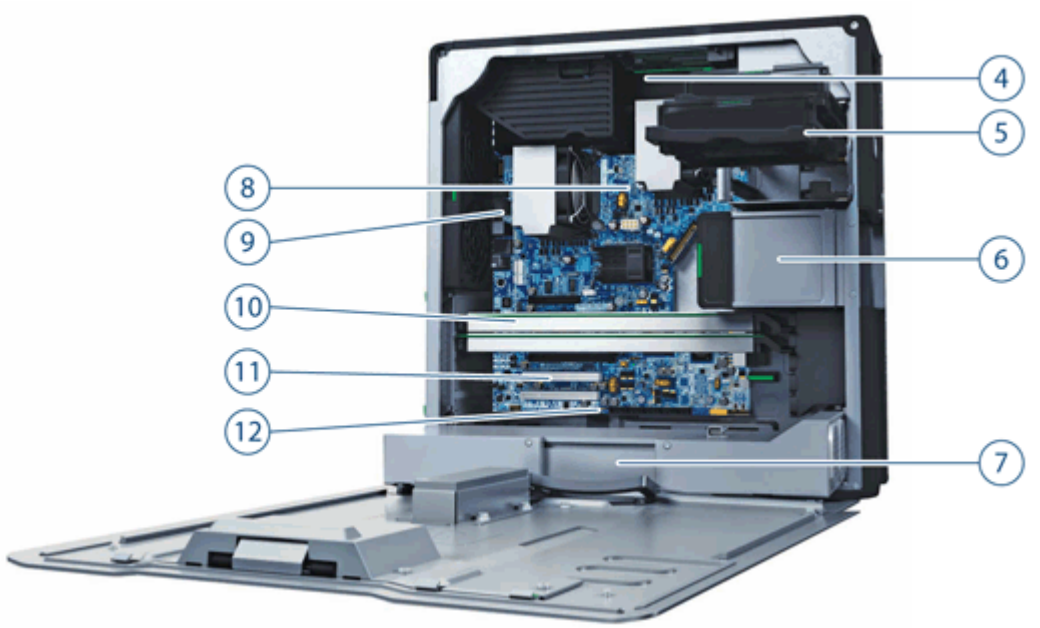
Overview

1. Power Button
2. 2 External 5.25" Bays
3. Front I/O: 3 USB 2.0, 1 IEEE 1394a (optional card required), Headphone, Microphone

Overview



4. 6 DIMM Slots for DDR3 ECC Memory
5. 2 Internal 3.5” Bays
6. 2 External 5.25” Bays
7. 650W, 85% efficient Power Supply
8. 2 Quad Core Intel 5500 Series Processors
9. Rear I/O: 6 USB 2.0, PS/2 keyboard/mouse
   1 RJ-45 to Integrated Gigabit LAN
   1 Audio Line In, 1 Audio Line Out, 1 Microphone In
10. 2 PCIe x16 Gen2 Slots
11. 1 PCIe x4 electrical / x8 mechanical Gen2,
    1 PCIe x4 electrical / x8 mechanical Gen1,
    2 PCI Slots
12. 3 Internal USB 2.0 ports

Form Factor	Minitower
Compatible Operating Systems	Genuine Windows 7® Ultimate 64-bit* Genuine Windows 7® Professional 64-bit* Genuine Windows 7® Professional 32-bit* Genuine Windows 7® Professional 64-bit with downgrade to Windows® XP Professional x64 custom installed Genuine Windows 7® Professional 32-bit with downgrade to Windows® XP Professional 32-bit custom installed HP Linux Installer Kit for Linux (includes drivers for both 32-bit & 64-bit OS versions of Red Hat Enterprise Linux WS4 and WS5 - see: http://www.hp.com/workstations/software/linux) Red Hat Enterprise Linux® WS5 (as Drop-in-the-box only) For detailed OS/hardware support information for Linux, see: http://www.hp.com/support/linux_hardware_matrix *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.
Available Processors	Intel® Xeon® Processor X5670 6C 2.93 GHz, 95W, 12M cache, 6.40GT/s QPI, DDR3 1333MHz, HT, Turbo Intel® Xeon® Processor X5667 4C 3.06 GHz, 95W, 12M cache, 6.40GT/s QPI, DDR3 1333MHz, HT, Turbo Intel® Xeon® Processor X5660 6C 2.80 GHz, 95W, 12M cache, 6.40GT/s QPI, DDR3 1333MHz,

	HT, Turbo Intel® Xeon® Processor X5650 6C 2.66 GHz, 95W, 12M cache, 6.40GT/s QPI, DDR3 1333MHz, HT, Turbo Intel® Xeon® Processor E5640 QC 2.66 GHz, 80W, 12M cache, 5.86GT/s QPI, DDR3 1066MHz, HT, Turbo Intel® Xeon® Processor E5630 QC 2.53 GHz, 80W, 12M cache, 5.86GT/s QPI, DDR3 1066MHz, HT, Turbo Intel® Xeon® Processor E5620 QC 2.40 GHz, 80W, 12M cache, 5.86GT/s QPI, DDR3 1066MHz, HT, Turbo Intel Xeon Processor E5507 4C 2.26 GHz, 80W, 4M cache, 4.80GT/s QPI, DDR3 800MHz Intel Xeon Processor E5506 QC 2.13 GHz, 80W, 4M cache, 4.80GT/s QPI, DDR3 800MHz
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 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 of 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. Processor 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.
Additional Details	• Intel® Nehalem Architecture • Up to 6.40GT/s QPI support • 3-channel 800/1066/1333 MHz DDR3 memory* subsystem • Up to 48 GB Memory capacity with 6 DIMM slots and 8 GB DIMMs • PCI Express I/O and PCIe x16 Gen2 graphics • Integrated Broadcom 5764 Gigabit LAN on Motherboard (LOM) • 6 channels of Serial ATA (SATA) 3.0 Gb/s natively supported internally • SATA RAID** 0, 1, 5, and 10 support standard on motherboard • SAS RAID 0, 1, and 10 supported using the LSI 3041E PCIe controller • SATA optical drives • High Definition integrated audio with internal speaker • 650W 85% efficient power supply • ENERGY STAR® qualification and energy-saving features available on selected configurations (Not supported by Linux) • Protected by HP Services, including a 3 years parts, 3 years labor, and 3 years onsite service (3/3/3) standard warranty. Terms and conditions vary by country. Certain restrictions and exclusions apply. *Each processor supports up to 3 channels of DDR3 memory. To realize full performance at least 1 DIMM must be inserted into each channel. To get full 6 channel support, 2 processors MUST be installed. **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.
Form Factor	Rackable Minitower

Overview

Color	Black/Silver	
I/O Slots (see system board section for more details)	• 2 PCI Express Gen2 x16 slots (full-length, full-height) • 1 PCI Express Gen2 x4/x8* slot – with x8 open-ended connectors (full-length, full-height) • 1 PCI Express Gen1 x4/x8* slot – with x8 open-ended connectors (full-length, full-height) • 2 PCI 32bit/33MHz slot, (full-length, full-height) *These slots have 4 PCI Express lanes routed to them. They are sometimes called "x4 electrial, x8 mechanical" slots. 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 = 4	
Internal Bays	2 internal 3.5" bays (with acoustic dampening rail assemblies)	
External Bays	2 external 5.25" bays (3rd & 4th HDDs occupy one external bay)	
Front I/O	3 USB 2.0, 1 Headphone Out, 1 Microphone In. 1 IEEE 1394a integrated with systems manufactured beginning 3/22/10.	
Rear I/O	6 USB 2.0 1 RJ-45 to integrated Gigabit LAN 2 legacy PS/2 1 Audio Line In, 1 Audio Line Out, 1 Microphone In; audio ports can be retasked to function as line in, line out, microphone, or headphone. Serial supported with optional rear bulkhead adapter.	
Internal USB	3 USB 2.0 headers [3 USB 2.0 ports available by one 2x5 header and one 1x5 header: supports either up to two HP Internal USB Port Kits, AMO- EM165AA (one port on each Kit), or one Internal Port kit and one USB Media Card Reader.]	
Chassis Dimensions (H x W x D)	44.51 x 16.53 x 44 cm (17.5 x 6.5 x 17.3 in)	
System Weight	Exact weights depend upon configuration Minimum config - 15.0 kg (33.0 lb) Typical config - 16.9 kg (37.4 lb) Maximum config - 19.6 kg (43.3 lb) (Maximum shipping weight - 23.6 kg/52.0 lb)	
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%
	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	650W 85% Efficient wide-ranging, active Power Factor Correction, with tool-free & cable-free connection The Power Supply Efficiency Report for this product may be found at this link: http://www.80plus.org/manu/psu/psu_reports/SO-034_DELTA_DPS-25AB%20A_650W_Report_mod.pdf	
Interfaces Supported	6-channel SATA 3.0 Gb/s Interface (6 Serial-ATA connectors on the motherboard, 4 channels are eSATA configurable for use with eSATA CTO/AMO Kit) SAS interface supported with optional LSI 3041E 4-port SAS/SATA PCIe card. 1 Floppy interface (1 Floppy connector), USB 2.0. 1 IEEE 1394a interface with systems manufactured beginning 3/22/10.	

Overview

Hard Drive Controllers Supported	SATA and SAS controllers
Backup Devices	For a complete listing of compatible DAT tape drives, LTO tape drives and RDX Removable Disk Backup System offerings, please visit: http://www.hp.com/go/connect

Supported Components

Processors

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Quad-Core Intel Xeon Processor 5500 Series with Intel® 64 Architecture				
Intel Xeon E5506, 2.13GHz, 4MB cache, 800MHz Memory, 4.80 GT/s QPI, 80W	Y	Y	NF147AA	
Intel Xeon E5507, 2.26 GHz, 4MB cache, 800MHz Memory, 4.80GT/s QPI, 80W	Y	Y	WG727AA	
Four-Core and Six-Core Intel Xeon Processor 5600 Series with Intel® 64 Architecture				
Intel® Xeon® Processor X5670 6C 2.93 GHz, 95W, 12M cache, 6.40GT/s QPI, DDR3 1333MHz, HT, Turbo	Y	Y	WG734AA	
Intel® Xeon® Processor X5667 6C 3.06 GHz, 95W, 12M cache, 6.40GT/s QPI, DDR3 1333MHz, HT, Turbo	Y	Y	WG733AA	
Intel® Xeon® Processor X5660 6C 2.80 GHz, 95W, 12M cache, 6.40GT/s QPI, DDR3 1333MHz, HT, Turbo	Y	Y	WG732AA	
Intel® Xeon® Processor X5650 6C 2.66 GHz, 95W, 12M cache, 6.40GT/s QPI, DDR3 1333MHz, HT, Turbo	Y	Y	WG731AA	
Intel® Xeon® Processor E5640 4C 2.66 GHz, 80W, 12M cache, 5.86GT/s QPI, DDR3 1066MHz, HT, Turbo	Y	Y	WG730AA	
Intel® Xeon® Processor E5630 4C 2.53 GHz, 80W, 12M cache, 5.86GT/s QPI, DDR3 1066MHz, HT, Turbo	Y	Y	WG729AA	
Intel® Xeon® Processor E5620 4C 2.40 GHz, 80W, 12M cache, 5.86GT/s QPI, DDR3 1066MHz, HT, Turbo	Y	Y	WG728AA	

NOTE 1: 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 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 of 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. Processor 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's numbering is not a measurement of higher performance.

Support for Xeon 5600 Series processors requires the C2 revision of the Intel 5520 chipset. Two methods are available to determine if a specific Z600 system has the C2 revision of the chipset. 1.

Supported Components

Use the BIOS setup menu to access the “Boot Block Date” from the “System Information Menu”. All B3-based systems will have a “1/30/09” date and C2-based systems will have a "01/07/10" date. 2. HP Performance Advisor SW can be used to determine the PCA ID, which is reported by Performance Advisor under “System Configuration” and “Baseboard ID”. All B3-based systems will have the ID "0AE8h" and all C2-based systems will have the ID "0B54h".

		Factory Configured	Option Kit	Option Kit Part Number	Support Notes
SAS Hard Drives	**HP SAS (Serial Attached SCSI) Hard Drives for HP Workstations**				
	146GB SAS 15K rpm 3Gb/s 3.5" HDD	Y	Y	EA330AA	
	300GB SAS 15K rpm 3Gb/s 3.5" HDD	Y	Y	EM174AA	
	450GB SAS 15K rpm 3Gb/s 3.5" HDD	Y	Y	FM803AA	
	600GB SAS 15K rpm 3.5" HDD (6Gb/s enabled)	Y	Y	VM647AA	
	Sub-Section Description/Notes				
	(SAS Controller, not integrated, is required)				
SATA Hard Drives	**SATA (Serial ATA) Hard Drives for HP Workstations**				
	160GB SATA 7200 rpm 3Gb/s 3.5" HDD	Y	Y	PV944A	
	250GB SATA 7200 rpm 3Gb/s 3.5" HDD	Y	Y	PY278AA	
	320GB SATA 7200 rpm 3Gb/s 3.5" HDD	Y	Y	FH963AA	
	500GB SATA 7200 rpm 3Gb/s 3.5" HDD	Y	Y	PV943A	
	1000GB (1TB) SATA 7200 rpm 3.0Gb/s 3.5" HDD	Y	Y	GE262AA	
	1.5TB SATA 7200 rpm 3Gb/s 3.5" HDD	Y	Y	VH997AA	
	2.0TB SATA 7200 rpm 3Gb/s 3.5" HDD	Y	Y	WE464AA	
	160GB SATA 10K rpm SFF in 3.5" Frame HDD	Y	Y	EW222AA	
	300GB SATA 10K rpm SFF in 3.5" Frame HDD	Y	Y	FM802AA	
	600GB SATA 10K rpm SFF in 3.5" Frame HDD	Y	Y	XP309AA	
	Sub-Section Description/Notes				
	(2.5" SFF drives cannot be mixed with 3.5" drives)				
SATA Solid State Drives	**HP Solid State Drive for Workstations**				
	HP 64GB SATA SLC Solid State Drive (SFF in 3.5" Frame)	Y	Y	NW778AA	
	HP 160GB SATA X25-M SSD	Y	Y	WV915AA	

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).
Up to 3 of the following 3.5" SATA and 3.5" 15K SAS drives, or up to 4 of the 2.5" small form factor (SFF) 10K SATA drives are allowed.

Supported Components

Hard Drive Controllers

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Integrated SATA 3.0 Gb/s Controller				
Integrated SATA 3.0 Gb/s Controller, RAID 0, 1, 10, 5 supported	Y	N		
Factory integrated RAID on motherboard for SATA drives				
RAID 0 Configuration – Striped Array	Y	N		See note 1
RAID 1 Configuration – Mirrored Array	Y	N		See note 1
LSI 3041E 4-Port SAS 3.0 Gb/s RAID Card				
LSI 3041E 4-Port SAS 3.0 Gb/s RAID Card	Y	Y	EH417AA	
LSI MegaRAID® SAS 8888ELP Host Bus Adapter (HBA)				
LSI 8888ELP 8-port SAS HW RAID Card	N	Y	GE258AA	

All RAID arrays must be less than 2 TB in size

NOTE 1: Requires 2 identical hard drives (speeds, capacity, interface). RAID 1 does not support a 3rd HDD. No Linux support for SATA RAID.

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

LSI RAID Definitions:
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

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Graphics

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes	Supported Multi Mixed
Professional 2D					
NVIDIA Quadro NVS 295 256MB PCIe Graphics Card	Y	Y	FY943AA	2nd card must be NVS 450 or NVS 295	2 X
NVIDIA Quadro NVS 450 512 MB PCIe Graphics Card	Y	Y	FH519AA	2nd card must be NVS 450 or NVS 295	2 X
NVIDIA NVS300 512MB PCIe Graphics Card	Y	Y	XP612AA	2nd card must be NVS 450 or NVS 300	2 X

Supported Components

NVIDIA Quadro NVS 290 256 MB PCIe Graphics Card with 'DMS-59 to Dual DVI cable' included – for Workstations	N	Y	GN502AA	1 or 2 of these cards are supported – 2nd card must be NVS 290	2
Entry 3D					
NVIDIA Quadro FX 380 256MB PCIe Graphics Card	Y	Y	NB769AA		2
ATI FirePro V3700 256MB PCIe Graphics Card	Y	Y	FY944AA		2
NVIDIA Quadro FX 580 512MB PCIe Graphics Card	Y	Y	FY945AA		2
NVIDIA Quadro 600 1GB Graphics Card	Y	Y	WS093AA		2
ATI FirePro V3800 512MB PCIe Graphics Card	Y	Y	WL048AA		2
ATI FirePro V4800 1GB Graphics Card	Y	Y	WL049AA		2
Mid-range 3D					
NVIDIA Quadro FX 1800 768MB PCIe Graphics Card	Y	Y	FY946AA		2
NVIDIA Quadro 2000 1GB Graphics Card	Y	Y	WS094AA		2
ATI FirePro V5700 512MB PCIe Graphics Card	Y	Y	FY947AA		2
ATI FirePro V5800 1GB Graphics Card	Y	Y	WL050AA		2
High End 3D					
NVIDIA Quadro FX 3800 1.0GB PCIe Graphics Card	Y	Y	FY949AA		1
ATI FirePro V7750 1.0GB PCIe Graphics Card	Y	Y	FY948AA		1
NVIDIA Quadro 4000 2GB Graphics Card	Y	Y	WS095AA		1
NVIDIA Quadro FX 4800 1.5GB PCIe Graphics Card	Y	Y	FQ138AA		1
NVIDIA Quadro 5000 2.5GB Graphics Card	Y	Y	WS096AA		1

Memory	CTO	Option Kit Part Number	Support Notes
	PC3-10600 DDR3-1333 ECC Unbuffered DIMMs CTO		
	1GB (1x1GB) DDR3-1333 ECC Unbuffered RAM 1-CPU		
	2GB (2x1GB) DDR3-1333 ECC Unbuffered RAM 1-CPU		
	3GB (3x1GB) DDR3-1333 ECC Unbuffered RAM 1-CPU		
	4GB (2x2GB) DDR3-1333 ECC Unbuffered RAM 1-CPU		
	6GB (3x2GB) DDR3-1333 ECC Unbuffered RAM 1-CPU		

8GB (2x4GB) DDR3-1333 ECC Unbuffered RAM 1-CPU	
8GB (2x2GB + 1x4GB) DDR3-1333 ECC Unbuffered RAM 1-CPU	
12GB (3x4GB) DDR3-1333 ECC Unbuffered RAM 1-CPU	
2GB (2x1GB) DDR3-1333 ECC Unbuffered RAM 2-CPU	Both processor sockets must be populated.
4GB (4x1GB) DDR3-1333 ECC Unbuffered RAM 2-CPU	Both processor sockets must be populated.
4GB (2x2GB) DDR3-1333 ECC Unbuffered RAM 2-CPU	Both processor sockets must be populated.
6GB (6x1GB) DDR3-1333 ECC Unbuffered RAM 2-CPU	Both processor sockets must be populated.
8GB (4x2GB) DDR3-1333 ECC Unbuffered RAM 2-CPU	Both processor sockets must be populated.
8GB (2x4GB) DDR3-1333 ECC Unbuffered RAM 2-CPU	Both processor sockets must be populated.
12GB (6x2GB) DDR3-1333 ECC Unbuffered RAM 2-CPU	Both processor sockets must be populated.
16GB (4x4GB) DDR3-1333 ECC Unbuffered RAM 2-CPU	Both processor sockets must be populated.
16GB (4x2GB + 2x4GB) DDR3-1333 ECC Unbuffered RAM 2-CPU	Both processor sockets must be populated.
24GB (6x4GB) DDR3-1333 ECC Unbuffered RAM 2-CPU	Both processor sockets must be populated.
PC3-10600 DDR3-1333 ECC Registered DIMMs CTO	
8GB (2x4GB) DDR3-1333 ECC Registered RAM 1-CPU	
12GB (3x4GB) DDR3-1333 ECC Registered RAM 1-CPU	
16GB (2x8GB) DDR3-1333 ECC Registered RAM 1-CPU	
24GB (3x8GB) DDR3-1333 ECC Registered RAM 1-CPU	
8GB (2x4GB) DDR3-1333 ECC Registered RAM 2-CPU	Both processor sockets must be populated.

16GB (4x4GB) DDR3-1333 ECC Registered RAM 2-CPU	Both processor sockets must be populated.
24GB (6x4GB) DDR3-1333 ECC Registered RAM 2-CPU	Both processor sockets must be populated.
32GB (4x8GB) DDR3-1333 ECC Registered RAM 2-CPU	Both processor sockets must be populated.
48GB (6x8GB) DDR3-1333 ECC Registered RAM 2-CPU	Both processor sockets must be populated.
Sub-Section Description/Notes	Both processor sockets must be populated.

The Z600 has a three-channel memory architecture. Three channels are associated with each processor. For optimal performance, populate a DIMM in each channel.

AMO

PC3-10600 DDR3-1333 ECC Unbuffered DIMMs AMO

1GB (1x1GB) DDR3-1333 ECC Unbuffered RAM	FX698AA
2GB (1x2GB) DDR3-1333 ECC Unbuffered RAM	FX699AA
4GB (1x4GB) DDR3-1333 ECC Unbuffered RAM	NL797AA

PC3-10600 DDR3-1333 ECC Registered DIMMs AMO

8GB (1x8GB) DDR3-1333 ECC Registered RAM	FX622AA
4GB (1x4GB) DDR3-1333 ECC Registered RAM	FX621AA

NOTE: Although all of these memory configurations incorporate 1333MHz memory modules, the speed at which they operate is dependent upon the processor.

Support for Registered DIMMs on the Z600 requires a systemboard with the C2 revision of the Intel 5520 chipset. Two methods are available to determine if a specific Z600 system has the C2 revision of the chipset. 1. Use the BIOS setup menu to access the “Boot Block Date” from the “System Information Menu”. All B3-based systems will have a “1/30/09” date and C2-based systems will have a "01/07/10" date. 2. HP Performance Advisor SW can be used to determine the PCA ID, which is reported by Performance Advisor under “System Configuration” and “Baseboard ID”. All B3-based systems will have the ID "0AE8h" and all C2-based systems will have the ID "0B54h".

Supported Components

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	
Creative X-Fi Titanium PCIe Audio Card	Y	Y	NH222AA	See note 1
Logitech® QuickCam® Pro 9000 USB Camera Audio Headset with Boom Microphone	N	Y	NG855AA	
Omni Directional USB Powered Speakers, Desktop Microphone, SoundBlaster® X-Fi™2 XtremeGamer Audio Card, PCIe	N	Y	NG857AA	

NOTE 1: The SoundBlaster X-Fi Titanium audio card is supported on the HP Z Series Workstations
with Microsoft Windows XP Pro 32-bit and 64-bit and Microsoft Vista 32-bit and 64-bit versions. Linux is not supported.

Optical and Removable Storage

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP 16X DVD-ROM SATA Drive	Y	Y	AR629AA	See note 1
HP 16X DVD+-RW SuperMulti SATA Drive	Y	Y	AR630AA	
HP Slot Load DVD+/-RW Drive	Y	N		
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 Carrier with 160GB SATA HDD	N	Y	FZ577AA	
HP DX115 Removable HDD Frame/Carrier	N	Y	FX576AA	
HP DX115 Removable HDD Carrier	N	Y	NB792AA	

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: Not supported as a 2nd Optical Drive.

Supported Components

Controller Cards

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP FireWire/IEEE 1394a PCI Card	Y	Y	PA997A	
HP IEEE 1394b FireWire PCIe Card	Y	Y	NK653AA	

Monitors

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP LP2065 20-inch LCD Monitor	Y	Y	EF227A4	
HP LP2475w 24-inch Widescreen LCD Monitor	Y	Y	KD911A4	
HP DreamColor LP2480zx Professional Display	Y	Y	GV546A4	
HP LP3065 30-inch Widescreen LCD Monitor	Y	Y	EZ320A4	
HP ZR22w 21.5-inch S-IPS LCD Monitor	Y	Y	VM626A4	
HP ZR24w 24-inch S-IPS LCD Monitor	Y	Y	VM633A4	
HP ZR30w 30-inch S-IPS LCD Monitor	Y	Y	VM617A4	

Supported by all Operating Systems available from HP

Screen size diagonally measured

Networking and Communications

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Integrated Broadcom 5764 PCIe LOM Controller	Y	N		
Broadcom NetXtreme Gigabit Ethernet Plus NIC (PCIe)	Y	Y	FS215AA	
HP NC360T PCI Express Dual Port Gigabit NIC	N	Y	KU004AA	
Intel Gigabit CT Desktop NIC	N	Y	FH969AA	

The Broadcom NetXtreme Plus card may be used, along with the integrated 5764 LOM, for teaming, redundancy, or additional network bandwidth.

"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.

Racking and Physical Security

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Security Cable with Kensington Lock	N	Y	PC766A	
HP Solenoid Hood Lock & Hood Sensor	Y	N		
HP (CMT) Solenoid Lock	N	Y	DE618A	
HP Z6/Z8 Adjustable Sliding Rail Rack Kit	N	Y	NN124AA	

Supported Components

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	N	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	EF390AA	

Other Hardware

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP Workstation Mouse Pad	Y	N		Japan only.
HP Power Cord Kit	N	Y	DM293A	
HP eSATA PCI Cable Kit	N	Y	GM110AA	
HP Serial Port Adapter	N	Y	PA716A	Provides 1st Serial Port for the Z600.
HP Internal USB Port Kit	N	Y	EM165AA	
HP Workstation to LTO SAS Int. Cable	N	Y	EH925A	
HP Optical Bay HDD Mounting Bracket	Y	Y	NQ099AA	For 3.5" HDDs
HP ENERGY STAR 5.0 Enabled Configuration	Y	N		

Supported Components

Software

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP SkyRoom Software	Y	N		
HP Performance Tuning Framework	Y	N		
Roxio Easy Media Creator (CD or DVD burner)	Y	N		
Intervideo WinDVD with DVD player	Y	N		
HP Backup and Recovery	Y	N		Supported on Windows XP ONLY
PDF Complete	Y	N		
Microsoft Office 2007 Small Business Edition	Y	N		
Microsoft Office 2007 Trial Edition	Y	N		
HP Client Manager Software v6.2 (optional download)	Y	N		
HP ProtectTools Security	Y	N		Must select as a Configure to Order Option. Delivered as a "Drop in the Box" CD
Elemental Accelerator for NVIDIA Quadro	Y	N		
HP Power Assistant	Y	N		
Parallels Workstation 4.0 Extreme	Y	N		Supported with dual NVIDIA Quadro 2000 graphics cards and a minimum of 8GB of system memory.

Supported Components

Operating Systems	Support Notes
Genuine Windows® 7 Ultimate 64-bit	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.
Genuine Windows® 7 Professional 64-bit	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.
Genuine Windows® 7 Professional 32-bit	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.
HP Linux Installer Kit	see: http://www.hp.com/workstations/software/linux
Red Hat Linux Workstation 5 Drop In Box OS	This second OS must be ordered with The HPIKL as the first OS. It is a Drop In the Box (DIB) Red Hat registration card redeemed directly with Red Hat SW company (using the URL and Subscription / registration number), NOT through HP.

System Board

System Board Form Factor	36 x 28 cm 14.2 x 11 inches
Processor Socket	Dual LGA 1366
CPU Bus Speed	QPI: Up to 6.4GT/second, depending on processor
Chipset	Intel® 5520
Super I/O Controller	SMSC SCH5327, Rev B
Memory Expansion Slots	6 (3 per processor)
Memory Type Supported	DDR3, UDIMM (Unbuffered), ECC: 1GB, 2GB, and 4GB DDR3, RDIMM (Registered), ECC: 4GB and 8GB
Memory Modes	NUMA (Non-Uniform Memory Architecture), Memory Node Interleave
Memory Speed Supported	800, 1066, & 1333MHz
Memory	
Maximum Memory	Supports up to 48GB

		Single Processor		
		CPU0		
Capacity	Type	DIMM1	DIMM2	DIMM3
1GB	UDIMM	1GB		
2GB	UDIMM	1GB	1GB	
3GB	UDIMM	1GB	1GB	1GB
4GB	UDIMM	2GB	2GB	
4GB	RDIMM	4GB		
6GB	UDIMM	2GB	2GB	2GB
8GB	UDIMM	4GB	4GB	
8GB	RDIMM	4GB	4GB	
8GB	RDIMM	8GB		
12GB	UDIMM	4GB	4GB	4GB
12GB	RDIMM	4GB	4GB	4GB
16GB	RDIMM	8GB	8GB	
24GB	RDIMM	8GB	8GB	8GB

		Dual Processor					
		CPU0			CPU1		
Capacity	Type	DIMM1	DIMM2	DIMM3	DIMM4	DIMM5	DIMM6
2GB	UDIMM	1GB			1GB		
4GB	UDIMM	1GB	1GB		1GB	1GB	
4GB	UDIMM	2GB			2GB		
6GB	UDIMM	1GB	1GB	1GB	1GB	1GB	1GB
8GB	UDIMM	2GB	2GB		2GB	2GB	
8GB	UDIMM	4GB			4GB		
8GB	RDIMM	4GB			4GB		
12GB	UDIMM	2GB	2GB	2GB	2GB	2GB	2GB
16GB	UDIMM	4GB	4GB		4GB	4GB	
16GB	RDIMM	4GB	4GB		4GB	4GB	
16GB	RDIMM	8GB			8GB		
24GB	UDIMM	4GB	4GB	4GB	4GB	4GB	4GB
24GB	RDIMM	4GB	4GB	4GB	4GB	4GB	4GB
32GB	RDIMM	8GB	8GB		8GB	8GB	
48GB	RDIMM	8GB	8GB	8GB	8GB	8GB	8GB

Memory Configuration (Supported)	• Not all memory configurations possible are represented above. • Only ECC DIMMs are supported. • Do not install memory modules into memory slots if corresponding processor is not installed. • Dual processor configurations with memory modules installed for only one processor is not supported. • UDIMM (Unbuffered) and RDIMM (Registered) memory cannot be mixed. All memory installed in the system must be either UDIMM or RDIMM.	
PCI Express Connectors (Gen2 Rev 0.7 connectors)	2 PCI Express x16 Gen2 graphics 1 PCI Express Gen2 (x8 mechanically, x4 electrically) 1 PCI Express Gen1 (x8 mechanically, x4 electrically)	
PCI Connectors (5.0V)	2 full length 33 MHz 32-Bit	
Interfaces Supported	**SATA**	Integrated 6-channel SATA 3.0Gb/sec controller with RAID 0, 1, 5, 10 and NCQ. (Factory integrated RAID is Microsoft Windows only)
Serial Attached SCSI	Requires Optional PCIe card	
Integrated RAID	Integrated SATA RAID • RAID 0, RAID 1*, RAID 5, RAID 10 • Supports one RAID array with 2-4 drives • RAID 0 configuration – striped array (supported and configure to order) • RAID 1 configuration – mirrored array (supported and configure to order) • RAID 5 parity striping (supported but not configure to order) • RAID 10 striped and mirrored array (supported but not configure to order) **NOTES**: *HW RAID functionality not supported by Linux. Use SW RAID functionality provided in the Red Hat Operating system instead.	
Integrated Graphics	No	

System Technical Specifications

Network Controller	Controller Broadcom 5764 PCI-E LAN Controller 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 Data path speed 2.5Gbit per sec 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 Microsoft Windows Vista Business 32 and 64, Microsoft Windows XP Professional 32 and 64 Management capabilities WOL, PXE 2.1 and ASF 2.0	
SATA Connectors	6 ports/connectors (Include 4 are eSATA configurable with optional eSATA After-Market Option cable kit)	
IEEE 1394a or 1394b	Integrated 1394a (beginning with systems manufactured 3/22/10) No integrated 1394b – optional PCIe card required. Cable from Front IO can be plugged into PCI Card. Not supported in Linux	
IEEE 1394 Connector(s)	**Front**	1 IEEE 1394a (requires optional PCI card to function with systems manufactured before 3/22/10 only)
	Rear	No
	Internal	No
USB Connector(s)	**Front**	3 on header for front
	Rear	6
	Internal	3 [3 USB 2.0 ports available by one 2x5 header and one 1x5 header: supports either up to two HP Internal USB Port Kits, AMO- EM165AA (one port on each Kit), or one Internal Port kit and one USB Media Card Reader.]
HD Integrated Audio	High Definition Integrated Realtek ALC262 Audio with Line in, Line Out, Microphone, Headphone Line-in, Line-out, Mic-in x2, and Headphone jacks	
Flash ROM	Yes	
Clear Fan Header	No	
CPU Fan Header	One for each CPU socket	
Chassis Fan Header	2 Rear System Chassis Fan Header 1 Front Chassis Fan Header	
Front PCI Fan Header	Yes	
Front Control Panel/Speaker Header	Yes	
CMOS Battery Holder – Lithium	Yes	
Integrated Trusted Platform Module	TPM 1.2, Infineon	
Power Supply Headers	Yes	

System Technical Specifications

Power Switch, Power LED & Hard Drive LED Header	Yes
Clear Password Jumper	Yes
Serial Port	Optional
Parallel Port	No
Keyboard/Mouse	PS/2
Power Supply	650 watt 85% efficient custom power supply (Wide Ranging, Active PFC)
Operating Voltage Range	90 – 269 VAC
Rated Voltage Range	100 - 240 VAC
Rated Line Frequency	50/60Hz
Operating Line Frequency Range	47-66Hz
Rated Input Current	10 A @ 100-240 VAC
Heat Dissipation	Typical = 434 btu/hr (109 kg-cal/hr) Maximum = 964 btu/hr (243 kg-cal/hr)
Power Supply Fan	92x25 mm variable speed
ENERGY STAR® qualified (Config Dependent)	Yes
80 PLUS Compliant	Yes. For the ECOs PSU Efficiency Report for the power supply, please go to this link: http://www.80plus.org/manu/psu/psu_reports/SO-034_DELTA_DPS-725AB%20A_650W_Report_mod.pdf.
FEMP Standby Power Compliant 115V (Wake-on LAN disabled) (<2W in S5 - Power Off)	Yes
Power consumption in sleep mode (as defined by ENERGY STAR) – Suspend to RAM (S3)	<5W
Built-in Self Test (BIST) LED	Yes
Surge Tolerant Full Ranging Power Supply (withstands power surges up to 2000V)	Withstands power surges up to 2000V
Hood Lock Header	Yes
Hood Sensor Header	Yes Integrated in Front Control Panel Cable
Multibay Header	No
Integrated Gigabit Ethernet	Integrated Broadcom 5764 Gigabit Ethernet LOM
Wake on LAN	Yes

ASF 1.0/2.0 (Alert Standard Format)	Yes
TPM	Integrated TPM 1.2; Infineon
Password Clear Header	Yes
CD-ROM; analog audio cable	No
AUX; analog audio in	No
Clear CMOS Button	Yes
Chassis Speaker Header	Yes (Integrated in Front Control Panel Cable)
ENERGY STAR® qualified (Config Dependent)	Yes

Z600 Required Power Supply Info		
Power Supply	**650 watt custom power supply – (Wide Ranging Active PFC)**	
Operating Voltage Range	90 - 269 VAC	
Rated Voltage Range	100 – 240 VAC	118 VAC
Rated Line Frequency	50-60 Hz	400 Hz
Operating Line Frequency Range	47 – 66 Hz	393 – 407 Hz
Rated Input Current	10 A @ 110-127 VAC 6 A @ 200-240 VAC	10 A @118 VAC
Heat Dissipation (Configuration and software dependent)	Typical 1578 btu/hr (397.7 kg-cal/hr) Maximum 2705 btu/hr (681.8 kg-cal/hr)	
Power Supply Fan	2x60x25 mm variable speed (sleeve-bearing)fans	
Energy Star Compliant (config dependent)	YES	
80 PLUS® Compliant	YES	
FEMP Standby Power Compliant@115V (Wake-on LAN disabled)(<2W in S5-Power Off)	YES	
EuP Compliant@230V (<1 W in S5-Power Off)	YES	
Power Consumption in sleep mode (as defined by ENERGY STAR) - Suspend to RAM (S3) (Instantly Available PC) measured at 115V.	<9W	
Built-in Selft Test LED	YES	
Surge Tolerant Full Ranging Power Supply (withstands power surges up to 2000V	YES	

System Configuration

Example Configuration #1

Processor Info	1x Intel Xeon E5506
Memory Info	1x1 GB DDR3 1333 (UDIMM)
Graphics Info	NVS290
Disks/Optical/Floppy	1x160GB SATA / 0 Optical / 0 Floppy
PSU	650W 80PLUS® BRONZE

Energy Consumption

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows Idle (S0)	62.2 W		61.8 W		63.1 W	
Windows Busy Typ (S0)	117.9 W		114.9 W		118.2 W	
Windows Busy Max (S0)	156.9 W		155.1 W		157.5 W	
Sleep (S3)	3.71 W	3.47 W	4.05 W	3.84 W	3.69 W	3.44 W
Off (S5)	1.14 W	1.32 W	1.45 W	1.32 W	1.12 W	0.99 W
Zero Power Mode (EuP)	0.24 W		0.52 W		0.29W	

Heat Dissipation**

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows Idle (S0)	212.4 btu/hr		210.8 btu/hr		215.2 btu/hr	
Windows Busy Typ (S0)	402.3 btu/hr		392.0 btu/hr		403.4 btu/hr	
Windows Busy Max (S0)	535.6 btu/hr		529.3 btu/hr		538.1 btu/hr	
Sleep (S3)	12.7 btu/hr	11.8 btu/hr	13.8 btu/hr	13.1 btu/hr	12.6 btu/hr	11.7 btu/hr
Off (S5)	3.9 btu/hr	4.5 btu/hr	4.9 btu/hr	4.5 btu/hr	3.8 btu/hr	3.4 btu/hr
Zero Power Mode (EuP)	0.8 btu/hr		1.77 btu/hr		0.7 btu/hr	

System Technical Specifications

Example Configuration #2

Processor Info	2 x Intel Xeon E5506
Memory Info	2x1GB DDR3 1333MHz (UDIMM)
Graphics Info	1xFX580
Disks/Optical/Floppy	1x250GB SATA / 0 Optical / 0 Floppy
PSU	650W 80PLUS® BRONZE

Energy Consumption

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows Idle (S0)	89.2 W		87.8 W		90.0 W	
Windows Busy Typ (S0)	294.1 W		287.8 W		294.9 W	
Windows Busy Max (S0)	313.5 W		307.3 W		317.0 W	
Sleep (S3)	5.08 W	4.84 W	5.43W	5.25 W	5.05 W	4.82 W
Off (S5)	1.14 W	1.01 W	1.45 W	1.32 W	1.12 W	0.99 W
Zero Power Mode (EuP)	0.24 W		0.52 W		0.22 W	

Heat Dissipation**

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows Idle (S0)	304.5 btu/hr		299.5 btu/hr		307 btu/hr	
Windows Busy Typ (S0)	1003.8 btu/hr		982.3 btu/hr		1006.5 btu/hr	
Windows Busy Max (S0)	1070 btu/hr		1048.8 btu/hr		1081.9 btu/hr	
Sleep (S3)	17.3 btu/hr	16.5 btu/hr	18.5 btu/hr	17.9 btu/hr	17.2 btu/hr	16.5 btu/hr
Off (S5)	3.9 btu/hr	3.5 btu/hr	5.0 btu/hr	4.5 btu/hr	3.8 btu/hr	3.38 btu/hr
Zero Power Mode (EuP)	0.8 btu/hr		1.8 btu/hr		0.8 btu/hr	

Example Configuration #3

Processor Info	2x Intel Xeon X5570
Memory Info	6x2GB DDR3 1333MHz (UDIMM)
Graphics Info	1 x FX4800
Disks/Optical/Floppy	2x1000GB SATA / 1 Optical / 1 Floppy
PSU	1xBroadcom 5761 Gigabit PCIe NIC 650W 80PLUS® BRONZE

Energy Consumption

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows Idle (S0)	123.3 W		119.9 W		123.6 W	
Windows Busy Typ (S0)	455.7 W		443.0 W		462.3 W	
Windows Busy Max (S0)	564.8 W		554.4 W		570.7 W	
Sleep (S3)	7.0 W	6.28 W	7.2 W	6.61 W	7.0 W	6.27 W
Off (S5)	1.6 W	0.90W	1.9 W	1.21W	1.6 W	0.88 W
Zero Power Mode (EuP)	0.24 W		0.51 W		0.22 W	

Heat Dissipation**

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows Idle (S0)	420.8 btu/hr		409.2 btu/hr		421.8 btu/hr	
Windows Busy Typ (S0)	1555.3 btu/hr		1512.0 btu/hr		1577.8 btu/hr	
Windows Busy Max (S0)	1927.7 btu/hr		1892.2 btu/hr		1947.8 btu/hr	
Sleep (S3)	23.9 btu/hr	21.4 btu/hr	24.6 btu/hr	22.6 btu/hr	23.9 btu/hr	21.4 btu/hr
Off (S5)	5.5 btu/hr	3.1 btu/hr	6.5 btu/hr	4.1 btu/hr	5.5 btu/hr	3.0 btu/hr
Zero Power Mode (EuP)	0.8 btu/hr		1.7 btu/hr		0.8 btu/hr	

Example Configuration #4 (ENERGY STAR Qualified)

Processor Info	2x Intel Xeon X5570
Memory Info	6x2GB DDR3 1333MHz (UDIMM)
Graphics Info	1 x FX4800
Disks/Optical/Floppy	2x1000GB SATA / 1 Optical / 1 Floppy
I/O	1xBroadcom 5761 Gigabit PCIe NIC
PSU	650W 80PLUS® BRONZE

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))	123.3 W		119.9 W		123.6 W	
ENERGY STAR® P_{MAX} Windows running Linpack and Viewperf	455.7 W		443.0 W		462.3 W	
ENERGY STAR® "Sleep" (S3)	7.0 W	-	7.2 W	-	7.0 W	-
ENERGY STAR® "Standby" (Off) (S5)	1.6 W	-	1.9 W	-	1.6 W	-

Heat Dissipation**

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
On-Idle (ENERGY STAR® Idle (S0))	420.8 btu/hr		409.2 btu/hr		421.8 btu/hr	
ENERGY STAR® P_{MAX} Windows running Linpack and Viewperf	1555.3 btu/hr		1512.0 btu/hr		1577.8 btu/hr	
ENERGY STAR® "Sleep" (S3)	23.9 btu/hr	-	24.6 btu/hr	-	23.9 btu/hr	-
ENERGY STAR® "Standby" (Off) (S5)	5.5 btu/hr	-	6.5 btu/hr	-	5.5 btu/hr	-

NOTES:

* Energy Star low energy mode

** Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.

This product is in compliance with US executive order 13221, WOL (wake on LAN) disabled.

Declared Noise Emissions (Entry-level and High-end configurations)		
System Configuration (Entry level)	**Processor Info**	Dual Intel Xeon X5570 2.93Ghz processors
	Memory Info	4 x 1GB 1333Mhz
	Graphics Info	nVidia Quadro NVS 295
	Disks/Optical/Floppy	250GB 7200 rpm SATA / 1 DVD-ROM/ 1 Floppy

System Technical Specifications

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)		**Sound Power** (LWAd, bels)	**Deskside Sound Pressure**
	Idle	4.1	22
	SATA Hard drive Operating (random reads)	4.2	23
	Floppy Drive Operating (continuous copy)		
	DVD-ROM Operating (sequential reads)	5.1	37

System Configuration (High-end)	**Processor Info**	Dual Intel Xeon X5570 2.93GHz processors
	Memory Info	6 x 2GB 1333 Mhz
	Graphics Info	nVidia FX4800
	Disks/Optical/Floppy	2x300GB 15k SAS / 1 DVD-ROM/ 1 Floppy

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)		**Sound Power** (LWAd, bels)	**Deskside Sound Pressure**
	Idle	4.8	32
	SATA Hard drive Operating (random reads)	4.9	33
	Floppy Drive Operating (continuous copy)		
	DVD-ROM Operating (sequential reads)	5.3	38

Environmental Requirements	**Temperature**	Operating: 5°C to 35°C (40°F to 95°F) Non-operating: -40°C to 60°C (-40°F to 140°F)
	Humidity	Operating: 8% to 85% RH, non-condensing Non-operating: 8% to 90% RH, non-condensing
	Maximum Altitude	Operating: 3,048 m (10,000 ft) Non-operating: 9,100 m (30,000 ft)
	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 1524m (5,000 ft) altitude, maximum operating temperature is de-rated by 1°C (1.8°F) per 305m (1,000 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
Floppy Drive	Tool-less
Hard Drives	Tool-less
Expansion Cards	Tool-less
Processor Socket	Yes
Green User Touch Points	Yes, on tool-free internal chassis components
Color-coordinated Cables and Connectors	Yes
Memory	Tool-less
System Board	Tool-less
Dual Color Power and HD LED on Front of Computer	Yes
Configuration Record SW	Yes
Over-Temp Warning on Screen	Yes
Restore CD Set	Restores the computer to its original factory shipping image - Can be obtained via HP Support
Dual Function Front Power Switch	Also acts as a reset switch 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	Yes (optional)
Rear Port Control Cover	Yes, locks rear IO cables to prevent cable theft
Serial, Parallel, USB, Audio, Network, Enable/Disable Port Control	Enables or disables serial, parallel, USB, 1394, audio, and network ports
Removable Media Write/Boot Control	User can prevent the workstation from writing to or booting from removable media
Power-On Password	Prevents an unauthorized person from booting up the computer
Setup Password	Prevents an unauthorized person from changing the system configuration
3.3V Aux Power LED on System PCA	No
NIC LEDs (integrated) (Green & Amber)	Yes

System Technical Specifications

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
Power Button	Yes
Power LED	Yes, blue (normal), red (fault)
Hard drive activity LED	Yes, green
Internal speaker	Yes
System/Emergency ROM Flash Recovery	Recovers corrupted system BIOS.
OS CD (Restore OS CD)	Restores computer to its original factory shipping image; No recovery CDs will ship with Windows XP, Vista or Linux - an ISO image will be available on an HD partition
ASF 2.0 support (Alert Standard Format)	Industry-standard specification for network alerting in operating system-absent environments
Cooling Solutions	Air cooled forced convection
Power Supply Fans	2x -- 60mm x 25mm
CPU Heatsink Fan(s)	80mm x 15mm
Chassis Fans	Rear: 2x -- 92mm x 25mm Front: 80mm x 25mm
Memory Fans	80mm x 25mm
Insight Diagnostics	**HP Insight 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 Insight 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 insight into potential system issues, is the configuration of the system. Insight Diagnostics helps provide higher system availability. Typical uses of the Insight 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, Infineon SLB9635TT1.2
Integrated Chassis Handles	Yes
Power Supply	Tool-less, direct-connect (blind-mate)
PCI Card Retention	Yes, rear (all), middle (full-height cards), front (full-length with extender cards)
Flash ROM	SPI ROM
Diagnostic Power Switch LED on board	Yes
Clear Password Jumper	Yes
Clear CMOS Button	Yes
CMOS Battery Holder for easy Replacement	Yes
DIMM Connectors for easy Upgrade	Yes
HP ProtectTools Security Manager	Yes – Not supported on Microsoft XP x64 or Linux

BIOS	
BIOS 32-bit Services	Standard BIOS 32-Bit Service Directory Proposal v0.4
PCI 3.0 Support	Full BIOS support for PCI Express through industry standard interfaces
ATAPI	ATAPI Removable Media Device BIOS Specification Version 1.0
BBS	BIOS Boot Specification v1.01
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 configuration settings controlled by the BIOS
System/Emergency ROM Flash Recovery with Video	Recovers system BIOS in corrupted Flash ROM
Replicated Setup	Saves BIOS settings to diskette or USB flash device in human readable file. Repset.exe utility can then replicate these settings on machines being deployed without entering Computer Configuration Utility (F10 Setup).
SMBIOS	System Management BIOS 2.5, previously known as DMI BIOS, for system management information
Boot Control	Disables the ability to boot from removable media on supported devices
Memory Change Alert	Alerts management console if memory is removed or changed
Thermal Alert	Monitors the temperature state within the chassis. Three modes: • NORMAL – normal temperature ranges

	• ALERTED – excessive temperatures are detected. Raises a flag so action can be taken to avoid shutdown or provide for a smoother system shutdown • SHUTDOWN – excessive temperatures are encountered. Automatically shuts down the computer without warning before hardware component damage occurs
Remote ROM Flash	Provides secure, fail-safe ROM image management from a central network console
ACPI (Advanced Configuration and Power Management Interface)	• Allows the system to enter and resume from low power modes (sleep states).] • Enables an operating system to control system power consumption based on the dynamic workload. • Makes it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system. • Supports ACPI 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
ASF 2.0 Compliant	Allows workstation status to be monitored on a remote console
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 the 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 2.0
ASF	Alert Standard Format Specification, Version 2.0
ATA (IDE)	AT Attachment 6 with Packet Interface (ATA/ATAPI-6), Revision 3b
CD Boot	"El Torito" Bootable CD-ROM Format Specification Version 1.0

EDD	• Enhanced Disk Drive Specification Version 1.1 • BIOS Enhanced Disk Drive Specification Version 3.0
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
PMM	POST Memory Manager Specification, Version 1.01
SATA	• Serial ATA Specification, Revision 1.0a • Serial ATA 3.0Gb/s: Extensions to Serial ATA 1.5Gb/s, Revision 1.0
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 1.1	Universal Serial Bus Revision 1.1 Specification
USB 2.0	Universal Serial Bus Revision 2.0 Specification
SMBIOS	System Management BIOS Reference Specification, Version 2.6

System Software Management and Updating	
HP Client Management Solutions	Visit: http://www.hp.com/go/easydeploy
Product Change	• 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.
Support Software CD & WWW	Yes
HP Client Manager	Visit: http://www.hp.com/go/easydeploy
System Software Manager (free)	Visit: http://www.hp.com/go/ssm
Social and Environmental Responsibility	
Eco-Label Certifications & Declarations	This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks: • ENERGY STAR (Configuration dependent, Microsoft 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	This product complies with ISO standards: • EU Directive 91/ 157/ EEC • EU Directive 93/ 86/ EEC •

	• EU Directive 98/ 101/ EEC Batteries used in the product do not contain: • Mercury greater than 5ppm by weight • Cadmium greater than 10ppm by weight • Lead greater than 4000ppm by weight Battery size: CR2032 (coin cell) Battery type: Lithium
Restricted Material Usage	This product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html): • Asbestos • Batteries – Mercury • Batteries – Cadmium • Batteries – Lead (non-rechargeable) • Batteries – Non-rechargeable Alkaline and Carbon-Zinc Batteries • Batteries – Classification as "Not Restricted" for Transport • Brominated Flame Retardants (PBBs, PBDEs, including DecaBDE) • Brominated Flame Retardants (all BFRs in external case plastic parts) • Cadmium and its compounds • Certain Azo Colorants • Chlorinated Hydrocarbons • Chlorinated Paraffins • Formaldehyde • Formaldehyde – emissions • Hexavalent Chromium and its compounds in metallic applications • Hexavalent Chromium and its compounds in non-metallic applications • Lead and its compounds • Lead in paint • Lead in Polyvinyl Chloride (PVC) coating of external cables, wires and cords • Mercury and its compounds • Nickel on external surfaces • Ozone Depleting Substances (ODS) • Polycyclic Aromatic Hydrocarbons (PAH) • Perfluorooctane sulfonates (PFOS) in parts • Perfluorooctane sulfonates (PFOS) in preparations • Polychlorinated Biphenyls (PCBs) and Polychlorinated Terphenyls (PCTs) • Polychlorinated Naphthalenes • Polyvinyl Chloride (PVC) in external case plastic parts • Radioactive Substances • Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)
Packaging	HP Workstation product packaging meets the following (refer to the HP General Specification for the Environment at http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html: • Does not contain restricted substances listed in HP Standard 011-1 General Specification for the Environment (see link above). • Does not contain ozone-depleting substances (ODS). • Design packaging materials for ease of disassembly. • Does not contain heavy metals (lead, mercury, cadmium or hexavalent chromium) in excess of 100 ppm sum total for all heavy metals listed. •
	•

	• Maximizes the use of post-consumer recycled content materials in packaging materials. • All packaging material is recyclable. • Reduces size and weight of packages to improve transportation fuel efficiency. • Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.
Longevity and Upgrading	This product is designed to be upgraded, possibly extending its useful life by several years. Spare parts are available throughout the warranty period and for up to 5 years after the end of production. Upgradeability features contained in the product include: • Intel LGA771 processor socket • 8 USB ports (5 rear, 2 front, 1 internal) • 2 PCI slots and 4 PCI Express slots • 5/6 storage bays (2 – 3.5 inch OR 3 – 2.5" internal, 1 – 3.5 inch FDD, 2 – 5.25 inch removable) • 8 memory slots
Packaging Materials	
External	Cardboard carton and insert: 1.537 kg
Internal	LDPE Foam: .740 kg
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: [link to new HP white paper now in progress] Global Citizenship Report: http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html Eco-label certifications: http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html ISO 14001 certificates: http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html
Service, Support and Warranty	On-site Warranty and Service (Note 1): This three-year, limited warranty and service offering delivers three years of on-site, next business-day (Note 2) service for parts and labor and includes free telephone support (Note 3) service for parts and labor and includes free telephone support (Note 2) ensures that any product purchased in one country and transferred to another, non-restricted country will remain fully covered under the original warranty and service offering. **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 24 x 7 support 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
Additional Information	• This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive – 2002/95/EC. • This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive – 2002/96/EC. • Plastic parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043. • This product contains 0% recycled materials (by weight) •

	• This product is >90% recycle-able when properly disposed of at end of life.

Global Series SKUs	
Title	Z600A/ZI2.40+/K160 /W6.0/Xa /p (WZ971AW)
OS	Genuine Windows® 7 Professional 64-bit
Base Unit	WD059AV - HP Z600 RDIMM Workstation w/ 650W 85% PSU
Localization Unit	FY914AV (with all WS supported localizations)
Processor 1	Intel® Xeon® Processor E5620 4C 2.40 GHz, 80W, 12M cache, 5.86GT/s QPI, DDR3 1066MHz, HT, Turbo
Processor 2	Intel® Xeon® Processor E5620 4C 2.40 GHz, 80W, 12M cache, 5.86GT/s QPI, DDR3 1066MHz, HT, Turbo
Memory	6GB (6x1GB) DDR3-1333 ECC Unbuffered RAM 2-CPU
Hard Drive	160GB SATA 7200 rpm 3Gb/s 3.5" HDD
Optical Drive	HP 16X DVD-ROM SATA Drive
Keyboard	HP USB Standard Keyboard
Mouse	HP USB 2-Button Optical Scroll Mouse

Title	Z600e/ZL2.66+/300L /6.0W /295+A/kp (XN057AW)
OS	Genuine Windows® 7 Professional 64-bit
Base Unit	WD059AV - HP Z600 RDIMM Workstation w/ 650W 85% PSU
Localization Unit	FY914AV (with all WS supported localizations)
Processor 1	Intel® Xeon® Processor X5650 6C 2.66 GHz, 95W, 12M cache, 6.40GT/s QPI, DDR3 1333MHz, HT, Turbo
Processor 2	Intel® Xeon® Processor X5650 6C 2.66 GHz, 95W, 12M cache, 6.40GT/s QPI, DDR3 1333MHz, HT, Turbo
Memory	6GB (6x1GB) DDR3-1333 ECC Unbuffered RAM 2-CPU
Hard Drive	300GB SATA 10K rpm SFF HDD
Graphics	NVIDIA Quadro NVS 295 256MB PCIe Graphics Card
Keyboard	HP USB Standard Keyboard
Mouse	HP USB 2-Button Optical Scroll Mouse

Copyright/Disclaimers	• The above SKU, XN057AW, also includes a 2nd NVS 295 Graphics Card and is Energy Star 5.0 qualified.

As part of its commitment to hardware, software, and solution innovation, HP is proud to introduce this breakthrough platform configuration stability to HP Workstation customers. HP Stable & Consistent Offerings are built on the foundation of a carefully chosen set of hardware and software designed and tested to work with all HP Z Workstation platforms through their end of life. These components and their corresponding HP Workstation platform compatibility are outlined in this section.

HP Stable & Consistent Offerings are available worldwide to all HP Workstation customers-no special programs, no additional cost-no kidding. Simply select your hardware and software components when you customize your HP Workstation and be assured that you'll be able to buy that same configuration throughout the lifecycle of the product.

Processors	**Product #**	**Offering**
	WG712AV	Intel Xeon E5620 2.40 12MB/1066 4C CPU-1
	WG720AV	Intel Xeon E5620 2.40 12MB/1066 4C CPU-2
	WG715AV	Intel Xeon X5650 2.66 12MB/1333 6C CPU-1
	WG723AV	Intel Xeon X5650 2.66 12MB/1333 6C CPU-2

Hard Drives	**Product #**	**Offering**
	FX560AV	HP 250GB SATA 7200 1st HDD
	FX570AV	HP 250GB SATA 7200 2nd HDD
	FX562AV	HP 500GB SATA 7200 1st HDD
	FX572AV	HP 500GB SATA 7200 2nd HDD

Graphics	**Product #**	**Offering**
	FY915AV	NVIDIA Quadro NVS 295 256MB Graphics Card
	FY924AV	NVIDIA Quadro NVS 295 256MB Graphics (2nd)
	WS077AV	NVIDIA Quadro 2000 1GB Graphics Card
	WS078AV	NVIDIA Quadro 2000 1GB Graphics Card (2nd)

Memory	**Product #**	**Offering**
	NL785AV	3GB (3x1GB) DDR3-1333 ECC Unbuffered RAM 1-CPU
	NL786AV	6GB (3x2GB) DDR3-1333 ECC Unbuffered RAM 1-CPU
	NL787AV	12GB (3x4GB) DDR3-1333 ECC Unbuffered RAM 1-CPU
	NL790AV	4GB (4x1GB) DDR3-1333 ECC Unbuffered RAM 2-CPU
	NL791AV	6GB (6x1GB) DDR3-1333 ECC Unbuffered RAM 2-CPU
	NL794AV	12GB (6x2GB) DDR3-1333 ECC Unbuffered RAM 2-CPU
	NL796AV	24GB (6x4GB) DDR3-1333 ECC Unbuffered RAM 2-CPU

Optical and Removable Storage	**Product #**	**Offering**
	FX600AV	HP 16X DVD+-RW SuperMulti SATA 1st Drive
	FX602AV	HP 16X DVD+-RW SuperMulti SATA 2nd Drive

Stable & Consistent Offerings

Input Devices	Product #	Offering
	FX596AV	HP USB Optical Scroll Mouse
	FY931AV	HP USB Standard Keyboard

Operating Systems	Product #	Offering
	VM436AV	Genuine Windows® 7 Professional 64-bit

Processors	Intel Xeon E5507, 2.26 GHz, 4MB cache, 800MHz Memory, 4.80GT/s QPI, 80W	
	Intel Xeon E5506, 2.13GHz, 4MB cache, 800MHz Memory, 4.80 GT/s QPI, 80W	NF147AA

Introduction

Intel's latest-generation microarchitecture represents the next step in unprecedented processor performance and dynamic scalability. Designed from the ground up to take advantage of hafnium-based Intel® 45nm hi-k metal gate silicon technology, Intel® Microarchitecture (Nehalem) unleashes parallel processing performance enabled by Intel® QuickPath technology providing an integrated memory controller and high-speed interconnect per independent processing core.

Performance and Features

Maximum multitasking performance Intel® Microarchitecture (Nehalem) offers the latest in processor innovation, including:

- Dynamic scalability, managed cores, threads, cache, interfaces, and power for energy-efficient performance on demand.
- Design and performance scalability for servers, workstations, notebooks and desktops with support for 2-8+ cores and up to 16+ threads with Intel® Hyper-Threading Technology (Intel® HT Technology), and scalable cache sizes, system interconnects, and integrated memory controllers.
- Intel® Turbo Boost Technology delivers additional performance automatically when needed by taking advantage of the processor's power and thermal headroom. This enables increased performance of both multi-threaded and single-threaded workloads.
- Intel Hyper-Threading Technology brings high-performance applications into mainstream computing with 1-16+ threads optimized for a new generation multi-core processor architecture.
- Scalable shared memory of Intel® QuickPath technology features memory distributed to each processor with integrated memory controllers and high-speed point-to-point interconnects to unleash the performance of future versions of next-generation Intel® multi-core processors.
- Multi-level shared cache improves performance and efficiency by reducing latency to frequently used data.

Turbo Boost Technology

This technology now built into Xeon 5500 processors will increase the speed of your processor on demand (from OS) if the CPU is operating below power / thermal specifications:

- Benefit of Turbo Boost (how much CPU speed up) depends on number of active cores
- Likelihood of Turbo Boost operation increases when less cores are active
- Likelihood of Turbo Boost operation increases when dynamic power mgt is enabled

Technical Specifications - Processors

Processors	Intel® Xeon® Processor X5670 6C 2.93 GHz, 95W, 12M cache, 6.40GT/s QPI, DDR3 1333MHz, HT, Turbo	WG734AA
	Intel® Xeon® Processor X5667 6C 3.06 GHz, 95W, 12M cache, 6.40GT/s QPI, DDR3 1333MHz, HT, Turbo	WG733AA
	Intel® Xeon® Processor X5660 6C 2.80 GHz, 95W, 12M cache, 6.40GT/s QPI, DDR3 1333MHz, HT, Turbo	WG732AA
	Intel® Xeon® Processor X5650 6C 2.66 GHz, 95W, 12M cache, 6.40GT/s QPI, DDR3 1333MHz, HT, Turbo	WG731AA
	Intel® Xeon® Processor E5640 4C 2.66 GHz, 80W, 12M cache, 5.86GT/s QPI, DDR3 1066MHz, HT, Turbo	WG730AA
	Intel® Xeon® Processor E5630 4C 2.53 GHz, 80W, 12M cache, 5.86GT/s QPI, DDR3 1066MHz, HT, Turbo	WG729AA
	Intel® Xeon® Processor E5620 4C 2.40 GHz, 80W, 12M cache, 5.86GT/s QPI, DDR3 1066MHz, HT, Turbo	WG728AA

Introduction

Intel's latest-generation microarchitecture represents the next step in unprecedented processor performance and dynamic scalability. Designed from the ground up to take advantage of hafnium-based Intel® 32nm hi-k metal gate silicon technology, Intel® Microarchitecture (Westmere) unleashes parallel processing performance enabled by Intel® QuickPath technology providing an integrated memory controller and high-speed interconnect per independent processing core.

Performance and Features

Maximum multitasking performance Intel® Microarchitecture (Westmere) offers the latest in processor innovation, including:

- Dynamic scalability, managed cores, threads, cache, interfaces, and power for energy-efficient performance on demand.
- Design and performance scalability for servers, workstations, notebooks and desktops with support for 4-12 cores and up to 24+ threads with Intel® Hyper-Threading Technology (Intel® HT Technology), and scalable cache sizes, system interconnects, and integrated memory controllers.
- Intel® Turbo Boost Technology delivers additional performance automatically when needed by taking advantage of the processor's power and thermal headroom. This enables increased performance of both multi-threaded and single-threaded workloads.
- Intel Hyper-Threading Technology brings high-performance applications into mainstream computing with 1-24 threads optimized for a new generation multi-core processor architecture.
- Scalable shared memory of Intel® QuickPath technology features memory distributed to each processor with integrated memory controllers and high-speed point-to-point interconnects to unleash the performance of future versions of next-generation Intel® multi-core processors.
- Multi-level shared cache improves performance and efficiency by reducing latency to frequently used data.

Turbo Boost Technology

This technology, now built into Xeon 5600 processors, will increase the speed of your processor on demand (from OS) if the CPU is operating below power / thermal specifications:

- Benefit of Turbo Boost (how much CPU speed up) depends on number of active cores.
- Likelihood of Turbo Boost operation increases when fewer cores are active.
- Likelihood of Turbo Boost operation increases when dynamic power mgt is enabled

HP SAS (Serial Attached SCSI) Hard Drives for HP Workstations	**600GB SAS 15K rpm 3.5" HDD (6Gb/s enabled)**	**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)	3.0 Gb/s (6Gb/s capable with 6.0 Gb/s controller)	
		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 3Gb/s 3.5" HDD	**Capacity**	450 GB	
		Height	1 in; 2.5 cm	
		Width	**Media Diameter**	3.5 in; 8.9 cm
			Physical Size	4 in; 10.2 cm
		Interface	SAS	
		Synchronous Transfer Rate (Maximum)	3.0 Gb/s	
		Buffer	16 MB	
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.2 ms
			Average	3.6 ms
			Full Stroke	6.6 ms
		Rotational Speed	15,000 rpm	
		Logical Blocks	879, 097, 968 – 512 byte blocks	
		Operating Temperature	50° to 95° F (10° to 35° C)	
	300GB SAS 15K rpm 3Gb/s 3.5" HDD	**Capacity**	300 GB	
		Height	1 in; 2.5 cm	
		Width	**Media Diameter**	3.5 in; 8.9 cm
			Physical Size	4 in; 10.2 cm
		Interface	SAS	
		Synchronous Transfer Rate (Maximum)	3.0 Gb/s	
		Buffer	16 MB	
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.2 ms
			Average	3.5 ms
			Full Stroke	6.7 ms

	Rotational Speed	15,000 rpm	
	Logical Blocks	585,937,500 – 512 byte blocks	
	Operating Temperature	50° to 95° F (10° to 35° C)	
146GB SAS 15K rpm 3Gb/s 3.5" HDD	**Capacity**	146 GB	
	Height	1 in; 2.5 cm	
	Width	**Media Diameter**	3.5 in; 8.9 cm
		Physical Size	4 in; 10.2 cm
	Interface	SAS	
	Synchronous Transfer Rate (Maximum)	3.0 Gb/s	
	Buffer	16 MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.2 ms
		Average	3.5 ms
		Full Stroke	6.7 ms
	Rotational Speed	15,000 rpm	
	Logical Blocks	286,749,488 – 512 byte blocks	
	Operating Temperature	50° to 95° F (10° to 3°5 C)	

SATA (Serial ATA) Hard Drives for HP Workstations	**600GB SATA 10K rpm SFF in 3.5" Frame HDD**	**Capacity**	600GB
		Height	1 in; 2.54 cm
		Width	**Media Diameter**	2.5 in; 6.36 cm
			Physical Size	4 in; 10.17 cm
		Interface	Serial ATA (3.0Gb/s)	
		Synchronous Transfer Rate (Maximum)	Up to 300MB/s	
		Buffer	32MB	
		Cache	Segmentable	
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.4 ms (max)
			Average	3.6 ms
			Full Stroke	9.0 ms
		Rotational Speed	10,000 rpm	
		Logical Blocks	1,172,123,568	
		Operating Temperature	41° to 131° F (5° to 55° C)	
	300GB SATA 10K rpm SFF in 3.5" Frame HDD	**Capacity**	300,069,052,416 bytes	
		Height	1 in; 2.54 cm	
		Width	**Media Diameter**	2.5 in; 6.36 cm
			Physical Size	4 in; 10.2 cm
		Interface	Serial ATA (3.0 Gb/s), Native Command Queuing enabled	
		Synchronous Transfer Rate (Maximum)	Up to 300 MB/s	

	Buffer	16 MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.7 ms (maximum)
		Average	4.4 ms
		Full Stroke	9.5 ms
	Rotational Speed	10,000 rpm	
	Logical Blocks	586,072,368	
	Operating Temperature	41 to 131 F (5 to 55 C)	
160GB SATA 10K rpm SFF in 3.5" Frame HDD	**Capacity**	160,041,885,696 bytes	
	Height	1 in; 2.5 cm	
	Width	**Media Diameter**	2.5 in; 6.36 cm
		Physical Size	4 in; 10.2 cm
	Interface	Serial ATA (1.5 Gb/s), Native Command Queuing enabled	
	Synchronous Transfer Rate (Maximum)	Up to 300 MB/s	
	Buffer	16 MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.7 ms (maximum)
		Average	4.4 ms
		Full Stroke	9.5 ms
	Rotational Speed	10,000 rpm	
	Logical Blocks	312,581,808	
	Operating Temperature	41 to 131 F (5 to 55 C)	
2.0TB SATA 7200 rpm 3Gb/s 3.5" HDD	**Capacity**	2.0TB	
	Height	1 in; 2.54 cm	
	Width	**Media Diameter**	3.5 in; 8.9 cm
		Physical Size	4.0 in; 10.17 cm
	Interface	Serial ATA (3.0 Gb/s), Native Command Queuing Enabled	
	Synchronous Transfer Rate (Maximum)	Up to 300MB/s	
	Buffer	64MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	1.0 ms
		Average	10 ms
		Full Stroke	Not Specified
	Rotational Speed	7,200 rpm	
	Logical Blocks	3,907,029,168	
	Operating Temperature	41° to 131° F (5° to 55° C)	
1.5TB SATA 7200 rpm 3Gb/s 3.5" HDD	**Capacity**	1.5TB	
	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 (3.0 Gb/s), Native Command Queuing enabled	
	Synchronous Transfer Rate (Maximum)	Up to 300MB/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	2,930,277,168	
	Operating Temperature	41° to 131° F (5° to 55° C)	
1000GB (1TB) SATA 7200 rpm 3.0Gb/s 3.5" HDD	**Capacity**	1,000,204,886,016 bytes	
	Height	1 in; 2.5 cm	
	Width	**Media Diameter**	3.5 in; 8.9 cm
		Physical Size	4 in; 10.2 cm
	Interface	Serial ATA (3.0 Gb/s), Native Command Queuing enabled	
	Synchronous Transfer Rate (Maximum)	Up to 300 MB/s	
	Buffer	32 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	1,953,525,168	
	Operating Temperature	41 to 131 F (5 to 55 C)	
500GB SATA 7200 rpm 3Gb/s 3.5" HDD	**Capacity**	500,107,862,016 bytes	
	Height	1 in; 2.5 cm	
	Width	**Media Diameter**	3.5 in; 8.9 cm
		Physical Size	4 in; 10.2 cm
	Interface	Serial ATA (3.0 Gb/s), Native Command Queuing enabled	
	Synchronous Transfer Rate (Maximum)	300 MB/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)	
320GB	**Capacity**	320,072,933,376 bytes	

SATA 7200 rpm 3Gb/s 3.5" HDD	**Height**	0.98 in; 2.5 cm	
	Width	**Media Diameter**	3.5 in; 8.9 cm
		Physical Size	4.0 in; 10.17 cm
	Interface	Serial ATA (3.0 Gb/s), Native Command Queuing enabled	
	Synchronous Transfer Rate (Maximum)	300 MB/s	
	Buffer	8 MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	2 ms
		Average	12 ms
		Full Stroke	21 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	625,142,448	
	Operating Temperature	41° to 131° F (5° to 55° C)	
250GB SATA 7200 rpm 3Gb/s 3.5" HDD	**Capacity**	250,059,350,016 bytes	
	Height	1 in; 2.5 cm	
	Width	**Media Diameter**	3.5 in; 8.9 cm
		Physical Size	4 in; 10.2 cm
	Interface	Serial ATA (3.0 Gb/s), Native Command Queuing enabled	
	Synchronous Transfer Rate (Maximum)	300 MB/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)	
160GB SATA 7200 rpm 3Gb/s 3.5" HDD	**Capacity**	160,041,885,696 bytes	
	Height	1 in; 2.5 cm	
	Width	**Media Diameter**	3.5 in; 8.9 cm
		Physical Size	4 in; 10.2 cm
	Interface	Serial ATA (3.0 Gb/s), Native Command Queuing enabled	
	Synchronous Transfer Rate (Maximum)	300 MB/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	312,581,808	

		Operating Temperature	41 to 131 F (5 to 55 C)	
HP Solid State Drive for Workstations	**HP 160GB SATA X25-M SSD**	**Capacity**	160,041,885,696 bytes	
		Height	0.28 in; 0.7 cm	
		Width	**Media Diameter**	NaN in; NaN cm
			Physical Size	2.75 in; 6.985 cm
		Interface	SATA	
		Synchronous Transfer Rate (Maximum)	3Gb/s	
		Seek Time (typical reads, includes controller overhead, including settling)	**Average**	Read: 75 microseconds; Write: 85 microseconds
		Logical Blocks	312,581,808	
		Operating Temperature	32° to 158° F (0° to 70° C)	
	HP 64GB SATA SLC Solid State Drive (SFF in 3.5" Frame)	**Capacity**	64,023,257,088 bytes	
		Height	0.28 in; 0.7 cm	
		Width	**Physical Size**	2.75 in; 6.985 cm
		Interface	SATA	
		Synchronous Transfer Rate (Maximum)	3Gb/s	
		Seek Time (typical reads, includes controller overhead, including settling)	**Average**	Average Latency (Access): Read: 75 microseconds typical; Write: 85 microseconds typical
		Logical Blocks	125,045,424	
		Operating Temperature	32° to 158° F (0° to 70° C)	

LSI 3041E 4-Port SAS 3.0 Gb/s RAID Card	**PCI Bus**	PCI-Express x4 lanes	
	PCI Modes	Bus Master DMA	
	RAID Levels	RAID 0, 1, 1E and 10E	
	PCI Data Burst Transfer Rate	250 MB/s per lane half duplex 500 MB/s per lane full duplex 1,000 MB/s 4-lane half duplex	
	SAS Bandwidth	**Half Duplex**	Single lane – 300 MB/s Wide Port (2 lanes) – 600 MB/s Wide Port (4 lanes) – 1200 MB/s
		Full Duplex	Single SAS Lane – 600 MB/s Wide Port (2 lanes) –1200 MB/s Wide Port (4 lanes) – 2400 MB/s
	PCI Card Type	3.3 volt add-in c	
	PCI Voltage	12 V ± 10%	
	PCI Power	7.5 Watts	
	Bracket	Full height and Low-profile	
	Certification Level	PCI-Express 1.0a	
	IO Bus	Four 3 Gb/s SAS/SATA ports	
	SAS Processor	LSISAS1064E	
	Internal Connectors	Four- SATA x1 connectors	
	External Connectors	None	
	Maximum Number of SCSI Devices	122	
	LED Indicators	On-board activity and fault LEDs	
	Integrated Mirroring	Integrated Mirroring option available	

LSI MegaRAID® SAS 8888ELP Host Bus Adapter (HBA)	**PCI Bus**	PCI-Express x8 lanes
	PCI Modes	Bus Master DMA
	RAID Levels	RAID 0, 1, and 5 RAID spans 10 and 50
	PCI Data Burst Transfer Rate	Up to 3Gb/s per port
	Full Duplex	Up to 1.5 GB/s
	PCI Voltage	+3.3V Add-in Card
	PCI Power	19.2 Watts Maximum
	Certification Level	PCI-Express 1.0a
	IO Bus	Eight 3Gb/s SAS/SATA ports
	Internal Connectors	Two SAS SFF8087 x4
	External Connectors	Two SAS SFF8088 x4
	Maximum Number of SCSI Devices	32
	LED Indicators	Connector LEDs indicate whether the internal or external connector is active for ports 0-3 and 4-7

NVIDIA Quadro NVS 295 256MB Graphics Card	**Form Factor**	2.731 inches (H) × 6.600 inches (L), Half-Height
	Graphics Controller	NVIDIA Quadro NVS 295 Graphics Board
	Bus Type	PCI Express x16, Generation 2.0
	Memory	256 MB GDDR3 SDRAM unified graphics memory
	Connectors	2 DisplayPort Comes with 2 DisplayPort to DVI-D Adapters ('DisplayPort to VGA' and 'DisplayPort to DL DVI' adapters available as an accessory)
	Maximum Resolution	Two DisplayPort outputs drive two digital displays up to 2560 x 1600 **NOTE:** This card supports up to two displays
	Display Output	• Drives DisplayPort enabled digital displays at resolutions up to 2560 × 1600 at 60 Hz with reduced blanking • Drives DVI enabled digital displays at resolutions up to 1920 × 1200 at 60 Hz with reduced blanking (through DisplayPort to DVI-D (single link) cable)
	Supported Graphics APIs	OpenGL 3.0 DirectX 10.0
	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) Red Hat Enterprise Linux(RHEL) WS4 (64-bit and 32-bit) * WS4 not supported on Z200 & Z200 SFF Red Hat Enterprise Linux(RHEL) 5 Desktop/Workstation (64-bit and 32-bit) 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	22.69 Watts

Technical Specifications - Graphics

NVIDIA Quadro NVS 450 512 MB PCIe Graphics Card	**Form Factor**	ATX Full Height, 1/2 length Passive cooling
	Bus Type	PCI Express x16, Generation 2.0
	Memory	512 MB GDDR3 (256MB per GPU)
	Connectors	Four DisplayPort; Four DisplayPort to DVI-D adapters included. ('DisplayPort to VGA' and 'DisplayPort to Dual Link DVI' adapters available as an accessory)
	Maximum Resolution	DisplayPort connectors support ultra-high-resolution panels (up to 2560 x 1600) **NOTE:** This card supports up to four displays
	Supported Graphics APIs	OpenGL 3.0 Direct X 10.0
	Available Graphics Drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Microsoft Windows Vista (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) 5 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	35 Watts

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 adapter available as an option
	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 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	17.5 Watts maximum
NVIDIA Quadro NVS 290 256 MB PCIe Graphics Card	**Form Factor**	Low Profile
	Bus Type	PCIe x16
	Memory	256 MB 400MHz DDR2 SDRAM unified frame buffer, Z-buffer and Texture storage
	Connectors	DMS-59, includes DMS-59 to Dual DVI-I cable. DMS-59 to Dual VGA cable available as an option.
	Maximum Resolution	Dual integrated analog display controllers supporting up to two analog displays at 2048x1536 @ 85Hz on both displays or dual digital displays at 1920x1200 (single-link). NVIEW advanced multi-display desktop and application management seamlessly integrated into Microsoft® Windows®
	RAMDAC	Integrated dual 400MHz
	Image Quality Features	Full-screen, full-frame video playback of HDTV and DVD content DVD-ready motion compensation for MPEG-2 Independent hardware color controls for video overlay Hardware color-space conversion (YUV 4:2:2 and 4:2:0) IDCT motion compensation 5-tap horizontal by 3-tap vertical filtering 8:1 up/down scaling
	Programmable Video Processor	Full-screen, full-frame video playback of HDTV and DVD content DVD-ready motion compensation for MPEG-2 Independent hardware color controls for video overlay Hardware color-space conversion (YUV 4:2:2 and 4:2:0) IDCT motion compensation 5-tap horizontal by 3-tap vertical filtering 8:1 up/down scaling
	Display Output	Dual integrated analog display controllers supporting up to two analog displays at 2048x1536 @ 85Hz on both displays or dual digital displays at 1920x1200 (single-link). NVIEW advanced multi-display desktop and application management seamlessly integrated into Microsoft® Windows®
	Supported Graphics APIs	OGL 2.1 & DX10 Support; Shader Model 4.0
	Available Graphics	Genuine Windows 7 Professional (64-bit and 32-bit)

Technical Specifications - Graphics

	Drivers	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 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
	High-Resolution AntiAliasing	Color planes: 32-bit color buffer Overlay planes: Hardware supported
	CUDA™ Parallel Processor Cores	NVIDIA Quadro NVS 290 (256 MB DH) PCIe Graphics Card with full height bracket attached, DMS-59 to Dual DVI cable, Workstation Software Driver CD, documentation.
NVIDIA Quadro FX 380 256MB Graphics Card	**Form Factor**	4.376 inches (H) × 6.60 inches (L)
	Graphics Controller	NVIDIA Quadro FX 380 Graphics Board
	Bus Type	PCI Express x16, Generation 2.0
	Memory	256 MB GDDR3 SDRAM unified graphics memory
	Connectors	2 Dual Link DVI-I Two DVI-I to VGA adapters included
	Maximum Resolution	Two dual-link DVI-I outputs drive two digital displays at resolutions up to 2560 x 1600 @ 60Hz or two analog displays at resolutions up to 2048 x 1536 @ 85Hz **NOTE:** This card supports up to two displays
	RAMDAC	Dual Internal 400 MHz DAC
	Shading architecture	Full Shader Model 4.0 (OpenGL 2.1/DirectX 10 class) • Long fragment programs (unlimited instructions) • Long vertex programs (unlimited instructions) • Looping and subroutines (up to 256 loops per vertex program) • Dynamic flow control • Conditional execution
	Supported graphics APIs	OpenGL 3.0 Direct X 10.0
	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) Red Hat Enterprise Linux(RHEL) WS4 (64-bit and 32-bit) * WS4 not supported on Z200 & Z200 SFF Red Hat Enterprise Linux(RHEL) 5 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
	High-level Shader Languages	• Optimized compiler for Cg and Microsoft HLSL • OpenGL 2.1 and DirectX 10 support • Open source compiler
	CUDA™ Parallel Processor Cores	16
	Power consumption	33.91 Watts
ATI FirePro V3700 256MB Graphics Card	**Form Factor**	4.40 inches (H) × 6.70 inches (L) (11.18 cm (H) × 17.02 cm (L))
	Graphics Controller	ATI FirePro V3700 Graphics Board
	Bus Type	PCI Express x16, Generation 2.0
	Memory	256 MB GDDR3 SDRAM unified graphics memory
	Connectors	2 Dual Link DVI-I Two DVI-I to VGA adapters included
	Maximum Resolution	Two dual-link DVI-I outputs drive two digital displays at resolutions up to 2560 x 1600 @ 60Hz or two analog displays at resolutions up to 2048 x 1536 @ 85Hz **NOTE:** This card supports up to two displays
	Shading architecture	Full Shader Model 4.0 • 40 Stream Processing Units • Dynamic load balancing and resource allocation for vertex, geometry, and pixel shaders • Common instruction set and texture unit access supported for all types of shaders • Dedicated branch execution units and texture address processors
	Supported graphics APIs	OpenGL 2.1 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 WS4 (64-bit and 32-bit) * WS4 not supported on Z200 & Z200 SFF Red Hat Enterprise Linux 5 Desktop (64-bit and 32-bit) 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	32 Watts

Technical Specifications - Graphics

NVIDIA Quadro FX 580 512MB Graphics Card	**Form Factor**	4.376 inches (H) × 6.60 inches (L)
	Graphics Controller	NVIDIA Quadro FX 580 Graphics Board
	Bus Type	PCI Express x16, Generation 2.0
	Memory	512MB GDDR3 SDRAM unified graphics memory
	Connectors	2 DisplayPort, 1 Dual-Link DVI-I. One DisplayPort to DVI adapter included ('DVI to VGA', 'DisplayPort to VGA' and 'DisplayPort to Dual Link DVI' adapters available as an accessory)
	Maximum Resolution	• Two DisplayPort outputs drive two digital displays up to 2560 x 1600 • One dual-link DVI-I output drives one digital display at resolutions up to 2560 x 1600 @ 60Hz or one analog display at resolutions up to 2048 x 1536 @ 85Hz **NOTE:** This card supports up to two displays
	RAMDAC	Single Internal 400 MHz DAC
	Shading architecture	Full Shader Model 4.0 (OpenGL 2.1/DirectX 10 class) • Long fragment programs (unlimited instructions) • Long vertex programs (unlimited instructions) • Looping and subroutines (up to 256 loops per vertex program) • Dynamic flow control • Conditional execution
	Supported graphics APIs	OpenGL 3.0 Direct X 10.0
	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) Red Hat Enterprise Linux(RHEL) WS4 (64-bit and 32-bit) * WS4 not supported on Z200 & Z200 SFF Red Hat Enterprise Linux(RHEL) 5 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
	High-level Shader Languages	• Optimized compiler for Cg and Microsoft HLSL • OpenGL 2.1 and DirectX 10 support • Open source compiler
	CUDA™ Parallel Processor Cores	32
	Power consumption	40 Watts

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) WS4 (64-bit and 32-bit) * WS4 not supported on Z200 and Z200 SFF Red Hat Enterprise Linux (RHEL) 5 Desktop/Workstation (64-bit and 32-bit) 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
	Parallel Processor Cores	96 CUDA parallel processing cores
	Power consumption	40 Watts

Technical Specifications - Graphics

ATI FirePro V3800 512MB Graphics Card	**Form Factor**	2.71 in (H) x 6.61 in (L) "Single-Wide"
	Graphics Controller	ATI FirePro V3800 Graphics Board
	Bus Type	PCI Express x16, Generation 2.0
	Memory	512 MB DDR3 SDRAM
	Connectors	1 DL DVI, 1 DP output One DP to DVI adapter included
	Maximum Resolution	Up to two digital displays at resolutions up to 2560 x 1600 @ 60Hz or two analog displays, one at resolutions up to 2048 x 1536 @ 85Hz, the other at up to 1920 x 1200 @ 60Hz (165 MHz dot clock) **NOTE:** This card supports up to two displays
	RAMDAC	400 MHz DAC, 10-bits per channel
	Image Quality Features	• Full 30-bit display pipeline for more accurate color reproduction superior image quality (30-bit monitor required for full 30-bit display) • Advanced video capabilities, including high fidelity gamma, color correction and scaling • Dedicated hardware (UVD2) for H.264, VC-1, and MPEG2 decode
	Shading architecture	• Support for Full Shader Model 5.0 • 400 Stream Processing Units • Dynamic load balancing and resource allocation for vertex, geometry, and pixel shaders • Common instruction set and texture unit access supported for all types of shaders • Dedicated branch execution units and texture address processors • Anti-aliases Shaders and Textures as well as Polygon Edges
	Supported graphics APIs	DirectX 11, OpenGL 3.2, OpenCL 1.0 and full implementation of DirectCompute 11 (OpenCL™ compliant driver and SDK release scheduled in 2010)
	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) WS4 * WS4 not supported on Z200 & Z200 SFF Red Hat Enterprise Linux(RHEL) 5 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
	Parallel Processor Cores	400 Stream processors (675 single-precision GFLOPS performance)
	Power consumption	43 Watts

ATI FirePro V4800 1GB Graphics Card	**Form Factor**	4.37 in (H) x 6.61 in (L)
	Graphics Controller	ATI FirePro V4800 Graphics Card
	Bus Type	PCI Express x 16, Generation 2.0
	Memory	1GB GDDR5 SDRAM

Technical Specifications - Graphics

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 or 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	400 MHz DAC, 10-bit per channel
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 for more accurate color reproduction superior image quality2 • 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 for xrandr 1.2 or greater in the X server
Shading architecture	• Support for Full Shader Model 5.0 • Dynamic load balancing and resource allocation for vertex, geometry, and pixel shaders • Common instruction set and texture unit access supported for all types of shaders • Dedicated branch execution units and texture address processors • Anti-aliases Shaders and Textures as well as Polygon Edges
Supported graphics APIs	DirectX 11, OpenGL 3.2, OpenCL 1.03 and full implementation of DirectCompute 11 (OpenCL™ compliant driver and SDK release scheduled in 2010)
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) WS4 (64-bit and 32-bit) * WS4 not supported on Z200 & Z200 SFF Red Hat Enterprise Linux (RHEL) 5 Desktop/Workstation (64-bit and 32-bit) 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
Parallel Processor Cores	800 stream processors (675 MFLOPS single-precision performance)
Power consumption	69 Watts

Technical Specifications - Graphics

NVIDIA Quadro FX 1800 768MB Graphics Card	**Form Factor**	4.376 inches (H) x 7.8 inches (L)
	Graphics Controller	NVIDIA Quadro FX 1800 Graphics Board
	Bus Type	PCI Express x16, Generation 2.0
	Memory	768MB GDDR3 SDRAM unified graphics memory
	Connectors	2 DisplayPort, 1 Dual-Link DVI-I. One DisplayPort to DVI-D adapter included ('DVI to VGA', 'DisplayPort to VGA' and 'DisplayPort to Dual Link DVI' adapters available as an accessory)
	Maximum Resolution	• Two DisplayPort outputs drive two digital displays up to 2560 x 1600 • One dual-link DVI-I output drives one digital display at resolutions up to 2560 x 1600 @ 60Hz or one analog display at resolutions up to 2048 x 1536 @ 85Hz **NOTE:** This card supports up to two displays
	RAMDAC	Single Internal 400 MHz DAC
	Shading Architecture	Full Shader Model 4.0 (OpenGL 2.1/DirectX 10 class) • Long fragment programs (unlimited instructions) • Long vertex programs (unlimited instructions) • Looping and subroutines (up to 256 loops per vertex program) • Dynamic flow control • Conditional execution
	Supported Graphics APIs	OpenGL 3.0 Direct X 10.0
	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) Red Hat Enterprise Linux(RHEL) WS4 (64-bit and 32-bit) * WS4 not supported on Z200 & Z200 SFF Red Hat Enterprise Linux(RHEL) 5 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
	High-level Shader Languages	• Optimized compiler for Cg and Microsoft HLSL • OpenGL 2.1 and DirectX 10 support • Open source compiler
	CUDA™ Parallel Processor Cores	64.
	Power consumption	59 Watts

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 @ 120Hz) 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) WS4 (64-bit and 32-bit) * WS4 not supported on Z200 and Z200 SFF Red Hat Enterprise Linux (RHEL) 5 Desktop/Workstation (64-bit and 32-bit) 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
	Parallel Processor Cores	192 CUDA parallel processing cores
	Power consumption	62 Watts

Technical Specifications - Graphics

ATI FirePro V5700 512MB Graphics Card	**Form Factor**	4.40 inches (H) × 6.70 inches (L) (11.18 cm (H) × 17.02 cm (L))
	Graphics Controller	ATI FirePro V5700 Graphics Board
	Bus Type	PCI Express x16, Generation 2.0
	Memory	512 MB GDDR3 SDRAM unified graphics memory
	Connectors	2 DisplayPort, 1 Dual-Link DVI-I. One DisplayPort to DVI adapter included ('DVI to VGA', 'DisplayPort to VGA' and 'DisplayPort to Dual Link DVI' adapters available as an accessory)
	Maximum Resolution	• Two DisplayPort outputs drive two digital displays up to 2560 x 1600 • One dual-link DVI-I output drives one digital display at resolutions up to 2560 x 1600 @ 60Hz or one analog display at resolutions up to 2048 x 1536 @ 85Hz **NOTE:** This card supports up to two displays
	Shading architecture	Full Shader Model 4.0 • 320 Stream Processing Units • Dynamic load balancing and resource allocation for vertex, geometry, and pixel shaders • Common instruction set and texture unit access supported for all types of shaders • Dedicated branch execution units and texture address processors
	Supported graphics APIs	OpenGL 3.0 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 WS4 (64-bit and 32-bit) * WS4 not supported on Z200 & Z200 SFF Red Hat Enterprise Linux 5 Desktop/Workstation (64-bit and 32-bit) 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	56 Watts

Technical Specifications - Graphics

ATI FirePro V5800 1GB Graphics Card	**Form Factor**	4.38 in (H) x 9.0 in (L)
	Graphics Controller	ATI FirePro V5800 Graphics Card
	Bus Type	PCI Express x 16, Generation 2.0
	Memory	1GB GDDR5 SDRAM
	Connectors	2 DP, 1 DL DVI One DP to DVI adapter included
	Maximum Resolution	Up to three digital displays at resolutions up to 2560 x 1600 @ 60Hz or up to three analog displays, one resolution up to 2048 x 1536 @ 85Hz, plus two display resolutions up to 1920 x 1200 @ 60 Hz (165 MHz dot clock) **NOTE:** This card supports up to three displays with Vista, Win7, or Linux, up to two displays with XP
	RAMDAC	400 MHz DAC, 10-bits per channel
	Image Quality Features	• 3 independent outputs with ATI Eyefinity1 technology support (More information at: www.amd.com/us/products/technologies/eyefinity/) • Full 30-bit display pipeline for more accurate color reproduction superior image quality2 • Advanced video capabilities, including high fidelity gamma, color correction and scaling • Dedicated hardware (UVD2) for H.264, VC-1, and MPEG2 decode
	Shading architecture	• Support for Full Shader Model 5.0 • Dynamic load balancing and resource allocation for vertex, geometry, and pixel shaders • Common instruction set and texture unit access supported for all types of shaders • Dedicated branch execution units and texture address processors • Anti-aliases Shaders and Textures as well as Polygon Edges
	Supported graphics APIs	DirectX 11, OpenGL 3.2, OpenCL 1.0 and full implementation of DirectCompute 11 (OpenCL™ compliant driver and SDK release scheduled in 2010)
	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) WS4 (64-bit and 32-bit) * WS4 not supported on Z200 & Z200 SFF Red Hat Enterprise Linux (RHEL) 5 Desktop/Workstation (64-bit and 32-bit) 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
	Parallel Processor Cores	800 stream processors (1.35 TFLOPS single-precision performance)
	Power consumption	75 Watts

Technical Specifications - Graphics

NVIDIA Quadro FX 3800 1.0GB Graphics Card	**Form Factor**	4.376 inches (H) x 9.0 inches (L) Single slot card
	Graphics Controller	NVIDIA Quadro FX 3800 Graphics Board
	Bus Type	PCI Express x16, Generation 2.0
	Memory	1GB GDDR3 SDRAM unified graphics memory
	Connectors	2 DisplayPort, 1 Dual-Link DVI-I. One DisplayPort to DVI-D adapter included ('DVI to VGA', 'DisplayPort to VGA' and 'DisplayPort to Dual Link DVI' adapters available as an accessory)
	Maximum Resolution	• Two DisplayPort outputs drive two digital displays up to 2560 x 1600 • One dual-link DVI-I output drives one digital display at resolutions up to 2560 x 1600 @ 60Hz or one analog display at resolutions up to 2048 x 1536 @ 85Hz **NOTE:** This card supports up to two displays
	RAMDAC	Single Internal 400 MHz DAC
	Shading architecture	Full Shader Model 4.0 (OpenGL 2.1/DirectX 10 class) • Long fragment programs (unlimited instructions) • Long vertex programs (unlimited instructions) • Looping and subroutines (up to 256 loops per vertex program) • Dynamic flow control • Conditional execution
	Supported graphics APIs	OpenGL 3.0 Direct X 10.0
	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) Red Hat Enterprise Linux(RHEL) 5 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 be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
	High-level Shader Languages	• Optimized compiler for Cg and Microsoft HLSL • OpenGL 2.1 and DirectX 10 support • Open source compiler
	CUDA™ Parallel Processor Cores	192
	Power consumption	107.9 Watts

Technical Specifications - Graphics

ATI FirePro V7750 1.0GB Graphics Card	**Form Factor**	4.40 inches (H) × 13.0 inches (L) (11.18 cm (H) × 33.02 cm (L))
	Graphics Controller	ATI FirePro V7750 Graphics Board
	Bus Type	PCI Express x16, Generation 2.0
	Memory	1024 MB GDDR3 SDRAM unified graphics memory
	Connectors	2 DisplayPort, 1 Dual-Link DVI-I. One DisplayPort to DVI adapter included ('DVI to VGA', 'DisplayPort to VGA' and 'DisplayPort to Dual Link DVI' adapters available as an accessory)
	Maximum Resolution	• Two DisplayPort outputs drive two digital displays up to 2560 x 1600 • One dual-link DVI-I output drives one digital display at resolutions up to 2560 x 1600 @ 60Hz or one analog display at resolutions up to 2048 x 1536 @ 85Hz **NOTE:** This card supports up to two displays
	Shading architecture	Full Shader Model 4.0 • 320 Stream Processing Units • Dynamic load balancing and resource allocation for vertex, geometry, and pixel shaders • Common instruction set and texture unit access supported for all types of shaders • Dedicated branch execution units and texture address processors
	Supported graphics APIs	OpenGL 3.0 DirectX 10.1
	Available graphics drivers	Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux 4 (64-bit and 32-bit) Red Hat Enterprise Linux 5 Desktop (64-bit and 32-bit) 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	76 Watts
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 or dual-link) adapters available as accessories (Optional stereo bracket available from 3rd party)

Technical Specifications - Graphics

Maximum Resolution	Dual DisplayPort (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz) 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) WS4 (64-bit and 32-bit) * WS4 not supported on Z200 and Z200 SFF Red Hat Enterprise Linux (RHEL) 5 Desktop/Workstation (64-bit and 32-bit) 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
High-Resolution Antialiasing	64x full scene antialiasing (FSAA)/128x FSAA in SLI Mode
Parallel Processor Cores	256 CUDA parallel processing cores
Power consumption	142 Watts

Technical Specifications - Graphics

NVIDIA Quadro FX 4800 1.5GB PCIe Graphics Card	**Form Factor**	4.36" (H) x 10.5" (L) Dual slot card
	Graphics Controller	NVIDIA Quadro FX 4800 graphics board
	Bus Type	PCI Express x16, Generation 2.0
	Memory	1.5 GB GDDR3 SDRAM unified graphics memory
	Connectors	2 DisplayPort, 1 Dual-Link DVI-I, 1 3-pin Mini DIN stereo output, One DisplayPort to DVI-D adapter included ('DVI to VGA', 'DisplayPort to VGA' and 'DisplayPort to Dual Link DVI' adapters available as an accessory)
	Maximum Resolution	• 2 DisplayPort connectors support ultra-high-resolution panels (up to 2560 x 1600) • Dual-link DVI-I output drives one digital display at resolutions up to 2560 x 1600 @ 60Hz • Internal 400 MHz DACs-One analog display up to 2048 x 1536 @ 85Hz **NOTE:** This card supports up to two displays
	Shading Architecture	• Full Shader Model 4.0 (OpenGL 2.1/DirectX 10 class) • Long fragment programs (unlimited instructions) • Long vertex programs (unlimited instructions) • Looping and subroutines (up to 256 loops per vertex program) • Dynamic flow control • Conditional execution
	Supported Graphics APIs	OpenGL 3.0 Direct X 10.0
	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) Red Hat Enterprise Linux(RHEL) 5 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 be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
	High-Resolution AntiAliasing	• Rotated Grid Full-Scene Antialiasing (RG FSAA) • 32xFSAA dramatically reduces visual aliasing artifacts or "jaggies" at resolution up to 1920 x 1200 • 64x FSAA SLI Mode
	High-level Shader Languages	• Optimized compiler for Cg and Microsoft HLSL • OpenGL 2.1 and DirectX 10 support • Open source compiler
	CUDA™ Parallel Processor Cores	192
	Power consumption	146 Watts
NVIDIA Quadro 5000 2.5GB Graphics Card	**Form Factor**	4.376" H x 9.75" L Dual Slot

Technical Specifications - Graphics

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 @ 120Hz) 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) WS4 (64-bit and 32-bit) * WS4 not supported on Z200 and Z200 SFF Red Hat Enterprise Linux (RHEL) 5 Desktop/Workstation (64-bit and 32-bit) 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
High-Resolution Antialiasing	64x full scene antialiasing (FSAA)/128x FSAA in SLI Mode
Parallel Processor Cores	352 CUDA parallel processing cores
Power consumption	152 Watts

Integrated Intel/Realtek HD ALC262 Audio	**Type**	Integrated
	High Definition Codec	Yes
	FM Synthesis Support	Yes
	OPL3 FM Synthesis Support	Yes
	Sound Blaster Compatibility	Yes
	Meets Premium performance for Windows Logo Program 3.0	Yes
	Audio Jacks	Front panel microphone in and headphone out - fixed usage. Rear panel line in and line out jacks - jacks are retaskable One Line-In* (12-K ohm Input Impedance)* **NOTE:** External Speakers need to be powered externally.
	Sampling	3 stereo ADCs support 16/20-bit PCM format with 44.1K/48K/96kHz sample rate 2 stereo DAC supports 16/20/24-bit PCM format with 44.1K/48K/96K/192kHz sample rate
	Wavetable Syntheses (software)	Yes – GM and FM Midi Support, Direct Music and Down Loadable Soundset (4 Meg DLS Level 1 and 2 Support)
	3D Positional Sound	No
	Digital Audio	Yes
	Analog Audio	Yes
	DVD Audio	Yes
	Number of Channels on Line-Out	Stereo (Left & Right channels)
	Internal Audio Speaker Power Rating	1.5 W
	Internal Speaker	Yes
	Hardware Equalizer for Internal Speaker	No
	External Speaker Jack (Line-Out)	Yes

Technical Specifications - Multimedia and Audio Devices

SoundBlaster (Creative Labs) X-Fi Titanium PCIe Audio Card	**24-bit Analog-to-Digital conversion of analog inputs**	96kHz sample rate	
	24-bit Digital-to-Analog conversion of digital sources	96kHz to analog 7:1 speaker output	
	24-bit Digital-to-Analog conversion of stereo digital sources	8, 11.025, 16, 22.05, 24, 32, 44.1, 48 and 96kHz	
	16-bit to 24-bit recording sampling rates	16-bit/44.1kHz, 16-bit/48kHz, 24-bit/44.1kHz, 24-bit/48kHz and 24-bit/96kHz with direct monitoring	
	Enhanced SoundFont support	Up to 24-bit resolution	
	Signal-to-Noise Ratio (2okHz Low-pass filter, A-Weighted)	109dB	
	Total Harmonic Distortion + Noise at 1kHz (20kHz Low-pass filter)	.004%	
	Frequency Response (-3dB, 24-bit/96kHz input)	10Hz to 46kHz	
	Frequency Response (-3dB, 24-bit/192kHz input)	10Hz to 46kHz	
	Speaker and Headphone connections	Stereo to 7.1 (Line Out via three 3.5mm mini jacks)	
	Flexijack	Line In/ Microphone In/Optical Out via shared 3.5mm mini jack	
	Front Panel Header	Intel HD Audio Compatible (2x5 pin)	
	Operating System	Microsoft Windows Vista Business 64 Microsoft Windows Vista Business 32 Microsoft® Windows® XP Professional SP2 Microsoft Windows XP Professional x64 Edition	
	Minimum System Requirements	**System RAM**	512MB
		Operating System	Windows Vista 32-bit and 64-bit version or Windows XP 32-bit or 64-bit version

Technical Specifications - Multimedia and Audio Devices

HP SkyRoom Standard Accessory Hardware Kit	**System requirements**	Windows® 7, Windows Vista™, Windows XP Intel® Core 2 Duo 2.3 GHz or higher Available analog microphone jacks
	Kit Contents	● Webcam ● Audio headset ● Software and Documentation CD-ROM ● Product and warranty documentation
	Webcam	● Video – Up to 30 fps VGA ● Lens – Carl Zeiss Lens ● Color Depth – 24 bit ● USB 2.0 Interface with Cable – 6 feet
	Headset	Frequency Response: ● Microphone – 100 Hz to 16000 Hz ● 150 Hz to 20000 Hz ● Sensitivity – - 44 dB ± 3dB ● Cable – 8 ft shielded plug with 3.5 mm analog plugs
	Product Safety	UL/cUL; TUV/(Europe only); NOM (Mexico)
	EMC	FCC; CE; VCCI; RRL; C-Tick; BSMI; GOST
	CE Mark	EN 55022:1998; EN 50024
	Telecom	All local telecom requirements and approvals for intended markets
	USA	FCC Part 15 Equipment Certificate; CFR 47, Part 15; other local requirements

HP SkyRoom Desktop Audio Kit (PCIe)	**USB Powered Speakers**	**Power LED**	Front of one speaker
		Frequency response	80Hz - 20kHz, +/-10dB
		Dimensions (H x W x D)	90.4mm x 90.4mm x 252.2mm (10.94 x 8.11 x 5.28 in.)per speaker
		Net weight	648 g (1.43 pounds)
		USB cable length	200 cm(6.6 feet)
		Speaker cable length	122 cm (4 feet)
	Microphone	**Frequency Response**	E110 Hz to 15000 Hz
		Input sensitivity	-35 dBV/µbar, -32dBV/Pa +/- 3 dB
		Cable	294.2 cm (9.6 ft) shielded plug with a 3.5 mm analog plug
		Dimensions (H x W x D)	17.2 x 68.5 x 88 mm (0.68 x 2.7 x 3.54 in)
	Creative X-Fi Titanium Audio Card, PCIe	**24-bit Analog-to-Digital conversion of analog inputs**	96kHz sample rate
		24-bit Digital-to-Analog conversion of stereo digital sources	96kHz to analog 7:1 speaker output
		24-bit Digital-to-Analog conversion of stereo digital sources	192 kHz to stereo output

16-bit to 24-bit recording sampling rates	8, 11.025, 16, 22.05, 24, 32, 44.1, 48 and 96kHz
Enhanced SoundFont support	Up to 24-bit resolution
Signal-to-Noise Ratio	Stereo Output 109dB Front and Rear Channels 109dB Center, Subwoofer and Side Channels 109dB
Frequency Response (-3dB, 24-bit/96kHz input)	0Hz to 46kHz
Frequency Response (-3dB, 24-bit/192kHz input)	10Hz to 46kHz
Speaker and Headphone connections	Stereo to 7.1 (Line Out via three 3.5mm mini jacks)
Flexijack	Line In/ Microphone In/Optical Out via shared 3.5mm mini jack
Front Panel Header	HDMI SPDIF (1 x 3 header), HDAudio FP (2 x 5 header)
Kit contents	• USB Powered Speakers • Unidirectional Microphone • Creative X-Fi Titanium Audio Card, PCIe • Product and warranty documentation
System requirements	Windows® 7, Windows Vista™, Windows XP Intel® Core 2 Duo 2.3 GHz or higher Available analog microphone jacks

NOTE 1: 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.

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 to 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**	5° to 50° C (41° to 122° F)
		Relative Humidity	10% to 90%
		Maximum Wet Bulb Temperature	30° C (86° F)
		Operating Systems Supported	Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32*. Red Hat Enterprise Linux(RHEL) WS4**, 5 Desktop/Workstation Novell SLED 10 & SLED 11 No driver is required for this device. Native support is provided by the operating system.

* Certain Windows Vista product features require advanced or additional hardware. See http://www.microsoft.com/windowsvista/getready/hardwarereqs.mspx and http://www.microsoft.com/windowsvista/getready/capable.mspx for details. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit: http://www.windowsvista.com/upgradeadvisor. For Windows Vista system requirements, visit: http://www.windowsvista.com/systemrequirements.

** RHEL WS4 not supported on Z200/Z200SFF

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**	5° to 50° C (41° to 122° F)	
		Relative Humidity	10% to 90%	
		Maximum Wet Bulb Temperature	30° C (86° F)	
		Operating Systems Supported	Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32*. Red Hat Enterprise Linux (RHEL) WS4**, 5 Desktop/Workstation Novell SLED 10 & SLED 11 No driver is required for this device. Native support is provided by the operating system.	

*Certain Windows Vista product features require advanced or additional hardware. See http://microsoft.com/windowsvista/getready/hardwarereqs.mspx and http://www.microsoft.com/windowsvista/getready/capable.mspx for details. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit: http://www.windowsvista.com/upgradeadvisor. For Windows Vista system requirements, visit: http://www.windowsvista.com/systemrequirements

* LightScribe functionality is not natively supported by Linux distributions. Customers may download LightScribe Linux drivers from: http://www.lightscribe.com/downloadSection/linux/index.aspx

** RHEL WS4 not supported on Z200/Z200SFF

	Kit Contents	HP SATA SuperMulti LightScribe DVD Writer drive, LightScribe software, Roxio Easy Media Creator software, Intervideo WinDVD Software, installation guide, and DVD+R media.

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 (Read & Write) 700/650MB Ultra & Ultra+ Speed CD-Rewritable (Read & Write)
		Full Stroke DVD	< 270 ms (seek)
		Full Stroke CD	< 250 ms (seek)

Technical Specifications - Optical and Removable Storage

	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**	5° to 50° C (41° to 122° F)
		Relative Humidity	10% to 90%
		Operating Systems Supported	Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows XP Professional or Windows XP Home 32*. Red Hat Enterprise Linux(RHEL) WS4, 5 Desktop/Workstation Novell SLED 10 & SLED 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 kit.

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	Blu-ray	
		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 maximum	
Operating Environmental (all conditions non-condensing)	**Temperature**	5° to 50° C (41° to 122° F)	
	Relative Humidity	15% to 80%	
	Maximum Wet Bulb Temperature	30° C (86° F)	
	Operating Systems Supported	Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32*. Red Hat Enterprise Linux (RHEL) WS4**, 5 Desktop/Workstation Novell SLED 10 & SLED 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, LightScribe software, 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, they may require a DVI or HDMI digital connection and your display may require HDCP support. HD-DVD movies cannot be played on this workstation.

HP 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 channel 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 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 Mobile 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 FireWire/IEEE 1394a PCI Card	**Data Transfer Rate**	Burst Data Rate up to 400 Mbps
	Device Interface Protocol	IEEE-1394a
	Devices Supported	IEEE-1394 compliant devices
	Bus Type	PCI card with brackets for low profile and full height PCI slots.
	Certification Level	FCC Part 15B, cULus 60950, CE Mark EN55022B(1995)/EN55024-1998 STD, Taiwan BSMI CNS13438, Korea MIC
	Ports	Two IEEE 1394 6-Pin Connector (Rear)
	Internal Connectors	One 10-Pin (9 Contacts) Custom Connector
	System Requirements	Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32*. No driver is required for this device. Native support is provided by the operating system. * Certain Windows Vista product features require advanced or additional hardware. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit: http://www.windowsvista.com/upgradeadvisor. For Windows Vista system requirements, visit: http://www.windowsvista.com/systemrequirements. Pentium II 266 or above 128-MB RAM 1-GB Hard Drive CD-ROM drive Built-in sound system Available PCI 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%
	Operating Systems Supported	Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32* * Certain Windows Vista product features require advanced or additional hardware. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit: http://www.windowsvista.com/upgradeadvisor. For Windows Vista system requirements, visit: http://www.windowsvista.com/systemrequirements.

Technical Specifications - Controller Cards

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 Connector (Rear)
	Internal Connectors	One 10-Pin header Custom Connector
	System Requirements	Microsoft Windows XP Professional, Windows XP Home, Windows Vista. Not supported on Linux. Pentium® III or higher processor 128-MB RAM 1-GB Hard Drive CD-ROM drive Built in sound system Available PCI 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	Microsoft Windows XP and Windows Vista

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.

Integrated Broadcom 5764 PCIe LOM Controller	**Connector**	RJ45
	Data Rates Supported	10/100/1000BT
	Bus Architecture	PCIe X1
	Alerting	ASF 2.0

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 Vista 32-bit SP1, Windows Vista x64 SP1, Windows XP 32 bit professional, Windows XP x64 Red Hat Enterprise Linux (RHEL) WS4*, 5 Desktop/Workstation Novell SLED 10 & 11 *RHEL WS4 not supported on Z200/Z200SFF
	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 XP Professional, Windows XP Professional x64 Edition. Red Hat Enterprise Linux(RHEL) WS4, 5 Desktop/Workstation Novell SLES 9 & SLE 10 * Certain Windows Vista product features require advanced or additional hardware. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit: http://www.windowsvista.com/upgradeadvisor. For Windows Vista system requirements, visit: http://www.windowsvista.com/systemrequirements.
	Management Capabilities	WOL , PXE 2.1
	Kit Contents	HP NC360T PCI Express Dual Port Gigabit NIC, low profile bracket, CD containing Intel PROset II NIC drivers, quick install guide, product warranty statement

Technical Specifications - Networking and Communications

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 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). * RHEL WS4 not supported on Z200/Z200SFF
	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