Overview

1. 3 External 5.25” Bays
2. Power Button
3. HDD Activity LED
4. Front I/O: 1 USB 2.0, 2 USB 3.0, 1 Headphone, 1 Microphone, 1 1394a

Overview

5. Choice of 850W, 88% or 1125W, 90% Efficient Power Supplies
6. 16 DIMM Slots for DDR3 ECC Memory
7. 3 External 5.25” Bays
8. 4 Internal 3.5” Bays
9. 2 Intel Xeon Processors E5-2600 family
10. Rear I/O: Rear Power Button & LED, PS/2 Ports, 1 1394a, 4 USB 2.0, 2 USB 3.0, 2 RJ-45 to Integrated GbE, 1 Audio Line In, 1 Audio Line Out, 1 Microphone, 1 Serial Port
11. 3 PCIe x16 Gen3 Slots
12. 1 PCIe x16 (x8) Gen3, 1 PCIe x8(x4) Gen3, 1 PCIe x8(x4) Gen2, 1 PCI Slot
13. 6 Internal USB 2.0 Ports
14. 6 SATA, 8 SAS Ports

Form Factor	Rackable Minitower
Operating Systems	Preinstalled: • Genuine Windows 7® Professional 32-bit* • Genuine Windows 7® Professional 64-bit* • Genuine Windows® 7 Ultimate 64-bit* • HP Installer Kit for Linux (includes drivers for 64-bit OS versions of RHEL 5 & 6 and SUSE Linux Enterprise Desktop 11) • Red Hat Enterprise Linux Desktop (Preinstall NOT available; 1 year paper license only) Supported: • Genuine Windows® 7 Enterprise 32/64 •

Overview

- SUSE Linux Enterprise Desktop 11

Notes: *Systems may require upgraded and/or separately purchased hardware and/or a DVD drive to install the Windows 7 software and take full advantage of Windows 7 functionality. See http://www.microsoft.com/windows/windows-7/ for details.

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

Available Processors

Name	Cores	Clock Speed (GHz)	Intel® Turbo Boost Technology[1]	Cache (MB)	Memory Speed (MHz)	QPI Speed (GT/s)	Hyper-Threading	Featuring Intel® vPro™ Technology	TDP (W)
Intel® Xeon® E5-2687W processor	8	3.1	3, 7	20	1600	8.0	Y	Y	150
Intel® Xeon® E5-2690 processor	8	2.9	4, 9	20	1600	8.0	Y	Y	135
Intel Xeon E5-2680 processor	8	2.7	4, 8	20	1600	8.0	Y	Y	130
Intel Xeon E5-2670 processor	8	2.6	4, 7	20	1600	8.0	Y	Y	115
Intel Xeon E5-2667 processor	6	2.9	3, 6	15	1600	8.0	Y	Y	130
Intel Xeon E5-2665 processor	8	2.4	4, 7	20	1600	8.0	Y	Y	115
Intel Xeon E5-2660 processor	8	2.2	5, 8	20	1600	8.0	Y	Y	95
Intel Xeon E5-2650 processor	8	2.0	4, 8	20	1600	8.0	Y	Y	95
Intel Xeon E5-2643 processor	4	3.3	1, 2	10	1600	8.0	Y	Y	130
Intel Xeon E5-2640 processor	6	2.5	3, 5	15	1333	7.2	Y	Y	95
Intel Xeon E5-2630 processor	6	2.3	3, 5	15	1333	7.2	Y	Y	95
Intel Xeon E5-2620 processor	6	2.0	3, 5	15	1333	7.2	Y	Y	95
Intel Xeon E5-2609 processor	4	2.4	N/A	10	1066	6.4	N	Y	80
Intel Xeon E5-2603 processor	4	1.8	N/A	10	1066	6.4	N	Y	80

Overview

	[1]The specifications shown in this column represent the following: (all core maximum turbo steps, one core maximum turbo steps). Turbo boost stepping occurs in 100MHz increments. Processor that do not have turbo functionality are denoted as N/A.
Available Processor Disclaimers	When ordering two processors, the second processor must be the same as the first. Intel processor numbers are not a measurement of higher performance. Processor numbers differentiate features within each processor family, not across different processor families. See: http://www.intel.com/products/processor_number/ for details. Quad-Core, Six-Core and Eight-Core technologies are designed to improve performance of multithreaded software products and hardware-aware multitasking operating systems and may require appropriate operating system software for full benefits; check with software provider to determine suitability; Not all customers or software applications will necessarily benefit from use these technologies. 64-bit computing on Intel® 64 architecture requires a computer system with a processor, chipset BIOS, operating system, device drivers, and applications enabled for Intel® 64 architecture. Processors will not operate (including 32-bit operation) without an Intel® 64 architecture-enabled BIOS. Performance will vary depending on your hardware and software configurations. See: http://www.intel.com/info/em64t for more information. Intel® Xeon® processor E5-2687W is only available in dual processor configurations with Liquid Cooling and with the 1125W Power Supply. Intel® Xeon® processors E5-2643, E5-2665, E5-2667, E5-2670, E5-2680, E5-2687W, and E5-2690 REQUIRE the 1125W Power Supply Option.
Form Factor	Rackable Minitower
Color	Black/Silver
I/O Slots (see system board section for more details)	• 3 PCI Express Gen3 x16 slots • 1 PCI Express Gen3 x8 slot - with x16 connector • 1 PCI Express Gen3 x4 slot - with x8 connector • 1 PCI Express Gen2 x4 slot - with x8 connector • 1 PCI 32bit/33MHz slot • 1 Mechanical-only slot, supporting cards which mount only to the I/O bulkhead and not the motherboard (half-length, full-height) • The PCIe x8 connectors are open ended, allowing a PCIe x16 card to be seated in the slot
Bays (see storage section for more details)	Total Bays = 7
Internal Bays	4 internal 3.5" bays (4 with acoustic dampening rail assemblies)
External Bays	3 external 5.25" bays Top bay device depth limit: 175mm Middle bay device depth limit: 206mm Bottom bay device depth limit: 206mm
Front I/O	2 USB 3.0, 1 USB 2.0, 1 Headphone, 1 Microphone, and 1 IEEE 1394a
Rear I/O	1 IEEE-1394a 2 USB 3.0 4 USB 2.0 1 Serial PS/2 keyboard and mouse 2 RJ-45 to integrated Gigabit LAN 1 Audio Line-In, 1 Audio Line-Out, 1 Microphone
Internal USB	6 USB 2.0 ports available by three 2x5 headers
Chassis Dimensions (H x W x D)	44.4 x 20.3 x 52.5 cm (17.5 x 8.0 x 20.7 in)

Overview

System Weight	Exact weights depend upon configuration Minimum config: TBD Typical config: TBD Maximum config: TBD	
Temperature	Operating:	5° to 35° C (40° to 95° F)
	Non-operating	-40° to 80° C (-40° to 176° F)
Humidity	Operating:	8% to 85%
	Non-operating	8% to 90%
Maximum Altitude (non-pressurized)	Operating:	3,000 m; 10,000 feet
	Non-operating	9,100 m; 30,000 feet
Power Supply	Choice of: • 850W 88% Efficient wide-ranging, active Power Factor Correction • 1125W 90% Efficient wide-ranging, active Power Factor Correction **NOTE:** The 1125W power supply can also supply 1275W of output power when the input voltage is greater than 105V. If the input voltage is less than 105V, but greater than 90V for any reason, the maximum power that can be drawn is 1125W. An uninterruptible power supply (UPS) is highl recommended if 1275W output power is desired. The Z820 power supply efficiency reports can be found at these links: 850W - TBD 1125W - TBD	
Interfaces Supported	• 2-channel SATA 6.0 Gb/s Interface (2 channels e-SATA configurable) 4-channel SATA 3.0 Gb/s Interface • 8-channel 6 Gb SAS interface (8 SAS connectors on the motherboard), SAS ports can be ported externally by using the SAS Bulkhead and/or Back Panel connector Kits • USB 3.0, USB 2.0, IEEE 1394a	
Hard Drive Controllers Supported	SATA and SAS controllers	
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	Option Kit Part Number	Support Notes
Intel Xeon E5-2600 Series - CTO				
Intel® Xeon® Processor E5-2687W 8C 3.10GHz	Y	N		
Intel® Xeon® Processor E5-2690 8C 2.90GHz	Y	N		
Intel® Xeon® Processor E5-2680 8C 2.70GHz	Y	N		
Intel® Xeon® Processor E5-2670 8C 2.60GHz	Y	N		
Intel® Xeon® Processor E5-2667 6C 2.90GHz	Y	N		
Intel® Xeon® Processor E5-2665 8C 2.40GHz	Y	N		
Intel® Xeon® Processor E5-2660 8C 2.20GHz	Y	N		
Intel® Xeon® Processor E5-2650 8C 2.00GHz	Y	N		
Intel® Xeon® Processor E5-2643 4C 3.30GHz	Y	N		
Intel® Xeon® Processor E5-2640 6C 2.50GHz	Y	N		
Intel® Xeon® Processor E5-2630 6C 2.30GHz	Y	N		
Intel® Xeon® Processor E5-2620 6C 2.00GHz	Y	N		
Intel® Xeon® Processor E5-2609 4C 2.40GHz	Y	N		
Intel® Xeon® Processor E5-2603 4C 1.80GHz	Y	N		
Intel Xeon E5-2600 Series - Z820 AMO				
Z820 Xeon E5-2690 8C 2.90 20MB 1600 CPU2	N	Y	A6S97AA	
Z820 Xeon E5-2680 8C 2.70 20MB 1600 CPU2	N	Y	A6S96AA	
Z820 Xeon E5-2670 8C 2.60 20MB 1600 CPU2	N	Y	A6S95AA	
Z820 Xeon E5-2667 6C 2.90 15MB 1600 CPU2	N	Y	A6S94AA	
Z820 Xeon E5-2665 8C 2.40 20MB 1600 CPU2	N	Y	A6S93AA	
Z820 Xeon E5-2660 8C 2.20 20MB 1600 CPU2	N	Y	A6S92AA	
Z820 Xeon E5-2650 8C 2.00 20MB 1600 CPU2	N	Y	A6S91AA	
Z820 Xeon E5-2643 4C 3.30 10MB 1600 CPU2	N	Y	A6S90AA	
Z820 Xeon E5-2640 6C 2.50 15MB 1333 CPU2	N	Y	A6S89AA	
Z820 Xeon E5-2630 6C 2.30 15MB 1333 CPU2	N	Y	A6S88AA	
Z820 Xeon E5-2620 6C 2.00 15MB 1333 CPU2	N	Y	A6S87AA	
Z820 Xeon E5-2609 4C 2.40 10MB 1066 CPU2	N	Y	A6S86AA	
Z820 Xeon E5-2603 4C 1.80 10MB 1066 CPU2	N	Y	A6S85AA	

Intel® Xeon® processors E5-2643, E5-2665, E5-2667, E5-2670, E5-2680, E5-2687W, and E5-2690 REQUIRE the 1125W Power Supply Option.

Supported Components

		Factory Configured	Option Kit	Option Kit Part Number	Support Notes
SAS Hard Drives					
	HP SAS (Serial Attached SCSI) Hard Drives for HP Workstations				
	600GB SAS 15K rpm 6Gb/s 3.5" HDD	Y	Y	VM647AA	
	450GB SAS 15K rpm 6Gb/s 3.5" HDD	Y	Y	LU968AA	
	300GB SAS 15K rpm 6Gb/s 3.5" HDD	Y	Y	LU967AA	
	HP 300GB SAS 10K SFF HDD	Y	Y	A2Z20AA	
	HP 600GB SAS 10K SFF HDD	Y	Y	A2Z21AA	
	Sub-Section Description/Notes				
	NOTE: NCQ (Native Command Queuing) not supported in Red Hat Enterprise Linux For hard drives, 1 GB = 1 billion bytes; TB = 1 trillion bytes. Actual formatted capacity is less. Up to 12 GB of hard drive (or system disk) is reserved for the system recovery software (XP and XP Pro). Up to 3 GB of system disk is reserved for system recovery software (Vista).				
SATA Hard Drives	**SATA (Serial ATA) Hard Drives for HP Workstations**				
	3.0TB SATA 7200 rpm 6Gb/s 3.5" HDD	Y	Y	QF298AA	
	2.0TB SATA 7200 rpm 6Gb/s 3.5" HDD	Y	Y	QB576AA	
	1TB SATA 7200 rpm 6Gb/s 3.5" HDD	Y	Y	LQ037AA	
	500GB SATA 7200 rpm 6Gb/s 3.5" HDD	Y	Y	LQ036AA	
	250GB SATA 7200 rpm 6Gb/s 3.5" HDD	Y	Y	LQ034AA	
	Sub-Section Description/Notes				
	Up to 5 SATA drives, 5 SAS, drives, or 6 SATA 2.5", Small Form Factor (SFF) drives 8 port SAS Controller included on the system board				
SATA Solid State Drives	**HP Solid State Drives (SSDs) for Workstations**				
	HP 300GB SATA SSD	Y	Y	LZ069AA	
	HP 160GB SATA SSD	Y	Y	LZ704AA	
	HP 256GB SATA SSD	Y	Y	A3D26AA	
	HP 128GB SATA SSD	Y	Y	A3D25AA	
	Sub-Section Description/Notes				
	Up to 5 SATA drives, 5 SAS, drives, or 6 SATA 2.5", Small Form Factor (SFF) drives **NOTE:** 128, 256 GB Solid State Drives only available as HDD1				

		Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Hard Drive Controllers					
	Factory integrated RAID on motherboard for SATA drives				
	RAID 0 Configuration - Striped Array	Y	N		See note 1
	RAID 0 Data Configuration -- Boot/OS Drive + 2 Drive Striped Array	Y	N		See note 2
	RAID 1 Configuration - Mirrored Array	Y	N		See note 3
	RAID 10 Configuration - Striped/Mirrored Array	Y	N		
	RAID 5 Configuration - Parity Array	Y	N		See note 4
	HP SAS Back Panel Connector kit				
	HP SAS Back Panel Connector kit	Y	Y		Must have 4 or fewer SAS hard drives to configure this option

Supported Components

HP SAS Back Panel Bulkhead Connector Kit				
HP SAS Back Panel Bulkhead	Y	Y		HP SAS Back Panel Connector kit required. Internal SAS HD drives are not supported
LSI MegaRAID® 9260-8i SAS 6Gb/s ROC RAID Card and iBBU07 Battery Backup Unit				
LSI MegaRAID® 9260-8i SAS 6Gb/s ROC RAID Card	Y	Y	WE465AA	
Integrated SAS Controller				
Integrated LSI SAS 2308 Controller with RAID 0/1/1E/10	Y	N		
Integrated SATA 6.0 Gb/s Controller				
Integrated SATA 6.0 Gb/s Controller	Y	N		
Integrated SATA 3.0 Gb/s Controller				
Integrated SATA 3.0 Gb/s Controller	Y	N		

All RAID arrays must be less than 2 TB in size

Note 1: Minimum of 2 hard drives needed. All hard drives must be identical (size/speed/type/bus/functional capabilities). Must have 2, 3 or 4 HD Drives.
Note 2: Minimum of 3 SATA hard drives needed. All hard drives must be identical (size/speed/type/bus/functional capabilities).
At least 3 HD Drives required. May have 4th and 5th HD Drives. Drives must be the same drive (size/speed/type/functional capability).
Note 3: 2 SATA or 2 SAS hard drives required. All hard drives must be identical (size/speed/type/bus/functional capabilities).
Note 4: Minimum of 3 SATA hard drives needed. All SATA hard drives must be identical (size/speed/type/bus/functional capabilities). Must have 3 or 4 HD Drives. 5 HD Drives not allowed.
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.
IS: Striping of 2 or more HDDs into a single logical volume
IM: Mirroring of 2 HDDs into a single logical volume
IME: Mirroring of 3 or more HDDs into a single logical volume

NOTE: Specific user-configured hardware SAS RAID configurations are supported on this Linux system. Please visit: http://www.hp.com/support/linux_hardware_matrix for details

Supported Components

Graphics

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes	Support Multi Mixed
Professional 2D					
NVIDIA NVS300 512MB PCIe Graphics Card	Y	Y	XP612AA		2
AMD FirePro 2270 512MB Graphics Card	Y	Y	LA524AA		2
NVIDIA NVS 310 512MB Graphics Card	Y	Y			2
Entry 3D					
NVIDIA Quadro 600 1GB Graphics Card	Y	Y	WS093AA		2
NVIDIA Quadro 410 512MB Graphics	Y	Y	A7U60AA		2
AMD FirePro V3900 1GB Graphics Card	Y	Y	A6R69AA		2
AMD FirePro V4900 1GB Graphics Card	Y	Y	A3J92AA		2
Mid-range 3D					
NVIDIA Quadro 2000 1GB Graphics Card	Y	Y	WS094AA		3
AMD FirePro V5900 2GB Graphics	Y	Y	LS992AA		2
High End 3D					
AMD FirePro V7900 2GB Graphics	Y	Y	LS993AA		2
NVIDIA Quadro 4000 2GB Graphics Card	Y	Y	WS095AA		2
NVIDIA Quadro 5000 2.5GB Graphics Card	Y	Y	WS096AA		2
NVIDIA Quadro 6000 6GB Graphics Card	Y	Y	WS097AA		2

NOTE: NVIDIA Quadro 6000 REQUIRES the Z820 with the 1125W Power Supply Option

High Performance GPU Computing

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
NVIDIA Tesla C2075 Compute Processor	Y	Y	QB035AA	See note 1

NOTE 1: Up to two C2075 processors are supported.
Only supported with the Z820 1125W Chassis.
Must have add-in graphics card in addition to the C2075.
Supported Graphics cards are Quadro 400 and Quadro 6000.
Not supported in a configuration that has BOTH E5-2687 Processors and Quadro 6000 Graphics.

Supported Components

Memory	CTO	Option Kit Part Number	Support Notes
	DDR3-1600 ECC Unbuffered DIMMs - CTO		
	4GB DDR3-1600 ECC Unbuffered RAM		
	2GB DDR3-1600 ECC Unbuffered RAM		
	DDR3-1600 ECC Registered DIMMs - CTO		
	32GB DDR3-1600 ECC Load Reduced (LR) RAM		
	16GB DDR3-1600 ECC Registered RAM		
	8GB DDR3-1600 ECC Registered RAM		
	4GB DDR3-1600 ECC Registered RAM		
	Sub-Section Description/Notes		
	For details on the supported memory configurations on the HP Z820 Workstation, please refer to the System Technical Specifications - System Board section of this document. DIMMs should be distributed across all four memory channels for optimal performance.		
	Each processor supports up to 4 channels of DDR3 memory. To realize full performance at least 1 DIMM must be inserted into each channel.		
	The CPUs determine the speed at which the memory is clocked. If a 1066MHz capable CPU is used in the system, the maximum speed the memory will run at is 1066MHz regardless of the specified speed of the memory.		
	NOTE: You cannot intermix registered and unbuffered DIMMs. The system will not work. **NOTE:** You cannot intermix LR DIMMs with either registered or unbuffered DIMMs. The system will not work.		
	AMO		
	DDR3-1600 ECC Unbuffered DIMMs - AMO		
	HP 2GB (1x2GB) DDR3-1600 ECC RAM		
	HP 4GB (1x4GB) DDR3-1600 ECC RAM		
	DDR3-1600 ECC Registered DIMMs - AMO		
	32GB DDR3-1600 ECC Load Reduced (LR) RAM	A2Z53AA	
	16GB DDR3-1600 ECC Registered RAM	A2Z52AA	
	8GB DDR3-1600 ECC Registered RAM	A2Z51AA	
	4GB DDR3-1600 ECC Registered RAM	A2Z49AA	
	NOTE: You cannot intermix registered and unbuffered DIMMs. The system will not work. **NOTE:** You cannot intermix LR DIMMs with either registered or unbuffered DIMMs. The system will not work.		

Multimedia and Audio Devices	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Integrated Intel/Realtek HD ALC262 Audio	Y	N		
HP Thin USB Powered Speakers	Y	Y	KK912AA	

Supported Components

Optical and Removable Storage	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP Slot Load DVD+/-RW Drive	Y	N		See note 1
HP 16X DVD+/-RW SuperMulti SATA Drive (non-Lightscribe)	Y	Y	QS208AA	
HP 16X DVD-ROM SATA Drive (non Lightscribe)	Y	Y	AR629AA	See note 2
HP Blu-ray Writer	Y	Y	AR482AA	
HP 22-in-1 Media Card Reader Kit (Workstations)	Y	Y	NK361AA	
HP DX115 Removable Drive Enclosure				
HP DX115 Removable HDD Frame/Carrier	Y	Y	FZ576AA	

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.

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

NOTE 1: May only order one.
NOTE 2: Cannot be 2nd drive.

Controller Cards	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP IEEE 1394b FireWire PCIe Card	Y	Y	NK653AA	

Networking and Communications	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Integrated Intel 82579LM PCIe GbE Controller	Y	N		
Intel Gigabit CT Desktop NIC	Y	Y	FH969AA	See note 1
Broadcom NetXtreme Gigabit Ethernet Plus NIC (PCIe)	Y	Y	FS215AA	See notes 1 and 2
HP NC360T PCI Express Dual Port Gigabit NIC	N	Y	KU004AA	See note 1

NOTE 1: "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 2: This is a PCI Express card based on the Broadcom 5761 chip. This card does not support DASH 1.1 manageability on the Z820.

Supported Components

Racking and Physical Security	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Security Cable with Kensington Lock	N	Y	PC766A	
HP Chassis Intrusion Sensor	Y	N		
HP Z6/Z8 Adjustable Sliding Rail Rack Kit	N	Y	NN124AA	

Input Devices	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP PS/2 Standard Keyboard	Y	Y	DT527A	
HP USB Standard Keyboard	Y	Y	DT528A	
HP PS/2 Optical Scroll Mouse	Y	Y	EY703AA	
HP USB 2-Button Optical Scroll Mouse	Y	Y	DC172B	
HP USB Laser Mouse	Y	Y	GW405AA	
HP USB Optical 3-Button Mouse	Y	Y	DY651A	
HP USB Smart Card Keyboard	Y	Y	ED707AA	
HP 2.4GHz Wireless Keyboard & Mouse	N	Y	NB896AA	
HP USB Optical 3-Button 2.9M OEM Mouse	N	Y	ET424AA	
HP SpaceExplorer 3D USB Controller	N	Y	RY429AA	
HP SpacePilot 3D USB Intelligent Controller	N	Y	WH343AA	

Other Hardware	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP Internal USB Port Kit	N	Y	EM165AA	
HP SAS Back Panel Connector Kit	N	Y	EM164AA	
HP eSATA PCI Cable Kit	Y	Y	GM110AA	
HP Power Cord Kit	Y	Y		
HP Energy Star Enabled Configuration	Y	N		
HP Workstation Mouse Pad	Y	N		Japan Only
HP Optical Bay HDD Mounting Bracket	N	Y	NQ099AA	

Supported Components

Software

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP Performance Advisor	Y	Y		See note 1
HP Remote Graphics Software (RGS) V5	Y	N		See note 2
HP ProtectTools Security	Y	N		See note 3
MS Office Home & Business 2010	Y	N		See note 4
HP Power Assistant	Y	N		
Roxio Easy Media Creator (DVD/Blu-ray Disc burner software)	Y	N		
Intervideo WinDVD (DVD player/burner software)	Y	N		
PDF Complete - Trial Edition	Y	N		

NOTE 1: Available as a free download here: www.hp.com/go/performanceadvisor
NOTE 2: Supports both 32 and 64 bit versions of Windows 7 Professional and Enterprise, Windows XP Professional and Enterprise, and RHEL V6
NOTE 3: Must select as a Configure to Order option. Delivered as a "Drop in the Box" CD
NOTE 4: Must select as a Configure to Order option

Operating Systems

	Support Notes
Genuine Windows® 7 Ultimate 64-bit	See Note 1
Genuine Windows® 7 Professional 64-bit	See Note 1
Genuine Windows® 7 Professional 32-bit	See Note 1
HP Linux Installer Kit	
Red Hat Enterprise Linux (RHEL) Workstation - Paper License (1yr)	See Note 2

NOTE 1: See http://www.microsoft.com/windows/windows-7/ for support details.
NOTE 2: This second OS must be ordered with the HP Linux Intaller Kit as the first OS.

System Board

System Board Form Factor	Custom Form Factor, 13" x 14.25" (330.20mm x 361.95mm)
Processor Socket	Dual LGA2011
CPU Bus Speed	QPI: Up to 8.0GT/sec
Chipset	Intel® C602 Chipset
Super I/O Controller	Nuvoton NPCD379H
Memory Expansion Slots	16 slots (8 slots per CPU)
Memory Type Supported	DDR3, RDIMM (Registered) or UDIMM (Unbuffered), ECC, LR (Load Reduction) DIMMs
Memory Modes	NUMA (Non-Uniform Memory Architecture), Memory Node Interleave
Memory Speed Supported	1066MHz, 1333MHz, & 1600MHz

		Single Processor							
		CPU0 Bottom Slots				CPU0 Top Slots			
Capacity (GB)	Type	DIMM 1	DIMM 2	DIMM 3	DIMM 4	DIMM 5	DIMM 6	DIMM 7	DIMM 8
2	UDIMM	2GB							
4	UDIMM	2GB							2GB
8	UDIMM	2GB		2GB			2GB		2GB
8	UDIMM	4GB							4GB
8	RDIMM	4GB							4GB
16	UDIMM	4GB		4GB			4GB		4GB
16	RDIMM	4GB		4GB			4GB		4GB
24	UDIMM	4GB	2GB	4GB	2GB	2GB	4GB	2GB	4GB
32	UDIMM	4GB	4GB	4GB	4GB	4GB	4GB	4GB	4GB
32	RDIMM	4GB	4GB	4GB	4GB	4GB	4GB	4GB	4GB
32	RDIMM	8GB		8GB			8GB		8GB
48	RDIMM	8GB	4GB	8GB	4GB	4GB	8GB	4GB	8GB
64	RDIMM	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB
64	RDIMM	16GB		16GB			16GB		16GB
128	RDIMM	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB
128	RDIMM	32GB		32GB			32GB		32GB
256	RDIMM	32GB	32GB	32GB	32GB	32GB	32GB	32GB	32GB
Slot Load Order		1	5	3	7	8	4	6	2

		Dual Processor															
		CPU0 Bottom Slots				CPU0 Top Slots				CPU1 Bottom Slots				CPU1 Top Slots			
Capacity (GB)	Type	DIMM 1	DIMM 2	DIMM 3	DIMM 4	DIMM 5	DIMM 6	DIMM 7	DIMM 8	DIMM 1	DIMM 2	DIMM 3	DIMM 4	DIMM 5	DIMM 6	DIMM 7	DIMM 8
4	UDIMM	2GB								2GB							
16	UDIMM	2GB		2GB			2GB		2GB	2GB		2GB			2GB		2GB
32	UDIMM	4GB		4GB			4GB		4GB	4GB		4GB			4GB		4GB
32	RDIMM	4GB		4GB			4GB		4GB	4GB		4GB			4GB		4GB
32	RDIMM	8GB							8GB	8GB							8GB
48	UDIMM	4GB	2GB	4GB	2GB	2GB	4GB	2GB	4GB	4GB	2GB	4GB	2GB	2GB	4GB	2GB	4GB
64	RDIMM	8GB		8GB			8GB		8GB	8GB		8GB			8GB		8GB
96	RDIMM	8GB	4GB	8GB	4GB	4GB	8GB	4GB	8GB	8GB	4GB	8GB	4GB	4GB	8GB	4GB	8GB
128	RDIMM	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB
128	RDIMM	16GB		16GB			16GB		16GB	16GB		16GB			16GB		16GB
256	RDIMM	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB
256	RDIMM	32GB		32GB			32GB		32GB	32GB		32GB			32GB		32GB
512	RDIMM	32GB	32GB	32GB	32GB	32GB	32GB	32GB	32GB	32GB	32GB	32GB	32GB	32GB	32GB	32GB	32GB
Slot Load Order		1	9	5	13	15	7	11	3	2	10	6	14	16	8	12	4

System Technical Specifications

Maximum Memory	Supports up to 64GB using UDIMMs Supports up to 256GB using RDIMMs Supports up to 512GB using LRDIMMs	
Memory Configuration (Supported)	• Not all memory configurations possible are represented. • Only ECC DIMMs are supported. • UDIMM (Unbuffered), RDIMM (Registered) and LR DIMM(Load Reduction) memory cannot be mixed. All memory installed in the system must be either UDIMM or RDIMM or LR DIMMs. • Do not install memory modules into memory slots if corresponding processor is nc installed. • Dual processor configurations with memory modules installed for only one process is not supported.	
PCI Express Connectors	PCIe3 x16, qty 3 (qty 2 when optional 2nd CPU is not installed) PCIe3 x16 (8), qty 1 (qty 0 when optional 2nd CPU is not installed) PCIe3 x8 (4), qty 1 (open-ended connector) PCIe2 x8 (4), qty 1 (open-ended connector)	
PCI Connectors (5.0V)	PCI 32b, 33MHz (supports 64-bit cards), qty 1	
Supported Drive Interfaces		
	SATA	Integrated 2-channel SATA 6.0Gb/sec controller and Integrated 4-channel 3.0Gb/sec controllers with RAID 0, 1, 5, 10 and NCQ. (Factory integrated RAID is Microsoft Windows only)
	Serial Attached SCSI	Integrated 8-channel SAS 6.0Gb/sec controller with HW RAID 0, 1, 10
	Integrated RAID	SATA: RAID 0, 1, 5, 10 SAS: HW RAID 0, 1, 10
Integrated Graphics	None	
Network Controller	Integrated Intel 82579 and 82574 Controllers Memory Integrated 48KB receive buffer and 8KB transmit buffer Data rates supported 10/100/1000 Mb/s Compliance IEEE 802.3, 802.3AB and 802.3u compliant, 802.3x flow control Bus architecture PCIe 1.0a Data path width X1 to each controller Data path speed 2.5 Gb/s per direction transfer rate Data transfer mode Bus-master DMA Power requirement 1.0 watts @ +3.3V AUX supply Boot ROM support Yes Network transfer rate 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 Management capabilities: WOL, PXE 2.1, DASH 1.1, Intel AMT/vPro Technology	
PCI-X Connectors	None	
PCI Card Guide	Yes	
Wake on LAN	Yes	
Integrated Trusted Platform Module	TPM 1.2	
SATA Connectors	6 ports/connectors (Included are 2 eSATA configurable with optional eSATA After-Marke Option cable kit)	
IEEE 1394 Connector(s)	**Front**	Yes, 1394a
	Rear	Yes, 1394a
	Internal	None

System Technical Specifications

USB Connector(s)	**Front**	2 USB 3.0 1 USB 2.0
	Rear	2 USB 3.0 4 USB 2.0
	Internal	6 USB 2.0 ports available 3 2x5 headers: supports up to two HP Internal USB Port K AMO- EM165AA, one on each header, or o USB Media Card Reader. Each Internal Por Kit has two USB 2.0 connectors.
HD Integrated Audio	Realtek ALC262	
Flash ROM	Yes, SPI Rom	
CPU Fan Header	One header for the CPU fans and memory fans	
Chassis Fan Header	One Chassis Fan Header	
Front PCI Fan Header	2 Front PCI Fan Headers	
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	Front power switch, front power and hard drive LED. Rear power switch and rear power LED. Drive LED header on system board	
Clear Password Jumper	Yes	
Serial Port	Yes, on rear panel	
Parallel Port	No	
Keyboard/Mouse	Yes	
Power Supply		

Power Supply	850W 88% Efficient, Custom PSU (Wide-Ranging, Active PFC)		1125W/1275W* 90% Efficient, Custom PSU (Wide-Ranging, Active PFC)	
Operating Voltage Range	90-269 VAC		90-269 VAC	
Rated Voltage Range	100-127 VAC 200-240 VAC	118 VAC	100 VAC 115-127 VAC 200-240 VAC	118 VAC
Rated Line Frequency	50-60 Hz	400 Hz	50-60 Hz	400 Hz
Operating Line Frequency Range	47-66 Hz	393-407 Hz	47-66 Hz	393-407 Hz
Rated Input Current	11A @ 100-127 VAC 5.5A @ 200-240 VAC	11A @ 118 VAC	12A @ 100 VAC 12A @ 115-127 VAC 10A @ 200-240 VAC	12A @ 118 VA
Heat Dissipation (Configuration and software dependent)	Typical = 2142 btu/hr (540kg-cal/hr) Max = 3335 btu/hr (840 kg-cal/hr)		Typical = 2773 btu/hr (699 kg-cal/hr) Max-1 = 3878 btu/hr (977 kg-cal/h Max-2 = 5002 btu/hr (1260 kg-cal/hr)	
Power Supply Fan	(2) 80x25 mm variable speed		(2) 80x25 mm variable speed	
ENERGY STAR Qualified (Configuration dependent)	Yes		Yes	

System Technical Specifications

80 PLUS® Compliant	Yes, 88% Efficient The Z820 850W power supply efficiency report can be found at this link: TBD	Yes, 90% Efficient The Z820 1125W power supply efficiency report can be found at this link: TBD
FEMP Standby Power Compliant @115V (<2W in S5 - Power Off)	Yes	Yes
EuP Compliant @ 230V (<0.5 W in S5 - Power Off)	Yes	Yes
CECP Compliant @ 220V (<4W in S3 - Suspend to RAM)	Yes; Configuration dependent	Yes; Configuration dependent
Power Consumption in sleep mode (as defined by ENERGY STAR) - Suspend to RAM (S3) (Instantly Available PC)	<15W	<35W
Built-in Self Test LED	Yes	Yes
Surge Tolerant Full Ranging Power Supply (withstands power surges up to 2000V)	Yes	Yes
		*Input voltage restriction

	NOTE: The 1125W power supply can also supply 1275W of output power when the input voltage is greater than 105V. If the input voltage is less than 105V, but greater than 90V f any reason, the maximum power that can be drawn is 1125W. An uninterruptible power supply (UPS) is highly recommended if 1275W output power is desired.
AUX IN (audio)	No
Clear CMOS Button	Yes
Multibay Header	No
Integrated Gigabit Ethernet	Yes, dual port.
Access Panel Solenoid Lock Header	No
Access Panel Intrusion Sensor Header	Yes, as part of Front UI (Control Panel) cable header
Memory Fan Connector	Yes, blind-mate

System Configuration

Example Configuration #1	Processor Info	1x Intel Xeon E5-2609 (Four-Core)					
	Memory Info	4x 2GB DDR3 1600 (UDIMM)					
	Graphics Info	1x NVIDIA Quadro 2000					
	Disks/Optical/Floppy	1x 500GB SATA 7200/1x16X DVD-ROM SATA					
	Power Supply	850W 88% Custom PSU					
	Other	-					
Energy Consumption		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)	75.5 W		73.9 W		75.5 W	
	Windows Busy Typ (S0)	156 W		149 W		155 W	
	Windows Busy Max (S0)	176 W		174 W		177 W	
	Sleep (S3)	4.35 W	3.87 W	4.51 W	4.06 W	4.37 W	3.87 W
	Off (S5)	1.68 W	1.28 W	1.85 W	1.45 W	1.67 W	1.27 W
	Zero Power Mode (ErP)	0.23 W		0.39 W		0.22 W	
Heat Dissipation ** **(Btu/hr)**		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled

	Windows Idle (S0)	258 btu/hr		252 btu/hr		258 btu/hr	
	Windows Busy Typ (S0)	532 btu/hr		508 btu/hr		529 btu/hr	
	Windows Busy Max (S0)	601 btu/hr		594 btu/hr		604 btu/hr	
	Sleep (S3)	14.8 btu/hr	13.2 btu/hr	15.4 btu/hr	13.9 btu/hr	14.9 btu/hr	13.2 btu/hr
	Off (S5)	5.73 btu/hr	4.37 btu/hr	6.31 btu/hr	4.95 btu/hr	5.70 btu/hr	4.33 btu/hr
	Zero Power Mode (ErP)	0.78 btu/hr		1.33 btu/hr		0.75 btu/hr	

Example Configuration #2 (ENERGY STAR QUALIFIED)	Processor Info	2x Intel Xeon E5-2640 (Six-Core)					
	Memory Info	8x 2GB DDR3 1600 (UDIMM)					
	Graphics Info	1x NVIDIA Quadro 4000					
	Disks/Optical/Floppy	3x 500GB SATA 7200/1x16X DVD-ROM SATA					
	Power Supply	850W 88% Custom PSU					
	Other	-					
Energy Consumption		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)	128 W		126 W		129 W	
	Windows Busy Typ (S0)	374 W		371 W		380 W	
	Windows Busy Max (S0)	432 W		425 W		434 W	
	Sleep (S3)	5.78 W	5.35 W	5.91 W	5.48 W	5.81 W	5.37 W
	Off (S5)	2.57 W	1.14 W	2.74 W	1.31 W	2.56 W	1.13 W
	Zero Power Mode (ErP)	0.23 W		0.39 W		0.22 W	
Heat Dissipation (Btu/hr)**		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)	437 btu/hr		430 btu/hr		440 btu/hr	
	Windows Busy Typ (S0)	1276 btu/hr		1266 btu/hr		1297 btu/hr	
	Windows Busy Max (S0)	1474 btu/hr		1450 btu/hr		1481 btu/hr	
	Sleep (S3)	19.7 btu/hr	18.3 btu/hr	20.2 btu/hr	18.7 btu/hr	19.8 btu/hr	18.3 btu/hr
	Off (S5)	8.77 btu/hr	3.89 btu/hr	9.35 btu/hr	4.47 btu/hr	8.74 btu/hr	3.86 btu/hr
	Zero Power Mode (ErP)	0.78 btu/hr		1.33 btu/hr		0.75 btu/hr	

Example Configuration #3	Processor Info	2x Intel Xeon E5-2680 (Eight-Core)					
	Memory Info	8x 4GB DDR3 1600 (RDIMM)					
	Graphics Info	1x NVIDIA Quadro 6000					
	Disks/Optical/Floppy	2x 300GB SAS 15K/1x16X DVD+-RW SuperMulti SATA					
	Power Supply	1125W 90% Custom PSU					
	Other	-					
Energy Consumption		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)	152 W		150 W		153 W	
	Windows Busy Typ (S0)	507 W		498 W		509 W	
	Windows Busy Max (S0)	614 W		603 W		617 W	
	Sleep (S3)	7.62 W	7.14 W	7.66 W	7.23 W	7.61 W	7.17 W
	Off (S5)	1.81 W	1.40 W	1.97 W	1.58 W	1.79 W	1.39 W
	Zero Power Mode (ErP)	0.23 W		0.39 W		0.22 W	
Heat Dissipation (Btu/hr)**		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)	519 btu/hr		512 btu/hr		522 btu/hr	
	Windows Busy Typ (S0)	1730 btu/hr		1699 btu/hr		1737 btu/hr	

	Windows Busy Max (S0)	2095 btu/hr		2058 btu/hr		2105 btu/hr	
	Sleep (S3)	26.0 btu/hr	24.4 btu/hr	26.1 btu/hr	24.7 btu/hr	26.0 btu/hr	24.5 btu/hr
	Off (S5)	6.18 btu/hr	4.78 btu/hr	6.72 btu/hr	5.39 btu/hr	6.11 btu/hr	4.74 btu/hr
	Zero Power Mode (ErP)	0.78 btu/hr		1.33 btu/hr		0.75 btu/hr	

Example Configuration #4	Processor Info	2x Intel Xeon E5-2687 (Eight-Core)					
	Memory Info	16x 4GB DDR3 1600 (RDIMM)					
	Graphics Info	2x NVIDIA Quadro 5000					
	Disks/Optical/Floppy	4x 300GB SAS 15K/1x16X DVD+-RW SuperMulti SATA					
	Power Supply	1125W 90% Custom PSU					
	Other	-					
Energy Consumption		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)	232 W		228 W		232 W	
	Windows Busy Typ (S0)	783 W		748 W		777 W	
	Windows Busy Max (S0)	896 W		878 W		902 W	
	Sleep (S3)	10.9 W	10.5 W	10.9 W	10.5 W	11.0 W	10.5 W
	Off (S5)	1.80 W	1.40 W	2.00 W	1.58 W	1.79 W	1.38 W
	Zero Power Mode (ErP)	0.23 W		0.39 W		0.22 W	
Heat Dissipation (Btu/hr)**		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)	792 btu/hr		778 btu/hr		792 btu/hr	
	Windows Busy Typ (S0)	2672 btu/hr		2552 btu/hr		2651 btu/hr	
	Windows Busy Max (S0)	3057 btu/hr		2996 btu/hr		3078 btu/hr	
	Sleep (S3)	37.2 btu/hr	35.8 btu/hr	37.2 btu/hr	35.8 btu/hr	37.5 btu/hr	35.8 btu/hr
	Off (S5)	6.14 btu/hr	4.78 btu/hr	6.82 btu/hr	5.39 btu/hr	6.11 btu/hr	4.71 btu/hr
	Zero Power Mode (ErP)	0.78 btu/hr		1.33 btu/hr		0.75 btu/hr	

Example Configuration #5 (ENERGY STAR QUALIFIED)	Processor Info	2x Intel Xeon 2687W (Eight-Core)					
	Memory Info	16x 32GB DDR3 1600 (LRDIMM)					
	Graphics Info	1x NVIDIA Quadro 6000					
	Disks/Optical/Floppy	2x 3TB SATA/1x 16X DVD+-RW SuperMulti SATA					
	Power Supply	1125W 90% Custom PSU					
	Other	-					
Energy Consumption		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	On-Idle (ENERGY STAR® Idle (S0))	212 W		210 W		213 W	
	ENERGY STAR® P_{MAX} Windows running Linpack and Viewperf	690 W		678 W		700 W	
	ENERGY STAR® "Sleep" (S3)	31.9 W		31.5 W		32.2 W	
	ENERGY STAR® "Standby" (Off) (S5)	1.35 W		1.50 W		1.35 W	
Heat Dissipation (Btu/hr)**		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled

	On-Idle (ENERGY STAR® Idle (S0))	723 btu/hr		717 btu/hr		727 btu/hr	
	ENERGY STAR® PMAX Windows running Linpack and Viewperf	2354 btu/hr		2313 btu/hr		2389 btu/hr	
	ENERGY STAR® "Sleep" (S3)	109 btu/hr		107 btu/hr		110 btu/hr	
	ENERGY STAR® "Standby" (Off) (S5)	4.61 btu/hr		5.12 btu/hr		4.61 btu/hr	

Declared Noise Emissions (Entry-level and High-end configurations)		
System Configuration (Entry level)	**Processor Info**	Dual Intel Xeon E5-2660 2.20 GHz with Standard Heatsinks
	Memory Info	4 - DDR3 2 GB 1600 MHz UDIMM
	Graphics Info	Single NVIDIA Quadro NVS 300
	Disks/Optical/Floppy	Single Blu-ray BD-R Single 1 TB 7200 RPM SATA 3.5" HDD

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)		**Sound Power** (LWAd, bels)	**Deskside Sound Pressure** (LpAm, decibels)
	Idle	3.9	23
	Hard drive Operating (random reads)	4.0	23
	DVD-ROM Operating (sequential reads)	4.7	34

System Configuration (High-end)	**Processor Info**	Dual Intel Xeon E5-2687W 3.10 GHz with Liquid Cooling
	Memory Info	16 - DDR3 4 GB 1600 MHz RDIMM
	Graphics Info	Dual NVIDIA Quadro 6000
	Disks/Optical/Floppy	Single Blu-ray BD-R Dual 600 GB 15K RPM SAS 3.5" HDD

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)		**Sound Power** (LWAd, bels)	**Deskside Sound Pressure** (LpAm, decibels)
	Idle	5.2	32
	Hard drive Operating (random reads)	5.1	33
	DVD-ROM Operating (sequential reads)	5.3	36

System Technical Specifications

Environmental Requirements	**Temperature**	Operating: 5° to 35° C (40° to 95° F) Non-operating: -40° to 60° C (-40° to 140° F)
	Humidity	Operating: 8% to 85% RH, non-condensing Non-operating: 8% to 90% RH, non-condensing
	Maximum Altitude	Operating: 3,000 m (10,000 feet) Non-operating: 9,100 m (30,000 feet)
	Dynamic (new)	Shock Operating: ½-sine: 40g, 2-3ms Non-operating: ½-sine: 160 cm/s, 2-3ms (~100g) square: 422 cm/s, 20g **NOTE:** Values represent individual shock events and do not indicate repetitive shock events. Vibration Operating random: 0.5g (rms), 5-300 Hz Non-operating random: 2.0g (rms), 10-500 Hz **NOTE:** Values do not indicate continuous vibration.
	Cooling	Above 1524 m (5000 ft) altitude, maximum operating temperature is de-rated by 1° C (1.8° F) per 305 m (1000 ft) elevation increase

Physical Security and Serviceability	
Access Panel	Tool-less Includes system board and memory information
Optical Drive	Tool-less, no carrier or rails required
Hard Drives	Tool-less
Expansion Cards	Tool-less
Processor Socket	Tool-less
Green User Touch Points	Yes, on tool-free internal chassis components
Color-coordinated Cables and Connectors	Yes
Memory	Tool-less
System Board	Tool-less, retained by Front PCI Card Guide
Dual Color Power and HD LED on Front of Computer	Yes
Configuration Record SW	Yes
Over-Temp Warning on Screen	Yes
Restore CD/DVD Set	Restores the computer to its original factory shipping image - Can be obtained via HP Support
Dual Function Front Power Switch	Yes, causes a fail-safe power off when held for 4 seconds
Padlock Support	No
Cable Lock Support	Yes, Kensington Cable Lock (optional): Prevents entire system theft only. 3mm x 7mm slot at rear of system
Universal Chassis Clamp Lock Support	No

Solenoid Lock and Hood Sensor	No
Rear Port Control Cover	Yes, locks rear IO cables to prevent cable theft
Serial, Parallel, USB, Audio, Network, Enable/Disable Port Control	Yes
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
3.3V Aux Power LED on System PCA	No
NIC LEDs (integrated) (Green & Amber)	Yes
CPUs and Heatsinks	A torx driver (T15) is needed to remove the CPU heatsink(s) before the CPU can be removed. CPU removal is tool-less
Power Supply Diagnostic LED	Yes
Front Power Button	Yes
Front Power LED	Yes, blue (normal), red (fault)
Front Hard Drive Activity LED	Yes, green
Front ODD Activity LED	Yes
Internal Speaker	Yes
System/Emergency ROM Flash Recovery	Recovers corrupted system BIOS
Cooling Solutions	Air cooled forced convection, liquid cooling (optional)
Power Supply Fans	2x - 80mm x 25mm
CPU Heatsink Fan	92 x 25mm 5-wire PWM for each CPU
Chassis Fan	Rear: 2x - 92mm x 25mm Front (850W config): 1x - 92mm x 25mm (upper position) Front (1125W config): 2x - 92mm x 25mm
Memory Heatsink Fan	3x - 75 x 90 x 35mm memory blowers 80 x 25 mm 4-wire PW fan
HP Vision Diagnostics Offline Edition	HP Vision Diagnostics Offline Edition The diagnostics utility enables you to perform testing and to view critical computer hardware and software configuration information from various sources. This utility enables you to: • Run diagnostics • View the hardware configuration of the system Key features and benefits HP Vision Diagnostics simplifies the process of effectively identifying, diagnosing, and isolating the hardware issues. In addition to robust management tools, service tools can be invaluable in quickly resolving system problems. To streamline the service process and resolve problems quickly, it is necessary to have the right information available at the time that a service call is placed. The primary information requirement, which is also the one that provides the greatest Vision into potential system issues, is the configuration of the system. Vision Diagnostics helps provide higher system availability. Typical uses of the Vision Diagnostics are: •

	• Testing and diagnosing apparent hardware failures • Documenting system configurations for upgrade planning, standardization, inventory tracking, disaster recovery, and maintenance • Sending configuration information to another location for more in-depth analysis
Access Panel Key Lock	Yes, prevents removal of the access panel and all internal components including optical and floppy drives
ACPI-Ready Hardware	Advanced Configuration and Power Management Interface (ACPI). • Allows the system to wake from a low power mode. • Controls system power consumption, making it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system
Trusted Platform Module Chip with optional ProtectTools Software	Yes
Integrated Chassis Handles	Yes, front and rear
Power Supply	Tool-less, direct-connect (blind-mate)
PCIe Card Retention	Yes, rear (all), middle (full-height cards), front (full-length with extender cards)
Flash ROM	Yes. SPI ROM
Diagnostic Power Switch LED on board	Yes
Clear Password Jumper	Yes
Clear CMOS Button	Yes
CMOS Battery Holder	Yes
DIMM Connectors	Yes
HP ProtectTools Security Manager	Yes - not supported on Linux

BIOS	
BIOS 32-bit Services	Standard BIOS 32-Bit Service Directory Proposal v0.4. BIOS supports 32 and 64-bit Operating systems.
PCI 3.0 Support	Full BIOS support for PCI Express through industry standard interfaces.
ATAPI	ATAPI Removable Media Device BIOS Specification Version 1.0.
BBS	BIOS Boot Specification v1.01
WMI Support	WMI is Microsoft's implementation of Web-Based Enterprise Management (WBEM) for Windows. WMI is fully compliant with the Distributed Management Task Force (DMTF) Common Information Model (CIM) and WBEM specifications.
BIOS Boot Spec 1.01+	Provides more control over how and from what devices the workstation will boot.
BIOS Power On	Users can define a specific date and time for the system to power on.
ROM Based Computer Setup Utility (F10)	Review and customize system 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 diskette or USB flash drive 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, for system management information

System Technical Specifications

Boot Control	Disables the ability to boot from removable media on supported devices.
Memory Change Alert	Alerts management console if memory is removed or changed.
Thermal Alert	Monitors the temperature state within the chassis. Three modes: ● NORMAL - normal temperature ranges. ● ALERTED - excessive temperatures are detected. Raises a flag so action can be taken to avoid shutdown or provide for a smoother system shutdown. ● SHUTDOWN - excessive temperatures are encountered. Automatically shuts down the computer without warning before hardware component damage occurs.
Remote ROM Flash	Provides secure, fail-safe ROM image management from a central network console.
ACPI (Advanced Configuration and Power Management Interface)	Allows the system to enter and wake 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 2.0 for full compatibility with 64-Bit operating systems.
Ownership Tag	A user-defined string stored in non-volatile memory that is displayed in the BIOS splash screen.
Remote Wakeup/Remote Shutdown	System administrators can power on, restart, and power off a client computer from a remote location.
Instantly Available PC (Suspend to RAM - ACPI sleep state S3)	Allows for very low power consumption with quick resume time.
Remote System Installation via F12 (PXE 2.1) (Remote Boot from Server)	Allows a new or existing system to boot over the network and download software, including the operating system.
ROM revision levels	Reports the system BIOS revision level in Computer Configuration Utility (F10 Setup). Version is available through an industry standard interface (SMBIOS) so that management SW applications can use and report this information.
System board revision level	Allows management SW to read the 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	Allows the user or MIS to set a unique tag string in non-volatile memory.
Per-slot Control	Allows I/O slot parameters (option ROM enable/disable, bus latency) to be configured individually.
Adaptive Cooling	Fan control parameters are set according to detected hardware configuration for optimal acoustics.
Pre-boot Diagnostics	Early (pre-video) critical errors are reported via beeps and blinks on the power LED.
Industry Standard Specification Support	
Industry Standard	Revision Supported by the BIOS
ACPI	Advanced Configuration and Power Management Interface, Version 2.0c
ATA (IDE)	AT Attachment 6 with Packet Interface (ATA/ATAPI-6), Revision 3b

System Technical Specifications

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
EHCI	Enhanced Host Controller Interface for Universal Serial Bus, Revision 1.0
PCI	• PCI Local Bus Specification, Revision 2.3 • PCI Power Management Specification, Revision 1.1 • PCI Firmware Specification, Revision 3.0, Draft 0.7
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 3 Gb/s: Serial ATA Specification, Revision 2.5 Serial ATA 6 Gb/s: Serial ATA Specification, Revision 3.0
SPD	PC SDRAM Serial Presence Detect (SPD) Specification, Revision 1.2B
TPM	Trusted Computing Group TPM Specification Version 1.2
UHCI	Universal Host Controller Interface Design Guide, Revision 1.1
USB	• Universal Serial Bus Revision 1.1 Specification • Universal Serial Bus Revision 2.0 Specification • Universal Serial Bus Revision 3.0 Specification
SMBIOS	System Management BIOS Reference Specification, Version 2.7

Social and Environmental Responsibility

Eco-Label Certifications & Declarations	This product has received or is in the process of being certified to the following approvals and ma be labeled with one or more of these marks: • ENERGY STAR® (energy-saving features available on selected configurations - Windows only) • US Federal Energy Management Program (FEMP) • China Energy Conservation Program • IT ECO declaration • Japan PC Green label* * This product conforms to the examination standards (2003 version) under JEITA's 'PC Green Label System.'
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 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 Directiv on a worldwide basis.
BFR/PVC-Free Statement	Configurations of the HP Z820 Workstation where SAS 3 ½" HDDs, Broadcom 5761 Gigabit PCI NIC, or LSI 9260-8i SAS 6Gb/s ROC RAID Card are not selected are brominated flame retardant and polyvinyl chloride free (BFR/PVC-free), meeting the evolving definition of "BFR/PVC-free" as set forth in the iNEMI Position Statement on the Definition of Low-Halogen Electronics

	(BFR/CFR/PVC-Free). http://thor.inemi.org/webdownload/projects/ese/HFR-Free/Low-Halogen_Def.pdf External peripherals, connectors, and cords/cables are not BFR/PVC free.
End-of-Life Management and Recycling	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.
Hewlett-Packard Corporate Environmental Information	For more information about HP's commitment to the environment, please see the Global Citizenship Report: http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html
Additional Information	This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986). EPEAT Gold - ENERGY STAR qualified configurations of this product are in compliance with the IEEE 1680 (EPEAT) standard at the GOld level where HP registers workstation products. See http://ww2.epeat.net/CompanyDetail.aspx?CompanyID=24 for registration status in your 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 • 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 exce 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 • Reduce size and weight of packages to improve transportation fuel efficiency • Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards
Packaging Materials	
Internal	LDPE Foam and Bag: .620 kg
External	Cardboard carton and insert: 2.200 kg

Manageability

Industry Standard Specifications	This product meets the following industry standard specifications for manageability functionality: • DASH 1.1 (via Intel LAN on motherboard)
Intel Active Management Technology (AMT)	Intel Active Management Technology (AMT) 7.0 An advanced set of remote management features and functionality providing IT 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 7.0 includes the following advanced management functions: • Power Management (on, off, reset) • Hardware Inventory (includes BIOS and firmware revisions) • Hardware Alerting • Agent Presence • System Defense Filters • SOL/IDER • Cisco NAC/SDN Support • 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 system connects to the IT or service provider console for maintenance. • 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 • Microsoft NAP Support • Host Base set-up and configuration • Management Engine (ME) firmware roll back
Intel® vPro™ Technology	The HP Z820 Workstation supports Intel vPro technology when configured as outlined below: • Intel Xeon processor E5-2600 product family featuring Intel vPro Technology • Intel C602 chipset • Intel 82579LM GbE LAN
Remote Manageability Software Solutions	The HP Z820 Workstation is supported on the following remote manageability software consoles • LANDesk Management Suite (HP recommended solution) • Microsoft System Center Configuration Manager • HP Client Automation Enterprise For questions or support for manageability needs, please visit http://www.hp.com/go/easydeploy
System Software Manager	For questions or support for SSM, please visit: http://www.hp.com/go/ssm
Service, Support, and Warranty	On-site Warranty and Service (Note 1): Three-years, limited warranty and service offering delivers on-site, next business-day (Note 2) service for parts and labor and includes free telephone suppo (Note 3) 8am - 5pm. Global coverage (Note 2) ensures that any product purchased in one countr and transferred to another, non-restricted country will remain fully covered under the original warranty and service offering. **NOTE 1:** Terms and conditions may vary by country. Certain restrictions and exclusions apply. **NOTE 2:** On-site service may be provided pursuant to a service contract between HP and an authorized HP third-party provider, and is not available in certain countries. Global service response times are based on commercially reasonable best effort and may vary by country. **NOTE 3:** Technical telephone support applies only to HP-configured, HP and HP-qualified, third-party hardware and software. Toll-free calling and 24x7 support service may not be available in some countries. HP Care Pack Services extend service contracts beyond the standard warranties. Service starts from date of hardware purchase. To choose the right level of service for your HP product, use the HP Care Pack Services Lookup Tool at: http://www.hp.com/go/lookuptool. Additional HP Care Pack Services information by product is available at: http://www.hp.com/hps/carepack. Service levels and response times for HP Care Packs may vary depending on your geographic location.
Product Change Notification	• 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.

As part of its commitment to hardware, software, and solution innovation, HP is proud to introduc 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 ir 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**
	A2A32AV	Intel Xeon E5-2620 2 15M 1333 6C 1 CPU
	A2A35AV	Intel Xeon E5-2643 3.3 10M 1600 4C 1 CPU
	A2A46AV	Intel Xeon E5-2620 2 15M 1333 6C 2 CPU
	A2A49AV	Intel Xeon E5-2643 3.3 10M 1600 4C 2 CPU
Hard Drives	**Product #**	**Offering**
	QJ686AV	500GB 7200 RPM SATA 1st HDD
	QJ697AV	500GB 7200 RPM SATA 2nd HDD
	QJ709AV	500GB 7200 RPM SATA 3rd HDD
	QJ721AV	500GB 7200 RPM SATA 4th HDD
	QJ733AV	500GB 7200 RPM SATA 5th HDD
	QJ687AV	1TB 7200 RPM SATA 1st HDD
	QJ698AV	1TB 7200 RPM SATA 2nd HDD
	QJ710AV	1TB 7200 RPM SATA 3rd HDD
	QJ722AV	1TB 7200 RPM SATA 4th HDD
	QJ734AV	1TB 7200 RPM SATA 5th HDD
Graphics	**Product #**	**Offering**
	A7U55AV	NVIDIA NVS 310 512MB GFX
	A7U56AV	NVIDIA NVS 310 512MB 2nd GFX
Memory	**Product #**	**Offering**
		TBD
Optical and Removable Storage	**Product #**	**Offering**
	QG250AV	16X SuperMulti DVDRW SATA 1st ODD
Input Devices	**Product #**	**Offering**
	A8Z58AV	HP USB Keyboard
	A8Z60AV	HP USB Optical Mouse
Operating Systems	**Product #**	**Offering**
	QG517AV	Windows 7 Professional 64bit OS

Processors

Intel® Xeon® Processor E5-2603 4C 1.80GHz
Intel® Xeon® Processor E5-2609 4C 2.40GHz
Intel® Xeon® Processor E5-2620 6C 2.00GHz
Intel® Xeon® Processor E5-2630 6C 2.30GHz
Intel® Xeon® Processor E5-2640 6C 2.50GHz
Intel® Xeon® Processor E5-2643 4C 3.30GHz
Intel® Xeon® Processor E5-2650 8C 2.00GHz
Intel® Xeon® Processor E5-2660 8C 2.20GHz
Intel® Xeon® Processor E5-2665 8C 2.40GHz
Intel® Xeon® Processor E5-2667 6C 2.90GHz
Intel® Xeon® Processor E5-2670 8C 2.60GHz
Intel® Xeon® Processor E5-2680 8C 2.70GHz
Intel® Xeon® Processor E5-2687W 8C 3.10GHz
Intel® Xeon® Processor E5-2690 8C 2.90GHz

Z820 Xeon E5-2603 4C 1.80 10MB 1066 CPU2	A6S85AA
Z820 Xeon E5-2609 4C 2.40 10MB 1066 CPU2	A6S86AA
Z820 Xeon E5-2620 6C 2.00 15MB 1333 CPU2	A6S87AA
Z820 Xeon E5-2630 6C 2.30 15MB 1333 CPU2	A6S88AA
Z820 Xeon E5-2640 6C 2.50 15MB 1333 CPU2	A6S89AA
Z820 Xeon E5-2643 4C 3.30 10MB 1600 CPU2	A6S90AA
Z820 Xeon E5-2650 8C 2.00 20MB 1600 CPU2	A6S91AA
Z820 Xeon E5-2660 8C 2.20 20MB 1600 CPU2	A6S92AA
Z820 Xeon E5-2665 8C 2.40 20MB 1600 CPU2	A6S93AA
Z820 Xeon E5-2667 6C 2.90 15MB 1600 CPU2	A6S94AA
Z820 Xeon E5-2670 8C 2.60 20MB 1600 CPU2	A6S95AA
Z820 Xeon E5-2680 8C 2.70 20MB 1600 CPU2	A6S96AA
Z820 Xeon E5-2690 8C 2.90 20MB 1600 CPU2	A6S97AA

Technical Specifications - Hard Drives

HP SAS (Serial Attached SCSI) Hard Drives for HP Workstations	**600GB SAS 15K rpm 6Gb/s 3.5" HDD**	**Capacity**	600GB	
		Height	1 in; 2.54 cm	
		Width	**Media Diameter**	3.5 in; 8.9 cm
			Physical Size	4 in; 10.17 cm
		Interface	SAS	
		Synchronous Transfer Rate (Maximum)	6.0 Gb/s	
		Buffer	16 MB	
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.2 ms
			Average	3.4 ms
			Full Stroke	6.6 ms
		Rotational Speed	15,000 rpm	
		Logical Blocks	1,172,123,568 - 512 byte blocks	
		Operating Temperature	50° to 95° F (10° to 35° C)	
	450GB SAS 15K rpm 6Gb/s 3.5" HDD	**Capacity**	450GB	
		Height	1 in; 2.54 cm	
		Width	**Media Diameter**	3.5 in; 8.9 cm
			Physical Size	4 in; 10.17 cm
		Interface	SAS	
		Synchronous Transfer Rate (Maximum)	6Gb/s	
		Buffer	16MB	
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.2 ms
			Average	3.4 ms
			Full Stroke	6.6 ms
		Rotational Speed	15,000 rpm	
		Operating Temperature	50° to 95° F (10° to 35° C)	
	300GB SAS 15K rpm 6Gb/s 3.5" HDD	**Capacity**	300GB	
		Height	1 in; 2.54 cm	
		Width	**Media Diameter**	3.5 in; 8.9 cm
			Physical Size	4 in; 10.17 cm
		Interface	SAS	
		Synchronous Transfer Rate (Maximum)	6Gb/s	
		Buffer	16MB	
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.2 ms
			Average	3.4 ms
			Full Stroke	6.6 ms
		Rotational Speed	15,000 rpm	
		Operating Temperature	50° to 95° F (10° to 35° C)	
	HP 300GB SAS 10K SFF HDD	**Capacity**	300GB	
		Height	0.6 in; 1.53 cm	

		Width	**Media Diameter**	2.5 in; 6.36 cm
			Physical Size	2.75 in; 6.99 cm
		Interface	SAS 6Gb/s	
		Synchronous Transfer Rate (Maximum)	Up to 600MB/s	
		Buffer	64MB	
		Cache	multi-segmentable cache buffer	
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.4 ms (max)
			Average	3.6 ms
			Full Stroke	7.3 ms
		Rotational Speed	10,000 rpm	
		Logical Blocks	585,937,500	
		Operating Temperature	41° to 131° F (5° to 55° C)	
	HP 600GB SAS 10K SFF HDD	**Capacity**	600GB	
		Height	0.6 in; 1.53 cm	
		Width	**Media Diameter**	2.5 in; 6.36 cm
			Physical Size	2.75 in; 6.99 cm
		Interface	SAS 6Gb/s	
		Synchronous Transfer Rate (Maximum)	Up to 600MB/s	
		Buffer	64MB	
		Cache	multi-segmentable cache buffer	
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.4 ms (max)
			Average	3.6 ms
			Full Stroke	7.3 ms
		Rotational Speed	10,000 rpm	
		Logical Blocks	1,172,123,568	
		Operating Temperature	41° to 131° F (5° to 55° C)	
SATA (Serial ATA) Hard Drives for HP Workstations	**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	7,200 rpm	
		Operating Temperature	41° to 140° F (5° to 60° C)	
	2.0TB SATA 7200 rpm 6Gb/s 3.5" HDD	**Capacity**	2.0TB	
		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 600 MB/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	
	Logical Blocks	3,907,029,168	
	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	4.0 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)	
500GB SATA 7200 rpm 6Gb/s 3.5" HDD	**Capacity**	500GB	
	Height	1 in; 2.5 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	16 MB	
	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)	
250GB SATA 7200 rpm 6Gb/s 3.5" HDD	**Capacity**	250 GB	
	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 600MB/s	
		Buffer	8 MB	
		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	488,397,168	
		Operating Temperature	41° to 131° F (5° to 55° C)	
HP Solid State Drives for Workstations	**HP 160GB SATA SSD**	**Capacity**	160GB	
		Width	**Media Diameter**	NaN in; NaN cm
			Physical Size	2.5 in; 6.36 cm
		Interface	SATA	
		Synchronous Transfer Rate (Maximum)	3Gb/s	
		Operating Temperature	32° to 158° F (0° to 70° C)	
	HP 300GB SATA SSD	**Capacity**	300GB	
		Width	**Physical Size**	2.5 in; 6.36 cm
		Interface	SATA	
		Synchronous Transfer Rate (Maximum)	3Gb/s	
		Operating Temperature	32° to 158° F (0° to 70° C)	

LSI MegaRAID® 9260-8i SAS 6Gb/s ROC RAID Card and iBBU07 Battery Backup Unit	**PCI Bus**	PCI-Express (Gen2) V2.0 x8 lanes
	PCI Modes	Bus Master DMA
	RAID Levels	RAID 0, 1, 5, and 6 RAID spans 10, 50 and 60
	PCI Data Burst Transfer Rate	Up to 4GB/s
	PCI Card Type	Low profile, single PCIe slot design with full height bracket. The optional iBBU07 Battery Backup unit mounts on the controller car and the assembly remains within a single PCIe slot width.
	PCI Voltage	+3.3V Add-in Card
	PCI Power	12.5 Watts
	Certification Level	PCI-Express 2.0
	IO Bus	Eight 3 Gb/s and 6Gb/s compatible SAS/SATA ports
	Internal Connectors	Two SAS SFF8087 x4
	External Connectors	None
	Maximum Number of SCSI Devices	32. **NOTE:** HP Workstations do not support this many internal drives.
	LED Indicators	Connector LEDs indicate whether the internal connector is active for ports 0-3 and 4-7

NVIDIA NVS 300 512MB Graphics Card	**Form Factor**	2.7 inches (H) x 5.7 inches (L), Half-Height
	Graphics Controller	NVIDIA NVS 300 Graphics Board
	Bus Type	PCI Express x16, Generation 2.0
	Memory	512 MB GDDR3 SDRAM unified graphics memory
	Connectors	DMS-59 Includes DMS-59 to Dual DVI-I adapter DMS-59 to Dual DisplayPort adapter and DMS-59 to Dual VGA adapte available as an option DMS-59 to Dual DisplayPort adapter required for HP ZR30w Display
	Maximum Resolution	DVI: two digital displays up to 1920 x 1200 DisplayPort: two digital displays up to 2560 x 1600 VGA: two analog displays up to 1920 x 1080
	Image Quality Features	
	Display Output	This card support up to two displays: ● Drives DVI enabled digital displays at resolutions up to 1920 × 1200 at 60 Hz with reduced blanking ● Drives DisplayPort enabled digital displays at resolutions up to 2560 × 1600 at 60 Hz with reduced blanking (through optional DMS-59 to DisplayPort adapter) ● Drives VGA enabled analog displays at resolutions up to 1920 x 1080 (through optional DMS-59 to VGA adapter)
	Supported Graphics APIs	OGL 3.3 DirectX 10.1
	Available Graphics Drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) 5 Desktop/Workstation 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 Novell SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
	Power Consumption	<18 Watts

Technical Specifications - Graphics

AMD FirePro 2270 512MB Graphics Card	**Form Factor**	Low Profile, Half Length, 2.3" x 6.6"
	Graphics Controller	AMD FirePro™ 2270 Professional Graphics
	Bus Type	PCI Express™ x16 Generation 2.0
	Memory	512MB DDR3
	Connectors	DMS-59 connector to support breakout cables for dual DisplayPort, DV and VGA output. DMS-59 to Dual DVI adapter included. (Display Port and VGA adapters sold separately)
	Maximum Resolution	Digital 2560x1600 (DisplayPort) Analog 1920x1200 (DVI 60 Hz/ VGA 75Hz)
	RAMDAC	400 MHz DAC, 10-bit per channel
	Display Output	Card supports up to two displays
	Supported Graphics APIs	DirectX 11 and OpenGL 4.0
	Available Graphics Drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (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	17W Maximum

NVIDIA NVS 310 512MB Graphics Card	**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.
	Display Output	Up to 2 displays in the following configurations: DisplayPort output: ● Drives two DisplayPort enabled digital display at resolutions up t

	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 wi 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 H 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	Genuine Windows 7 Professional (64-bit and 32-bit) Microsoft 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 Quadro 600 1GB Graphics Card	**Form Factor**	2.731" H x 6.6" L Single Slot Small Form Factor
	Graphics Controller	NVIDIA Quadro 600 Graphics Card
	Bus Type	PCI Express 2.0 x16
	Memory	1 GB GDDR3 128-bit
	Connectors	1 DVI-I output, 1DisplayPort output One DP to DVI adapter included with card DVI to VGA, DisplayPort to VGA and DisplayPort to DVI adapters available as accessories
	Maximum Resolution	DisplayPort (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz) Dual-link DVI-I output (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz)
	Shading Architecture	Shader Model 5.0
	Supported Graphics APIs	OpenGL 4.0 DirectX 11 CUDA API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran
	Available Graphics Drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux (RHEL) 5 Desktop/Workstation (64-bit and 3 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 SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
	Power Consumption	40 Watts

Technical Specifications - Graphics

NVIDIA Quadro 410 512MB Graphics	**Form Factor**	Low Profile: 2.713 inches × 5.7 inches, single slot
	Graphics Controller	NVIDIA Quadro 410
	Bus Type	PCI Express x16, 3.0 compliant
	Memory	Size: 512MB DDR3 Clock: 900MHz Memory Bandwidth: 14GB/s
	Connectors	One dual-link DVI-I connector One DisplayPort connector
	Maximum Resolution	Up to 2560 x 1600 (digital display) per display.
	RAMDAC	400 MHz integrated RAMDAC
	Display Output	Maximum resolution over DisplayPort: 2560 × 1600 × 32 bpp at 60 Hz (reduced blanking) Maximum resolution over DVI port: 2560 × 1600 × 32 bpp at 60 Hz (reduced blanking) Maximum resolution over VGA (through DVI to VGA cable): 2048 × 153 × 32 bpp at 85 Hz
	Shading Architecture	Shader Model 5.0
	Supported Graphics APIs	DX11, OpenGL 4.2
	Available Graphics Drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Microsoft 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

AMD FirePro V3900 1GB Graphics Card	**Form Factor**	Full height, half length (full-height bracket included)
	Graphics Controller	AMD FirePro™ V3900 professional graphics
	Bus Type	PCI Express® x16, Generation 2.1
	Memory	1GB DDR3 memory
	Connectors	1 DL DVI, 1 DP output One DP to DVI adapter included
	Maximum Resolution	2560x1600 per display (5120x1600 max. horizontal resolution)
	Display Output	1 DisplayPort® 1.2 1 Dual-link DVI
	Supported Graphics APIs	OpenCL™ 1.1, DirectX® 11 and OpenGL 4.2
	Available Graphics Drivers	Genuine Windows® 7 Professional (64-bit and 32-bit) Genuine Windows Vista® Business (64-bit and 32-bit) Microsoft® 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 available from the HP support Web site:

		http://welcome.hp.com/country/us/en/support.html
	Power Consumption	<50W
	Note	AMD Eyefinity technology can support multiple displays using a single enabled AMD FirePro™ professional graphics card; the number of supported displays varies by card model. Microsoft® Windows® 7, Windows Vista®, or Linux® is required in order to support more than 2 displays. Depending on the card model, native DisplayPort™ connecto and/or certified DisplayPort™ active or passive adapters to convert you monitor's native input to your card's DisplayPort™ or Mini-DisplayPort™ connector(s) may be required. See www.amd.com/firepro for details.
AMD FirePro V4900 1GB Graphics Card	**Form Factor**	Full height (4.37 in) , half length (6.61 in)
	Graphics Controller	AMD FirePro™ V4900 Professional Graphics
	Bus Type	PCI Express™ x16, Generation 2.1
	Memory	1GB GDDR5
	Connectors	2 DisplayPort, 1 dual link DVI Output, One DP to DVI adapter included
	Maximum Resolution	Up to three digital displays at resolutions up to 2560 x 1600 @ 60Hz o up to three analog displays, one at resolutions up to 2048 x 1536 @ 85Hz, plus two resolutions up to 1920 x 1200 @ 60Hz (165 MHz dot clock) Note: This card supports up to three displays with Windows 7, Vista or Linux, and up to two displays on XP
	RAMDAC	
	Image Quality Features	Up to 3 independent outputs with ATI Eyefinity technology support (More information at: www.amd.com/us/products/technologies/eyefinity/). Full 30-bit display pipeline. Advanced video capabilities, including high fidelity gamma, color correction and scaling. Dedicated hardware (UVD2) for H.264, VC 1, and MPEG2 decode **NOTE:** The use of more than two displays on Linux requires support fo xrandr 1.2 or greater in the X server.
	Supported graphics APIs	DirectX 11 and OpenGL 4.1. OpenCL 1.2 DirectCompute 11
	Available graphics drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft 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
	Power Consumption	<75W
	Note	AMD Eyefinity technology can support multiple displays using a single enabled AMD FirePro™ professional graphics card; the number of supported displays varies by card model. Microsoft® Windows® 7, Windows Vista®, or Linux® is required in order to support more than 2 displays. Depending on the card model, native DisplayPort™ connecto and/or certified DisplayPort™ active or passive adapters to convert you monitor's native input to your card's DisplayPort™ or Mini-DisplayPort™ connector(s) may be required. See www.amd.com/firepro for details.

Technical Specifications - Graphics

NVIDIA Quadro 2000 1GB Graphics Card	**Form Factor**	4.376" H x 7" L Single Slot
	Graphics Controller	NVIDIA Quadro 2000 Graphics Card
	Bus Type	PCI Express 2.0 x16
	Memory	1 GB GDDR5 128-bit
	Connectors	1 DVI-I output, 2 DisplayPort outputs One DP to DVI adapter included with card DVI to VGA, DisplayPort to VGA and DisplayPort to DVI adapters available as accessories
	Maximum Resolution	Dual DisplayPort (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120H Dual-link DVI-I output (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz)
	Image Quality Features	• Up to 16K x16K texture and render processing • Transparent multisampling and super sampling • 16x angle independent anisotropic filtering • 128-bit floating point performance • 32-bit per-component floating point texture filtering and blending • Support for any combination of two connected displays • DisplayPort 1.1a, HDMI 1.3a, and HDCP support • NVIDIA® 3D Vision™ technology, 3D DLP, Interleaved, and othe 3D stereo format support • Full OpenGL quad buffered stereo support • Underscan/overscan compensation and hardware scaling • NVIDIA® nView® multi-display technology
	Shading Architecture	Shader Model 5.0
	Supported Graphics APIs	OpenGL 4.0 DirectX 11 CUDA API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran
	Available Graphics Drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux (RHEL) 5 Desktop/Workstation (64-bit and 3 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 SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
	Power Consumption	62 Watts

Technical Specifications - Graphics

AMD FirePro V5900 2GB Graphics Card	**Form Factor**	Full-height, full length, single slot
	Graphics Controller	AMD FirePro™ V5900 Professional Graphics
	Bus Type	PCI Express™ x16, Generation 2.1
	Memory	2GB GDDR5
	Connectors	2 x Display Port 1.2 1 x Dual-link DVI
	Maximum Resolution	2560 x 1600
	Display Output	DirectX 11 and OpenGL 4.1
	Supported Graphics APIs	DirectX 11 and OpenGL 4.1
	Available Graphics Drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft 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 available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
	Power Consumption	< 75W
	Note	AMD Eyefinity technology can support multiple displays using a single enabled AMD FirePro™ professional graphics card; the number of supported displays varies by card model. Microsoft® Windows® 7, Windows Vista®, or Linux® is required in order to support more than 2 displays. Depending on the card model, native DisplayPort™ connecto and/or certified DisplayPort™ active or passive adapters to convert you monitor's native input to your card's DisplayPort™ or Mini-DisplayPort™ connector(s) may be required. See www.amd.com/firepro for details.
AMD FirePro V7900 2GB Graphics Card	**Form Factor**	Full height, full length, single slot
	Graphics Controller	AMD FirePro™ V7900 Professional Graphics
	Bus Type	PCI Express™ x16, Generation 2.1
	Memory	2GB GDDR5
	Connectors	4 x DisplayPort 1.2
	Maximum Resolution	2560 x1600
	Supported Graphics APIs	DirectX 11 and OpenGL 4.1
	Available Graphics Drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft 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 available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
	Power Consumption	< 150W
	Note	AMD Eyefinity technology can support multiple displays using a single enabled AMD FirePro™ professional graphics card; the number of supported displays varies by card model. Microsoft® Windows® 7, Windows Vista®, or Linux® is required in order to support more than 2 displays. Depending on the card model, native DisplayPort™ connecto and/or certified DisplayPort™ active or passive adapters to convert you 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 4000 2GB Graphics Card	**Form Factor**	4.376" H x 9.50" L Single Slot
	Graphics Controller	NVIDIA Quadro 4000 Graphics Card
	Bus Type	PCI Express 2.0 x16
	Memory	2 GB GDDR5 256-bit
	Connectors	1 DVI-I output, 2 DisplayPort outputs; One DP to DVI adapter included with card DVI to VGA, DisplayPort to VGA and DisplayPort to DVI (single- link c dual-link) adapters available as accessories (Optional stereo bracket available from 3rd party)
	Maximum Resolution	Dual DisplayPort (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120H Dual-link DVI-I output (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz)
	RAMDAC	400 MHz integrated RAMDAC
	Image Quality Features	• Up to 16K x16K texture and render processing • Transparent multisampling and super sampling • 16x angle independent anisotropic filtering • 128-bit floating point performance • 32-bit per-component floating point texture filtering and blending • Support for any combination of two connected displays • DisplayPort 1.1a, HDMI 1.3a, and HDCP support • NVIDIA 3D Vision™ technology, 3D DLP, Interleaved, and other 3D stereo format support • Full OpenGL quad buffered stereo support • Underscan/overscan compensation and hardware scaling • NVIDIA nView® multi-display technology
	Shading Architecture	Shader Model 5.0
	Supported Graphics APIs	OpenGL 4.0 DirectX 11 CUDA API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran
	Available Graphics Drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux (RHEL) 5 Desktop/Workstation (64-bit and 3 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 Novell SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
	Power Consumption	142 Watts

Technical Specifications - Graphics

NVIDIA Quadro 5000 2.5GB Graphics Card	**Form Factor**	4.376" H x 9.75" L Dual Slot
	Graphics Controller	NVIDIA Quadro 5000 Graphics Card
	Bus Type	PCI Express 2.0 x16
	Memory	2.5 GB GDDR5 320-bit
	Connectors	DVI-I (1), DP (2), Stereo (1) One DP to DVI adapter included with card DVI to VGA, DisplayPort to VGA and DisplayPort to DVI adapters available as accessories
	Maximum Resolution	Dual DisplayPort (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120H: Dual-link DVI-I output (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz)
	Image Quality Features	• Up to 16K x16K texture and render processing • Transparent multisampling and super sampling • 16x angle independent anisotropic filtering • 128-bit floating point performance • 32-bit per-component floating point texture filtering and blending • Support for any combination of two connected displays • DisplayPort 1.1a, HDMI 1.3a, and HDCP support • NVIDIA 3D Vision™ technology, 3D DLP, Interleaved, and other 3D stereo format support • Full OpenGL quad buffered stereo support • Underscan/overscan compensation and hardware scaling • NVIDIA nView® multi-display technology
	Shading Architecture	Shader Model 5.0
	Supported Graphics APIs	OpenGL 4.0 DirectX 11 CUDA API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran
	Available Graphics Drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux (RHEL) 5 Desktop/Workstation (64-bit and 3: 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 Novell SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
	Power Consumption	152 Watts

Technical Specifications - Graphics

NVIDIA Quadro 6000 6GB Graphics Card	**Form Factor**	4.376" H x 9.75" L Dual Slot
	Graphics Controller	NVIDIA Quadro 6000 Graphics Card
	Bus Type	PCI Express 2.0 x16
	Memory	6 GB GDDR5 384-bit ECC Memory
	Connectors	1 DVI-I output, 2 DisplayPort outputs, 1 Stereo(3-pin mini DIN); One DP to DVI adapter included with card DVI to VGA, DisplayPort to VGA and DisplayPort to dual link DVI adapters available as accessories
	Maximum Resolution	Dual DisplayPort (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120H: Dual-link DVI-I output (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz)
	Image Quality Features	• 30-bit color • Up to 16K x16K texture and render processing • Transparent multisampling and super sampling • 16x angle independent anisotropic filtering • 128-bit floating point performance • 32-bit per-component floating point texture filtering and blending • 64x full scene antialiasing (FSAA) / 128x FSAA in SLI Mode • Support for any combination of two connected displays • DisplayPort 1.1a, HDMI 1.3a, and HDCP support • NVIDIA 3D Vision™ technology, 3D DLP, Interleaved, and other 3D stereo format support • Full OpenGL quad buffered stereo support • Underscan/overscan compensation and hardware scaling • NVIDIA nView® multi-display technology
	Shading Architecture	Shader Model 5.0
	Supported Graphics APIs	OpenGL 4.0 DirectX 11 CUDA API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran
	Available Graphics Drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux (RHEL) 5 Desktop/Workstation (64-bit and 3: 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 Novell SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
	Power Consumption	<250 Watts

NVIDIA Tesla C2075 Compute Processor	**Form Factor**	4.376 inches by 9.75 inches Dual Slot
	System Interface	PCI Express Gen2 ×16
	Video Outputs	One Dual Link DVI-I (Entry graphics level of performance)
	Memory	6GB GDDR5
	Peak Memory Bandwidth	+170 GB/s
	Supported APIs	CUDA API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran
	Supported Operating Systems	Genuine Windows 7 Professional (64-bit) Genuine Windows Vista Business (64-bit) Microsoft Windows XP Professional (64-bit) Red Hat Enterprise Linux (RHEL) 5, 6 Desktop/Workstation (64-bit) SUSE Linux Enterprise Desktop 11 (64-bit) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html Novell SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
	Processor Cores	448 CUDA cores
	Power Consumption	~215 Watts **NOTE 1:** A 1110W PSU is required for Tesla C2075 on the Z800 **NOTE 2:** A 600W PSU is required for Tesla C2075 on the Z400 **NOTE 3:** A 1125W PSU is required for Tesla C2075 on the Z820

Technical Specifications - Optical and Removable Storage

HP Slot Load DVD+/-RW Drive	**Description**	Slim-Line, Slot-load	
	Mounting Orientation	Either horizontal or vertical	
	Interface Type	SATA	
	Dimensions (WxHxD)	12.7 x 1.2 x 12.9 cm (5 x 0.5 x 5 in)	
	Disc Formats	DVD-RAM DVD+R DVD+RW DVD+R DL DVD-R DL DVD-R DVD-RW CD-R CD-RW	
	Disc Capacity	**DVD-ROM**	5/9/10/18 G DVD-Single / Dual (PTP, OTP) (Read Only) 4.7G DVD±R/RW (Read & Write) DVD±R Dual (Read & Write) 80mm DVD DVD-RAM (Read & Write)
		CD-ROM	650 MB CD-ROM (Read Only) 80mm CD 800/700/650/ CD-Recordable (Read & Write) 700/650MB CD-Rewritable (Read & Write) 700/650MB High Speed CD-Rewritable (Rea & Write) 700/650MB Ultra & Ultra+ Speed CD-Rewritable (Read & Write)
		Full Stroke DVD	< 270 ms (seek)
		Full Stroke CD	< 250 ms (seek)
	Maximum Data Transfer Rates	**CD ROM Read**	CD-ROM, CD-R and CD-RW Up to 24X
		DVD ROM Read	DVD-RAM Up to 5X DVD Single layer Up to 8X DVD Dual Layer up to 6X
	Power	**Source**	SATA DC power receptacle
		DC Power Requirements	5 VDC ± 5%-100 mV ripple p-p
		DC Current	5 VDC 40 mA typical, 800 mA maximum
	Operating Environmental (all conditions non-condensing)	**Temperature**	41° to 122° F (5° to 50° C)
		Relative Humidity	10% to 90%
		Operating Systems Supported	Windows Vista Business 64*, Windows Vist Business 32*, Windows Vista Home Basic 32*, 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.
		Kit Contents	Factory integrated only. Not available as a k

HP DVD+/-RW Drive	**Description**	5.25-inch, half-height, tray-load
	Mounting Orientation	Either horizontal or vertical
	Interface Type	SATA/ATAPI
	Dimensions (WxHxD)	15.0 x 4.4 x 20.3 cm (5.9 x 1.7 x 8.0 in)
	Disc Formats	DVD-RAM DVD+R DVD+RW DVD+R DL DVD-R DL

	DVD-R DVD-RW CD-R CD-RW		
Disc Capacity	**DVD-ROM**	8.5 GB DL or 4.7 GB standard	
	Full Stroke DVD	< 250 ms (seek)	
	Full Stroke CD	< 210 ms (seek)	
Maximum Data Transfer Rates	**CD ROM Read**	CD-ROM, CD-R Up to 40X CD-RW Up to 32X	
	DVD ROM Read	DVD-RAM	Up to 12X
		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 16X
		DVD-ROM DL	Up to 8X
		DVD+R	Up to 16X
		DVD-R	Up to 16X
Power	**Source**	SATA DC power receptacle	
	DC Power Requirements	5 VDC ± 5%-100 mV ripple p-p 12 VDC ± 5%-200 mV ripple p-p	
	DC Current	5 VDC - <1000 mA typical, <1600 mA maximum 12 VDC - <600 mA typical, <1400 mA maximum	
Operating Environmental (all conditions non-condensing)	**Temperature**	41° to 122° F (5° to 50° C)	
	Relative Humidity	10% to 90%	
	Maximum Wet Bulb Temperature	86° F (30° C)	
	Operating Systems Supported	Windows 7 Professional 32-bit and 64-bit, Windows Vista Business 64*, Windows Vist Business 32*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32*. Red Hat Enterprise Linux(RHEL) WS4**, 5, (Desktop/Workstation SUSE Linux Enterprise Desktop 10 & 11 No driver is required for this device. Native support is provided by the operating system.	
	Kit Contents	HP SATA SuperMulti DVD Writer Drive, Rox Easy Media Creator software, Intervideo WinDVD Software, installation guide, and DVD+R media.	

Technical Specifications - Optical and Removable Storage

HP DVD-ROM Drive	**Description**	5.25-inch, half-height, tray-load	
	Mounting Orientation	Either horizontal or vertical	
	Interface Type	SATA/ATAPI	
	Dimensions (WxHxD)	15.0 x 4.4 x 20.3 cm (5.9 x 1.7 x 8.0 in)	
	Disc Capacity	**DVD-ROM**	Single layer: Up to 4.7 GB Double layer: Up 8.5 GB
	Access Times	**DVD-ROM Single Layer**	< 140 ms (typical)
		CD-ROM Mode 1	< 125 ms (typical)
		Full Stroke DVD	< 250 ms (seek)
		Full Stroke CD	< 210 ms (seek)
	Power	**Source**	SATA DC power receptacle
		DC Power Requirements	5 VDC ± 5%-100 mV ripple p-p 12 VDC ± 5%-200 mV ripple p-p
		DC Current	5 VDC - <1000 mA typical, < 1600 mA maximum 12 VDC - < 600 mA typical, < 1400 mA maximum
	Operating Environmental (all conditions non-condensing)	**Temperature**	41° to 122° F (5° to 50° C)
		Relative Humidity	10% to 90%
		Maximum Wet Bulb Temperature	86° F (30° C)
		Operating Systems Supported	Windows 7 Professional 32-bit and 64-bit, Windows Vista Business 64*, Windows Vist 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, Removed reference to "Novell" because of acquisition and changed product reference to "SUSE Linux Enterprise Desktop 10 & 11", No driver is required for this device. Native support is provided by the operating system.

HP Blu-Ray Writer	**Description**	5.25-inch, half-height, tray-load	
	Mounting Orientation	Either horizontal or vertical	
	Interface Type	SATA	
	Dimensions (WxHxD)	15.0 x 4.4 x 20.3 cm (5.9 x 1.7 x 8.0 in)	
	Disc Formats	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	
	Disc Capacity	**DVD-ROM**	8.5 GB DL or 4.7 GB standard
		Blu-ray	50 GB DL or 25 GB standard

	Full Stroke DVD	< 250 ms (seek)	
	Full Stroke CD	< 210 ms (seek)	
	Blu-ray	<275 ms (seek)	
	Startup Time (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	45S
Maximum Data Transfer Rates	**CD ROM Read**	CD-ROM	Up to 40X
		CD-R	Up to 40X
		CD-RW	Up to 40X
	DVD ROM Read	DVD-RAM	Up to 5X
		DVD+RW	Up to 10X
		DVD-RW	Up to 10X
		DVD+R DL	Up to 8X
		DVD-R DL	Up to 8X
		DVD-ROM	Up to 16X
		DVD-ROM DL	Up to 8X
		DVD+R	Up to 12X
		DVD-R	Up to 12X
	Blu-Ray	BD-ROM	Up to 6X
		BD-ROM DL	Up to 4.8X
		BD-R	Up to 6X
		BD-R DL	Up to 4.8X
		BD-R	Up to 6X
		BD-RE SL/DL	Up to 4.8X
Power	**Source**	SATA DC power receptacle	
	DC Power Requirements	5 VDC ± 5%-100 mV ripple p-p 12 VDC ± 10%-100 mV ripple p-p	
	DC Current	5 VDC -900 mA typical, 1200 mA maximum 12 VDC -1000 mA typical, 1600 mA maximu	
Operating Environmental (all conditions non-condensing)	**Temperature**	41° to 122° F (5° to 50° C)	
	Relative Humidity	15% to 80%	
	Maximum Wet Bulb Temperature	86° F (30° C)	
	Operating Systems Supported	Windows 7 Professional 32-bit and 64-bit, Windows Vista Business 64*, Windows Vist Business 32*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32*. Red Hat Enterprise Linux(RHEL) WS4**, 5, (Desktop/Workstation, SUSE Linux Enterprise Desktop 10 & 11	

		* No driver is required for this device. Native support is provided by the operating system. ** RHEL WS4 not supported on Z200/Z200SFF
	Kit Contents	HP Blue Laser RW Drive, Roxio Easy Media Creator software, Intervideo WinDVD Software, installation guide.
Disclaimer		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, th 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 22-in-1 Media Card Reader	**Description**	The Media Card Reader device uses the same physical form factor and mounting as a Floppy Disk Drive. The device connects to a 2x5 two-channel USB header on the motherboard of the system. There is no USB controller card provided. Please see the Disc Formats section below for a list of flash memory card formats that are supported.
	Mounting Orientation	The Media Card Reader can be mounted in a dedicated Floppy Drive bay (if the chassis provides one) or in an appropriate Optical Bay adapter. It will operate in any orientation.
	Interface Type	USB 2.0 (one channel dedicated to the separate USB port; one channe dedicated to the flash memory card slots)
	Dimensions (WxHxD)	124.5 x 101.6 x 25.4 mm (4.9 x 4.0 x 1.0 in)
	Disc Formats	xD-Picture Micro SD Micro SDHC SD SDHC SDXC Mini SD Mini SDHC MultiMediaCard (MMC) Reduced Size MultiMediaCard (RS MMC) MultiMedia Card 4.2 (MMC Plus, including MMC Plus HC) Reduced Size MultiMedia Card 4.2 (MMC Mobile, including MMC Mob HC) CompactFlash Card Type I CompactFlash Card Type II MicroDrive Memory Stick (MS) MagicGate Memory Stick (MG) MagicGate Memory Stick Duo 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 Two additional formats are usable with adapters (not supplied): MMC Micro Memory Stick Micro (M2)

HP DX115 Removable Drive Enclosure	**Interface Type**	Compatible with SAS or SATA controllers
	Dimensions (WxHxL)	147.6 x 41.1 x 205 mm (5.81 x 1.62 x 8.08 in)
	Weight	Frame and Carrier: 1.73 kg (3.8 lbs) Carrier: 0.45 kg (1 lbs)

HP IEEE 1394b FireWire PCIe Card	**Data Transfer Rate**	Supports up to 800 Mbps
	Devices Supported	IEEE-1394 compliant devices
	Bus Type	PCIe card full height PCIe slots
	Ports	Two IEEE-1394b bilingual 9-Pin connectors (Rear)
	Internal Connectors	One 10-Pin Header connector
	System Requirements	Windows 7 Professional 32-bit and 64-bit, Microsoft® Windows® XP Professional, Windows XP Home, Windows Vista, SLED 11 and RHEL 6. Intel Pentium® G series or higher processor, 128-MB RAM, 1-GB Hard Drive, CD-ROM drive, built in sound system, 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 32-bit and 64-bit, Windows Vista® Business 32-bit and 64-bit, Windows® XP Professional, XP Professional 64-bit, RHEL 6 and SLED 11.

Integrated Intel 82579LM PCIe GbE Controller	**Connector**	RJ-45
	Controller	Intel 82579LM GbE platform LAN connect networking controller
	Memory	24 KB FIFO packet buffer memory
	Data Rates Supported	10/100/1000 Mbps
	Compliance	802.1P, 802.1Q, 802.2, 802.3, 802.3ab, 802.3az, 802.3u
	Bus Architecture	PCI Express and SMBus
	Data Path Width	Single Channel PCI-Express
	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 and 1.05V or just 3.3V with integrated regulators
	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	WOL, auto MDI crossover, PXE, Muti-port teaming, RSS, Advanced cable diagnostic. AMT 7.0 support
Intel Gigabit CT Desktop NIC	**Connector**	RJ-45
	Controller	Intel WG82574L Gigabit Ethernet Controller
	Memory	Integrated Dual 48K configurable transmit receive FIFO Buffers
	Data Rates Supported	10/100/1000 Mbps
	Compliance	IEEE 802.1P, 802,1Q, 802.2, 802.3, 802.3AB and 802.3u compliant, 802.3x flow control
	Bus Architecture	PCI-E 1.0a
	Data Path Width	X1, 250 MB/s, Bi-directional interface
	Data Transfer Mode	Bus-master DMA
	Hardware Certifications	FCC, B, CE, TUV- cTUVus Mark Canada and United States, TUV- GS Mark for European Union
	Power Requirement	Aux 3.3V, 3.0 Watts in 1000base-T and 2.0 Watts in 100Base-T
	Boot ROM Support	Yes
	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
	Operating Temperature	32° to 131°F (0° to 55° C)
	Operating Humidity	85% at 131° F (55° C)
	Dimensions	12.1 x 5.7 x 2.0 cm (4.75 x 2.25 x 0.8 in)
	Operating System Driver Support	Windows 7 Professional 32-bit and 64-bit, Windows Vista Business 64 Windows Vista Business 32, Windows XP Professional, Windows XP x64. Red Hat Enterprise Linux 4 (RHEL4.8 or newer)*, Red Hat Enterprise Linux 5 (RHEL5.3 or newer), Red Hat Enterprise Linux 6, SUSE Linux Enterprise Desktop (SLED) 11

		RHEL 4 and 5, SLED 10, are not supported on the Z220 CMT/SFF
	Management Capabilities	WOL , PXE, DMI, WFM 2.0
	Kit Contents	Intel Gigabit CT Desktop NIC, low profile bracket, CD containing Intel PROset II NIC drivers, quick install guide, product warranty statement

Broadcom (5761) NetXtreme Gigabit Ethernet Plus NIC	**Connector**	RJ-45
	Controller	Broadcom 5761 PCI-Express LAN Controller
	Memory	8 MB NVRAM serial Flash
	Data Rates Supported	10/100/1000 Mbps
	Compliance	IEEE 802.1P, 802.1Q, 802.2, 802.3, 802.3AB, 802.3u, and 802.3x
	Bus Architecture	PCI-Express
	Data Path Width	Single Channel PCI-Express
	Data Transfer Mode	Bus Master DMA
	Hardware Certifications	FCC class B, Canada and US NRTL Mark, C-Tick for Australia, BSMI for Taiwan, VCCI for Japan, MIC for Korea, GOST for Russia, UL listed (E212044), European Union Notice (CE 0682)
	Power Requirement	1.8W @ 3.3V
	Boot ROM Support	Yes
	Network Transfer Mode	Full-duplex Half-duplex (not available 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
	Operating Temperature	32° to 131°F (0° to 55° C)
	Operating Humidity	131° F (55° C) with 5% to 95% non-condensing humidity
	Dimensions	7 cm x 10.5 cm (2.75 in x 4.13 in), low profile compatible
	Operating System Driver Support	Windows 7 Professional 32-bit and 64-bit, Windows Vista 32-bit SP1, Windows Vista x64 SP1, Windows XP 32 bit professional, Windows XI x64 Red Hat Enterprise Linux (RHEL) 5, 6; Novell SLED 10 & 11
	Management Capabilities	ACPI, WOL and DMI 2.0, PXE 2.0, WfM 2.0, Broadcom mgmt utility, ASF2.0, DASH 1.0 and DASH 1.1 profiles
	Kit Contents	Broadcom NetXtreme Gigabit Ethernet Plus NIC, Broadcom NetXtreme Gigabit Ethernet Plus NIC USB Cable Assembly, CD, drivers, quick install guide, product warranty statement

Technical Specifications - Networking and Communications

HP NC360T PCI Express Dual Port Gigabit NIC	**Connector**	Two RJ-45
	Controller	Intel 82571EB
	Memory	Integrated 96KB
	Data Rates Supported	10/100/1000 Mbps
	Compliance	802.3, 802.3u, 802.3x, 802.3ab, 802.3ad, 802.1p, 802.1Q
	Bus Architecture	PCI-E 1.0a
	Data Path Width	Four lane (x4) PCI Express compatible with x4, x8, and x16 PCI Express slots
	Data Transfer Mode	Bus-master DMA
	Hardware Certifications	FCC Class B, VCCI Class B, BSMI Class A, CISPR 22 Class B, EN 55022 Class B, EN55024-1, ICES-003 Class B, MIC Class B, ACA Class B, UL, Canada UL, EN60950
	Power Requirement	1280 mA @ 3.3V typical
	Boot ROM Support	Yes
	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
	Operating Temperature	32° to 131°F (0° to 55° C)
	Operating Humidity	0% to 95% non-condensing
	Dimensions	12.95 x 6.8 cm (5.1 x 2.7 in)
	Operating System Driver Support	Windows Vista Business 64, Windows Vista Business 32, Windows X Professional, Windows XP Professional x64 Edition. Red Hat Enterprise Linux(RHEL) WS4, 5, 6 Desktop/Workstation Novell SLED 10 & SLED 11
	Management Capabilities	WOL , PXE 2.1
	Kit Contents	HP NC360T PCI Express Dual Port Gigabit NIC, low profile bracket, CI containing Intel PROset II NIC drivers, quick install guide, product warranty statement