

Overview

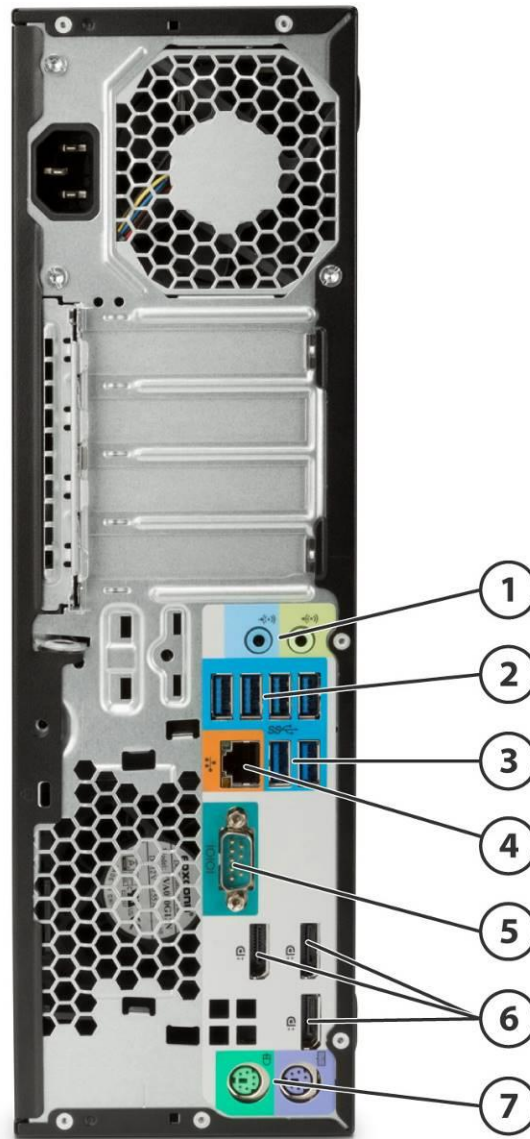
HP Z240 SFF Workstation



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 7 Professional (available through downgrade rights from Windows 10 Pro 64)**Windows 10 Home 64
- Windows 7 Professional 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 8.1 Pro 64
- Windows 7 Enterprise 32/64
- Windows 7 Professional 32
- Red Hat® Enterprise Linux® Desktop 6, 7
- SUSE Linux® Enterprise Desktop 11 SP3, 12

*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

Processors

Name	Cores	Clock Speed (GHz)	Intel® Turbo Boost Technology ¹	Cache (MB)	Memory Speed (MT/s)	Hyper-Threading	Integrated Graphics	Featuring Intel® vPro™™ Technology	TDP (W)
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

¹The 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 is not supported on all Intel® Xeon E3 processors

Supported Components

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.

Processor numbers differentiate features within each processor family, not across different processor families. See: 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.

Color	Black
Convertibility	The Z240 SFF can either be placed flat on the desktop or made to stand on the desk with the optional tower stand.
Expansion Slots	<ul style="list-style-type: none"> 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 <p>(all slots are Low Profile)</p> <p>NOTE: In the PCIe Gen3 x16 slot, if it is not being used for a graphics card, only cards certified as After Market Options for this platform are supported.</p>
Expansion Bays	<ul style="list-style-type: none"> 1 shared internal/external 3.5" bay. 1 internal 3.5" bay 1 internal 2.5" bay (for SSD only)
Front I/O	2 USB 3.0, 1 USB 2.0, 1 USB 2.0 Charging Data Port, 1 Headphone, and 1 Microphone/Headphone;
Internal I/O	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.
Rear I/O	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.
Interfaces Supported	SD Media Card Reader (optional)
Chassis Dimensions (H x W x D)	<p>Standard desktop orientation: 100 x 338 x 381 mm (3.95 x 13.3 x 15.0 in);</p> <p>Optional SFF Tower orientation (excluding stand dimension): 338 x 100 x 381 mm (13.3 x 3.95 x 15.0 in)</p>
Weight	<p>Exact weights depend upon configuration</p> <p>Minimum Weight: 5.7 kg (12.66 lb) Typical Weight*: 6.7 kg (14.86 lb) Maximum Weight: 7.7 kg (16.93 lb)</p> <p>Max Supported Weight (desktop orientation): 35 kg (77 lb)</p> <p>* Configured with 2 3.5" hard drives, 1 optical drive, 2 DIMMs and 1 NVIDIA Quadro K620 graphics card</p>

Supported Components

Temperature	Operating: 40° to 95°F (5° to 35°C) Non-operating: -40° to 140°F (-40° to 60°C) NOTES: 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).
Humidity	Operating: 8% to 85% Non-operating: 8% to 90%
Maximum Altitude (non-pressurized)	Operating: 3,000 m (10,000 ft) Non-operating: 9,100 m (30,000 ft).
Power Supply	240W 92% Efficiency wide-ranging, active Power Factor Correction (PFC) 200W 85% Efficiency wide-ranging, active PFC Power Supply option available in some countries.
Backup Devices	For a complete listing of compatible DAT tape drives, LTO tape drives and RDX Removable Disk Backup System offerings, please visit http://www.hp.com/go/connect
Chipset	Intel® C236 chipset
Memory	4 DIMM slots, supporting up to 64GB ECC/non-ECC, DDR4 2133 MT/s 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. Note: Transfer rates up to 2133 MT/s
Workstation ISV Certifications	See the latest list of certifications at http://www.hp.com/united-states/campaigns/workstations/partnerships.html

Supported Components

Processors

	Factory Configured	Option Kit
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 CP	Y	N

NOTE 1: Intel Integrated Graphics 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			
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

SATA Solid State Drives

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 256GB SATA 6Gb/s SED Opal 2 SSD	Y	Y	G7U67AA

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

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

Supported Components

Hard Drive Controllers

Integrated SATA Controller (Z240)

	Factory Configured	Option Kit
Integrated SATA Controller, RAID 0,1 supported: 4x 6 Gb/s ports	Y	N
RAID 0 Configuration – Striped Array ¹	Y	N
RAID 1 Configuration – Mirrored Array ¹	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

		Factory Configured	Option Kit	Option Kit Part Number	Supported # of cards
Integrated Graphics	Intel Integrated Graphics for Xeon processors	Y	N		1
	Intel® HD Graphics 530	Y	N		1
Professional 2D	NVIDIA® NVS™ 310 512MB Graphics ¹	Y	Y	A7U59AA	2
	NVIDIA® NVS™ 315 1GB Graphics	Y	Y	E1U66AA	2
	NVIDIA® NVS™ 510 2GB Graphics ²	Y	Y	C2J98AA	1
Graphics DisplayPort Cable Adapters	HP DisplayPort To DVI-D Adapter	Y	Y	FH973AA	1
	HP DisplayPort To DVI-D Adapter (2-Pack)	Y	N		1
	HP DisplayPort To DVI-D Adapter (4-Pack)	Y	N		1
	HP DisplayPort To VGA Adapter	Y	Y	AS615AA	1
	HP DisplayPort to Dual Link DVI Adapter	Y	Y	NR078AA	1
Entry 3D	AMD FirePro™ W2100 2GB Graphics	Y	Y	J3G91AA	2
	NVIDIA® Quadro® K420 2GB Graphics	Y	Y	N1T07AA	1
	NVIDIA® Quadro® K620 2GB Graphics	Y	Y	J3G87AA	1
Mid-range 3D	NVIDIA® Quadro® K1200 4GB Graphics	Y	Y	L4D16AA	1

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. However, HP recommends using only discrete graphics cards when four or more displays are required to be supported.

Supported Components

Memory

DDR3-2133 ECC Unbuffered DIMMs - CTO

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

DDR3-1600 nECC Unbuffered DIMMs - CTO

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

NOTES: 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.

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

The CPUs determine the speed at which the memory is clocked. If a 2133 MHz capable CPU is used in the system, the maximum speed the memory will run at is 2133 MHz regardless of the specified speed of the memory.

Transfer rates up to 2133 MT/s

AMO

Option Kit Part Number

DDR4-2133 ECC Unbuffered DIMMs - AMO

HP 4GB (1x4GB) DDR4-2133 ECC RAM	NOH86AA
HP 8GB (1x8GB) DDR4-2133 ECC RAM	NOH87AA
HP 16GB (1x16GB) DDR4-2133 ECC RAM	NOH88AA

DDR4-2133 non-ECC Unbuffered DIMMs - AMO

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

Factory Configured	Option Kit	Option Kit Part Number
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Supported Components

Integrated Realtek HD ALC221-VB Audio Y N

Optical and Removable Storage

	Factory Configured	Option Kit	Option Kit Part Number
HP SlimTray Optical Drives			
HP DVD ROM Slim-Tray Drive	Y	Y	E5Z82AA
HP DVD RW SuperMulti Slim-Tray Drive	Y	Y	E5Z80AA
HP Blu-ray Writer Slim-Tray Drive	Y	Y	E5Z81AA
HP SD Media Card Reader			
HP SD Media Card Reader	Y	N	

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 ^{3,4}	Y	Y	E0X95AA
Intel 8260 802.11 a/b/g/n/ac with Bluetooth® 4.2 PCIe NIC	Y	Y	N0S95AA

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.

Supported Components

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
HP USB Optical Mouse	Y	Y	QY777AA
HP PS/2 Mouse	Y	Y	QY775AA
HP PS/2 Keyboard	Y	Y	QY774AA
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 (Japan only)	N	Y	DM293A
HP Workstation Mouse Pad*	Y	N	
HP Serial Port Adapter	Y	Y	PA716A
HP ENERGY STAR® iCertified Configuration	Y	N	
HP Parallel Port Adapter Kit	N	Y	KD061AA
HP Internal USB Port Kit	N	Y	EM165AA
HP eSATA PCI Cable Kit	Y	Y	FH966AA
HP (SFF) Tower Stand	Y	Y	VN569AA

Software

	Factory Configured	Option Kit	Support Notes
HP Performance Advisor ¹	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

Supported Components

Operating Systems

Windows® 7 Professional 64-bit

Red Hat Enterprise Linux (RHEL) Workstation -
Paper License (1yr)

Windows 10 Pro 64

Windows 7 Professional (available through
downgrade rights from Windows 10
Professional)

Windows 10 Home 64

Windows 7 Professional 64-bit (National
Academic)

See <http://www.microsoft.com/windows/windows-7/> for support details.

See <http://www.redhat.com/rhel/desktop/>

System Technical Specifications

System Board													
System Board Form Factor	ATX 24.38 x 24.38 mm (9.6 x 9.6 inches)												
Processor Socket	Single LGA 1151												
CPU Bus Speed	DMI												
Chipset	Intel® PCH C236												
Memory Expansion Slots	4 DDR4 memory slots												
Memory Type Supported	DDR4, UDIMM (Unbuffered), ECC& non-ECC												
Memory Modes	Non-Interleaved for single channel. Interleaved when both channels are populated.												
Memory Speed Supported	2133MT/s DDR4												
Memory Protection	ECC available on data												
Maximum Memory	64GB												
Memory Configuration (Supported)	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. NOTE: * 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.												
PCI Express Connectors	<ul style="list-style-type: none"> • 1 PCI Express Gen3 slot x16 mechanical/ x16 electrical (LP, half length) • 1 PCI Express Gen3 slot x1 mechanical/ x1 electrical (LP, half length) • 1 PCI Express Gen3 slot x1 mechanical/ x1 electrical (LP, half length) • 1 PCI Express Gen3 slot x16 mechanical/ x4 electrical (LP, half length) <p>NOTE: LP = Low Profile</p> <p>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.</p>												
Supported Drive Interfaces	<table border="1"> <tbody> <tr> <td>SATA</td> <td>Integrated (4) Serial ATA interfaces (6Gb/s SATA). RAID 0 and 1 supported. Factory integrated RAID for Microsoft Windows only.</td> </tr> <tr> <td>Serial Attached SCSI</td> <td>None</td> </tr> <tr> <td>Integrated RAID</td> <td>NOTE: Requires identical hard drives (speeds, capacity, interface)</td> </tr> <tr> <td>Integrated Graphics</td> <td>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</td> </tr> <tr> <td>Network Controller</td> <td>Integrated Ethernet PHY Connection I219LM. Management capabilities: WOL, PXE 2.1 and AMT 11.0</td> </tr> <tr> <td>IDE connector</td> <td>No</td> </tr> </tbody> </table>	SATA	Integrated (4) Serial ATA interfaces (6Gb/s SATA). RAID 0 and 1 supported. Factory integrated RAID for Microsoft Windows only.	Serial Attached SCSI	None	Integrated RAID	NOTE: Requires identical hard drives (speeds, capacity, interface)	Integrated Graphics	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	Network Controller	Integrated Ethernet PHY Connection I219LM. Management capabilities: WOL, PXE 2.1 and AMT 11.0	IDE connector	No
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IDE connector	No												

System Technical Specifications

	Floppy connector	No
	Serial	1 rear port
	2nd Serial	Yes- requires optional Serial Port Adapter Kit
	Parallel	1 internal header (optional Parallel Port Adapter required)
IEEE 1394 Connector(s)		
USB Connector(s)	Front	2 USB 3.0, 2 USB 2.0
	Rear	6 USB 3.0
	Internal	1 USB 3.0, 2 USB 2.0
HD Integrated Audio	Yes	
Flash ROM	Yes	
Chassis Fan Header	Not applicable	
Front Control Panel/Speaker Header	Yes	
CMOS Battery Holder - Lithium	Yes	
Integrated Trusted Platform Module	Integrated TPM 1.2.	
Power Supply Headers	Yes	
Power Switch, Power LED & Hard Drive LED Header	Yes	
Clear Password Jumper	Yes	
Keyboard/Mouse	USB or PS/2	
	240W, 92% efficiency, wide-ranging, active PFC Power Supply; (Note: 200W 85% Efficiency wide-ranging, active PFC Power Supply option available in some countries). The Z240 SFF 92% PSU Efficiency Report can be found at this link: TBD	
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 (Config Dependent)	Yes	
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	
ErP Lot 6- Tier 2 Compliance @ 230V	Yes	

System Technical Specifications

(<0.5W in S5- Power Off)	
Declared Noise Emissions (Entry-level and High-end configurations)	
System Configuration (Entry level)	Processor Info
	Memory Info
	Graphics Info
	Disks/Optical
System Configuration (High-end)	Processor Info
	Memory Info
	Graphics Info
	Disks/Optical

Environmental Requirements	Temperature	Operating: 40° to 95° F (5° to 35° C) Non-operating: -40° to 140° F (-40° to 60° C)
	Humidity	Operating: 8% to 85% RH, non-condensing Non-operating: 8% to 90% RH, non-condensing
	Maximum Altitude	Operating: 10,000 feet (3,000 m) Non-operating: 30,000 feet (9,100 m)
	Dynamic (new)	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 NOTES: Values represent individual shock events and do not indicate repetitive shock events. Values do not indicate continuous vibration.
	Cooling	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

Access Panel	Tool-less Includes system board and memory information
Hard Drives	Tool-less (Internal bays)
Expansion Cards	Tool-less
Processor Socket	Tool-less, except for the processor heatsink.
Green User Touch Points	Yes, on tool-free internal chassis mechanisms
Color-coordinated Cables and Connectors	Yes
Memory	Tool-less
System Board	Screw-In
Dual Color Power and HD	Yes

System Technical Specifications

LED on Front of Computer	
Configuration Record SW	Yes
Over-Temp Warning on Screen	Yes
Restore CD/DVD Set	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.
Dual Function Front Power Switch	Yes, causes a fail-safe power off when held for 4 seconds
Padlock Support	Yes (optional): Locks side cover and secures chassis from theft 0.22-in diameter padlock loop at rear of system
Cable Lock Support	Yes, Kensington Cable Lock (optional): Locks side cover and secures chassis from theft 3 mm x 7 mm slot at rear of system
Universal Chassis Clamp Lock Support	Yes (optional): Locks side cover and locks cables to chassis. Secures chassis from theft and allows multiple units to be chained together when used with optional cable Threaded feature at rear of system
Solenoid Lock and Hood Sensor	Yes (optional) The Solenoid Hood Lock eliminates the need for a physical key by making the chassis lockable through software and a password. You can also lock and unlock the chassis remotely over the network. The Sensor Kit detects when the access panel has been removed.
Rear Port Control Cover	Yes, locks rear IO cables to prevent cable theft
Serial, Parallel, USB, Audio, Network, Enable/Disable Port Control	Yes, enables or disables serial, parallel, USB, audio, and network ports
Removable Media Write/Boot Control	Yes, prevents ability to boot from removable media on supported devices (and can disable writes to media)
Power-On Password	Yes, prevents an unauthorized person from booting up the workstation
Setup Password	Yes, prevents an unauthorized person from changing the workstation configuration
NIC LEDs (integrated) (Green & Amber)	Yes
CPUs and Heatsinks	A T-15 Torx or flat blade screwdriver is needed to remove the CPU heatsink before the CPU can be removed. CPU removal is tool-less
Power Supply Diagnostic LED	No
Front Power Button	Yes, ACPI multi-function
Front Power LED	Yes, white (normal), red (fault)
Front Hard Drive Activity LED	Yes, white
Front ODD Activity LED	Yes
Internal Speaker	Yes
System/Emergency ROM Flash Recovery	Recovers corrupted system BIOS.
Cooling Solutions	Air cooled forced convection
Power Supply Fans	70mm x 70mm x 25mm 4-wire PWM (non-serviceable)
CPU Heatsink Fan	Mainstream (<=65W): 93mm x 86mm 75.8mm

System Technical Specifications

	Performance (<=95W): 93mm x 102.7mm x 75.8mm
Chassis Fan	Not applicable. CPU heatsink fan also operates as the chassis fan.
Memory Heatsink Fan	No
HP PC Hardware Diagnostics UEFI	HP PC Hardware Diagnostics (UEFI) enables hardware level testing outside the operating system on many components. The diagnostics can be invoked by pressing F2 at POST, and is available as a download from HP Support.
Access Panel Key Lock	No
ACPI-Ready Hardware	Advanced Configuration and Power Management Interface (ACPI). <ul style="list-style-type: none"> • Allows the system to wake from a low power mode. • Controls system power consumption, making it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system
Trusted Platform Module Chip	Yes
Integrated Chassis Handles	No
Power Supply	Requires T15 Torx or flat blade screwdriver
PCI Card Retention	Yes, rear (all), middle (none), front (none)
Flash ROM	Yes
Diagnostic Power Switch LED on board	Yes
Clear Password Jumper	Yes
Clear CMOS Button	Yes
CMOS Battery Holder	Yes
DIMM Connectors	Yes

System Technical Specifications

BIOS	
BIOS 32-bit Services	Standard BIOS 32-bit Service Directory Proposal v0.4
PCI 3.0 Support	Full BIOS support for PCI Express through industry standard interfaces.
ATAPI	ATAPI Removable Media Device BIOS Specification Version 1.0.
BBS	BIOS Boot Specification v1.01. Provides more control over how and from what devices the workstation will boot.
WMI Support	WMI is Microsoft's implementation of Web-Based Enterprise Management (WBEM) for Windows. WMI is fully compliant with the Distributed Management Task Force (DMTF) Common Information Model (CIM) and WBEM specifications.
BIOS Power On	Users can define a specific day-of-week and time for the system to power on.
ROM Based Computer Setup Utility (F10)	Review and customize system configuration settings controlled by the BIOS.
System/Emergency ROM Flash Recovery with Video	Recovers system BIOS in corrupted Flash ROM.
Replicated Setup	Saves BIOS settings to USB flash device in human readable file. Repset.exe utility can then replicate these settings on machines being deployed without entering Computer Configuration Utility (F10 Setup).
SMBIOS	System Management BIOS 2.7.1, for system management information.
Boot Control	Disables the ability to boot from removable media on supported devices.
Memory Change Alert	Alerts management console if memory is removed or changed.
Thermal Alert	Monitors the temperature state within the chassis. Three modes: <ul style="list-style-type: none"> • NORMAL - normal temperature ranges. • ALERTED - excessive temperatures are detected. Raises a flag so action can be taken to avoid shutdown or provide for a smoother system shutdown. • SHUTDOWN - excessive temperatures are encountered. Automatically shuts down the computer without warning before hardware component damage occurs.
Remote ROM Flash	Provides secure, fail-safe ROM image management from a central network console. Updates can be performed before starting the OS. Updates can be periodically scheduled.
ACPI (Advanced Configuration and Power Management Interface)	Allows the system to enter and resume from low power modes (sleep states). Enables an operating system to control system power consumption based on the dynamic workload. Makes it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system. Supports ACPI 4.0 for full compatibility with 64-bit operating systems.
Ownership Tag	A user-defined string stored in non-volatile memory that is displayed in the BIOS splash screen.
Remote Wakeup/Remote Shutdown	System administrators can power on, restart, and power off a client computer from a remote location.
ASF 2.0 Compliant	No.
Instantly Available PC (Suspend to RAM - ACPI sleep state S3)	Allows for very low power consumption with quick resume time.
Remote System Installation via F12 (PXE 2.1) (Remote Boot from Server)	Allows a new or existing system to boot over the network and download software, including the operating system.
ROM revision levels	Reports the system BIOS revision level in Computer Configuration Utility (F10 Setup). Version is available through an industry standard interface (SMBIOS) so that management SW applications can use and report this information.

System Technical Specifications

System board revision level	Allows management SW to read revision level of the system board. Revision level is digitally encoded into the HW and cannot be modified.
Start-up Diagnostics (Power-on Self-Test)	Assesses system health at boot time with selectable levels of testing.
Auto Setup when new hardware installed	System automatically detects addition of new hardware.
Keyboard-less Operation	The system can be booted without a keyboard.
Localized ROM Setup	Common BIOS image supports System Configuration Utility (F10 Setup) menus in 12 languages with local keyboard mappings.
Asset Tag	The user or IT administrator to set a unique tag string in non-volatile memory.
Per-slot Control	Allows I/O slot parameters (option ROM enable/disable) to be configured individually.
Adaptive Cooling	Control parameters are set according to detected hardware configuration for optimal acoustics.
Pre-boot Diagnostics	(Pre-video) critical errors are reported via beeps and blinks on the power LED.
Intel® Active Management Technology (AMT)	AMT 11.0; Allows workstation status to be monitored on a remote console
Digitally and Cryptographically Signed BIOS	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.
Master Boot Record Protection	A feature in the HP BIOS that prevents changes and/or infections to the Master Boot Record. Useful in protecting from viruses.
Boot Block Emergency Recovery Mode (BIOS Recovery)	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.
Industry Standard Specification Support	
Industry Standard	Revision Supported by the BIOS
UEFI Specification Revision	UEFI 2.4.0
ACPI	Advanced Configuration and Power Management Interface, Version 4.0
ASF	Alert Standard Format Specification, Version 2.0
ATA (IDE)	AT Attachment 6 with Packet Interface (ATA/ATAPI-6), Revision 3b
CD Boot	"El Torito" Bootable CD-ROM Format Specification Version 1.0
EDD	- Enhanced Disk Drive Specification Version 1.1 - BIOS Enhanced Disk Drive Specification Version 3.0
PCI Express	PCI Express Base Specification, Revision 2.0; PCI Express Base Specification, Revision 3.0.
PMM	POST Memory Manager Specification, Version 1.01
SATA	- Serial ATA Specification, Revision 1.0a - Serial ATA 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
SPD	PC SDRAM Serial Presence Detect (SPD) Specification, Revision 1.2B
TPM	Trusted Computing Group TPM Specification Version 1.2 (TPM 2.0 via Firmware Update)
USB	Universal Serial Bus Revision 1.1 Specification Universal Serial Bus Revision 2.0 Specification Universal Serial Bus Revision 3.0 Specification

System Technical Specifications

Social and Environmental Responsibility	
Eco-Label Certifications & Declarations	<p>This product is low halogen except for power cords, cables and peripherals. Service parts obtained after purchase may not be Low Halogen.</p> <ul style="list-style-type: none"> ENERGY STAR® (energy-saving features available on selected configurations -Windows only) US Federal Energy Management Program (FEMP) China Energy Conservation Program (CECP) IT ECO declaration
Batteries	<p>The battery in this product complies with EU Directive 2006/66/EC Battery size: CR2032 (coin cell) Battery type: Lithium Metal</p> <p>The battery in this product does not contain:</p> <ul style="list-style-type: none"> Mercury greater than 5ppm by weight Cadmium greater than 10ppm by weight Lead greater than 40ppm by weight
Restricted Material Usage	<p>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 Hewlett-Packard 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.</p>
Low Halogen Statement	<p>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.</p>
End-of-Life Management and Recycling	<p>Hewlett-Packard 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.</p>
Hewlett-Packard Corporate Environmental Information	<p>For more information about HP's commitment to the environment: Living Progress Report http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html</p> <p>Eco-label certifications http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html</p> <p>ISO 14001 certificates: http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html</p>
Additional Information	<ul style="list-style-type: none"> 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	<p>HP Workstation product packaging meets the HP General Specification for the Environment at http://www.hp.com/hpinfo/globalcitizenship/society/gen_specifications.html</p> <ul style="list-style-type: none"> Does not contain restricted substances listed in HP Standard 011-1 General Specification for

System Technical Specifications

	<p>the Environment</p> <ul style="list-style-type: none"> • 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 • 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.

System Technical Specifications

Manageability	
Intel® Active Management Technology (AMT)	<p>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:</p> <ul style="list-style-type: none"> • 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	Visit: http://www.hp.com/go/ssm
Service, Support, and Warranty	<ul style="list-style-type: none"> • 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.

Technical Specifications - Processors

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

Technical Specifications - Hard Drives

SATA Hard Drives for HP Workstations

500GB SATA 7200 rpm 6Gb/s 3.5" HDD

Capacity	500GB
Height	1 in; 2.54 cm
Width	Media Diameter 3.5 in; 8.9 cm
	Physical Size 4 in; 10.17 cm
Interface	Serial ATA (6.0Gb/s), NCQ enabled
Synchronous Transfer Rate (Maximum)	Up to 600MB/s
Buffer	16MB
Seek Time (typical reads, includes controller overhead, including settling)	Single Track 2 ms
	Average 11 ms
	Full Stroke 21 ms
Rotational Speed	7,200 rpm
Logical Blocks	976,773,168
Operating Temperature	41° to 131° F (5° to 55° C)

1TB SATA 7200 rpm 6Gb/s 3.5" HDD

Capacity	1 Terabyte (1000 GB)
Height	1 in; 2.54 cm
Width	Media Diameter 3.5 in; 8.9 cm
	Physical Size 4 in; 10.17 cm
Interface	Serial ATA (6.0Gb/s), NCQ enabled
Synchronous Transfer Rate (Maximum)	Up to 600 MB/s
Buffer	32MB
Seek Time (typical reads, includes controller overhead, including settling)	Single Track 2 ms
	Average 11 ms
	Full Stroke 21 ms
Rotational Speed	7,200 rpm
Logical Blocks	1,953,525,168
Operating Temperature	41° to 131° F (5° to 55° C)

2.0TB SATA 7200 rpm 6Gb/s 3.5" HDD

Capacity	2TB
Height	1 in; 2.54 cm
Width	Media Diameter 3.5 in; 8.9 cm
	Physical Size 4 in; 10.17 cm
Interface	Serial ATA (6.0 Gb/s), NCQ Enabled
Synchronous Transfer Rate (Maximum)	Up to 600MB/s
Buffer	64MB
Seek Time (typical reads, includes controller overhead, including settling)	Single Track 1.0 ms
	Average 11 ms
	Full Stroke 18 ms
Rotational Speed	7,200 rpm

Technical Specifications - Hard Drives

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

Technical Specifications - Hard Drives

HP SATA Solid State Drives (SSDs) for Workstations

HP 128GB SATA 6Gb/s SSD

Capacity	128GB
Height	0.28 in; 0.7 cm
Width	Physical Size 2.5 in; 6.36 cm
Interface	SATA 6Gb/s
Synchronous Transfer Rate (Maximum)	Up to 500MB/s (Sequential Read)
Operating Temperature	32° to 158° F (0° to 70° C)

HP 256GB SATA 6Gb/s SSD

Capacity	256GB
Height	0.28 in; 0.7 cm
Interface	SATA 6Gb/s
Synchronous Transfer Rate (Maximum)	Up to 500MB/s (Sequential Read)
Operating Temperature	32° to 158° F (0° to 70° C)

HP 512GB SATA 6Gb/s SSD

Capacity	512GB
Height	0.28 in; 0.7 cm
Width	Physical Size 2.5 in; 6.36 cm
Interface	6Gb/s SATA
Synchronous Transfer Rate (Maximum)	Up to 500MB/s (Sequential Read)
Operating Temperature	32° to 158° F (0° to 70° C)

HP 1TB SATA 6Gb/s SSD

Capacity	1TB
Height	0.28 in; 0.7 cm
Width	Physical Size 2.5 in; 6.36 cm
Interface	6Gb/s SATA
Synchronous Transfer Rate (Maximum)	Up to 500MB/s (Sequential Read)
Operating Temperature	32° to 158° F (0° to 70° C)

HP 256GB SATA 6Gb/s SED SSD

Capacity	256GB
Height	0.28 in; 0.7 cm
Width	Physical Size 2.5 in; 6.36 cm
Interface	6Gb/s SATA
Synchronous Transfer Rate (Maximum)	Up to 550MB/s (Sequential Read)
Operating Temperature	32° to 158° F (0° to 70° C)

Technical Specifications - Hard Drives

PCIe SSDs for HP Workstations

HP Z Turbo Drive G2 128GB SSD

Capacity	128GB
Interface	PCI Express 3.0 x4 electrical x4 physical
Operating Temperature	32° to 158° F (0° to 70° C)

HP Z Turbo Drive G2 256GB SSD

Capacity	256GB
Interface	PCI Express 3.0 x4 electrical x4 physical
Operating Temperature	32° to 158° F (0° to 70° C)

HP Z Turbo Drive 512GB SSD

Capacity	512GB
Interface	PCI Express 2.0 x4 electrical x4 physical
Operating Temperature	32° to 158° F (0° to 70° C)

Technical Specifications - Graphics

Integrated Intel® HD* Graphics (Z240)	Form Factor	Integrated in select Intel® Xeon® E3, Intel® Core™ i7, and Intel® Core™ i5 processors.
		Check specific platform specifications for selections.
	Graphics Controller	Intel® HD Graphics
	Memory	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 DVMT 5.0), to provide an optimal balance between graphics and system memory use.
	Connectors	Check system platform specifications where Intel® HD Graphics are available.
	Maximum Resolution	Display Port: 2560 x 1600 DVI: 1920x1200 VGA: 2048x1536
	Shading Architecture	Shader Model 5.0
	Supported Graphics APIs	OpenGL 4.0 DirectX 11.1
	Available Graphics Drivers	Windows 10 Windows 7

NOTE: For DVI and VGA outputs, separate adapters may be required.

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

NVIDIA® NVS™310 512MB Graphics	Form Factor	Low Profile: 2.713 inches in height × 6.150 inches in length
	Graphics Controller	NVIDIA® NVS™310
	Bus Type	PCI Express x16, 2.0 compliant
	Memory	Size: 512MB DDR3 Clock: 875Mhz Memory Bandwidth: 14GB/s
	Connectors	2 x DisplayPort 1.2
	Maximum Resolution	Up to 2560 x 1600 (digital display) per display.
	Image Quality Features	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 for the computationally intensive parts of video processing, as well as provides improved video playback speeds via faster decode and transcode.

Technical Specifications - Graphics

Display Output

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 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

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

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 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
	Image Quality Features	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: <ul style="list-style-type: none">• 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: <ul style="list-style-type: none">• 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

Technical Specifications - Graphics

adaptor

VGA display output:

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

Shading Architecture Shader Model 5.0

Supported Graphics APIs DX11, OpenGL 4.3

Available Graphics Drivers 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

NVIDIA® NVS™ 510 2GB Graphics	Form Factor	Low Profile, 2.713 inches × 6.3 inches, single slot
	Graphics Controller	NVS™NVS™™™™ 510 GPU Core Clock: 797 Mhz Memory Clock: 891 Mhz CUDA® Cores: 192
	Bus Type	PCI Express x16, Generation 2.0
	Memory	2GB DDR3
	Connectors	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)
	Maximum Resolution	Mini-DisplayPort connectors support ultra-high-resolution panels (up to 3840 x 2160 @ 60Hz)
		NOTE: This card supports up to four displays. For Windows XP, only 2 active displays are supported.
	Image Quality Features	10-bit internal display processing, including hardware support for 10-bit scan-out
	Display Output	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™™™™ 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™™™™ 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.
		Analog Display Support 1. VGA display output - Drives four analog displays at resolutions up to 1920 × 1200 at 60 Hz using DisplayPort to VGA cable adaptors.
	Supported Graphics APIs	Full Microsoft® DirectX 11, Shader Model 5.0 support Full OpenGL 4.3 support
	Available Graphics	Windows 7 Professional (64-bit and 32-bit)

Technical Specifications - Graphics

Drivers	Windows® XP Professional (64-bit and 32-bit) 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	33.4 Watts
Note	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

Supported Graphics APIs	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
Available Graphics Drivers	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: http://welcome.hp.com/country/us/en/support.html
Notes	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 www.amd.com/firepro for details.

NVIDIA® Quadro® K420 1GB Graphics	Form Factor	Low Profile, single slot Dimensions: 2.713 inches × 6.3 inches Cooling: Active
	Graphics Controller	NVIDIA® Quadro® K420 GPU: GK107 with 192 CUDA® cores Power: 41W
	Bus Type	PCI Express x16, 2.0 compliant
	Memory	Size: 2GB DDR3 Clock: 891MHz Memory Bandwidth: 29GB/s Memory Width: 128 bit
	Connectors	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.
	Maximum Resolution	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
Image Quality Features	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
Display Output	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.
Shading Architecture	Shader Model 5.0
Supported Graphics APIs	DX11, OpenGL 4.4 Programming support for CUDA® C, CUDA® C++, DirectCompute 5.0, OpenCL, Python, and Fortran
Available Graphics Drivers	Windows 8.1 Windows 8 Windows 7 Linux® - Full OpenGL implementation, complete with NVIDIA® and ARB extensions
Notes	<ol style="list-style-type: none"> 1. Factory configured Quadro® K420 does not include any video adapters. Adapters must be ordered separately. 2. Option kit Quadro® K420 includes one DP to DVI-D adapter. 3. Full Height Profile bracket installed. Low Profile bracket included in after market kit.

NVIDIA® Quadro® K620 2GB Graphics

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

Technical Specifications - Graphics

	<p>Memory Bandwidth: 29 GB/s Memory Width: 128-bit</p>
Connectors	<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>
Maximum Resolution	<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>
Image Quality Features	<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>
Display Output	<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>
Shading Architecture	<p>Shader Model 5.0</p>
Supported Graphics APIs	<p>OpenGL 4.4 DirectX 11</p> <p>API support includes: CUDA® C, CUDA® C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran</p>
Available Graphics	<p>Windows 8.1</p>

Technical Specifications - Graphics

Drivers	<p>Windows 8 Windows 7 Linux® - Full OpenGL implementation, complete with NVIDIA® and ARB extensions</p> <p>HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html</p>
Notes	<ol style="list-style-type: none"> 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® K1200 4GB Graphics	Form Factor	<p>Dimensions: 2.71" H x 6.875" L Single Slot, Low Profile Cooling: Active Weight: ~175 grams</p>
	Graphics Controller	<p>NVIDIA® Quadro® K1200 Graphics Card GPU: GM107 with 512 CUDA® cores Power: 46 Watts</p>
	Bus Type	<p>PCI Express 2.0 x16</p>
	Memory	<p>Size: 4GB GDDR5 Memory Bandwidth: 80 GB/s Memory Width: 128-bit</p>
	Connectors	<p>4 mini-DisplayPort 1.2a</p> <p>Factory Configured Option: 4 mini-DP-to-DP adapters included with card Option Kit: 4 mini-DP-to-DP adapters included with card</p> <p>Additional DisplayPort-to-VGA or DisplayPort-to-DVI adapters are available as accessories</p>
	Maximum Resolution	<p>DisplayPort: - up to 4096 x 2160 x 30 bpp @ 60Hz - supports High Bit Rate 2 (HBR2) and Multi-Stream Transport (MST)</p> <p>DL-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>

Technical Specifications - Graphics

Image Quality Features	12-bit internal display pipeline (hardware support for 12-bit scanout on supported panels, applications and connection)
Display Output	<p>Maximum number of displays</p> <ul style="list-style-type: none">- 4 direct attached monitors <p>Maximum number of DisplayPort displays possible:</p> <ul style="list-style-type: none">- 4 1920x1200- 4 2560x1600- 4 4096x2160 <p>Maximum number of monitors across all available Quadro® K1200 outputs is 4.</p>
Shading Architecture	Shader Model 5.0
Supported Graphics APIs	<p>OpenGL 4.4 DirectX 11.1</p> <p>API support includes: CUDA® C, CUDA® C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran</p>
Available Graphics Drivers	<p>Windows 8.1 Windows 8 Windows 7 Linux® - Full OpenGL implementation, complete with NVIDIA® and ARB extensions</p> <p>HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html</p>
Notes	<ol style="list-style-type: none">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).

Technical Specifications - Optical and Removable Storage

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)

4.9 x 4 x 1 in (124.5 x 101.6 x 25.4 mm) Fits conveniently in the 5.25" drive bay.

Supported Media Types

CompactFlash Type I
 CompactFlash Type II
 Microdrive
 Secure Digital Card (SD)
 Secure Digital High Capacity (SDHC)
 SD Extended Capacity Memory Card (SDXC)
 SD Ultra High Speed II(SD UHSII)
 Memory Stick
 Memory Stick Select
 Memory Stick Duo (MS Duo)
 Memory Stick PRO (MS PRO)
 Memory Stick PRO Duo (MS PRO Duo)
 Memory Stick PRO-HG Duo
 MagicGate Memory Stick (MG)
 MagicGate Memory Stick Duo

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

Technical Specifications - Optical and Removable Storage

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 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

Media card reader, 5.25" bracket/rails/bezel, 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)

Technical Specifications - Controller Cards

HP Thunderbolt™ 2 PCIe 1-port I/O Card	Data Transfer Rate	Supports up to 20 Gb/s (20,000 Mb/s)
	Devices Supported	Thunderbolt™ certified devices
	Bus Type	PCIe card, full or half height PCIe slots
	Ports	One Thunderbolt™ 2 external 20-Pin output connectors (Rear)
	Internal Connectors	One 5-Pin header connector
	System Requirements	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.
	Temperature - Operating	50° to 131° F (10° to 55° C)
	Temperature - Storage	-22° to 140° F (-30° to 60° C)
	Relative Humidity - Operating	20% to 80%
	Compliances	FCC Part 15B, cULus 60950, CE Mark EN55022B(1995)/EN55024-1998 STD, Taiwan BSMI CNS13438, Korea MIC
	Operating Systems Supported	Windows 7 Professional 64-bit, Windows 8.1 64-bit.
	Kit Contents	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.
	Warranty	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

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

Summary of Changes

Date of change:	Version History:		Description of change:
	From v1 to v2		

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