	1.042 W	1.038 W
	Zero Power Mode (EuP)	0.211 W		0.286 W		0.206 W	
<b>Heat Dissipation (Btu/hr)</b>		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled

### System Technical Specifications

Windows Idle (S0)	96.816 btu/hr	90.381 btu/hr	93.622 btu/hr			
Windows short Idle (S0)	98.048 btu/hr	98.392 btu/hr	98.857 btu/hr			
Windows Busy Typ (S0)	397.548 btu/hr	390.417 btu/hr	398.947 btu/hr			
Windows Busy Max (S0)	588.553 btu/hr	582.084 btu/hr	593.057 btu/hr			
Sleep (S3)	13.6btu/hr	13.53btu/hr	13.96btu/hr	13.89btu/hr	13.66btu/hr	13.54btu/hr
Off (S5)	3.62 btu/hr	3.61 btu/hr	3.94 btu/hr	3.85 btu/hr	3.56btu/hr	3.54btu/hr
Zero Power Mode (EuP)	0.72 btu/hr	0.976 btu/hr	0.703 btu/hr			

<b>Power Supply</b>	<p>240W, 92% efficiency, wide-ranging, active PFC Power Supply;</p> <p><b>(Note: 200W 85% Efficiency wide-ranging, active PFC Power Supply option available in some countries).</b></p> <p>The Z240 SFF 92% PSU Efficiency Report can be found at this link: TBD</p>
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**Operating Voltage Range** 90-264 VAC

**Rated Voltage Range** 100-240 VAC

**Rated Line Frequency** 50-60 Hz

**Operating Line Frequency Range** 47-63 Hz

**Rated Input Current** 4A @ 100-240V

**Heat Dissipation**  
 Typical: 444 btu/hr (112 kcal/hr)  
 Maximum: 890 btu/hr (224 kcal/hr)

**Power Supply Fan** 70mm x 70mm x 25 mm 4-wire PWM

**ENERGY STAR® qualified** Yes  
 (Config Dependent)

**FEMP Standby Power Compliant** Yes, with Wake-on-LAN disabled: <2W in S5- Power Off

**Surge Tolerant Full Ranging Power Supply (withstands power surges up to 2000V)** Yes

### Declared Noise Emissions (Entry-level and High-end configurations)

<b>System Configuration (Entry level)</b>	<b>Processor Info</b>	Intel® Core i5-6500 3.2GHz
	<b>Memory Info</b>	1 - 4 GB DDR4 2133 MHz ECC RAM
	<b>Graphics Info</b>	iGfx
	<b>Disks/Optical</b>	Single 1 TB 7200 RPM SATA Blu-ray DVD-RW

<b>Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)</b>	<b>Sound Power (LWAd, bels)</b>	<b>Deskside Sound Pressure (LpAm, decibels)</b>	
	<b>Idle</b>	3.2	21
	<b>Hard drive Operating (random reads)</b>	3.3	22

<b>System Configuration (High-end)</b>	<b>Processor Info</b>	Intel® Xeon E3-1280 V5 3.70 GHz
	<b>Memory Info</b>	4 - 8GB DDR4 2133 MHz ECC RAM

### System Technical Specifications

**Graphics Info**

AMD W2100

**Disks/Optical**

Dual 2 TB 7200 RPM SATA

Blu-ray DVD-RW

**Declared Noise Emissions**

(in accordance with ISO 7779 and ISO 9296)

**Sound Power** (LWAd, bels)**Deskside Sound Pressure**

(LpAm, decibels)

**Idle**

3.4

25

**Hard drive Operating**

(random reads)

3.4

25

**DVD-ROM Operating**

(sequential reads)

### System Technical Specifications

<b>Environmental Requirements</b>	<b>Temperature</b>	Operating: 40° to 95° F (5° to 35° C) Non-operating: -40° to 140° F (-40° to 60° C)
	<b>Humidity</b>	Operating: 8% to 85% RH, non-condensing Non-operating: 8% to 90% RH, non-condensing
	<b>Maximum Altitude</b>	Operating: 10,000 feet (3,000 m) Non-operating: 30,000 feet (9,100 m)
	<b>Dynamic (new)</b>	Shock Operating: ½-sine: 40g, 2-3ms Non-operating: ½-sine: 160 cm/s, 2-3ms (~100g) square: 422 cm/s, 20g
		Vibration Operating random: 0.5g (rms), 5-300 Hz Non-operating random: 2.0g (rms), 10-500 Hz
	<b>Cooling</b>	<b>NOTES:</b> Values represent individual shock events and do not indicate repetitive shock events. Values do not indicate continuous vibration. Above 5,000 ft (1524 m) altitude, maximum operating temperature is de-rated by 1.8° F (1° C) per 1,000 ft (305 m) elevation increase

### Physical Security and Serviceability

<b>Access Panel</b>	Tool-less Includes system board and memory information
<b>Hard Drives</b>	Tool-less (Internal bays)
<b>Expansion Cards</b>	Tool-less
<b>Processor Socket</b>	Tool-less, except for the processor heatsink.
<b>Green User Touch Points</b>	Yes, on tool-free internal chassis mechanisms
<b>Color-coordinated Cables and Connectors</b>	Yes
<b>Memory</b>	Tool-less
<b>System Board</b>	Screw-In
<b>Dual Color Power and HD LED on Front of Computer</b>	Yes
<b>Configuration Record SW</b>	Yes
<b>Over-Temp Warning on Screen</b>	Yes
<b>Restore CD/DVD Set</b>	Consists of an operating system DVD (OSDVD) and a driver DVD (DRDVD). OSDVD restores the original operating system. DRDVD will provide all drivers for the system. The DRDVD may also contain applications that originally shipped with the system for optional installation. Applications can also be obtained from HP.com. OSDVD and DRDVD are orderable with the system and available from HP Support.
<b>Dual Function Front Power Switch</b>	Yes, causes a fail-safe power off when held for 4 seconds
<b>Padlock Support</b>	Yes (optional): Locks side cover and secures chassis from theft 0.22-in diameter padlock loop at rear of system
<b>Cable Lock Support</b>	Yes, Kensington Cable Lock (optional): Locks side cover and secures chassis from theft 3 mm x 7 mm slot at rear of system
<b>Universal Chassis Clamp Lock Support</b>	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



### System Technical Specifications

	Threaded feature at rear of system
<b>Solenoid Lock and Hood Sensor</b>	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.
<b>Rear Port Control Cover Serial, Parallel, USB, Audio, Network, Enable/Disable Port Control</b>	Yes, locks rear IO cables to prevent cable theft Yes, enables or disables serial, parallel, USB, audio, and network ports
<b>Removable Media Write/Boot Control</b>	Yes, prevents ability to boot from removable media on supported devices (and can disable writes to media)
<b>Power-On Password Setup Password</b>	Yes, prevents an unauthorized person from booting up the workstation Yes, prevents an unauthorized person from changing the workstation configuration
<b>NIC LEDs (integrated) (Green &amp; Amber)</b>	Yes
<b>CPUs and Heatsinks</b>	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
<b>Power Supply Diagnostic LED</b>	No
<b>Front Power Button</b>	Yes, ACPI multi-function
<b>Front Power LED</b>	Yes, white (normal), red (fault)
<b>Front Hard Drive Activity LED</b>	Yes, white
<b>Front ODD Activity LED</b>	Yes
<b>Internal Speaker</b>	Yes
<b>System/Emergency ROM Flash Recovery</b>	Recovers corrupted system BIOS.
<b>Cooling Solutions</b>	Air cooled forced convection
<b>Power Supply Fans</b>	70mm x 70mm x 25mm 4-wire PWM (non-serviceable)
<b>CPU Heatsink Fan</b>	Mainstream (<=65W): 93mm x 86mm 75.8mm Performance (<=95W): 93mm x 102.7mm x 75.8mm
<b>Chassis Fan</b>	Not applicable. CPU heatsink fan also operates as the chassis fan.
<b>Memory Heatsink Fan</b>	No
<b>HP PC Hardware Diagnostics UEFI</b>	HP PC Hardware Diagnostics (UEFI) enables hardware level testing outside the operating system on many components. The diagnostics can be invoked by pressing F2 at POST, and is available as a download from HP Support.
<b>Access Panel Key Lock</b>	No
<b>ACPI-Ready Hardware</b>	Advanced Configuration and Power Management Interface (ACPI). <ul style="list-style-type: none"> <li>• Allows the system to wake from a low power mode.</li> <li>• Controls system power consumption, making it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system</li> </ul>
<b>Trusted Platform Module Chip</b>	Yes
<b>Integrated Chassis Handles</b>	No
<b>Power Supply</b>	Requires T15 Torx or flat blade screwdriver
<b>PCI Card Retention</b>	Yes, rear (all), middle (none), front (none)
<b>Flash ROM</b>	Yes

### System Technical Specifications

<b>Diagnostic Power Switch</b>	Yes
<b>LED on board</b>	
<b>Clear Password Jumper</b>	Yes
<b>Clear CMOS Button</b>	Yes
<b>CMOS Battery Holder</b>	Yes
<b>DIMM Connectors</b>	Yes

### System Technical Specifications

<b>BIOS</b>	
<b>BIOS 32-bit Services</b>	Standard BIOS 32-bit Service Directory Proposal v0.4
<b>PCI 3.0 Support</b>	Full BIOS support for PCI Express through industry standard interfaces.
<b>ATAPI</b>	ATAPI Removable Media Device BIOS Specification Version 1.0.
<b>BBS</b>	BIOS Boot Specification v1.01. Provides more control over how and from what devices the workstation will boot.
<b>WMI Support</b>	WMI is Microsoft's implementation of Web-Based Enterprise Management (WBEM) for Windows. WMI is fully compliant with the Distributed Management Task Force (DMTF) Common Information Model (CIM) and WBEM specifications.
<b>BIOS Power On</b>	Users can define a specific day-of-week and time for the system to power on.
<b>ROM Based Computer Setup Utility (F10)</b>	Review and customize system configuration settings controlled by the BIOS.
<b>System/Emergency ROM Flash Recovery with Video</b>	Recovers system BIOS in corrupted Flash ROM.
<b>Replicated Setup</b>	Saves BIOS settings to USB flash device in human readable file. Repset.exe utility can then replicate these settings on machines being deployed without entering Computer Configuration Utility (F10 Setup).
<b>SMBIOS</b>	System Management BIOS 2.7.1, for system management information.
<b>Boot Control</b>	Disables the ability to boot from removable media on supported devices.
<b>Memory Change Alert</b>	Alerts management console if memory is removed or changed.
<b>Thermal Alert</b>	Monitors the temperature state within the chassis. Three modes: <ul style="list-style-type: none"> <li>• NORMAL - normal temperature ranges.</li> <li>• ALERTED - excessive temperatures are detected. Raises a flag so action can be taken to avoid shutdown or provide for a smoother system shutdown.</li> <li>• SHUTDOWN - excessive temperatures are encountered. Automatically shuts down the computer without warning before hardware component damage occurs.</li> </ul>
<b>Remote ROM Flash</b>	Provides secure, fail-safe ROM image management from a central network console. Updates can be performed before starting the OS. Updates can be periodically scheduled.
<b>ACPI (Advanced Configuration and Power Management Interface)</b>	Allows the system to enter and resume from low power modes (sleep states). Enables an operating system to control system power consumption based on the dynamic workload. Makes it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system. Supports ACPI 4.0 for full compatibility with 64-bit operating systems.
<b>Ownership Tag</b>	A user-defined string stored in non-volatile memory that is displayed in the BIOS splash screen.
<b>Remote Wakeup/Remote Shutdown</b>	System administrators can power on, restart, and power off a client computer from a remote location.
<b>ASF 2.0 Compliant</b>	No.
<b>Instantly Available PC (Suspend to RAM - ACPI sleep state S3)</b>	Allows for very low power consumption with quick resume time.
<b>Remote System Installation via F12 (PXE 2.1) (Remote Boot from Server)</b>	Allows a new or existing system to boot over the network and download software, including the operating system.
<b>ROM revision levels</b>	Reports the system BIOS revision level in Computer Configuration Utility (F10 Setup). Version is available through an industry standard interface (SMBIOS) so that management SW applications can use and report this information.
<b>System board revision level</b>	Allows management SW to read revision level of the system board. Revision level is digitally encoded into the HW and cannot be modified.

### System Technical Specifications

<b>Start-up Diagnostics (Power-on Self-Test)</b>	Assesses system health at boot time with selectable levels of testing.
<b>Auto Setup when new hardware installed</b>	System automatically detects addition of new hardware.
<b>Keyboard-less Operation</b>	The system can be booted without a keyboard.
<b>Localized ROM Setup</b>	Common BIOS image supports System Configuration Utility (F10 Setup) menus in 12 languages with local keyboard mappings.
<b>Asset Tag</b>	The user or IT administrator to set a unique tag string in non-volatile memory.
<b>Per-slot Control</b>	Allows I/O slot parameters (option ROM enable/disable) to be configured individually.
<b>Adaptive Cooling</b>	Control parameters are set according to detected hardware configuration for optimal acoustics.
<b>Pre-boot Diagnostics</b>	(Pre-video) critical errors are reported via beeps and blinks on the power LED.
<b>Intel® Active Management Technology (AMT)</b>	AMT 11.0; Allows workstation status to be monitored on a remote console
<b>Digitally and Cryptographically Signed BIOS</b>	Helps to prevent the installation of unauthorized versions of a BIOS (a rogue BIOS) from a virus, malware, or other code that could lead to compromised system security, data access, physical service, or even system board replacement.
<b>Master Boot Record Protection</b>	A feature in the HP BIOS that prevents changes and/or infections to the Master Boot Record. Useful in protecting from viruses.
<b>Boot Block Emergency Recovery Mode (BIOS Recovery)</b>	The HP BIOS offers a write-protected boot block ROM that provides recovery from a failed flashing of the computer BIOS. This special recovery mode prevents the system from becoming unusable or “bricked” when a BIOS update is interrupted.
<b>Industry Standard Specification Support</b>	
<b>Industry Standard UEFI Specification Revision</b>	Revision Supported by the BIOS UEFI 2.4.0
<b>ACPI</b>	Advanced Configuration and Power Management Interface, Version 4.0
<b>ASF</b>	Alert Standard Format Specification, Version 2.0
<b>ATA (IDE)</b>	AT Attachment 6 with Packet Interface (ATA/ATAPI-6), Revision 3b
<b>CD Boot</b>	"El Torito" Bootable CD-ROM Format Specification Version 1.0
<b>EDD</b>	- Enhanced Disk Drive Specification Version 1.1 - BIOS Enhanced Disk Drive Specification Version 3.0
<b>PCI Express</b>	PCI Express Base Specification, Revision 2.0; PCI Express Base Specification, Revision 3.0.
<b>PMM</b>	POST Memory Manager Specification, Version 1.01
<b>SATA</b>	- Serial ATA Specification, Revision 1.0a - Serial ATA II: Extensions to Serial ATA 1.0, Revision 1.0a - Serial ATA II Cables and Connectors Volume 2 Gold - SATA-IO SATA Revision 3.0 Specification
<b>SPD</b>	PC SDRAM Serial Presence Detect (SPD) Specification, Revision 1.2B
<b>TPM</b>	Trusted Computing Group TPM Specification Version 1.2 (TPM 2.0 via Firmware Update)
<b>USB</b>	Universal Serial Bus Revision 1.1 Specification Universal Serial Bus Revision 2.0 Specification Universal Serial Bus Revision 3.0 Specification

### Social and Environmental Responsibility

**Eco-Label Certifications & Declarations** This product is low halogen except for power cords, cables and peripherals. Service parts obtained after purchase may not be Low Halogen.

- ENERGY STAR® (energy-saving features available on selected configurations -Windows only)

### System Technical Specifications

- US Federal Energy Management Program (FEMP)
- China Energy Conservation Program (CECP)
- IT ECO declaration

#### Batteries

The battery in this product complies with EU Directive 2006/66/EC  
Battery size: CR2032 (coin cell)  
Battery type: Lithium Metal

The battery in this product does not contain:

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

**Restricted Material Usage** This product meets the material restrictions specified in HP's General Specification for the Environment. <http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/gse.pdf>

HP is committed to compliance with all applicable environmental laws and regulations, including the European Union Restriction of Hazardous Substances (RoHS) Directive. HP's goal is to exceed compliance obligations by meeting the requirements of the RoHS Directive on a worldwide basis.

#### Low Halogen Statement

This product is low halogen except for power cords, cables and peripherals, as well as the following customer-configurable internal components: Creative Recon3D PCIe Audio Card is not Low Halogen. Service parts obtained after purchase may not be Low Halogen.

#### 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/recycle> or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner. This product is greater than 90% recyclable by weight when properly disposed of at end of life.

#### HP Inc. Corporate Environmental Information

For more information about HP's commitment to the environment:  
Living Progress Report <http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html>

Eco-label certifications

<http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html>

ISO 14001 certificates:

<http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html>

#### Additional Information

- This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive - 2002/96/EC.
- Plastic parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.
- This product is >90% recycle-able when properly disposed of at end of life
- EPEAT® Gold registered in the U.S. EPEAT registration varies by country. See <http://www.epeat.net> for registration status by country.

#### Packaging

HP Workstation product packaging meets the HP General Specification for the Environment at [http://www.hp.com/hpinfo/globalcitizenship/society/gen\\_specifications.html](http://www.hp.com/hpinfo/globalcitizenship/society/gen_specifications.html)

- Does not contain restricted substances listed in HP Standard 011-1 General Specification for the Environment
- Does not contain ozone-depleting substances (ODS)
- Does not contain heavy metals (lead, mercury, cadmium or hexavalent chromium) in excess of 100 ppm sum total for all heavy metals listed
- Maximizes the use of post-consumer recycled content materials in packaging materials
- All packaging material is recyclable
- All packaging material is designed for ease of disassembly
- Reduced size and weight of packages to improve transportation fuel efficiency

### System Technical Specifications

- Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards formatting

#### **Packaging Materials**

##### **Internal**

Cushions made from fabricated recycled expanded-polyethylene (EPE) or recycled expanded-polypropylene (EPP). May also be made from recycled molded paper-pulp (MPP).

##### **External**

Carton made from corrugated fiberboard with at least 25% recycled content.

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### System Technical Specifications

#### Manageability

**Intel® Active Management Technology (AMT)** An advanced set of remote management features and functionality which provides network administrators the latest and most effective tools to remotely discover, heal, and protect networked client systems regardless of the system's health or power state. AMT 11.0 includes the following advanced management functions:

- Power Management (on, off, standby, reset)
- Hardware/Software Inventory (includes BIOS and firmware revisions)
- Hardware Alerting
- Agent Presence
- System Defense Filters
- SOL (Serial Over LAN)
- ME Wake-on-LAN
- DASH 1.1 compliance
- IPv6 Support
- Fast Call for Help - a client inside or outside the firewall may initiate a call for help via BIOS screen, periodic connections, or alert triggered connection
- Remote Scheduled Maintenance - pre-schedule when the PC connects to the IT or service provider console for maintenance. Remote PCs can get required patches, be inventoried, etc by connecting to their IT console or Service Provider when it's convenient
- Remote Alerts - automatically alert IT or service provider if issues arise
- Access Monitor - Provides oversight into Intel® AMT actions to support security requirements
- PC Alarm Clock
- Protected Audio Video Path (PAVP)
- Microsoft NAP Support
- Host Base set-up and configuration
- Management Engine (ME) firmware roll back
- Enhanced KVM resolution (Up to 4K)

#### Intel® vPro™ Technology

The HP Z240 workstations support Intel® vPro™ technology when purchased with a vPro™ technology capable CPU: Intel® Xeon® processor family or 6th Generation Intel® Core i5/i7 processors with Intel® VT-d/VT-x and Intel® TXT technology

#### Remote Manageability Software Solutions

Visit: <http://www.hp.com/go/easydeploy>

#### System Software Manager Service, Support, and Warranty

Visit: <http://www.hp.com/go/ssm>

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

### Stable & Consistent Offerings

As part of its commitment to hardware, software, and solution innovation, HP is proud to introduce this breakthrough platform configuration stability to HP Workstation customers. HP Stable & Consistent Offerings are built on the foundation of a carefully chosen set of hardware and software designed and tested to work with all HP Z Workstation platforms through their end of life. These components and their corresponding HP Workstation platform compatibility are outlined in this section. HP Stable & Consistent Offerings are available worldwide to all HP Workstation customers—no special programs, no additional cost, no kidding. Simply select your hardware and software components when you customize your HP Workstation and be assured that you'll be able to buy that same configuration throughout the lifecycle of the product.

Processors	Product #	Offering
	N2K97AV	Intel® Xeon E3-1225v5 3.3 8M GT2 4C SFF
	N2L00AV	Intel® Xeon E3-1240v5 3.5 8M GT0 4C SFF
	N2K98AV	Intel® Xeon E3-1245v5 3.5 8M GT2 4C SFF

Hard Drives	Product #	Offering
	M6U81AV	500GB 7200 RPM SATA 1st HDD
	M6U90AV	500GB 7200 RPM SATA 2nd HDD
	M6U82AV	1TB 7200 RPM SATA 1st HDD
	M6U91AV	1TB 7200 RPM SATA 2nd HDD

Graphics	Product #	Offering
	M6Q36AV	NVIDIA NVS 510 2GB 1st GFX
	M6Q40AV	NVIDIA Quadro K620 2GB 1st GFX
	M6Q32AV	AMD FirePro W2100 2GB 1st GFX

Memory	Product #	Offering
	M6Q57AV	4GB DDR4-2133 ECC (1x4GB) RAM
	M6Q58AV	8GB DDR4-2133 ECC (2x4GB) RAM
	M6Q59AV	8GB DDR4-2133 ECC (1x8GB) RAM
	M6Q60AV	16GB DDR4-2133 ECC (2x8GB) RAM
	M6Q61AV	32GB DDR4-2133 ECC (4x8GB) RAM

Optical and Removable Storage	Product #	Offering
	L8S24AV	16X DVDRW SATA 1st ODD



### Technical Specifications - Processors

#### **Intel® Xeon® processor E3-1200 v5 family**

Intel® Xeon E3-1280 v5 3.7 2133 4C CPU  
Intel® Xeon E3-1270 v5 3.6 2133 4C CPU  
Intel® Xeon E3-1245 v5 3.5 2133 4C CPU  
Intel® Xeon E3-1240 v5 3.5 2133 4C CPU  
Intel® Xeon E3-1230 v5 3.4 2133 4C CPU  
Intel® Xeon E3-1225 v5 3.3 2133 4C CPU

Intel® Core™ i7-6700 3.4 2133 4C CPU  
Intel® Core™ i7-6600 3.3 2133 4C CPU  
Intel® Core™ i7-6500 3.2 2133 4C CPU

Intel® Core i3-6300 3.8 2133 2C CPU  
Intel® Core i3-6100 3.7 2133 2C CPU  
Intel® Pentium G4400 3.3 2133 2C CPU

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### Technical Specifications - Hard Drives

<b>SATA Hard Drives for HP Workstations</b>	<b>500GB SATA 7200 rpm 6Gb/s 3.5" HDD</b>	<b>Capacity</b>	500GB		
		<b>Height</b>	1 in; 2.54 cm		
		<b>Width</b>		<b>Media Diameter</b>	3.5 in; 8.9 cm
				<b>Physical Size</b>	4 in; 10.17 cm
		<b>Interface</b>	Serial ATA (6.0Gb/s), NCQ enabled		
		<b>Synchronous Transfer Rate (Maximum)</b>	Up to 600MB/s		
		<b>Buffer</b>	16MB		
		<b>Seek Time</b> (typical reads, includes controller overhead, including settling)		<b>Single Track</b>	2 ms
				<b>Average</b>	11 ms
				<b>Full Stroke</b>	21 ms
		<b>Rotational Speed</b>	7,200 rpm		
		<b>Logical Blocks</b>	976,773,168		
		<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)		
	<b>1TB SATA 7200 rpm 6Gb/s 3.5" HDD</b>	<b>Capacity</b>	1 Terabyte (1000 GB)		
		<b>Height</b>	1 in; 2.54 cm		
		<b>Width</b>		<b>Media Diameter</b>	3.5 in; 8.9 cm
				<b>Physical Size</b>	4 in; 10.17 cm
		<b>Interface</b>	Serial ATA (6.0Gb/s), NCQ enabled		
		<b>Synchronous Transfer Rate (Maximum)</b>	Up to 600 MB/s		
		<b>Buffer</b>	32MB		
		<b>Seek Time</b> (typical reads, includes controller overhead, including settling)		<b>Single Track</b>	2 ms
				<b>Average</b>	11 ms
				<b>Full Stroke</b>	21 ms
		<b>Rotational Speed</b>	7,200 rpm		
		<b>Logical Blocks</b>	1,953,525,168		
		<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)		
	<b>2.0TB SATA 7200 rpm 6Gb/s 3.5" HDD</b>	<b>Capacity</b>	2TB		
		<b>Height</b>	1 in; 2.54 cm		
		<b>Width</b>		<b>Media Diameter</b>	3.5 in; 8.9 cm
				<b>Physical Size</b>	4 in; 10.17 cm
		<b>Interface</b>	Serial ATA (6.0 Gb/s), NCQ Enabled		
		<b>Synchronous Transfer Rate (Maximum)</b>	Up to 600MB/s		
		<b>Buffer</b>	64MB		
		<b>Seek Time</b> (typical reads, includes controller overhead, including settling)		<b>Single Track</b>	1.0 ms
				<b>Average</b>	11 ms
				<b>Full Stroke</b>	18 ms
		<b>Rotational Speed</b>	7,200 rpm		

### Technical Specifications - Hard Drives

	<b>Logical Blocks</b>	3,907,029,168	
	<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)	
<b>3.0TB SATA 7200 rpm 6Gb/s 3.5" HDD</b>	<b>Capacity</b>	3.0TB	
	<b>Height</b>	1 in; 2.54 cm	
	<b>Width</b>	<b>Media Diameter</b>	3.5 in; 8.9 cm
		<b>Physical Size</b>	4.0 in; 10.17 cm
	<b>Interface</b>	Serial ATA (6.0Gb/s), NCQ enabled	
	<b>Synchronous Transfer Rate (Maximum)</b>	Up to 6.0 Gb/s	
	<b>Buffer</b>	64MB	
	<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track</b>	0.6 ms
		<b>Average</b>	11 ms
		<b>Full Stroke</b>	Not specified
	<b>Rotational Speed</b>	7200 rpm	
	<b>Operating Temperature</b>	41° to 140° F (5° to 60° C)	
<b>500GB SATA 7.2K SED SFF HDD</b>	<b>Capacity</b>	500GB	
	<b>Height</b>	0.275 in; 0.7 cm	
	<b>Width</b>	<b>Media Diameter</b>	2.5 in; 6.36 cm
		<b>Physical Size</b>	2.75 in; 6.99 cm
	<b>Interface</b>	Serial ATA (6Gb/s)	
	<b>Synchronous Transfer Rate (Maximum)</b>	Up to 600MB/s	
	<b>Buffer</b>	32MB	
	<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track</b>	0.6 ms
		<b>Average</b>	4.2 ms
		<b>Full Stroke</b>	25ms (typical)
	<b>Rotational Speed</b>	7200 rpm	
	<b>Operating Temperature</b>	32° to 140° F (0° to 60° C)	
<b>1TB SATA 7200 rpm 8GB 3.5" SSHD (hybrid)</b>	<b>Capacity</b>	1TB	
	<b>Height</b>	1 in; 2.54 cm	
	<b>Width</b>	<b>Media Diameter</b>	3.5 in; 8.9 cm
		<b>Physical Size</b>	4 in; 10.17 cm
	<b>Interface</b>	6Gb/s SATA	
	<b>Synchronous Transfer Rate (Maximum)</b>	Up to 600MB/s	
	<b>Buffer</b>	64MB standard HDD cache buffer	
	<b>Cache</b>	8GB NAND flash	
	<b>Rotational Speed</b>	7,200 rpm	
	<b>Operating Temperature</b>	32° to 140° F (0° to 60° C)	

### Technical Specifications - Hard Drives

<b>HP SATA Solid State Drives (SSDs) for Workstations</b>	<b>HP 128GB SATA 6Gb/s SSD</b>	<b>Capacity</b>	128GB		
		<b>Height</b>	0.28 in; 0.7 cm		
		<b>Width</b>		<b>Physical Size</b>	2.5 in; 6.36 cm
		<b>Interface</b>	SATA 6Gb/s		
		<b>Synchronous Transfer Rate (Maximum)</b>	Up to 500MB/s (Sequential Read)		
		<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)		
	<b>HP 256GB SATA 6Gb/s SSD</b>	<b>Capacity</b>	256GB		
		<b>Height</b>	0.28 in; 0.7 cm		
		<b>Interface</b>	SATA 6Gb/s		
		<b>Synchronous Transfer Rate (Maximum)</b>	Up to 500MB/s (Sequential Read)		
		<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)		
	<b>HP 256GB SATA 6Gb/s SED Opal 2 SSD</b>	<b>Capacity</b>	256GB		
		<b>Height</b>	0.28 in; 0.7 cm		
		<b>Width</b>		<b>Physical Size</b>	2.5 in; 6.36 cm
		<b>Interface</b>	6Gb/s SATA		
		<b>Synchronous Transfer Rate (Maximum)</b>	Up to 550MB/s (Sequential Read)		
		<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)		
	<b>HP 512GB SATA 6Gb/s SSD</b>	<b>Capacity</b>	512GB		
		<b>Height</b>	0.28 in; 0.7 cm		
		<b>Width</b>		<b>Physical Size</b>	2.5 in; 6.36 cm
		<b>Interface</b>	6Gb/s SATA		
		<b>Synchronous Transfer Rate (Maximum)</b>	Up to 500MB/s (Sequential Read)		
		<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)		
	<b>HP 1TB SATA 6Gb/s SSD</b>	<b>Capacity</b>	1TB		
		<b>Height</b>	0.28 in; 0.7 cm		
		<b>Width</b>		<b>Physical Size</b>	2.5 in; 6.36 cm
		<b>Interface</b>	6Gb/s SATA		
		<b>Synchronous Transfer Rate (Maximum)</b>	Up to 500MB/s (Sequential Read)		
		<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)		
	<b>HP 2TB SATA 6Gb/s SSD</b>	<b>Capacity</b>	2TB		

### Technical Specifications - Hard Drives

<b>Protocol</b>	SATA								
<b>Form Factor</b>	2.5"								
<b>Controller</b>	AHCI								
<b>NAND Type</b>	3D TLC								
<b>Endurance</b>	400TBW (TB Written)								
<b>Reliability (MTTF)</b>	1.5M hours								
<b>Physical Size (Height)</b>	0.28 in; 0.7 cm								
<b>Physical Size (Width)</b>	2.5 in; 6.36 cm								
<b>Interface</b>	SATA 6Gb/s								
<b>Synchronous Transfer Rate (Maximum)</b>	Up to 550MB/s (Sequential Read)								
<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)								
<b>Performance</b>	<table> <tr> <td><b>Sequential Read</b></td> <td>530 MB/s</td> </tr> <tr> <td><b>Sequential Write</b></td> <td>500 MB/s</td> </tr> <tr> <td><b>Random Read</b></td> <td>92K IOPS</td> </tr> <tr> <td><b>Random Write</b></td> <td>83K IOPS</td> </tr> </table>	<b>Sequential Read</b>	530 MB/s	<b>Sequential Write</b>	500 MB/s	<b>Random Read</b>	92K IOPS	<b>Random Write</b>	83K IOPS
<b>Sequential Read</b>	530 MB/s								
<b>Sequential Write</b>	500 MB/s								
<b>Random Read</b>	92K IOPS								
<b>Random Write</b>	83K IOPS								

#### HP Enterprise Class 240GB SATA SSD

<b>Capacity</b>	240GB
<b>Height</b>	0.28 in; 0.7 cm
<b>Width</b>	<b>Physical Size</b> 2.5 in; 6.36 cm
<b>Interface</b>	6Gb/s SATA
<b>Synchronous Transfer Rate (Maximum)</b>	Up to 600MB/s
<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)

#### HP Enterprise Class 480GB SATA SSD

<b>Capacity</b>	480GB
<b>Height</b>	0.28 in; 0.7 cm
<b>Width</b>	<b>Physical Size</b> 2.5 in; 6.36 cm
<b>Interface</b>	6Gb/s SATA
<b>Synchronous Transfer Rate (Maximum)</b>	Up to 600MB/s
<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)

#### PCIe SSDs for HP Workstations

#### HP Z Turbo Drive G2 128GB SSD

<b>Capacity</b>	128GB		
<b>Protocol</b>	PCIe		
<b>Form Factor</b>	M.2 in Half-height, half-length card		
<b>Controller</b>	NVMe		
<b>NAND Type</b>	MLC		
<b>Endurance</b>	73TB		
<b>Reliability (MTBF)</b>	1.5M hours		
<b>Interface</b>	PCI Express 3.0 x4 electrical x4 physical		
<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)		
<b>Performance</b>	<table> <tr> <td><b>Sequential Read</b></td> <td>2000 MB/a</td> </tr> </table>	<b>Sequential Read</b>	2000 MB/a
<b>Sequential Read</b>	2000 MB/a		

### Technical Specifications - Hard Drives

		<b>Sequential Write</b>	650 MB/s
		<b>Random Read</b>	300K IOPS
		<b>Random Write</b>	83K IOPS
<b>HP Z Turbo Drive G2 256GB SSD</b>	<b>Capacity</b>	256GB	
	<b>Protocol</b>	PCIe	
	<b>Form Factor</b>	M.2 in Half-height, half-length card	
	<b>Controller</b>	NVMe	
	<b>NAND Type</b>	MLC	
	<b>Endurance</b>	146TB	
	<b>Reliability (MTBF)</b>	1.5M hours	
	<b>Interface</b>	PCI Express 3.0 x4 electrical x4 physical	
	<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)	
	<b>Performance</b>	<b>Sequential Read</b>	2150 MB/s
		<b>Sequential Write</b>	1260 MB/s
		<b>Random Read</b>	300K IOPS
		<b>Random Write</b>	100K IOPS
<b>HP Z Turbo Drive G2 512GB SSD</b>	<b>Capacity</b>	512GB	
	<b>Protocol</b>	PCIe	
	<b>Form Factor</b>	M.2 in Half-height, half-length card	
	<b>Controller</b>	NVMe	
	<b>NAND Type</b>	MLC	
	<b>Endurance</b>	292TB	
	<b>Reliability (MTBF)</b>	1.5M hours	
	<b>Interface</b>	PCI Express 3.0 x4 electrical x4 physical	
	<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)	
	<b>Performance</b>	<b>Sequential Read</b>	2150 MB/s
		<b>Sequential Write</b>	1550 MB/s
		<b>Random Read</b>	300K IOPS
		<b>Random Write</b>	100K IOPS
<b>HP Z Turbo Drive G2 1TB SSD</b>	<b>Capacity</b>	1TB	
	<b>Protocol</b>	PCIe	
	<b>Form Factor</b>	M.2 in Half-height, half-length card	
	<b>Controller</b>	NVMe	
	<b>NAND Type</b>	MLC	
	<b>Endurance</b>	600TB	
	<b>Reliability (MTBF)</b>	1.5M hours	
	<b>Interface</b>	PCI Express 3.0 x4 electrical x4 physical	
	<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)	
	<b>Performance</b>	<b>Sequential Read</b>	2500 MB/s
		<b>Sequential Write</b>	1550 MB/s
		<b>Random Read</b>	210K IOPS
		<b>Random Write</b>	130K IOPS

### Technical Specifications - Hard Drives

<b>HP Z Turbo Drv G2 256GB PCIe SSD (Z240 MB)</b>	<b>Capacity</b>	256GB	
	<b>Protocol</b>	PCIe	
	<b>Form Factor</b>	M.2 in native slot on motherboard	
	<b>Controller</b>	NVMe	
	<b>NAND Type</b>	MLC	
	<b>Endurance</b>	146TB	
	<b>Reliability (MTBF)</b>	1.5M hours	
	<b>Interface</b>	PCI Express 3.0 x4 electrical x4 physical	
	<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)	
	<b>Performance</b>	<b>Sequential Read</b>	2150 MB/s
		<b>Sequential Write</b>	1260 MB/s
		<b>Random Read</b>	300K IOPS
<b>Random Write</b>		100K IOPS	

<b>HP Z Turbo Drv G2 512GB PCIe SSD (Z240 MB)</b>	<b>Capacity</b>	512GB (one M.2 PCIe NVMe module)	
	<b>Protocol</b>	PCIe	
	<b>Form Factor</b>	M.2 in native slot on motherboard	
	<b>Controller</b>	NVMe	
	<b>NAND Type</b>	MLC	
	<b>Endurance</b>	292TB	
	<b>Reliability (MTBF)</b>	1.5M hours	
	<b>Interface</b>	PCI Express 3.0 x4 electrical x4 physical	
	<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)	
	<b>Performance</b>	<b>Sequential Read</b>	2260 MB/s
		<b>Sequential Write</b>	1550 MB/s
		<b>Random Read</b>	300K IOPS
<b>Random Write</b>		100K IOPS	

<b>HP Z Turbo Drv G2 1TB PCIe SSD (Z240 MB)</b>	<b>Capacity</b>	1TB	
	<b>Protocol</b>	PCIe	
	<b>Form Factor</b>	M.2 in native slot on motherboard	
	<b>Controller</b>	NVMe	
	<b>NAND Type</b>	MLC	
	<b>Endurance</b>	600TB	
	<b>Reliability (MTBF)</b>	1.5M hours	
	<b>Interface</b>	PCI Express 3.0 x4 electrical x4 physical	
	<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)	
	<b>Performance</b>	<b>Sequential Read</b>	2500 MB/s
		<b>Sequential Write</b>	1550 MB/s
		<b>Random Read</b>	210K IOPS
<b>Random Write</b>		130K IOPS	

### Technical Specifications - Hard Drives

<b>HP Z Turbo Drv G2 256GB TLC PCIe SSD (Z2 MB)</b>	<b>Capacity</b>	256GB	
	<b>Protocol</b>	PCIe	
	<b>Form Factor</b>	M.2 in native slot on motherboard	
	<b>Controller</b>	NVMe	
	<b>NAND Type</b>	3D TLC	
	<b>Endurance</b>	75TBW (TB Written)	
	<b>Reliability (MTBF)</b>	1.5M hours	
	<b>Interface</b>	PCI Express 3.0 x4 electrical x4 physical	
	<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)	
	<b>Performance</b>	<b>Sequential Read</b>	2800 MB/s
		<b>Sequential Write</b>	320 MB/s (1100 MB/s max/Turbo)
		<b>Random Read</b>	250K IOPS
		<b>Random Write</b>	180K IOPS
<b>HP Z Turbo Drv G2 512GB TLC PCIe SSD (Z2 MB)</b>	<b>Capacity</b>	512GB	
	<b>Protocol</b>	PCIe	
	<b>Form Factor</b>	M.2 in native slot on motherboard	
	<b>Controller</b>	NVMe	
	<b>NAND Type</b>	3D TLC	
	<b>Endurance</b>	150TBW (TB Written)	
	<b>Reliability (MTBF)</b>	1.5M hours	
	<b>Interface</b>	PCI Express 3.0 x4 electrical x4 physical	
	<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)	
	<b>Performance</b>	<b>Sequential Read</b>	2800 MB/s
		<b>Sequential Write</b>	660 MB/s (1600 MB/s max/Turbo)
		<b>Random Read</b>	260K IOPS
		<b>Random Write</b>	260K IOPS
<b>HP Z Turbo Drv G2 1TB TLC PCIe SSD (Z2 MB)</b>	<b>Capacity</b>	1TB	
	<b>Protocol</b>	PCIe	
	<b>Form Factor</b>	M.2 in native slot on motherboard	
	<b>Controller</b>	NVMe	
	<b>NAND Type</b>	3D TLC	
	<b>Endurance</b>	300TBW (TB Written)	
	<b>Reliability (MTBF)</b>	1.5M hours	
	<b>Interface</b>	PCI Express 3.0 x4 electrical x4 physical	
	<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)	
	<b>Performance</b>	<b>Sequential Read</b>	3000 MB/s
		<b>Sequential Write</b>	1150 MB/s (1700 MB/s max/Turbo)
		<b>Random Read</b>	360K IOPS



### Technical Specifications - Hard Drives

		<b>Random Write</b>	330K IOPS
<b>HP Z Turbo Drive G2 512GB SED (Z2 MB)</b>	<b>Capacity</b>	512GB	
	<b>Protocol</b>	PCIe	
	<b>Form Factor</b>	M.2 in native slot on motherboard	
	<b>Controller</b>	NVMe	
	<b>NAND Type</b>	3D MLC	
	<b>Endurance</b>	300TBW (TB Written)	
	<b>Reliability (MTBF)</b>	1.5M hours	
	<b>Interface</b>	PCI Express 3.0 x4 electrical x4 physical	
	<b>Performance</b>	<b>Sequential Read</b>	3200 MB/s
		<b>Sequential Write</b>	1700 MB/s
		<b>Random Read</b>	330K IOPS
		<b>Random Write</b>	300K IOPS
	<b>Self-Encrypting Drive Support</b>	OPAL 2	
<b>HP Z Turbo Drive G2 256GB SED (Z2 MB)</b>	<b>Capacity</b>	256GB	
	<b>Protocol</b>	PCIe	
	<b>Form Factor</b>	M.2 in native slot on motherboard	
	<b>Controller</b>	NVMe	
	<b>NAND Type</b>	3D MLC	
	<b>Endurance</b>	150TBW (TB Written)	
	<b>Reliability (MTBF)</b>	1.5M hours	
	<b>Interface</b>	PCI Express 3.0 x4 electrical x4 physical	
	<b>Performance</b>	<b>Sequential Read</b>	3100 MB/s
		<b>Sequential Write</b>	1400 MB/s
		<b>Random Read</b>	330K IOPS
		<b>Random Write</b>	280K IOPS
	<b>Self-Encrypting Drive Support</b>	OPAL 2	

### Technical Specifications - Graphics

<b>Integrated Intel® HD* Graphics (Z240)</b>	<b>Form Factor</b>	Integrated in select Intel® Xeon® E3, Intel® Core™ i7, and Intel® Core™ i5 processors.
		Check specific platform specifications for selections.
	<b>Graphics Controller</b>	Intel® HD Graphics
	<b>Memory</b>	Unified Memory Architecture (UMA) frame buffer. Graphics memory is shared with system memory. Size selectable between 64 MB to 512 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® DVM 5.0), to provide an optimal balance between graphics and system memory use.
	<b>Connectors</b>	Check system platform specifications where Intel® HD Graphics are available.
	<b>Maximum Resolution</b>	Display Port: 2560 x 1600 DVI: 1920x1200 VGA: 2048x1536
		<b>NOTE:</b> For DVI and VGA outputs, separate adapters may be required.
	<b>Shading Architecture</b>	Shader Model 5.0
	<b>Supported Graphics APIs</b>	OpenGL 4.0 DirectX 11.1
	<b>Available Graphics Drivers</b>	Windows 10 Windows 7

\*Integrated graphics will depend on processor. HD content required to view HD images

<b>NVIDIA® NVS™310 1GB Graphics</b>	<b>Form Factor</b>	Low Profile: 2.713 inches in height × 6.150 inches in length Weight: ~142 grams
	<b>Graphics Controller</b>	NVIDIA® NVS™310 GPU: GF119-825
	<b>Bus Type</b>	PCI Express x16, 2.0 compliant
	<b>Memory</b>	Size: 1GBB DDR3 Clock: 875Mhz Memory Bandwidth: 14GB/s
	<b>Connectors</b>	2 x DisplayPort 1.2
	<b>Maximum Resolution</b>	Up to 2560 x 1600 (digital display) per display.
	<b>Image Quality Features</b>	See Display Output section.

The following video formats are supported:

- MPEG2
- MPEG4 Part 2 Advanced Simple Profile
- H.264 SVC codec support
- Support for 3D Blu Ray
- VC1
- DivX version 3.11 and later
- MVC

A full range of video resolutions are supported including 1080p, 1080i, 720p, 480p and 480i. The NVS™ 310 GPU provides hardware acceleration

### Technical Specifications - Graphics

#### Display Output

for the computationally intensive parts of video processing, as well as provides improved video playback speeds via faster decode and transcode. Up to 2 displays in the following configurations:

##### DisplayPort output:

- Drives two DisplayPort enabled digital display at resolutions up to 2560 × 1600 at 60 Hz with reduced blanking, when connected natively using the 2 DisplayPort connectors on the NVS™ 310 graphics card
- Supports 2 monitors up to resolution of 1920 × 1200 at 60 Hz with reduced blanking using DisplayPort 1.2 multi stream topology technology.

##### DVI-D output:

- Drives two digital display at resolutions up to 1920 × 1200 at 60 Hz with reduced blanking using DisplayPort to DVI-D single-link cable adaptors
- Drives two digital display at resolutions up to 2560 × 1600 at 60 Hz with reduced blanking using DisplayPort to DVI-D dual-link cable adaptors

##### HDMI output:

- NVS™ 310 is capable of driving two high definition (HD) panels up to resolutions of 1920 × 1080P at 60 Hz using DisplayPort to HDMI cable adaptors

##### VGA display output:

- Drives two analog display at resolutions up to 1920 × 1200 at 60 Hz using DisplayPort to VGA cable adaptors

#### Shading Architecture

Shader Model 5.0

#### Supported Graphics APIs

DX11, OpenGL 4.1

#### Available Graphics Drivers

Windows 8.1  
Windows 8  
Windows 7 Professional (64-bit and 32-bit)  
Windows XP Professional (64-bit and 32-bit)  
Red Hat® Enterprise Linux® (RHEL)  
SUSE Linux® Enterprise Desktop 11 (64-bit and 32-bit)

HP qualified drivers may be preloaded or the latest HP qualified drivers are available from the HP support Web site:

<http://welcome.hp.com/country/us/en/support.html>

SUSE Linux® Enterprise drivers may also be obtained from:

<ftp://download.nvidia.com/novell> or <http://www.nvidia.com>

#### Power Consumption

19.5 Watts

#### Note

1. [The thermal solution used on this card is an active fan heatsink.](#)

### Technical Specifications - Graphics

2. Factory configured NVS 310 graphics card have no cable adapters included. Adapters must be ordered separately.
  3. Option kit NVS 310 includes 2 DP to DVI-D cable adapters.
-

### Technical Specifications - Graphics

#### **NVIDIA® NVS™ 315 1GB Graphics (for HP Workstations)**

#### **Form Factor**

Low Profile:  
2.713 inches in height × 5.7 inches in length

#### **Graphics Controller**

NVIDIA® NVS™ 315 (using GF119-825 GPU)  
Number of Cores: 48 CUDA® cores  
Max. Power: 19.3W  
Cooling Solution: Active fan heatsink

#### **Bus Type**

PCI Express x16, 2.0 compliant

#### **Memory**

Size: 1GB DDR3  
Clock: 875Mhz  
Memory Bandwidth: 14GB/s

#### **Connectors**

DMS-59 output

#### **Maximum Resolution**

Cables included:  
- For CTO: DMS-59 to DVI cable  
- For AMO: DMS-59 to DVI cable and DMS-59 to VGA cable  
Maximum number of displays supported: 2

#### **Image Quality Features**

Maximum Resolution Support:

- DMS-59 to VGA: 2048 x 1536 @ 85Hz
- DMS-59 to DVI: 1980 x 1200 @ 60Hz
- DMS-59 to DP: 2560 x 1600 @ 60Hz

See Display Output section.

The following video formats are supported:

- MPEG2
- MPEG4 Part 2 Advanced Simple Profile
- H.264 SVC codec support
- Support for 3D Blu Ray
- VC1
- DivX version 3.11 or later

A full range of video resolutions are supported including 1080p, 1080i, 720p, 480p and 480i. The NVS™NVS™™ 315 GPU provides hardware acceleration for the computationally intensive parts of video processing, as well as provides improved video playback speeds via faster decode and transcode.

#### **Display Output**

Up to 2 displays in the following configurations:

DisplayPort output:

- Drives two DisplayPort enabled digital displays at resolutions up to 2560 × 1600 at 60 Hz with reduced blanking, when connected via the DMS-59 to DP adapter.

DVI-D output:

### Technical Specifications - Graphics

- Drives two digital display at resolutions up to 1920 × 1200 at 60 Hz with reduced blanking using DMS-59 to DVI-D single-link cable adaptor

VGA display output:

- Drives two analog display at resolutions up to 2048 × 1536 at 85 Hz using DMS-59 to VGA cable adaptor.

<b>Shading Architecture</b>	Shader Model 5.0
<b>Supported Graphics APIs</b>	DX11, OpenGL 4.3
<b>Available Graphics Drivers</b>	Windows® 8 Windows 7 Professional (64-bit and 32-bit) Windows XP Professional (64-bit and 32-bit) Red Hat® Enterprise Linux® (RHEL) SUSE Linux® Enterprise Desktop 11 (64-bit and 32-bit)

HP qualified drivers may be preloaded or the latest HP qualified drivers are available from the HP support Web site:

<http://welcome.hp.com/country/us/en/support.html>

SUSE Linux® Enterprise drivers may also be obtained from:

<ftp://download.nvidia.com/novell> or <http://www.nvidia.com>

#### Notes

The thermal solution used on this card is an active fan heatsink.

### Technical Specifications - Graphics

<b>NVIDIA® NVS™ 510 2GB Graphics</b>	<b>Form Factor</b>	Low Profile, 2.713 inches × 6.3 inches, single slot
	<b>Graphics Controller</b>	NVS™NVS™TM™ 510 GPU Core Clock: 797 Mhz Memory Clock: 891 Mhz CUDA® Cores: 192
	<b>Bus Type</b>	PCI Express x16, Generation 2.0
	<b>Memory</b>	2GB DDR3
	<b>Connectors</b>	Four mini-DisplayPort. Four mini-DisplayPort to DisplayPort adapters included. (DisplayPort to DVI-D, DisplayPort to VGA, DisplayPort to HDMI, and DisplayPort to Dual-Link DVI adapters available as separate accessories)
	<b>Maximum Resolution</b>	Mini-DisplayPort connectors support ultra-high-resolution panels (up to 3840 x 2160 @ 60Hz)
	<b>Image Quality Features</b>	<b>NOTE:</b> This card supports up to four displays. For Windows XP, only 2 active displays are supported. 10-bit internal display processing, including hardware support for 10-bit scan-out
	<b>Display Output</b>	DisplayPort with Multi-Stream Technology (MST) and High Bit Rate 2 (HBR2) support.  Digital Display Support  1. DisplayPort Output - Drives four DisplayPort enabled digital display at resolutions up to 3840 × 2160 at 60 Hz with reduced blanking, when connected natively using the 4 DisplayPort connectors on the NVS™NVS™TM™ 510 graphics card. - DisplayPort Multi-Stream Topology (MST) Technology: Supports various combinations of display resolutions and number of displays when using DisplayPort multi stream topology technology - up to a maximum of 4 monitors at a resolution of 1920 × 1200 at 60 Hz with reduced blanking.  2. DVI-D Output - Drives four digital displays at resolutions up to 1920 × 1200 at 60 Hz with reduced blanking using DisplayPort to DVI-D single-link cable adaptors. - Drives four digital displays at resolutions up to 2560× 1600 at 60 Hz with reduced blanking using DisplayPort to DVI-D dual-link cable adaptors.  3. HDMI Output - The NVS™NVS™TM™ 510 graphics board is capable of driving four high definition (HD) panels up to resolutions of 1920 × 1080P at 60 Hz using DisplayPort to HDMI cable adaptors.
	<b>Supported Graphics APIs</b>	Full Microsoft® DirectX 11, Shader Model 5.0 support Full OpenGL 4.3 support
	<b>Available Graphics Drivers</b>	Windows 7 Professional (64-bit and 32-bit) Windows® XP Professional (64-bit and 32-bit)

### Technical Specifications - Graphics

Red Hat® Enterprise Linux® (RHEL) 6 Desktop/Workstation  
 SUSE Linux® Enterprise Desktop 11 (64-bit and 32-bit)

HP qualified drivers may be preloaded or available from the HP support Web site:

<http://welcome.hp.com/country/us/en/support.html>

**Power Consumption Note**

33.4 Watts

The thermal solution used on this card is an active fan heatsink.

**AMD FirePro™ W2100  
 2GB Graphics**

**Form Factor**

Low Profile, half length (full-height bracket included)

**Graphics Controller**

AMD FirePro™ W2100 professional graphics based on Oland GPU.  
 GPU: 320 Stream Processors organized into 5 Compute Units  
 GPU Frequency: 630Mhz  
 Power: 26W  
 Cooling: Active

**Bus Type**

PCI Express® x8, Generation 3.0

**Memory**

2GB DDR3 memory  
 Memory Bandwidth: up to 28.8 GB/s  
 Memory Width: 128 bit

**Connectors**

2x Display Port 1.2 connectors

Factory Configured: No video cable adapter included  
 After market option kit: No video cable adapter included

Additional DisplayPort-to-VGA or DisplayPort-to-DVI adapters are available as Factory Configuration or Option Kit accessories.

**Maximum Resolution**

DisplayPort 1.2:  
 - up to 4096x2160 x 24 bpp @ 60Hz

Dual Link DVI(I) (requires adapter cable):  
 - up to 2560 x 1600 x 32 bpp @ 60Hz

Single Link-DVI(I)(requires adapter cable):  
 - up to 1920 x 1200 x 32 bpp @ 60Hz

VGA (requires adapter cable):  
 - up to 1920 x 1200 x 32 bpp @ 60Hz

**Image Quality Features**

Advanced support for 8-bit, 10-bit, and 16-bit per RGB color component.  
 High bandwidth scaler for high quality up and downscaling.

**Display Output**

2 x DisplayPort® 1.2a  
 Maximum number of displays: 2

**Shading Architecture**

Shader Model 5.0



### Technical Specifications - Graphics

<b>Supported Graphics APIs</b>	OpenCL™ 1.2, DirectX® 11.2/12, OpenGL 4.4  OpenGL 4.4 support with driver release 14.301.xxx OpenCL 1.2 conformance expected with drive release 14.301.xxx
<b>Available Graphics Drivers</b>	Windows 8.1 (64-bit and 32-bit) Windows 7 (64-bit and 32-bit) Linux®  HP qualified drivers may be preloaded or available from the HP support Web site: <a href="http://welcome.hp.com/country/us/en/support.html">http://welcome.hp.com/country/us/en/support.html</a>
<b>Notes</b>	Depending on the card model, native DisplayPort™ connectors and/or certified DisplayPort™ active or passive adapters to convert your monitor's native input to your card's DisplayPort™ or Mini-DisplayPort™ connector(s) may be required. See <a href="http://www.amd.com/firepro">www.amd.com/firepro</a> for details.

#### NVIDIA® Quadro® K420 2GB Graphics

<b>Form Factor</b>	Low Profile, single slot Dimensions: 2.713 inches × 6.3 inches Cooling: Active
<b>Graphics Controller</b>	NVIDIA® Quadro® K420 GPU: GK107 with 192 CUDA® cores Power: 41W
<b>Bus Type</b>	PCI Express x16, 2.0 compliant
<b>Memory</b>	Size: 2GB DDR3 Clock: 891MHz Memory Bandwidth: 29GB/s Memory Width: 128 bit
<b>Connectors</b>	One dual-link DVI-I connector One DisplayPort connector  Factory Configured: No video cable adapter included After market option kit: One DP-to-DVI adapter included with card  Additional DisplayPort-to-VGA or DisplayPort-to-DVI adapters are available as Factory Configuration or Option Kit accessories.
<b>Maximum Resolution</b>	VGA (via adapter cable): - 2048 × 1536 × 32 bpp at 85 Hz  Dual-link DVI - 2560 × 1600 × 32 bpp at 60 Hz (reduced blanking)  Single-link DVI - 1920 × 1200 × 32 bpp at 60 Hz (reduced blanking)

### Technical Specifications - Graphics

	DisplayPort 1.2 - 3840 × 2160 × 30 bpp at 60 Hz
<b>Image Quality Features</b>	12-bit internal display pipeline (hardware support for 12-bit scanout on supported panels, applications and connection)  Stereoscopic 3D display support including NVIDIA® 3D Vision™ technology, 3D DLP, Interleaved, and passive stereo
<b>Display Output</b>	Maximum number of displays: - 2 direct attached monitors - 4 using DP 1.2a with MST and HBR2 enabled monitors  Maximum number of DisplayPort displays possible (may require MST and/or HBR2): - 4 1920x1200 - 2 2560x1600 - 1 3840x2160  Maximum number of monitors across all available Quadro® K420 outputs is 4.
<b>Shading Architecture</b>	Shader Model 5.0
<b>Supported Graphics APIs</b>	DX11, OpenGL 4.4 Programming support for CUDA® C, CUDA® C++, DirectCompute 5.0, OpenCL, Python, and Fortran
<b>Available Graphics Drivers</b>	Windows 8.1 Windows 8 Windows 7 Linux® - Full OpenGL implementation, complete with NVIDIA® and ARB extensions
<b>Notes</b>	<ol style="list-style-type: none"> <li>1. Factory configured Quadro® K420 does not include any video adapters. Adapters must be ordered separately.</li> <li>2. Option kit Quadro® K420 includes one DP to DVI-D adapter.</li> <li>3. Full Height Profile bracket installed. Low Profile bracket included in after-market kit.</li> </ol>

#### NVIDIA® Quadro® K620 2GB Graphics

<b>Form Factor</b>	Dimensions: 2.713" H x 6.3" L Single Slot, Low Profile Cooling: Active Weight: 133 grams
<b>Graphics Controller</b>	NVIDIA® Quadro® K620 GPU: GM107 GPU with 384 CUDA® cores Power: 45 Watts
<b>Bus Type</b>	PCI Express 2.0 x16
<b>Memory</b>	Size: 2GB GDDR3

### Technical Specifications - Graphics

	<p>Memory Bandwidth: 29 GB/s Memory Width: 128-bit</p>
<b>Connectors</b>	<p>1 DL-DVI(I) 1 DisplayPort</p> <p>Factory Configured: No video cable adapter included After market option kit: One DP-to-DVI adapter included with card</p> <p>Additional DVI-to-VGA, DisplayPort-to-VGA or DisplayPort-to-DVI adapters are available as Factory Configuration or Option Kit accessories.</p>
<b>Maximum Resolution</b>	<p>DisplayPort 1.2: - up to 4096x2160 x 30 bpp @ 60Hz - supports High Bit Rate 2 (HBR2) and Multi-Stream Transport (MST)</p> <p>Dual Link DVI(I) output: - up to 2560 x 1600 x 32 bpp @ 60Hz</p> <p>Single Link-DVI(I) output: - up to 1920 x 1200 x 32 bpp @ 60Hz</p> <p>VGA (via adapter cable): - 2048 x 1536 x 32 bpp at 85 Hz</p>
<b>Image Quality Features</b>	<p>12-bit internal display pipeline (hardware support for 12-bit scanout on supported panels, applications and connection)</p> <p>Stereoscopic 3D display support including NVIDIA® 3D Vision™ technology, 3D DLP, Interleaved, and passive stereo</p>
<b>Display Output</b>	<p>Maximum number of displays: - 2 direct attached monitors - 4 using DP 1.2a with MST and HBR2 enabled monitors</p> <p>Maximum number of DisplayPort displays possible (may require MST and/or HBR2): - 4 1920x1200 - 2 2560x1600 - 1 4096x2160</p> <p>Maximum number of monitors across all available Quadro® K620 outputs is 4.</p>
<b>Shading Architecture</b>	<p>Shader Model 5.0</p>
<b>Supported Graphics APIs</b>	<p>OpenGL 4.4 DirectX 11</p> <p>API support includes: CUDA® C, CUDA® C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran</p>

### Technical Specifications - Graphics

**Available Graphics Drivers**

Windows 8.1  
 Windows 8  
 Windows 7  
 Linux® - Full OpenGL implementation, complete with NVIDIA® and ARB extensions

HP qualified drivers may be preloaded or available from the HP support Web site:

<http://welcome.hp.com/country/us/en/support.html>

**Notes**

1. Factory configured Quadro K620 does not include a video cable adapter. Video cable adapters must be ordered separately.
2. Quadro K620 offered as an Option Kit (AMO) includes one DP-to-DVI video cable adapter. Additional cables must be ordered separately.
3. Full Height Profile bracket installed. Low Profile bracket included in after-market kit.

**NVIDIA® Quadro® P400 2GB Graphics**

**Form Factor**

Dimensions: 2.713" H x 5.7" L  
 Single Slot, Low Profile  
 Cooling: Active  
 Weight: 129 grams

**Graphics Controller**

NVIDIA® Quadro® P400 Graphics Card  
 GP107-825 GPU  
 256 CUDA cores  
 Max Power: 30 Watts

**Bus Type**

PCI Express 3.0 x16

**Memory**

Size: 2 GB GDDR5, 2000 MHz  
 Memory Interface: 64-bit  
 Memory Bandwidth: 32 GB/s

**Connectors**

3mDP Outputs\*

**Maximum Resolution**

DisplayPort 1.4:  
 - up to 3x 5120 x 2880 x 24 bpp @ 60Hz  
 - supports Multi-Stream Transport (MST)

**Image Quality Features**

10-bit internal display processing pipeline  
 10-bit scan-out support

**Display Output**

3 mDP Connectors

**Shading Architecture**

Full Microsoft DirectX 12 Shader Model 5.1

**Supported Graphics APIs**

OpenGL 4.5  
 DirectX 12  
 Vulkan 1.0  
 API support includes:  
 CUDA C, CUDA C++, DirectCompute , OpenCL

**Available Graphics Drivers**

Microsoft Windows 10  
 Microsoft Windows 8.1  
 Microsoft Windows 7  
 Linux

HP qualified drivers may be preloaded or available from the HP support

### Technical Specifications - Graphics

Web site:  
<http://welcome.hp.com/country/us/en/support.html>

**Notes**

\*P400, P600 and P1000 only have mini-DisplayPort (mDP) video ports.  
**Note 1:** Two mDP-to-DP adapters will ship with each P400, P600 or P1000 configured in HP Z Workstations Compatibles.  
**Note 2:** AMO kits for P400, P600, P1000 and Adapters will ship in July 2017.

- No mDP-to-DP Adapters are included in the P400, P600 and P1000 AMO kits.
- If mDP-to-DP Adapters are needed, Adapters can be ordered separately:
  - 2KW86A6 - HP (Bulk 4) miniDP-to-DP Adapter Cables
  - 2KW87A6 - HP (Bulk 12) miniDP-to-DP Adapter Cables

**NVIDIA® Quadro® P600  
2GB Graphics**

**Form Factor**

Dimensions: 2.713" H x 5.7" L  
 Single Slot, Low Profile  
 Cooling: Active  
 Weight: 129 grams

**Graphics Controller**

NVIDIA® Quadro® P600 Graphics Card  
 GP107-850 GPU  
 384 CUDA cores  
 Max Power: 40 Watts

**Bus Type**

PCI Express 3.0 x16

**Memory**

Size: 2 GB GDDR5, 2000 MHz  
 Memory Interface: 128-bit  
 Memory Bandwidth: 64 GB/s

**Connectors**

4mDP Outputs\*

**Maximum Resolution**

DisplayPort 1.4:  
 - up to 4x 5120 x 2880 x 24 bpp @ 60Hz  
 - supports Multi-Stream Transport (MST)

**Image Quality Features**

10-bit internal display processing pipeline  
 10-bit scan-out support

**Display Output**

4 mDP Connectors

**Shading Architecture**

Full Microsoft DirectX 12 Shader Model 5.1

**Supported Graphics APIs**

OpenGL 4.5  
 DirectX 12  
 Vulkan 1.0  
 API support includes:  
 CUDA C, CUDA C++, DirectCompute , OpenCL

**Available Graphics Drivers**

Microsoft Windows 10  
 Microsoft Windows 8.1  
 Microsoft Windows 7  
 Linux

HP qualified drivers may be preloaded or available from the HP support Web site:

<http://welcome.hp.com/country/us/en/support.html>

**Notes**

\*P400, P600 and P1000 only have mini-DisplayPort (mDP) video ports.  
**Note 1:** Two mDP-to-DP adapters will ship with each P400, P600 or P1000 configured in HP Z Workstations Compatibles.

### Technical Specifications - Graphics

**Note 2:** AMO kits for P400, P600, P1000 and Adapters will ship in July 2017.

- No mDP-to-DP Adapters are included in the P400, P600 and P1000 AMO kits.
- If mDP-to-DP Adapters are needed, Adapters can be ordered separately:
  - 2KW86A6 - HP (Bulk 4) miniDP-to-DP Adapter Cables
  - 2KW87A6 - HP (Bulk 12) miniDP-to-DP Adapter Cables

<b>Radeon™ Pro WX 4100 4GB Graphics</b>	<b>Form Factor</b>	Low-Profile Single Slot (6.6" Length)
	<b>Graphics Controller</b>	Polaris 11 Baffin GL XT GPU: 1024 Stream Processors organized into 16 Compute Units Power: 50 Watts Cooling: Active
	<b>Memory</b>	4GB GDDR5 memory Memory Bandwidth: 6 Gbps / 96 GB/s Memory Width: 128 bit
	<b>Connectors</b>	4x Mini DisplayPort 1.4 – HDR ready connectors with HBR3 and MST support.  Factory Configured: Four mDP-to-DP cable adapters included After market option kit: Four mDP-to-DP cable adapters included
	<b>Maximum Resolution</b>	Additional DisplayPort-to-VGA or DisplayPort-to-DVI adapters are available as Factory Configuration or Option Kit accessories. 5K support @ 60Hz <ul style="list-style-type: none"> <li>• 1x single-cable 5K monitor, or 2x dual-cable 5K monitors</li> </ul> 4x 4K support @ 60Hz
	<b>Image Quality Features</b>	Advanced support for 8-bit and 10-bit per RGB color component. High bandwidth scaler for high quality up and downscaling
	<b>Display Output</b>	4 full physical DP1.3 HBR3 / DP1.4 HDR outputs FreeSync support
	<b>GPU Architecture</b>	GCN 4th Generation
	<b>Supported Graphics APIs</b>	DirectX®12 OpenGL® 4.5 OpenCL™ 2.0 Vulkan™ 1.0
	<b>Available Graphics Drivers</b>	Windows 10 64-bit Windows® 7 64-bit Linux 64-bit (selected Enterprise distributions)
		HP qualified drivers may be preloaded or available from the HP support Web site: <a href="http://welcome.hp.com/country/us/en/support.html">http://welcome.hp.com/country/us/en/support.html</a>

**Notes**

1. HDR content requires that the system be configured with a fully HDR-ready content chain, including: graphics card,

### Technical Specifications - Graphics

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

<b>AMD FirePro W4300 4GB Graphics</b>	<b>Form Factor</b>	Low Profile, single slot (6.6" x 3.118") Full Height, single slot (6.6" x 4.725")
	<b>Graphics Controller</b>	AMD FirePro W4300 graphics GPU Frequency: 930Mhz Memory Clock Speed: 1500Mhz GPU: 768 Stream Processors organized into 12 Compute Units Power: <50 Watts Cooling: Active
	<b>Bus Type</b>	PCI Express® x16, Generation 3.0
	<b>Memory</b>	4GB GDDR5 memory Memory Bandwidth: up to 96 GB/s Memory Width: 128 bit
	<b>Connectors</b>	4x Mini Display Port 1.2 connectors with HBR2 and MST support.  Factory Configured: No video cable adapter included After market option kit: No video cable adapter included  Additional DisplayPort-to-VGA, DisplayPort-to-HDMI, or DisplayPort-to-DVI adapters are available as Factory Configuration or Option Kit accessories.
	<b>Maximum Resolution</b>	DisplayPort: - 4096x2160 @24bpp (3 x 4K @ 60Hz, 4 x 4K @ 30Hz)
	<b>Image Quality Features</b>	Advanced support for 8-bit, 10-bit, and 16-bit per RGB color component. High bandwidth scaler for high quality up and downscaling Incorporated Adaptive-Sync enables FreeSync™ technology from AMD that allows GPU control of display refresh rates for tear-free and jitter-free image quality when rotating models or viewing video content.(Requires FreeSync compliant displays)

### Technical Specifications - Graphics

<b>Display Output</b>	<p>Max number of monitors supported using DisplayPort 1.2a:</p> <ul style="list-style-type: none"> <li>- 4 direct attached monitors</li> <li>- 6 using DP 1.2a with MST and HBR2 enabled monitors</li> </ul> <p>Monitor chaining from a single DisplayPort (subject to a max of 6 total monitors across all outputs, requires use of DisplayPort enabled monitors supporting MST and HBR2):</p> <ul style="list-style-type: none"> <li>- one 4096x2160 display</li> <li>- two 2560x1600 displays</li> <li>- four 1920x1200 displays</li> </ul>
<b>Shading Architecture</b>	Shader Model 5.0
<b>Supported Graphics APIs</b>	OpenGL 4.4 OpenCL 2.0 DirectX 12.0
<b>Available Graphics Drivers</b>	<p>Windows 10 (64-bit and 32-bit) Windows® 7 (64-bit and 32-bit) Linux</p> <p>HP qualified drivers may be preloaded or available from the HP support Web site: <a href="http://welcome.hp.com/country/us/en/support.html">http://welcome.hp.com/country/us/en/support.html</a></p>
<b>Notes</b>	<ol style="list-style-type: none"> <li>1. AMD Eyefinity technology supports up to six DisplayPort™ monitors on an enabled graphics card. Supported display quantity, type and resolution vary by model and board design; confirm specifications with manufacturer before purchase. To enable more than two displays, or multiple displays from a single output, additional hardware such as DisplayPort-ready monitors or DisplayPort 1.2 MST-enabled hubs may be required. A maximum of two active adapters is recommended for consumer systems. See <a href="http://www.amd.com/eyefinityfaq">www.amd.com/eyefinityfaq</a> for full details.</li> <li>2. Configurations of two FirePro W4300 graphics cards in HP Z440 Workstation require the HP Z440 Fan and Front Card Guide Kit, configurable from the factory (CTO PN: G8T99AV) or as an Aftermarket Option (AMO PN: J9P80AA).</li> </ol>

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<b>NVIDIA® Quadro® K1200 4GB Graphics</b>	<b>Form Factor</b>	<p>Dimensions: 2.71" H x 6.875" L Single Slot, Low Profile Cooling: Active Weight: ~175 grams</p>
	<b>Graphics Controller</b>	<p>NVIDIA® Quadro® K1200 Graphics Card GPU: GM107 with 512 CUDA® cores Power: 46 Watts</p>
	<b>Bus Type</b>	PCI Express 2.0 x16
	<b>Memory</b>	Size: 4GB GDDR5



### Technical Specifications - Graphics

	Memory Bandwidth: 80 GB/s Memory Width: 128-bit
<b>Connectors</b>	4 mini-DisplayPort 1.2a  Factory Configured Option: 4 mini-DP-to-DP adapters included with card Option Kit: 4 mini-DP-to-DP adapters included with card  Additional DisplayPort-to-VGA or DisplayPort-to-DVI adapters are available as accessories
<b>Maximum Resolution</b>	DisplayPort: - up to 4096 x 2160 x 30 bpp @ 60Hz - supports High Bit Rate 2 (HBR2) and Multi-Stream Transport (MST)  DL-DVI(I) output: - up to 2560 x 1600 x 32 bpp @ 60Hz  Single Link-DVI(I) output: - up to 1920 x 1200 x 32 bpp @ 60Hz  VGA (via adapter cable): - 2048 x 1536 x 32 bpp at 85 Hz
<b>Image Quality Features</b>	12-bit internal display pipeline (hardware support for 12-bit scanout on supported panels, applications and connection)
<b>Display Output</b>	Maximum number of displays - 4 direct attached monitors  Maximum number of DisplayPort displays possible: - 4 1920x1200 - 4 2560x1600 - 4 4096x2160  Maximum number of monitors across all available Quadro® K1200 outputs is 4.
<b>Shading Architecture</b>	Shader Model 5.0
<b>Supported Graphics APIs</b>	OpenGL 4.4 DirectX 11.1  API support includes: CUDA® C, CUDA® C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran
<b>Available Graphics Drivers</b>	Windows 8.1 Windows 8 Windows 7 Linux® - Full OpenGL implementation, complete with NVIDIA® and ARB extensions

### Technical Specifications - Graphics

HP qualified drivers may be preloaded or available from the HP support Web site:

<http://welcome.hp.com/country/us/en/support.html>

#### Notes

1. Quadro® K1200 offered as Factory Configured Option includes 4 miniDP to DP video cable adapters. Other video cable adapters must be ordered separately.
2. Quadro® K1200 offered as an Option Kit includes 4 mini-DP to DP adapters. Additional cables must be ordered separately.
3. A total maximum of 4 active monitors are supported across all display output types. This may be accomplished by using daisy chained DisplayPort 1.2 displays (displays must support MST and HBR2).

#### NVIDIA® Quadro® P1000 4GB Graphics

#### Form Factor

Dimensions: 2.713" H x 5.7" L  
Single Slot, Low Profile  
Cooling: Active  
Weight: 129 grams

#### Graphics Controller

NVIDIA® Quadro® P1000 Graphics Card  
GP107-860 GPU  
640 CUDA cores  
Max Power: 47 Watts

#### Bus Type Memory

PCI Express 3.0 x16  
Size: 4 GB GDDR5, 2500 MHz  
Memory Interface: 128-bit memory interface  
Memory Bandwidth: 80 GB/s memory bandwidth

#### Connectors

4mDP Outputs

#### Maximum Resolution

DisplayPort 1.4:  
- up to 4x 5120 x 2880 x 24 bpp @ 60Hz  
- supports Multi-Stream Transport (MST)

#### Image Quality Features

10-bit internal display processing pipeline  
10-bit scan-out support

#### Display Output

4 mDP Connectors

#### Shading Architecture

Full Microsoft DirectX 12 Shader Model 5.1

#### Supported Graphics APIs

OpenGL 4.5  
DirectX 12  
Vulkan 1.0  
API support includes:  
CUDA C, CUDA C++, DirectCompute, OpenCL

#### Available Graphics Drivers

Microsoft Windows 10  
Microsoft Windows 8.1  
Microsoft Windows 7  
Linux

HP qualified drivers may be preloaded or available from the HP support Web site:

<http://welcome.hp.com/country/us/en/support.html>

#### Notes

\*P400, P600 and P1000 only have mini-DisplayPort (mDP) video ports.  
**Note 1:** Two mDP-to-DP adapters will ship with each P400, P600 or P1000 configured in HP Z Workstations Compatibles.

### Technical Specifications - Graphics

**Note 2:** AMO kits for P400, P600, P1000 and Adapters will ship in July 2017.

- No mDP-to-DP Adapters are included in the P400, P600 and P1000 AMO kits.
  - If mDP-to-DP Adapters are needed, Adapters can be ordered separately:
    - 2KW86A6 - HP (Bulk 4) miniDP-to-DP Adapter Cables
    - 2KW87A6 - HP (Bulk 12) miniDP-to-DP Adapter Cables
-

### Technical Specifications - Optical and Removable Storage

<b>HP 9.5mm Slim DVD Writer</b>	<b>Description</b>	9.5mm height, tray-load
	<b>Mounting Orientation</b>	Either horizontal or vertical
	<b>Interface Type</b>	SATA/ATAPI
	<b>Dimensions (WxHxD)</b>	128 x 9.5 x 127mm
	<b>Supported Media Types</b>	DVD+R DVD+RW DVD+R DL DVD-R DL DVD-R DVD-RW CD-R CD-RW
	<b>Disc Capacity</b>	<b>DVD-ROM</b> 8.5 GB DL or 4.7 GB standard
	<b>Access Times</b>	<b>Full Stroke DVD</b> < 200ms (seek) <b>Full Stroke CD</b> < 200ms (seek)
	<b>Maximum Data Transfer Rates</b>	<b>CD ROM Read</b> CD-ROM, CD-R Up to 24X CD-RW Up to 24X  <b>DVD ROM Read</b> 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
	<b>Power</b>	<b>Source</b> SATA DC power receptacle <b>DC Power Requirements</b> 5 VDC ± 5%-100 mV ripple p-p <b>DC Current</b> 5 VDC – < 800 mA typical, < 1600 mA maximum
	<b>Operating Environmental</b> (all conditions non-condensing)	<b>Temperature</b> 41° to 122° F (5° to 50° C) <b>Relative Humidity</b> 10% to 80% <b>Maximum Wet Bulb Temperature</b> 84° F (29° C)
	<b>Operating Systems Supported</b>	Windows 10, Windows 7 Professional 32-bit and 64-bit, Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32*. Red Hat Enterprise Linux(RHEL) WS4**, 5, 6 Desktop/Workstation SUSE Linux Enterprise Desktop 10 & 11  No driver is required for this device. Native support is provided by the operating system.
	<b>Kit Contents</b>	HP SATA DVD Writer drive, installation guide.

<b>HP 9.5mm Slim DVD-ROM Drive</b>	<b>Description</b>	9.5mm height, tray-load
	<b>Mounting Orientation</b>	Either horizontal or vertical
	<b>Interface Type</b>	SATA / ATAPI
	<b>Dimensions (WxHxD)</b>	128 x 9.5 x 127mm

### Technical Specifications - Optical and Removable Storage

<b>Disc Capacity</b>	<b>DVD-ROM</b>	Single layer: Up to 4.7 GB Double layer: Up to 8.5 GB
<b>Access Times</b>	<b>DVD-ROM Single Layer</b>	< 110 ms (typical)
	<b>CD-ROM Mode 1</b>	< 110 ms (typical)
	<b>Full Stroke DVD</b>	< 230 ms (typical)
	<b>Full Stroke CD</b>	< 220 ms (typical)
<b>Power</b>	<b>Source</b>	SATA DC power receptacle
	<b>DC Power Requirements</b>	5 VDC ± 5%-100 mV ripple p-p
	<b>DC Current</b>	5 VDC – <800mA typical, < 1600 mA maximum
<b>Operating Environmental</b> (all conditions non-condensing)	<b>Temperature</b>	41° to 122° F (5° to 50° C)
	<b>Relative Humidity</b>	10% to 80%
	<b>Maximum Wet Bulb Temperature</b>	84° F (29° C)
<b>Operating Systems Supported</b>	Windows 8.1, Windows 8 32-bit and 64-bit, Windows 7 Professional 32-bit and 64-bit, Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32*. Red Hat Enterprise Linux(RHEL) WS4**, 5, 6 Desktop/Workstation SUSE Linux Enterprise Desktop 10 & 11	
	No driver is required for this device. Native support is provided by the operating system.	
<b>Kit Contents</b>	9.5mm Slim DVD-ROM Drive, 5.25" ODD Bay adapter/carrier, slim SATA data/power cable, installation guide	

<b>HP 9.5mm Slim BDXL Blu-Ray Writer</b>	<b>Description</b>	9.5mm height, tray-load	
	<b>Mounting Orientation</b>	Either horizontal or vertical	
	<b>Interface Type</b>	SATA/ATAPI	
	<b>Dimensions (WxHxD)</b>	128 x 9.5 x 127mm	
	<b>Supported Media Types</b>	BD-ROM BD-R BD-RE DVD-RAM DVD+R DVD+RW DVD+R DL DVD-R DL DVD-R DVD-RW CD-R CD-RW	
	<b>Disc Capacity</b>	<b>DVD-ROM</b>	8.5 GB DL or 4.7 GB standard
		<b>Blu-ray</b>	25 GB (single-layer) 50 GB (dual-layer) 100/128 GB (BDXL)
	<b>Access Times</b>	<b>Full Stroke DVD</b>	< 230 ms (seek)

### Technical Specifications - Optical and Removable Storage

	<b>Full Stroke CD</b>	< 220 ms (seek)
	<b>Blu-ray</b>	< 230 ms (seek) (Full Stroke Blu-ray)
	<b>Startup Time</b>	(Time to drive ready from tray loading)
		BD-ROM (SL/DL) 25S / 28S
		BD-R (SL/DL) 25S / 28S
		BD-RE (SL/DL) 25S / 28S
		DVD-ROM (SL/DL) 18S / 18S
		DVD-R (SL/DL) 25S / 25S
		DVD-RW 25S
		DVD+R (SL/DL) 25S / 25S
		DVD+RW 25S
		DVD-RAM 45S
		CD-ROM 15S
<b>Maximum Data Transfer Rates</b>	<b>CD ROM Read</b>	CD-ROM, CD-R Up to 24X CD-RW Up to 24X
	<b>DVD ROM Read</b>	DVD-RAM Up to 8X 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
	<b>Blu-ray</b>	BD-ROM Up to 6X BD-ROM DL Up to 6X BD-R Up to 6X BD-R DL Up to 6X BD-RE Up to 6X BD-RE SL/DL Up to 6X
<b>Power</b>	<b>Source</b>	SATA DC power receptacle
	<b>DC Power Requirements</b>	5 VDC ± 5%-100 mV ripple p-p
	<b>DC Current</b>	5 VDC -900 mA typical, 2000mA maximum
<b>Operating Environmental</b> (all conditions non-condensing)	<b>Temperature</b>	41° to 122° F (5° to 50° C)
	<b>Relative Humidity</b>	10% to 80%
	<b>Maximum Wet Bulb Temperature</b>	84° F (29° C)
<b>Operating Systems Supported</b>		Windows 8.1, Windows 8 32-bit and 64-bit, Windows 7 Professional 32-bit and 64-bit, Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32*. Red Hat Enterprise Linux(RHEL) WS4**, 5, 6 Desktop/Workstation SUSE Linux Enterprise Desktop 10 & 11
		No driver is required for this device. Native support is provided by the operating system.
<b>Kit Contents</b>		9.5mm Slim BDXL Blu-Ray Writer, 5.25" ODD Bay adapter/carrier, slim SATA data/power cable, installation guide

### Technical Specifications - Optical and Removable Storage

#### NOTES

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

#### HP SD Media Card Reader Description

Supports hardware ECC (Error Correction Code) function  
 Supports hardware CRC (Cyclic Redundancy Check) function  
 Supports MS 4-bit parallel transfer mode  
 Supports MS-PRO 4-bit parallel transfer mode  
 Supports MS PRO-HG Duo 4-bit parallel transfer mode  
 Supports SD 4-bit parallel transfer mode  
 Supports UHS-104 SD 4-bit card (version 3.0)  
 Supports CF v6.0 with PIO mode 6 and Ultra DMA 7 mode

#### Interface Type

USB 3.0 High-speed interface  
 Note: If there is a USB2 connection, USB2 transfer speeds are supported.

#### Dimensions (WxHxD)

Dedicated slot in front bezel (orderable option)

#### Supported Media Types

Secure Digital Card (SD)  
 Secure Digital High Capacity (SDHC)  
 SD Extended Capacity Memory Card (SDXC)  
 SD Ultra High Speed II(SD UHSII)  
 These additional media types are supported with a card adapter.  
 Memory Stick Micro (M2)  
 miniSD  
 miniSD High Capacity  
 Micro SD Memory Card (MicroSD)  
 Micro SD High Capacity Memory Card (MicroSDHC)

#### Operating Systems Supported

Test Parameters/Conditions - Power applied, unit operating on system ±5%

Windows 8 Pro (64-bit)\*  
 Windows 8.1 (64-bit)\*  
 Windows 8 (64-bit)\*  
 Windows 7 Ultimate (32-bit)\*\*  
 Windows 7 Ultimate (64-bit)\*\*  
 Windows 7 Professional (32-bit)\*\*  
 Windows 7 Professional (64-bit)\*\*  
 Windows 7 Home Basic\*\*  
 Windows 7 Home Premium (32-bit)\*\*  
 Windows 7 Home Premium (64-bit)\*\*  
 Windows Vista Business 64  
 Windows Vista Business 32  
 Windows Vista Home Basic 32  
 Windows XP Professional  
 Windows XP Home 32

No driver is required for this device. Native support is provided by the operating system.

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

### Technical Specifications - Optical and Removable Storage

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.microsoft.com>

#### **Kit Contents**

SD card reader, Install Guide, IO & Security Software and Documentation CD

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

0.35 lbs (0.16 kg)

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### Technical Specifications - Controller Cards

<b>HP Thunderbolt™ 2 PCIe 1-port I/O Card</b>	<b>Data Transfer Rate</b>	Supports up to 20 Gb/s (20,000 Mb/s)
	<b>Devices Supported</b>	Thunderbolt™ certified devices
	<b>Bus Type</b>	PCIe card, full or half height PCIe slots
	<b>Ports</b>	One Thunderbolt™ 2 external 20-Pin output connectors (Rear)
	<b>Internal Connectors</b>	One 5-Pin header connector
	<b>System Requirements</b>	Windows 7 Professional 64-bit, Windows 8.1 64-bit, Intel® i5 series or higher processor, 128-MB RAM, 1-GB Hard Drive, available PCIe slot.
	<b>Temperature - Operating</b>	50° to 131° F (10° to 55° C)
	<b>Temperature - Storage</b>	-22° to 140° F (-30° to 60° C)
	<b>Relative Humidity - Operating</b>	20% to 80%
	<b>Compliances</b>	FCC Part 15B, cULus 60950, CE Mark EN55022B(1995)/EN55024-1998 STD, Taiwan BSMI CNS13438, Korea MIC
	<b>Operating Systems Supported</b>	Windows 7 Professional 64-bit, Windows 8.1 64-bit.
	<b>Kit Contents</b>	HP Thunderbolt™ 2 PCIe 1-port I/O Card, full height and half height bracket, DisplayPort to DisplayPort cable, internal header cables (2), user documentation and warranty card.
	<b>Warranty</b>	The HP Thunderbolt™ 2 PCIe 1-port I/O Card has a one-year Limited Warranty or the remainder of the warranty of the HP supported product in which it is installed. Technical support is available seven days a week, 24 hours a day, by phone, as well as online support forums. Certain restrictions and exclusions apply.

### Technical Specifications - Networking and Communications

<b>Integrated Intel® I219LM PCIe GbE Controller (Intel® vPro™ with Intel® AMT 11.0)</b>	<b>Connector</b>	RJ-45
	<b>Controller</b>	Intel® I217LM GbE platform LAN connect networking controller
	<b>Memory</b>	3 KB Tx and 3KB Rx FIFO packet buffer memory
	<b>Data Rates Supported</b>	10/100/1000 Mbps
	<b>Compliance</b>	802.1as/1588, 802.1p, 802.1Q, 802.3, 802.3ab, 802.3az, 802.3i, 802.3u, 802.3z
	<b>Bus Architecture</b>	PCI Express and SMBus
	<b>Data Transfer Mode</b>	PCIe-based interface for active state operation (S0 state) and SMBus for host and management traffic (Sx low power state)
	<b>Power Requirement</b>	Requires 3.3V (integrated regulators for core Vdc)
	<b>Boot ROM Support</b>	Yes
	<b>Network Transfer Mode</b>	Full-duplex; Half-duplex (not supported for the 1000BASE-T transceiver)
	<b>Network Transfer Rate</b>	10BASE-T (half-duplex) 10 Mbps 10BASE-T (full-duplex) 20 Mbps 100BASE-TX (half-duplex) 100 Mbps 100BASE-TX (full-duplex) 200 Mbps 1000BASE-T (full-duplex) 2000 Mbps
<b>Management Capabilities</b>	vPro™, WOL, auto MDI crossover, PXE, iSCSI Boot, Multi-port teaming, RSS, ACPI, Advanced cable diagnostic, loopback modes, AMT 9.0 support, Circuit Breaker, VLAN, Multicast Listener Discovery (MLD)	

<b>Intel® 8260 802.11 a/b/g/n/ac with Bluetooth 4.2 PCIe NIC</b>	<b>Operating Temperature</b>	0 to 80 C
	<b>Operating Humidity</b>	Non-operating 50% to 90% RH non-condensing (at temperatures of 25C to 35C)
	<b>Kit Contents</b>	WLAN module with PCIe x1 card, Dual band antenna, USB cable for internal Bluetooth connection, installation guide, warranty card

<b>Intel® Ethernet I350-T2 2-Port 1Gb NIC</b>	<b>Connector</b>	Two RJ-45
	<b>Controller</b>	Intel® Ethernet I350 Controller
	<b>Data Rates Supported</b>	10/100/1000 Mbps, Half- and full-duplex
	<b>Compliance</b>	802.3, 802.3u, 802.3x, 802.3ab, 802.3ad, 802.1p, 802.1Q, 802.3az, IEEE 1588 PCIe v2.1 standard RoHS (6 of 6) FCC (U.S. only) Class B DOC (Canada) Class B CE EN 55024, EN55022 Class B VCCI Class II UL 1950 CSA 950 EN 60950 CE ACPI 1.1a Microsoft WHQL (Windows Hardware Quality Labs)

### Technical Specifications - Networking and Communications

<b>Data Path Width</b>	Four lane (x4) PCI Express compatible with x4, x8, and x16 PCI Express slots
<b>Power Requirement</b>	4.4W (typical)
<b>Network Transfer Rate</b>	10BASE-T (half-duplex) 10 Mb/s 10BASE-T (full-duplex) 20 Mb/s 100BASE-TX (half-duplex) 100 Mb/s 100BASE-TX (full-duplex) 200 Mb/s 1000BASE-T (full-duplex) 2000 Mb/s
<b>Operating Temperature</b>	32° to 131° F (0° to 55° C )
<b>Operating Humidity</b>	10% to 95% non-condensing
<b>Dimensions (H x W x D)</b>	5.3 x 2.5 in (13.50cm x 6.4 cm) (without brackets)
<b>Operating System Driver Support</b>	Windows 7 32-bit and 64-bit; Windows 10 32-bit and 64-bit; Red Hat Enterprise Linux(RHEL) WS4, 5, 6 Desktop/Workstation Novell SLED 10 & SLED 11
<b>Kit Contents</b>	Intel® I350-T2 PCIe Dual Port Gigabit NIC PCA with a standard height bracket attached to it (the low profile bracket is included in the clamshell that the PCA ships in) Product Warranty statement and the Installation Guide.

#### Intel® Ethernet I350-T4 4-Port 1Gb NIC

<b>Connector</b>	Four RJ-45
<b>Controller</b>	Intel® Ethernet I350 Controller
<b>Data Rates Supported</b>	10/100/1000 Mbps, Half- and full-duplex
<b>Compliance</b>	802.3, 802.3u, 802.3x, 802.3ab, 802.3ad, 802.1p, 802.1Q, 802.3az, IEEE 1588 PCIe v2.1 standard RoHS (6 of 6) FCC (U.S. only) Class B DOC (Canada) Class B CE EN 55024, EN55022 Class B VCCI Class II UL 1950 CSA 950 EN 60950 CE ACPI 1.1a Microsoft WHQL (Windows Hardware Quality Labs)
<b>Data Path Width</b>	Four lane (x4) PCI Express compatible with x4, x8, and x16 PCI Express slots
<b>Power Requirement</b>	5.0W (typical)
<b>Network Transfer Rate</b>	10BASE-T (half-duplex) 10 Mb/s 10BASE-T (full-duplex) 20 Mb/s 100BASE-TX (half-duplex) 100 Mb/s 100BASE-TX (full-duplex) 200 Mb/s 1000BASE-T (full-duplex) 2000 Mb/s

### Technical Specifications - Networking and Communications

<b>Operating Temperature</b>	32° to 131° F (0° to 55° C)
<b>Operating Humidity</b>	10% to 95% non-condensing
<b>Dimensions (H x W x D)</b>	5.3 x 2.5 in (13.50cm x 6.4 cm) (without brackets)
<b>Operating System Driver Support</b>	Windows 7 32-bit and 64-bit; Windows 10 32-bit and 64-bit; Red Hat Enterprise Linux(RHEL) WS4, 5, 6 Desktop/Workstation Novell SLED 10 & SLED 11
<b>Kit Contents</b>	Intel® I350-T4 PCIe Quad Port Gigabit NIC PCA with a standard height bracket attached to it (the low profile bracket is included in the clamshell that the PCA ships in) Product Warranty statement and the Installation Guide.

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### Summary of Changes

Date of change:	Version History:		Description of change:
October 8, 2015	From v1 to v2	Changed	Expansions slots under Overview; Memory nomenclature, Z Turbo Drive 512 PCI Express version. Nvidia NVS 310 memory size, Quadro K420 memory size, SD Media card reader dimensions, kit contents and media type
November 11, 2015	From v2 to v3	Added	Intel® Xeon® processor E3-v5 family, M.2 slot (PCIe Gen3 x4), Intel HD Graphics P530, NVIDIA NVS 310 1GB Graphics, HP 9.5mm Slim SuperMulti DVD Writer, HP 9.5mm Slim DVD-ROM Drive, HP 9.5mm Slim BDXL Blu-Ray Writer, Z240 SFF Dust Filter
		Changed	Processors Note Intel Integrated Graphics P530 for Xeon processors, Processors Note Intel Integrated Graphics P530 for Xeon processors, M.2 support note,
		Removed	NVIDIA NVS 310 512MB Graphics, HP DVD ROM Slim-Tray Drive, HP DVD RW SuperMulti Slim-Tray Drive, HP Blu-ray Writer Slim-Tray Drive
January 1, 2016	From v3 to v4	Added	Update Available Processors table in "Overview" section. Update Processors with Core i3/Pentium specs in "Supported Components" section, Updated Stable & Consistent Offerings Section
		Changed	nECC RAM to non-ECC RAM in Supported components
March 1, 2016	From v4 to v5	Added	HP PCIe x1 Parallel Port Card to "Other hardware" section; Note for Z Turbo Drives under "Storage/Hard Drives" under supported components 2; AMD W4300 GFX card Under "Graphics Mid-range 3D"; Noise/acoustics declaration table under "System"; Power supply configuration table under "System Board"
		Changed	SLED 11 SP 4 in Overview section under Supported OS
		Removed	Removed eSATA option kit number and changed option from Y to N under "Supported Components"
March 31, 2016	From v5 to v6	Added	Windows 7 Professional 32 note in OS Overview; HP Z Turbo Drive G2 1TB SSD, HP Z Turbo Drv G2 256GB, 512, and 1TB M.2; The HP Z Turbo Drive G2 (NVMe) Win 7 32bit support note; BIOS and Security features in Supported Components
		Changed	HP eSATA PCI Cable Kit options in Other Hardware
May 1, 2016	From v6 to v7	Added	Intel I350-T2 card under Supported Components and Networking and Communications sections
		Changed	Intel 8260 Wireless LAN card to "Y" under Factory Configured, Z240 SFF Dust Filter to "Y" under Factory Configured in the Other Hardware section
June 1, 2016	From v7 to v8	Added	"HP DP25 Removable 2.5" HDD Frame/Carrier" to Optical and Removable Storage section
		Changed	Multi from "2" to "1" for W2100 GFX card under Graphics Cards
		Removed	eSATA cable from "Other Hardware" in supported components
July 1, 2016	From v8 to v9	Added	HP USB Hardened Mouse, 3Dconnexion CADMouse to Input Devices.
August 1, 2016	From v9 to v10	Removed	Internal header (parallel port adapter required) from System Board
September 1, 2016	From v10 to v11	Changed	Graphics note under Supported Components section
October 1, 2016	From v11 to v12	Removed	AMO kit PN for Slim 9.5mm ODD DVDRW, Graphics notes under Supported Components, Graphics Cards
November 1, 2016	From v12 to v13	Added	HP Z Turbo Drv G2 256, 512, and 1TB, 256, 512 SED and 512 TLC, HP Linux Installer Kit.
		Changed	Windows 7 Pro 32 bit and Graphics note about intermixing.
		Removed	Windows 8.1 Pro 64, Win 7 Ent and Pro NA

### Summary of Changes

January 1, 2017	From v13 to v14	Added	HP 2TB SATA 6Gb/s SSD specs
February 1, 2017	From v14 to v15	Added	HP 9.5mm Slim SuperMulti DVD Writer and HP inc disclaimers
March 1, 2017	From v15 to v16	Added	Intel® 7 <sup>th</sup> Gen processors, 2400 AMO and CTO memory modules, Intel I350 NIC
		Removed	Pentium from memory footnote support
April 1, 2017	From v16 to v17	Added	Intel Xeon processors E3 v6 Family, CTO & AMO 2400 Memory modules, Intel HD Graphics 610 & P630, Radeon Pro WX4100 Mid-range 3D Graphics.
May 1, 2017	From v17 to v18	Changed	Changed The HP 9.5mm Slim SuperMulti DVD Writer for The HP 9.5mm Slim DVD Writer.
June 5, 2017	From v18 to v19	Added	Windows 10 Pro License MSNA to Operating Systems section, added NVIDIA Quadro P400 & P600 to Entry 3D Graphics section, added NVIDIA Quadro P1000 & P2000 to Mid-range 3D section, added NVIDIA Quadro P4000 to High-end 3D section, Radeon Pro WX4100 4GB 1st GFX Graphics to Mid-range 3D section and added the Shipping Weight in the Weight section
		Changed	HP 9.5mm Slim DVD Writer Option Kit Part Number under Optical and Removable Storage section
		Removed	DVD-RAM as a supported format under the DVD writer section
June 6, 2017	From v19 to v20	Removed	the Shipping Weight in the Weight section
June 27, 2017	From v20 to v21	Removed	NVIDIA Quadro P2000 & P4000

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