

Overview



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

Overview



- 4. 3 External 5.25" Bays
- 5. 4-DIMM slots for DDR3 ECC memory
- 6. 3 Internal 3.5" Bays
- 7. 320W, 89% efficient Power Supply
- 8. Dual Core Intel Core i3/i5 Series Processors
Quad Core Intel 3400 Series Processors
- 9. Rear I/O: 6 USB 2.0, 1 optional serial port
PS/2 keyboard/mouse
1 RJ-45 to Integrated Gigabit LAN
1 Audio Line In, 1 Audio Line Out, 1 Microphone In
- 10. 1 PCIe x16 Gen2 Slots
- 11. 1 PCIe x16 Gen1, 1 PCIe x1 Gen1, 1 PCIe x4 Gen1
3 PCI Slots
- 12. 5 Internal USB 2.0 ports

Form Factor	Convertible Minitower
Compatible Operating Systems	<p>Genuine Windows® 7 Ultimate 64-Bit Genuine Windows® 7 Professional 32-Bit Genuine Windows® 7 Professional 64-Bit</p> <p>NOTES: Systems may require upgraded and/or separately purchased hardware and/or 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.</p> <p>Novell SLED 11 Linux Preloaded 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</p>
Available Processors	<p>Intel® Celeron® processor G1101, 2.26 GHz, 73W, 2 MB cache, 1066 MHz memory, Dual-Core Intel® Pentium® processor G6950, 2.80 GHz, 73W, 3 MB cache, 1066 MHz memory, Dual-Core Intel Core processor i3-540, 3.06 GHz, 73W, 4 MB cache, 1333 MHz memory, Dual-Core, HT Intel Core processor i3-550, 3.20 GHz, 73W, 4 MB cache, 1333 MHz memory, Dual-Core, HT Intel Core processor i3-560, 3.33 GHz, 73W, 4 MB cache, 1333 MHz memory, Dual-Core, HT Intel Core processor i5-650, 3.20 GHz, 73W, 4 MB cache, 1333 MHz memory, Dual-Core, HT, Turbo Intel Core processor i5-660, 3.33 GHz, 4 MB cache, 1333 MHz memory, Dual-Core, HT, Turbo</p>



Overview

	<p>Intel Core processor i5-670, 3.46 GHz, 73W, 4 MB cache, 1333 MHz memory, Dual-Core, HT, Turbo</p> <p>Intel Core processor i5-680, 3.60 GHz, 73W, 4 MB cache, 1333 MHz memory, Dual-Core, HT, Turbo</p> <p>Intel Core processor i5-750, 2.66 GHz, 95W, 8 MB cache, 1333 MHz memory, Quad-Core, Turbo</p> <p>Intel Core processor i5-760, 2.80 GHz, 95W, 8 MB cache, 1333 MHz memory, Quad-Core, Turbo</p> <p>Intel Core processor i7-870, 2.93 GHz, 95W, 8 MB cache, 1333 MHz memory, Quad-Core, HT, Turbo</p> <p>Intel Core processor i7-880, 3.06 GHz, 95W, 8 MB cache, 1333 MHz memory, Quad-Core, HT, Turbo</p> <p>Intel Xeon processor X3440, 2.53 GHz, 95W, 8 MB cache, 1333 MHz memory, Quad-Core, HT, Turbo</p> <p>Intel Xeon processor X3450, 2.66 GHz, 95W, 8 MB cache, 1333 MHz memory, Quad-Core, HT, Turbo</p> <p>Intel Xeon processor X3470, 2.93 GHz, 95W, 8 MB cache, 1333 MHz memory, Quad-Core, HT, Turbo</p> <p>Intel Xeon processor X3480, 3.06 GHz, 95W, 8 MB cache, 1333 MHz memory, Quad-Core, HT, Turbo</p>
Available Processor Disclaimers	<p>Integrated Intel HD graphics is not supported on the Quad-Core Intel Core i5-700 Desktop Processor Series, Intel Core i7-800 Desktop Processor Series or Intel Xeon Processor 3400 Series.</p> <p>Intel's numbering is 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.</p> <p>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.</p> <p>Dual-Core and 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.</p>
Color	Jack Black
Convertibility	Yes. 5.25" drives rotate for Minitower or Desktop orientation.
Expansion Slots (see system board section for more details)	<ul style="list-style-type: none"> • 1 PCI Express Gen1 slot x1 mechanical/x1 electrical • 1 PCI Express Gen2 slots x16 mechanical/ x16 electrical (used for discrete graphics) • 1 PCI Express Gen1 slot x4 mechanical/x1 electrical • 1 PCI Express Gen1 slot x16 mechanical/x4 electrical • 3 PCI slots (full-height, full-length)
Expansion Bays (see storage section for more details)	<ul style="list-style-type: none"> • 3 internal 3.5" bays • 3 external 5.25" bays <p>NOTE: Third external 5.25" bay is not full depth; maximum depth 170 mm (6.7 inches)</p>
Front I/O	2 USB 2.0, 1 IEEE 1394 (requires optional PCI card to function), 1 audio out, and 1 microphone.
Internal I/O	5 USB 2.0 ports available by two separate 2x5 and one 1x5 header: supports one HP Internal USB Port Kits, (one port on each Kit) for 1x5 pin header plus (a) up to two USB Media Card Readers, or (b) one Internal Port kit and one USB Media Card Reader.
Rear I/O	1 DVI-I Single Link and 1 DisplayPort output from Intel HD graphics (available on dual-core processors only), 6 USB 2.0, 1 optional serial port, 2 PS/2, RJ-45 (NIC), 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
Interfaces Supported	22-in-1 Media Card Reader (optional)
Chassis Dimensions (W x D x H)	Standard minitower orientation: 17.78 x 45.43 x 44.76 cm (7 x 17.9 x 17.6 in) Converted desktop orientation: 17.78 x 45.43 x 44.76 cm (7 x 17.9 x 17.6 in)



Overview

Weight	Exact weights depend upon configuration Minimum: 10.7 kg (23.6 lbs) Standard: 11.8 kg (26.0 lbs) Maximum: 14 kg (30.8 lbs)	
Temperature	Operating:	40° to 95°F (5° to 35°C)
	Non-operating	-40° to 140°F (-40° to 60°C)
Humidity	Operating:	8% to 85%
	Non-operating	8% to 90%
Maximum Altitude (non-pressurized)	Operating:	3,000 m; 10,000 ft
	Non-operating	9,100 m; 30,000 ft
Power Supply	320 watts wide-ranging, active Power Factor Correction, 89% Efficient (http://www.80plus.org/manu/psu/psu_detail.aspx?id=41&type=2) The Power Supply Efficiency Report for this Power Supply may be found at the following link: http://www.80plus.org/manu/psu/psu_reports/HEWLETT%20PACKARD_DPS-320KB-1%20A_ECOS%201557.1_320W_Report.pdf	
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
Dual-Core Intel® "Clarkdale" Processors for Z200				
Intel® Celeron® Processor G1101 2.26 GHz, 2MB cache, 1066 MHz memory, Dual-Core	Y	N		Not Supported on Non ECC type memory modules.
Intel® Pentium® Processor G6950 2.8 GHz, 3MB cache, 1066 MHz memory, Dual-Core	Y	N		
Intel Core Processor i3-540 3.06 GHz, 4MB cache, 1333 MHz memory, Dual-Core, HT	Y	N		
Intel Core Processor i3-550 3.20 GHz, 4MB cache, 1333 MHz memory, Dual-Core, HT	Y	N		
Intel Core Processor i3-560 3.33 GHz, 4MB cache, 1333 MHz memory, Dual-Core, HT	Y	N		
Intel Core Processor i5-650 3.20 GHz, 4MB cache, 1333 MHz memory, Dual-Core, HT, Turbo	Y	N		
Intel Core Processor i5-660 3.33 GHz, 4MB cache, 1333 MHz memory, Dual-Core, HT, Turbo	Y	N		
Intel Core Processor i5-670 3.46 GHz, 4MB cache, 1333 MHz memory, Dual-Core, HT, Turbo	Y	N		
Intel Core Processor i5-680 3.60 GHz, 4MB cache, 1333 MHz memory, Dual-Core, HT, Turbo	Y	N		
Quad-Core Intel® Core™ i5-700 and Core i7-800 Desktop Processor Series				
Intel Core Processor i5-750 2.66 GHz, 8 MB cache, 1333 MHz memory, Quad-Core, Turbo	Y	N		
Intel Core Processor i5-760 2.80 GHz, 8 MB cache, 1333 MHz memory, Quad-Core, Turbo	Y	N		
Intel Core Processor i7-870 2.93 GHz, 8 MB cache, 1333 MHz memory, Quad-Core, HT, Turbo	Y	N		
Intel Core Processor i7-880 3.06 GHz, 8 MB cache, 1333 MHz memory, Quad-Core, HT, Turbo	Y	N		
Quad-Core Intel® Xeon® Processor 3400 Series with Intel® Nehalem Architecture				
Intel Xeon Processor X3430 2.40 GHz, 8MB cache, 1333 MHz memory, Quad-Core, Turbo	Y	N		
Intel Xeon Processor X3440 2.53 GHz, 8MB cache, 1333 MHz memory, Quad-Core, HT, Turbo	Y	N		
Intel Xeon Processor X3450 2.66 GHz, 8MB cache, 1333 MHz memory, Quad-Core, HT, Turbo	Y	N		
Intel Xeon Processor X3460 2.80 GHz, 8MB cache, 1333 MHz memory, Quad-Core, HT, Turbo	Y	N		



Supported Components

Intel Xeon Processor X3470 2.93 GHz, 8MB cache, 1333 MHz memory, Quad-Core, HT, Turbo Y N

Intel Xeon Processor X3480 3.06 GHz, 8MB cache, 1333 MHz memory, Quad-Core, HT, Turbo Y N

Integrated Intel HD graphics is supported only on Dual-Core Intel® "Clarkdale" Processors; it is not supported on the Quad-Core Intel Core i5-700 Desktop Processor Series, Intel Core i7-800 Desktop Processor Series or Intel Xeon Processor 3400 Series.

SATA Hard Drives

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
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 (for HP Z-Workstations)	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	
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	

SATA Solid State Drives

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP Solid State Drives for Workstations				
HP 160GB SATA X25-M SSD	Y	Y	WV915AA	

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 Data Configuration -- Boot/OS Drive + 2 Drive Striped Array	Y	N		
RAID 0 Configuration - Striped Array	Y	N		
RAID 1 Configuration - Mirrored Array	Y	N		

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.

All drives must be identical in type and capacity

All RAID arrays must be less than 2 TB

NOTE 1: Requires identical hard drives (speeds, capacity, interface).



Supported Components

Integrated Graphics

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes	Supported Multi Mixed
Intel® HD Graphics (integrated)	Y	N		Available with dual-core processors only, the Integrated Graphics is turned off if a discrete graphics adapter is installed.	1
Professional 2D					
NVIDIA Quadro NVS 295 256MB PCIe Graphics Card	Y	Y	FY943AA		2 X
Entry 3D					
ATI FirePro V3700 256MB PCIe Graphics Card	Y	Y	FY944AA		1
NVIDIA Quadro FX 380 256MB PCIe Graphics Card	Y	Y	NB769AA		1
ATI FirePro V3800 512MB PCIe Graphics Card	Y	Y	WL048AA		1
NVIDIA Quadro FX 580 512MB PCIe Graphics Card	Y	Y	FY945AA		1
ATI FirePro V4800 1GB Graphics Card	Y	Y	WL049AA		1
NVIDIA Quadro 600 1GB Graphics Card	Y	Y	WS093AA		1
Mid-range 3D					
ATI FirePro V5700 512MB PCIe Graphics Card	Y	Y	FY947AA		1
ATI FirePro V5800 1GB Graphics Card	Y	Y	WL050AA		1
NVIDIA Quadro FX 1800 768MB PCIe Graphics Card	Y	Y	FY946AA		1



Supported Components

Memory	CTO	Option Kit Part Number	Support Notes
	PC3-10600 DDR3-1333 ECC Unbuffered DIMMs CTO		
	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		
	8GB (4x2GB) DDR3-1333 ECC Unbuffered RAM 1-CPU		
	8GB (2x4GB) DDR3-1333 ECC Unbuffered RAM 1-CPU		
	16GB (4x4GB) DDR3-1333 ECC Unbuffered RAM 1-CPU		
	PC3-10600 DDR3-1333 nECC Unbuffered DIMMs CTO		
	1 GB (1x1GB) DDR3-1333 nECC Unbuffered RAM 1-CPU		
	2 GB (2x1GB) DDR3-1333 nECC Unbuffered RAM 1-CPU		
	4 GB (2x2GB) DDR3-1333 nECC Unbuffered RAM 1-CPU		
	8 GB (4x2GB) DDR3-1333 nECC Unbuffered RAM 1-CPU		
	Sub-Section Description/Notes		
	Each processor supports up to 2 channels of DDR3 memory. To realize full performance at least 1 DIMM must be inserted into each channel.		
	The CPUs determine the speed at which the memory is clocked. If a 1333MHz capable CPU is used in the system, the maximum speed the memory will run at is 1333MHz regardless of the specified speed of the memory		
	AMO		
	PC3-10600 DDR3-1333 ECC Unbuffered DIMMs AMO		
	4GB (1x4GB) DDR3-1333 ECC Unbuffered RAM	NL797AA	
	2GB (1x2GB) DDR3-1333 ECC Unbuffered RAM	FX699AA	
	1GB (1x1GB) DDR3-1333 ECC Unbuffered RAM	FX698AA	
	NOTE: Only unbuffered DDR3 DIMMs are supported.		

Multimedia and Audio Devices

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP Thin USB Powered Speakers	Y	Y	KK912AA	
Integrated Intel/Realtek HD ALC262 Audio	Y	N		
Creative X-Fi Titanium PCIe Audio Card	Y	Y	NH222AA	
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 Home Basic 32-bit and Microsoft Windows 7 32-bit and 64-bit versions. Linux is not supported.				



Supported Components

Optical and Removable Storage

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP 16X DVD-ROM SATA Drive	Y	Y	EW268AA	See note 1
HP 16X DVD+-RW SuperMulti SATA Drive	Y	Y	EW269AA	
HP 22-in-1 Media Card Reader Kit (Workstations)	Y	Y	NK361AA	
HP Blu-ray Writer	Y	Y	AR482AA	

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 drive option.

Controller Cards

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

Monitors

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP ZR24w 24" S-IPS LCD Monitor	N	Y	VM633A8	
HP ZR22w 21.5" S-IPS LCD Monitor	N	Y	VM626A8	
HP LP3065 30-inch Widescreen LCD Monitor	N	Y	EZ320A	
HP LP2475w 24-inch Widescreen LCD Monitor	N	Y	KD911A	
HP LP2275w 22-inch Widescreen LCD Monitor	N	Y	KE289A	
HP DreamColor LP2480zx Professional Display	N	Y	GV546A	
HP LP1965 19-inch LCD Monitor	N	Y	RA373A	
HP LP2065 20-inch LCD Monitor	N	Y	EF227A	

Supported by all Operating Systems available from HP

Screen Size Diagonally Measured



Supported Components

Networking and Communications

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Broadcom NetXtreme Gigabit Ethernet Plus NIC (PCIe)	Y	Y	FS215AA	This is a PCI Express card based on the Broadcom 5761 chip.
Intel Gigabit CT Desktop NIC	Y	Y	FH969AA	
Integrated Intel 82578DM PCIe LoM Controller	Y	N		

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.

The Broadcom (5761) NetXtreme Gigabit Ethernet Plus NIC and the Intel Gigabit CT NIC are supported on the following operating systems:

Microsoft Windows XP Pro 32-bit and 64-bit and Microsoft Vista Home Basic 32-bit and Microsoft Windows 7 32-bit and 64-bit versions.

Red Hat Enterprise Linux(RHEL), 5 Desktop/Workstation

Novell SLED 10 & 11

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	Y	DE618A	

Input Devices

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP USB Laser Mouse	Y	Y	GW405AA	
HP SpacePilot 3D USB Intelligent Controller	N	Y	EF390AA	
HP SpaceExplorer 3D USB Controller	N	Y	RY429AA	
HP USB 2-Button Optical Scroll Mouse	Y	Y	DC172B	
HP USB Standard Keyboard	Y	Y	DT528A	
HP PS/2 Optical Scroll Mouse	Y	Y	EY703AA	
HP PS/2 Standard Keyboard	Y	Y	DT527A	
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 CCID SmartCard Keyboard	Y	Y	BV813AA	



Supported Components

Other Hardware

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP Power Cord Kit	N	Y	DM293A	
HP eSATA PCI Cable Kit	Y	Y	GM110AA	
HP Workstation Mouse Pad	Y	N		Japan only
Configure minitower in desktop orientation	Y	N		
HP Serial Port Adapter	N	Y	PA716A	
HP Internal USB Port Kit	N	Y	EM165AA	
HP ENERGY STAR 5.0 Enabled Configuration	Y	N		
HP Parallel Port Adapter Kit	N	Y	KD061AA	

Software

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Intervideo WinDVD with DVD player	Y	N		
Microsoft Office 2007 Small Business Edition	Y	N		
Microsoft Office 2007 Trial Edition	Y	N		
MS Office Home & Business 2010	Y	N		
PDF Complete - Trial Edition	Y	N		
Roxio Easy Media Creator (CD or DVD burner)	Y	N		
HP Client Manager Software v6.2 (optional download)	Y	N		
HP SkyRoom Software	N	Y		
Elemental Accelerator for NVIDIA Quadro	Y	Y	VH158AA	Support FX1800 only
HP Support Assistant	Y	N		
HP Performance Advisor	N	Y		Available as a web download/install starting 1/7/2010. Included in the Windows 7 preload starting 3/1/2010.
HP Power Assistant	Y	N		



Supported Components

Operating Systems

HP Linux Installer Kit
Genuine Windows® 7 Professional 32-bit
Red Hat Linux Workstation 5 Drop In Box OS
Genuine Windows® 7 Professional 32-bit with downgrade to Windows® XP Professional 32-bit custom installed
Genuine Windows® 7 Professional 64-bit
Novell SLED 11 Linux
Genuine Windows® 7 Professional 64-bit with downgrade to Windows® XP Professional x64 custom installed

Support Notes

See: <http://www.hp.com/workstations/software/linux>
See: <http://www.microsoft.com/windows/windows-7/> for support details.
See: <http://www.microsoft.com/windows/windows-7/> for support details.
See: <http://www.microsoft.com/windows/windows-7/> for support details.
Preload
See: <http://www.microsoft.com/windows/windows-7/> for support details.



System Technical Specifications

System Board																																													
System Board Form Factor	ATX 251.46 x 304.8 mm (9.9 x 12 inches)																																												
Processor Socket	Single LGA 1156																																												
CPU Bus Speed	DMI																																												
Chipset	Intel® PCH 3450																																												
Super I/O Controller	SMSC SCH5327, Rev B																																												
Memory Expansion Slots	4 DDR3 memory slots																																												
Memory Type Supported	DDR3, UDIMM (Unbuffered), ECC& nECC																																												
Memory Modes	Channel non-Interleaved																																												
Memory Speed Supported	1333MHz DDR3																																												
Memory Protection	ECC available on data, parity on address and command																																												
Memory																																													
Maximum Memory	16GB																																												
<table border="1"> <thead> <tr> <th rowspan="2">Capacity</th> <th colspan="4">CPU0</th> </tr> <tr> <th>DIMM1</th> <th>DIMM2</th> <th>DIMM3</th> <th>DIMM4</th> </tr> </thead> <tbody> <tr> <td>1GB</td> <td>1GB</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2GB</td> <td>1GB</td> <td></td> <td>1GB</td> <td></td> </tr> <tr> <td>3GB</td> <td>1GB</td> <td>1GB</td> <td>1GB</td> <td></td> </tr> <tr> <td>4GB</td> <td>2GB</td> <td></td> <td>2GB</td> <td></td> </tr> <tr> <td>8GB</td> <td>2GB</td> <td>2GB</td> <td>2GB</td> <td>2GB</td> </tr> <tr> <td>8GB</td> <td>4GB</td> <td></td> <td>4GB</td> <td></td> </tr> <tr> <td>16GB</td> <td>4GB</td> <td>4GB</td> <td>4GB</td> <td>4GB</td> </tr> </tbody> </table>		Capacity	CPU0				DIMM1	DIMM2	DIMM3	DIMM4	1GB	1GB				2GB	1GB		1GB		3GB	1GB	1GB	1GB		4GB	2GB		2GB		8GB	2GB	2GB	2GB	2GB	8GB	4GB		4GB		16GB	4GB	4GB	4GB	4GB
Capacity	CPU0																																												
	DIMM1	DIMM2	DIMM3	DIMM4																																									
1GB	1GB																																												
2GB	1GB		1GB																																										
3GB	1GB	1GB	1GB																																										
4GB	2GB		2GB																																										
8GB	2GB	2GB	2GB	2GB																																									
8GB	4GB		4GB																																										
16GB	4GB	4GB	4GB	4GB																																									
Memory Configuration (Supported)	ECC DIMMs are supported, and support nEcc 1GBx1 configuration on Z200																																												
PCI Express Connectors	1 PCI Express Gen2 slots x16 mechanical/ x16 electrical (used for discrete graphics) 1 PCI Express Gen1 slot x16 mechanical/x4 electrical 1 PCI Express Gen1 slot x4 mechanical/x1 electrical 1 PCI Express Gen1 slot x1 mechanical/x1 electrical																																												
PCI Connectors (5.0V)	3 PCI																																												
Interfaces Supported	SATA Integrated 6-channel SATA 3.0Gb/sec controller with RAID 0, 1, 5 and NCQ. (Factory integrated RAID is Microsoft Windows only) RAID 5 is supported by Software XOR.																																												
Serial Attached SCSI	None																																												
Integrated RAID	NOTE: Requires identical hard drives (speeds, capacity, interface)																																												
Integrated Graphics	Integrated Intel HD Graphics (available with dual-core processors only) UMA architecture (graphics frame buffer): with Unified Memory Architecture, a region of system memory is reserved and dedicated to the graphics display; DirectX 10.0 compliant; 1 Single-link DVI-I + 1 DP graphics ports integrated in motherboard; Supports dual display across DP & DVI-I																																												



System Technical Specifications

Network Controller	Integrated Gbit LAN MAC by Intel PHY Hanksville 82578DM. Management capabilities WOL, PXE 2.1 and AMT 6.0	
External SATA (eSATA)	1 port at SATA5 eSATA capable with optional eSATA After-Market Option cable kit.	
IDE connector	No	
Floppy connector	No	
Network Controller	Management capabilities WOL, PXE 2.1 and ASF 2.0	
Serial	1 internal header (requires optional Serial Port Adaptor)	
2nd Serial	No	
Parallel	1 internal header (optional parallel port adaptor required)	
HD Integrated Audio	High Definition Integrated Realtek ALC262 Audio with Line in, Line Out, Microphone, Headphone	
CD-ROM input/Audio	No	
AUX INPUT; Audio	No	
IEEE 1394 Connector(s)	Front	1 IEEE 1394a (requires optional PCI card to function)
	Rear	No
	Internal	No
USB Connector(s)	Front	2 USB 2.0
	Rear	6 USB 2.0
	Internal	5 USB 2.0 ports available by two separate 2x5 and one 1x5 header: supports one HP Internal USB Port Kits, (one port on each Kit) for 1x5 pin header plus (a) up to two USB Media Card Readers, or (b) one Internal Port kit and one USB Media Card Reader.
Flash ROM	Yes	
Clear Fan Header	Yes	
CPU Fan Header	Yes	
Chassis Fan Header	1 Rear System Chassis Fan Header, 1 Optional Front Chassis Fan Header	
Front PCI Fan Header	Yes	
Front Control Panel/Speaker Header	Yes	
CMOS Battery Holder - Lithium	Yes	
Integrated Trusted Platform Module	Integrated TPM 1.2	
Power Supply Headers	Yes	
Power Switch, Power LED & Hard Drive LED Header	Yes	
Clear Password Jumper	Yes	
Keyboard/Mouse	USB or PS/2	
Power Supply	320w Wide Ranging, Active PFC, 89% Efficient	
Operating Voltage Range	90-264 VAC	
Rated Voltage Range	100-240 VAC	
Rated Line Frequency	50/60 Hz	



System Technical Specifications

Operating Line Frequency Range	47-63 Hz
Rated Input Current	5.5A @100-240V
Heat Dissipation	Typical: 728 btu/hr Maximum: 1255 BTU/hr (316.3 kg-cal/hr)
Power Supply Fan	92x25 mm variable speed
ENERGY STAR® qualified (Config Dependent)	Yes
80 PLUS Compliant	Yes, 89% Efficient
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	No
Surge Tolerant Full Ranging Power Supply (withstands power surges up to 2000V)	Yes
Hood Lock Header	Yes

Energy Consumption

Example Configuration #1	Processor Info	1x X3430 2.40 GHz					
	Memory Info	2x 1GB 1333 MHz DDR3					
	Graphics Info	1x FX380					
	Disks/Optical/Floppy	1x SATA 250 GB 7.2k rpm / 1x Optical / 0x Floppy					
	PSU	320w					
	OS/BIOS	Win7 32 / v1.03					
Energy Consumption		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)	40.31 W		41.34 W		40.32 W	
	Windows Busy Typ (S0)	159.09 W		156.30 W		159.24 W	
	Windows Busy Max (S0)	173.21 W		169.04 W		174.06 W	
	Sleep (S0)	3.79 W	3.71 W	4.00 W	3.94 W	3.79 W	3.72 W
	Off (S0)	1.26 W	1.18 W	1.44 W	1.37 W	1.24 W	1.27 W
	Zero Power Mode (EuP)	0.21 W		0.39 W		0.20 W	
Heat Dissipation**		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)	137.58 btu/hr		141.09 btu/hr		137.61 btu/hr	
	Windows Busy Typ (S0)	542.97 btu/hr		533.45 btu/hr		543.49 btu/hr	
	Windows Busy Max (S0)	591.17 btu/hr		576.93 btu/hr		594.07 btu/hr	
	Sleep (S0)	12.9 btu/hr	12.7 btu/hr	13.7 btu/hr	13.5 btu/hr	12.9 btu/hr	12.7 btu/hr



System Technical Specifications

	Off (S0)	4.30 btu/hr	4.03 btu/hr	4.91 btu/hr	4.68 btu/hr	4.23 btu/hr	4.33 btu/hr
	Zero Power Mode (EuP)	0.72 btu/hr		1.33 btu/hr		0.68 btu/hr	

Example Configuration #2	Processor Info	1x X3450 2.66 GHz 1333 MHz					
	Memory Info	3x 1GB 1333 MHz DDR3					
	Graphics Info	1x FX580					
	Disks/Optical/Floppy	1x SATA 500 GB 7.2k rpm / 1x Optical / 0x Floppy					
	PSU	320w					
	OS/BIOS	Win7 32 / v1.03					
Energy Consumption		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)	40.16 W		42.36 W		39.71 W	
	Windows Busy Typ (S0)	180.73 W		178.99 W		181.11 W	
	Windows Busy Max (S0)	202.85 W		200.25 W		204.01 W	
	Sleep (S0)	3.78 W	3.73 W	4.01 W	3.94 W	3.79 W	3.72 W
	Off (S0)	1.25 W	1.17 W	1.43 W	1.36 W	1.23 W	1.17 W
	Zero Power Mode (EuP)	0.21 W		0.39 W		0.20 W	
Heat Dissipation**		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)	137.07 btu/hr		144.57 btu/hr		135.53 btu/hr	
	Windows Busy Typ (S0)	616.83 btu/hr		610.89 btu/hr		618.13 btu/hr	
	Windows Busy Max (S0)	692.33 btu/hr		683.45 btu/hr		696.29 btu/hr	
	Sleep (S0)	12.9 btu/hr	12.7 btu/hr	13.7 btu/hr	13.5 btu/hr	12.9 btu/hr	12.7 btu/hr
	Off (S0)	4.27 btu/hr	3.99 btu/hr	4.88 btu/hr	4.64 btu/hr	4.2 btu/hr	3.99 btu/hr
	Zero Power Mode (EuP)	0.72 btu/hr		1.33 btu/hr		0.68 btu/hr	

Example Configuration #3	Processor Info	1x X3470 2.93 GHz 1333 MHz					
	Memory Info	4x 1GB 1333 MHz DDR3					
	Graphics Info	1x FX1800					
	Disks/Optical/Floppy	1x SATA 1.0 TB 7.2k rpm / 1x Optical / 0x Floppy					
	PSU	320w					
	OS/BIOS	Win7 64 / v1.03					
Energy Consumption		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)	41.33 W		42.14 W		41.61 W	
	Windows Busy Typ (S0)	188.72 W		182.86 W		188.51 W	
	Windows Busy Max (S0)	263.88 W		238.62 W		260.85 W	
	Sleep (S0)	3.98 W	3.92 W	4.20 W	4.15 W	3.98 W	3.92 W
	Off (S0)	1.26 W	1.18 W	1.44 W	1.37 W	1.24 W	1.17 W
	Zero Power Mode (EuP)	0.21 W		0.39 W		0.20 W	
Heat Dissipation**		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)	140.6 btu/hr		143.82 btu/hr		142.01 btu/hr	
	Windows Busy Typ (S0)	644.10 btu/hr		624.10 btu/hr		643.38 btu/hr	
	Windows Busy Max (S0)	900.62 btu/hr		814.41 btu/hr		890.28 btu/hr	
	Sleep (S0)	13.6 btu/hr	13.4 btu/hr	14.3 btu/hr	14.2 btu/hr	13.6 btu/hr	13.4 btu/hr
	Off (S0)	4.30 btu/hr	4.03 btu/hr	4.91 btu/hr	4.68 btu/hr	4.23 btu/hr	3.99 btu/hr
	Zero Power Mode (EuP)	0.72 btu/hr		1.33 btu/hr		0.68 btu/hr	



System Technical Specifications

	Zero Power Mode (EuP)	0.72 btu/hr	1.33 btu/hr	0.68 btu/hr
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Example Configuration #4 <i>(ENERGY STAR Qualified)</i>	Processor Info	1x X3470 2.93 GHz 1333 MHz					
	Memory Info	4x 4GB 1333 MHz DDR3					
	Graphics Info	1x FX1800					
	Disks/Optical/Floppy	1x SATA 1.0 TB 7.2k rpm / 1x Optical / 0x Floppy					
	PSU	320w					
	OS/BIOS	Win7 64 / v1.03					
Energy Consumption		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	<i>On-Idle (ENERGY STAR* Idle (S0))</i>	62.18 W		62.49 W		62.06 W	
	<i>ENERGY STAR = PMAX Windows running Unneck and Viewperf</i>	212.17 W		208.04 W		210.42 W	
	<i>ENERGY STAR "Sleep" (S3)</i>	4.56 W	4.52 W	4.80 W	4.75 W	4.56 W	4.52 W
	<i>ENERGY STAR "Standby" (Off) (S5)</i>	1.25 W	1.11 W	1.44 W	1.30 W	1.24 W	1.09 W
Heat Dissipation**		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	<i>On-Idle (ENERGY STAR* Idle (S0))</i>	212.22 btu/hr		213.28 btu/hr		211.81 btu/hr	
	<i>ENERGY STAR = PMAX Windows running Unneck and Viewperf</i>	724.35 btu/hr		710.25 btu/hr		718.37 btu/hr	
	<i>ENERGY STAR "Sleep" (S3)</i>	15.6 btu/hr	15.4 btu/hr	16.3 btu/hr	16.2 btu/hr	15.6 btu/hr	15.4 btu/hr
	<i>ENERGY STAR "Standby" (Off) (S5)</i>	4.27 btu/hr	3.79 btu/hr	4.91 btu/hr	4.44 btu/hr	4.23 btu/hr	3.72 btu/hr

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

System Configuration (Entry level)	Processor Info	Intel Xeon Processor X3470 2.93 GHz
	Memory Info	2 x 2GB DDR3 1333 MHz
	Graphics Info	NVIDIA Quadro NVS 295
	Disks/Optical/Floppy	1 x 160 GB 7200 RPM SATA/ DVD-ROM/ 16X DVD+RW SuperMulti

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)		Sound Power (LWAd, bels)
	Idle	3.3 Bels (20 dB)
	Hard drive Operating (random reads)	3.3 Bels (20 dB)
	Floppy Drive Operating (continuous copy)	
	DVD-ROM Operating (sequential reads)	4.7 Bels (32 dB)



System Technical Specifications

System Configuration (High-end)	Processor Info	Intel Xeon Processor X3470 2.93 GHz
	Memory Info	2 x 2GB DDR3 1333 MHz
	Graphics Info	NVIDIA Quadro FX 1800
	Disks/Optical/Floppy	3 x 300GB 10K rpm SATA/ DVD-ROM/ 16X DVD+RW SuperMulti

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)		Sound Power (LWAd, bels)
	Idle	3.6 Bels (20 dB)
	Hard drive Operating (random reads)	4.0 Bels (22 dB)
	Floppy Drive Operating (continuous copy)	
	DVD-ROM Operating (sequential reads)	4.7Bels (32 dB)

Environmental Requirements	Temperature	Operating: 40° to 95° F (5° to 35° C) Non-operating: -40° to 140° F (-40° to 60° C)
	Humidity	Operating: 8% to 85% RH, non-condensing Non-operating: 8% to 90% RH, non-condensing
	Maximum Altitude	Operating: 3,000 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 Vibration Operating random: 0.5g (rms), 5-300 Hz Non-operating random: 2.0g (rms), 10-500 Hz NOTES: Values represent individual shock events and do not indicate repetitive shock events.Values do not indicate continuous vibration.
	Cooling	Above 1524 m (5,000 ft) altitude, maximum operating temperature is de-rated by 1.8° F (1° C) per 305 m (1000 ft) elevation increase

Physical Security and Serviceability	
Access Panel	Tool-less Includes system board and memory information
Optical Drive	Tool-less
Floppy Drive	Tool-less
Hard Drives	Tool-less
Expansion Cards	Tool-less
Processor Socket	Tool-less



System Technical Specifications

Green User Touch Points	Yes, on tool-free internal chassis mechanisms
Color-coordinated Cables and Connectors	Yes
Memory	Tool-less
System Board	Screw-In
Dual Color Power and HD LED on Front of Computer	Yes
Configuration Record SW	Yes
Over-Temp Warning on Screen	Yes
Restore CD/DVD Set	Restores the computer to its original factory shipping image - Can be obtained via HP Support
Dual Function Front Power Switch	Yes, causes a fail-safe power off when held for 4 seconds
Padlock Support	Yes (optional): Locks side cover and secures chassis from theft 0.22-in diameter padlock loop at rear of system
Cable Lock Support	Yes, Kensington Cable Lock (optional): Locks side cover and secures chassis from theft 3 mm x 7 mm slot at rear of system
Universal Chassis Clamp Lock Support	Yes (optional): Locks side cover and locks cables to chassis. Secures chassis from theft and allows multiple units to be chained together when used with optional cable Threaded feature at rear of system
Solenoid Lock and Hood Sensor	Yes (optional) The Solenoid Hood Lock eliminates the need for a physical key by making the chassis lockable through software and a password. You can also lock and unlock the chassis remotely over the network. The Sensor Kit detects when the access panel has been removed
Rear Port Control Cover	Yes, locks rear IO cables to prevent cable theft
Serial, Parallel, USB, Audio, Network, Enable/Disable Port Control	Yes, enables or disables serial, USB, audio, and network ports
Removable Media Write/Boot Control	Yes, prevents ability to boot from removable media on supported devices (and can disable writes to media)
Power-On Password	Yes, prevents an unauthorized person from booting up the workstation
Setup Password	Yes, prevents an unauthorized person from changing the workstation configuration
3.3V Aux Power LED on System PCA	Yes
NIC LEDs (integrated) (Green & Amber)	Yes
CPUs and Heatsinks	A T-15 Torx or flat blade screwdriver is needed to remove the CPU heatsink before the CPU can be removed. CPU removal is tool-less
Power supply diagnostic LED	No
Power Button	Yes, ACPI multi-function
Power LED	Yes, blue (normal), red (fault)
Hard drive activity LED	Yes, green



System Technical Specifications

Internal speaker	Yes
System/Emergency ROM Flash Recovery	Recovers corrupted system BIOS.
OS CD (Restore OS CD)	Restores computer to its original factory shipping Operating System - No recovery CDs will ship with Windows XP, Vista or Linux - an ISO image will be available on an HD partition.
Cooling Solutions	Air cooled forced convection
Power Supply Fans	92 mm x 92 mm x 25 mm 4-wire PWM (non-serviceable)
CPU Heatsink Fan(s)	Mainstream (<=95W): 92 mm x 92 mm x 25 mm 5-wire PWM
Chassis Fans	92 mm x 92mm x 25 mm 4-wire PWM
Memory Fans	No
Access Panel Key Lock	No
ACPI-Ready Hardware	Advanced Configuration and Power Management Interface (ACPI). <ul style="list-style-type: none"> • Allows the system to wake from a low power mode. • Controls system power consumption, making it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system
Integrated Chassis Handles	No
Power Supply	Requires T15 Torx or flat blade screwdriver
PCI Card Retention	Yes, rear (all), middle (none), front (full-length cards with extender)
Flash ROM	Yes
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

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.



System Technical Specifications

Replicated Setup	Saves BIOS settings to USB flash device in human readable file. Repset.exe utility can then replicate these settings on machines being deployed without entering Computer Configuration Utility (F10 Setup).
SMBIOS	System Management BIOS 2.6, for system management information.
Boot Control	Disables the ability to boot from removable media on supported devices.
Memory Change Alert	Alerts management console if memory is removed or changed.
Thermal Alert	Monitors the temperature state within the chassis. Three modes: <ul style="list-style-type: none"> ● NORMAL - normal temperature ranges. ● ALERTED - excessive temperatures are detected. Raises a flag so action can be taken to avoid shutdown or provide for a smoother system shutdown. ● SHUTDOWN - excessive temperatures are encountered. Automatically shuts down the computer without warning before hardware component damage occurs.
Remote ROM Flash	Provides secure, fail-safe ROM image management from a central network console.
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 revision level of the system board. Revision level is digitally encoded into the HW and cannot be modified.
Start-up Diagnostics (Power-on Self-Test)	Assesses system health at boot time with selectable levels of testing.
Auto Setup when new hardware installed	System automatically detects addition of new hardware.
Keyboard-less Operation	The system can be booted without a keyboard.
Localized ROM Setup	Common BIOS image supports System Configuration Utility (F10 Setup) menus in 12 languages with local keyboard mappings.
Asset Tag	The user or MIS to set a unique tag string in non-volatile memory.
Per-slot Control	Allows I/O slot parameters (option ROM enable/disable, bus latency) to be configured individually.
Adaptive Cooling	Control parameters are set according to detected hardware configuration for optimal acoustics.
Pre-boot Diagnostics	(Pre-video) critical errors are reported via beeps and blinks on the power LED.
AMT 6.0 Compliant	Allows workstation status to be monitored on a remote console



System Technical Specifications

Industry Standard Specification Support	
Industry Standard	Revision Supported by the BIOS
ACPI	Advanced Configuration and Power Management Interface, Version 2.0c
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	<ul style="list-style-type: none"> Enhanced Disk Drive Specification Version 1.1 BIOS Enhanced Disk Drive Specification Version 3.0
EHCI	Enhanced Host Controller Interface for Universal Serial Bus, Revision 1.0
PCI	PCI Local Bus Specification, Revision 2.3 PCI Power Management Specification, Revision 1.1 PCI Firmware Specification, Revision 3.0, Draft .7
PCI Express	PCI Express Base Specification, Revision 2.0
PMM	POST Memory Manager Specification, Version 1.01
SATA	<ul style="list-style-type: none"> Serial ATA Specification, Revision 1.0a Serial ATA 3 Gb/s: Extensions to Serial ATA 1.5 Gb/s, Revision 1.0
SPD	PC SDRAM Serial Presence Detect (SPD) Specification, Revision 1.2B
TPM	Trusted Computing Group TPM Specification Version 1.2
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	<ul style="list-style-type: none"> Program to proactively communicate Product Change Notifications (PCNs) and Customer Advisories by email to customers, based on a user-defined profile. PCNs provide advance notification of hardware and software changes to be implemented in the factory providing time to plan for transition. o 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	Visit: http://www.hp.com/go/ssm
Social and Environmental Responsibility	
Eco-Label Certifications & Declarations	<p>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:</p> <ul style="list-style-type: none"> ENERGY STAR® (energy-saving features available on selected configurations -Windows only) US Federal Energy Management Program (FEMP) China Energy Conservation Program IT ECO declaration o Japan PC Green label* <p>*This product conforms to the examination standards (2003 version) under JEITA's 'PC Green Label</p>



System Technical Specifications

Batteries	<p>System.'</p> <p>This product complies with ISO standards:</p> <ul style="list-style-type: none">• EU Directive 91/ 157/ EEC• EU Directive 93/ 86/ EEC• EU Directive 98/ 101/ EEC <p>Batteries used in the product do not contain:</p> <ul style="list-style-type: none">• Mercury greater than 5ppm by weight• Cadmium greater than 10ppm by weight• Lead greater than 4000ppm by weight. <p>Battery size: CR2032 (coin cell)Battery type: Lithium Metal</p>
Restricted Material Usage	<p>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):</p> <ul style="list-style-type: none">• 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	<p>HP follows these guidelines to decrease the environmental impact of product packaging:</p> <ul style="list-style-type: none">• Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials.• Eliminate the use of ozone-depleting substances (ODS) in packaging materials.



System Technical Specifications

	<ul style="list-style-type: none"> • Design packaging materials for ease of disassembly. • Maximize the use of post-consumer recycled content materials in packaging materials. • Use readily recyclable packaging materials such as paper and corrugated materials. • Reduce size and weight of packages to improve transportation fuel efficiency. • Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.
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:
Packaging Materials	
External	Cardboard carton and insert: 1.536 kg
Internal	LDPE Foam: .366 kg
End-of-Life Management and Recycling	<p>Hewlett-Packard offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: http://www.hp.com/recycle or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner. [link to new HP white paper now in progress]</p> <p>Global Citizenship Report: http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html</p> <p>Eco-label certifications: http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html ISO 14001 certificates: http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html</p>
Hewlett-Packard Corporate Environmental Information	For more information about HP's commitment to the environment:
Service, Support and Warranty	<p>On-site Warranty and Service ^(Note 1): One and three-years, limited warranty and service offering delivers on-site, next business-day ^(Note 2) service for parts and labor and includes free telephone support ^(Note 3) 8am - 5pm. Global coverage ^(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</p> <p>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.</p>
Additional Information	<ul style="list-style-type: none"> • 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.



Stable & Consistent Offerings

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

Processors	Product #	Offering
	VX094AV	Intel Core i5-650 3.2 4MB/1333 DC CPU
	VX096AV	Intel Core i5-670 3.46 4MB/1333 DC CPU
	VX099AV	Intel Xeon X3450 2.66 8MB/1333 QC CPU

Hard Drives	Product #	Offering
	VB235AV	HP 250GB SATA 7200 1st HDD
	VB239AV	HP 250GB SATA 7200 2nd HDD
	WW558AV	HP 250GB SATA 7200 3rd HDD
	VB237AV	HP 500GB SATA 7200 1st HDD
	VB241AV	HP 500GB SATA 7200 2nd HDD

Graphics	Product #	Offering
	VB120AV	NVIDIA Quadro NVS 295 256MB Graphics
	VJ029AV	NVIDIA Quadro NVS 295 256MB Graphics (2nd)

Memory	Product #	Offering
	VB286AV	HP 2GB (2x1GB) DDR3-1333 ECC RAM
	VB290AV	HP 4GB (2x2GB) DDR3-1333 ECC RAM
	VB296AV	HP 8GB (4x2GB) DDR3-1333 ECC RAM

Optical and Removable Storage	Product #	Offering
	VB281AV	HP 16X DVD+-RW SuperMulti SATA 1st Drive
	WU981AV	HP 16X DVD+-RW SuperMulti SATA 2nd Drive

Input Devices	Product #	Offering
	VG956AV	HP USB Standard Keyboard
	VB274AV	HP USB Optical Scroll Mouse

Operating Systems	Product #	Offering
	VR944AV	MS Windows 7 Professional 64-bit OS



Technical Specifications - Processors

Processors

Intel® Celeron® Processor G1101 2.26 GHz, 2MB cache, 1066 MHz memory, Dual-Core

Intel® Pentium® Processor G6950 2.8 GHz, 3MB cache, 1066 MHz memory, Dual-Core

Intel Core Processor i3-540 3.06 GHz, 4MB cache, 1333 MHz memory, Dual-Core, HT

Intel Core Processor i3-550 3.20 GHz, 4MB cache, 1333 MHz memory, Dual-Core, HT

Intel Core Processor i3-560 3.33 GHz, 4MB cache, 1333 MHz memory, Dual-Core, HT

Intel Core Processor i5-650 3.20 GHz, 4MB cache, 1333 MHz memory, Dual-Core, HT, Turbo

Intel Core Processor i5-660 3.33 GHz, 4MB cache, 1333 MHz memory, Dual-Core, HT, Turbo

Intel Core Processor i5-670 3.46 GHz, 4MB cache, 1333 MHz memory, Dual-Core, HT, Turbo

Intel Core Processor i5-680 3.60 GHz, 4MB cache, 1333 MHz memory, Dual-Core, HT, Turbo

Intel Core Processor i5-750 2.66 GHz, 8 MB cache, 1333 MHz memory, Quad-Core, Turbo

Intel Core Processor i5-760 2.80 GHz, 8 MB cache, 1333 MHz memory, Quad-Core, Turbo

Intel Core Processor i7-870 2.93 GHz, 8 MB cache, 1333 MHz memory, Quad-Core, HT, Turbo

Intel Core Processor i7-880 3.06 GHz, 8 MB cache, 1333 MHz memory, Quad-Core, HT, Turbo

Intel Xeon Processor X3430 2.40 GHz, 8MB cache, 1333 MHz memory, Quad-Core, Turbo

Intel Xeon Processor X3440 2.53 GHz, 8MB cache, 1333 MHz memory, Quad-Core, HT, Turbo

Intel Xeon Processor X3450 2.66 GHz, 8MB cache, 1333 MHz memory, Quad-Core, HT, Turbo

Intel Xeon Processor X3460 2.80 GHz, 8MB cache, 1333 MHz memory, Quad-Core, HT, Turbo

Intel Xeon Processor X3470 2.93 GHz, 8MB cache, 1333 MHz memory, Quad-Core, HT, Turbo

Intel Xeon Processor X3480 3.06 GHz, 8MB cache, 1333 MHz memory, Quad-Core, HT, Turbo



Technical Specifications - Hard Drives

SATA (Serial ATA) Hard Drives for HP Workstations	300GB SATA Capacity	300,069,052,416 bytes	
	10K rpm SFF Height	1 in; 2.54 cm	
	in 3.5" Frame Width	Media Diameter	2.5 in; 6.36 cm
		Physical Size	4 in; 10.17 cm
	HDD	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
	Rotational Speed	10,000 rpm	
	Logical Blocks	586,072,368	
	Operating Temperature	41° to 131° F (5° to 55° C)	
	160GB SATA Capacity	160GB SATA Capacity	160,041,885,696 bytes
10K rpm SFF Height		1 in; 2.5 cm	
in 3.5" Frame Width		Media Diameter	2.5 in; 6.36 cm
		Physical Size	4 in; 10.2 cm
HDD		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
Rotational Speed		10,000 rpm	
Logical Blocks		312,581,808	
Operating Temperature		41° to 131° F (5° to 55° C)	
1.5TB SATA		Capacity	1.5TB
	7200 rpm Height	1 in; 2.54 cm	
	3Gb/s 3.5" Width	Media Diameter	3.5 in; 8.9 cm
		Physical Size	4.0 in; 10.17 cm
	HDD	Interface	Serial ATA (3.0 Gb/s), Native Command Queuing enabled
		Synchronous Transfer Rate (Maximum)	Up to 300MB/s
	Buffer	32MB	



Technical Specifications - Hard Drives

	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 SATA 7200 rpm 3Gb/s 3.5" HDD	Capacity		320,072,933,376 bytes	
	Height		0.98 in; 2.5 cm	



Technical Specifications - Hard Drives

3Gb/s 3.5" HDD	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; 2.54 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)	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		



Technical Specifications - Hard Drives

Operating Temperature 41° to 131° F (5° to 55° C)

HP Solid State Drives 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)		



Technical Specifications - Graphics

Integrated Intel Graphics Media Accelerator HD	Form Factor	Integrated
	Graphics Controller	Intel Integrated Graphics Media Accelerator HD
	Bus Type	PCI Express x16
	Memory	Graphics memory is shared with system memory. Graphics memory usage varies depending on the amount of system memory installed, BIOS settings, operating system, and system load. 32 MB is pre-allocated for graphics use at system boot time. Additional memory can be allocated at boot time by the BIOS for PAVP (Protected Audio Video Playback) support for playback of protected video content. For Vista, use of PAVP heavy mode preallocates an additional 96MB. Additional memory is allocated for graphics as needed using Intel's Dynamic Video Memory Technology (DVMT), to provide an optimal balance between graphics and system memory use.
	Connectors	Z200; 1 Single Link DVI-I, 1 DP Z200 SFF; 1 VGA, 1 DP Graphics adapters are orderable as an accessory as necessary.
	RAMDAC	Integrated, 350 MHz
	Display Output	Z200: Integrated dual independent monitor support facilitated via one DVI port and one DisplayPort integrated on the back plane of the system board and presented as part of the rear I/O set of interfaces. Second DVI supported via optional DisplayPort to DVI-D adapter. VGA support via optional DVI to VGA adapter or DisplayPort to VGA adapter. Z200 SFF: Integrated dual independent monitor support facilitated via one VGA port and one DisplayPort integrated on the back plane of the system board and presented as part of the rear I/O set of interfaces. Second VGA supported via optional DisplayPort to VGA adapter. DVI support via optional DisplayPort to DVI adapter. Intel HD graphics can provide audio to displays supporting audio over DisplayPort or HDMI (via DisplayPort to HDMI adapter)
	Supported Graphics APIs	Microsoft DirectX 10, OpenGL 2.1



Technical Specifications - Graphics

NVIDIA Quadro NVS 295 Form Factor	2.731 inches (H) × 6.600 inches (L), Half-Height
256MB Graphics Card	NVIDIA Quadro NVS 295 Graphics Board
Graphics Controller	
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
Display Output	NOTE: This card supports up to two displays <ul style="list-style-type: none">• 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

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 <ul style="list-style-type: none">● 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 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) <i>* WS4 not supported on Z200 & Z200 SFF</i> 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 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) <ul style="list-style-type: none">● 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) <i>* WS4 not supported on Z200 & Z200 SFF</i> 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	<ul style="list-style-type: none">● 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



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) NOTES: This card supports up to two displays Use of more than two displays on Linux requires support for xrandr 1.2 or greater in the X server
	RAMDAC	400 MHz DAC, 10-bits per channel
	Image Quality Features	<ul style="list-style-type: none">● 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	<ul style="list-style-type: none">● 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



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	<ul style="list-style-type: none">• 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) <ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• 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

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	1 GB GDDR5 SDRAM
	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	<ul style="list-style-type: none">● 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	<ul style="list-style-type: none">● 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 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, 1 DisplayPort 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) <i>* WS4 not supported on Z200 and Z200 SFF</i> 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 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	<ul style="list-style-type: none">• 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
	Shading architecture	NOTE: This card supports up to two displays Full Shader Model 4.0 <ul style="list-style-type: none">• 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) <i>* WS4 not supported on Z200 & Z200 SFF</i> 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)
		NOTES: This card supports up to three displays with Vista, Win7, or Linux, up to two displays with XP
		The use of more than two displays on Linux requires support for xrandr 1.2 or greater in the X server
	RAMDAC	400 MHz DAC, 10-bits per channel
	Image Quality Features	<ul style="list-style-type: none">• 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	<ul style="list-style-type: none">• 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 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	<ul style="list-style-type: none">• 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
	RAMDAC	Single Internal 400 MHz DAC
	Shading Architecture	Full Shader Model 4.0 (OpenGL 2.1/DirectX 10 class) <ul style="list-style-type: none">• 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 <ul style="list-style-type: none">• Optimized compiler for Cg and Microsoft HLSL• OpenGL 2.1 and DirectX 10 support• Open source compiler
	High-level Shader Languages	
	CUDA™ Parallel Processor Cores	64.
	Power consumption	59 Watts



Technical Specifications - Multimedia and Audio Devices

HP Thin USB Powered Speakers	Frequency Response (-3dB, 24-bit/96kHz input)	FO to 20kHz
	Dimensions	Speakers: 14.52 x 9.50 x 2.45 cm (5.72 x 3.74 x 0.96 in) per speaker
	On/Off/Volume Controls	Right side of right speaker
	Power LED	Front of right speaker (green)
	Watts	2/3 watt (normal/maximum)
	Net weight	0.31kg (0.68 lbs)
	Environmental (all conditions non-condensing)	Temperature (operating): -10° to 40° C (14° to 104° F) Relative Humidity (operating): 40% to 90%
	Speaker cable length	Input cord: 1800mm±35mm (5.91 ft) L-channel cord: 1000mm±35mm (3.28 ft) USB cord: 1800mm±35mm (5.91 ft)
	Color	HP Carbonite
	Kit Contents	One pair of HP Thin USB Powered Speakers with attached audio signal and USB power cables for connecting to your PC HP Warranty documentation

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)



Technical Specifications - Multimedia and Audio Devices

Internal Audio Speaker Power Rating	1.5 W
Internal Speaker	Yes
Hardware Equalizer for Internal Speaker	No
External Speaker Jack (Line-Out)	Yes

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 (20kHz 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 - Optical and Removable Storage

HP DVD-ROM Drive	Description	5.25-inch, half-height, tray-load	
	Mounting Orientation	Either horizontal or vertical	
	Interface Type	SATA/ATAPI	
	Dimensions (WxHxD)	15.0 x 4.4 x 20.3 cm (5.9 x 1.7 x 8.0 in)	
	Disc Capacity	DVD-ROM Single layer: Up to 4.7 GB Double layer: Up 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 \pm 5%-100 mV ripple p-p 12 VDC \pm 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



Technical Specifications - Optical and Removable Storage

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 \pm 5%-100 mV ripple p-p			
		12 VDC \pm 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			



Technical Specifications - Optical and Removable Storage

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

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

Kit Contents

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)



Technical Specifications - Optical and Removable Storage

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 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		



Technical Specifications - Optical and Removable Storage

		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
	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 \pm 5%-100 mV ripple p-p	
		12 VDC \pm 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.	



Technical Specifications - Optical and Removable Storage

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.



Technical Specifications - Controller Cards

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 - Networking and Communications

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

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

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