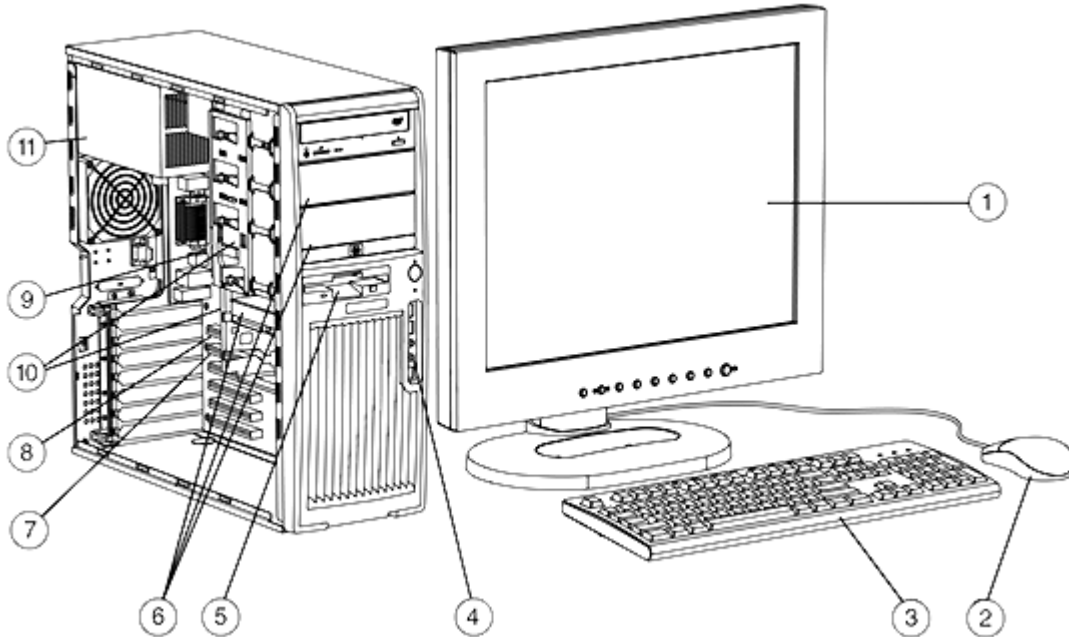


### Overview

**Windows®. Life without Walls™.**  
**HP recommends Windows 7.**



1. Monitor (sold separately)
2. Mouse
3. Keyboard
4. Front IO: 2 USB 2.0, IEEE-1394 (requires optional PCI card to enable), headphone and microphone
5. One 3.5" external bay for optional diskette drive or other 3.5" device
6. Three 5.25" external bays (3rd external is not full depth), and two 3.5" internal bays
7. 3 PCI slots, 1 PCI Express x1 slot, 1 PCI Express x8 slot (with x4 functionality), 2 PCI Express x16 slots (one exclusive for graphics)
8. Rear IO: 7 USB 2.0, 1 standard serial port, 1 optional serial port, 1 parallel port, PS/2 keyboard, PS/2 mouse, RJ-45, External SATA, audio line in, audio line out, and microphone in.
9. 3 USB 2.0 internal port (1 type A receptacle, 2 headers)
10. R475 watt (continuous) 80 PLUS efficient power supply.
11. Intel® Core™ 2 Duo, Core 2 Quad, Core 2 Extreme processor or Intel Pentium® Dual Core processor; all processors are EM64T capable

<b>Form Factor</b>	Convertible Minitower
<b>Compatible Operating Systems</b>	<p>Genuine Windows® 7 Professional 32-Bit                  Genuine Windows® 7 Professional 64-Bit                  Genuine Windows® 7 Professional 32-bit Downgrade to Genuine Microsoft® Windows® XP Professional 32-bit                  Genuine Windows® 7 Professional 64-bit Downgrade to Genuine Microsoft® Windows® XP Professional 64-bit</p> <p><i>* Systems may require upgraded and/or separately purchased hardware and/or a DVD drive to install the Windows 7 software and take full advantage of</i></p>

### Overview

	<p>Windows 7 functionality. See <a href="http://www.microsoft.com/windows/windows-7/">http://www.microsoft.com/windows/windows-7/</a> for details.</p> <p>Genuine Windows Vista® Business 32-bit            Genuine Windows Vista® Business 64-bit            Genuine Windows Vista 32-bit downgrade to Genuine Microsoft® Windows XP® Professional 32-bit            Genuine Windows Vista 64-bit downgrade to Genuine Microsoft Windows XP Professional 64-bit            Genuine Windows Vista® Home Basic 32-bit            HP Linux Installer Kit for Linux (includes drivers for both 32-bit &amp; 64-bit OS versions of Red Hat Enterprise Linux WS4 and WS5 - see: <a href="http://www.hp.com/workstations/software/linux">http://www.hp.com/workstations/software/linux</a>)            For detailed OS/hardware support information for Linux, see:  <a href="http://www.hp.com/support/linux_hardware_matrix">http://www.hp.com/support/linux_hardware_matrix</a>.            Novell SLED 11 Linux</p>
<b>Available Processors</b>	<p>Intel Core™ 2 Quad processors with Intel 64 architecture:</p> <ul style="list-style-type: none"> <li>● Quad-Core</li> <li>● 1333 MHz Front Side Bus</li> <li>● 4, 6, or 12 MB L2 cache</li> <li>● Virtualization Technology available with most processor options</li> </ul> <p>Intel Core™ 2 Duo processors with Intel 64 architecture:</p> <ul style="list-style-type: none"> <li>● Dual-Core</li> <li>● 1066/1333 MHz Front Side Bus</li> <li>● 3, 4, or 6 MB L2 cache</li> <li>● Virtualization Technology</li> </ul> <p>Intel Pentium™ Dual-Core processors with Intel 64 architecture:</p> <ul style="list-style-type: none"> <li>● Dual-Core</li> <li>● 800 MHz Front Side Bus</li> <li>● 1 or 2 MB L2 cache</li> </ul>
<b>Available Processor Disclaimers</b>	<p>Intel processor numbers are not a measurement of higher performance. Processor numbers differentiate features within each processor family, not across different processor families. See: <a href="http://www.intel.com/products/processor_number/">http://www.intel.com/products/processor_number/</a> for details.</p> <p>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: <a href="http://www.intel.com/technology/64bitextensions">http://www.intel.com/technology/64bitextensions</a> for more information.</p> <p>Quad-Core and Dual-Core are new technologies 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>
<b>Chipset</b>	Intel X38 Express chipset
<b>Color</b>	Carbonite/Alloy metallic
<b>Convertibility</b>	Yes. 5.25" drives rotate for Minitower or Desktop orientation

### Overview

<b>Expansion Slots</b> (see system board section for more details)	<ul style="list-style-type: none"> <li>• 3 PCI slots (full-height, full-length)</li> <li>• 1 PCI Express x8 slot (x4 functionality)</li> <li>• 1 PCI Express x1 slot (half length)</li> <li>• 2 PCI Express x16 Gen2 slots (one dedicated for graphics)</li> </ul>
<b>Expansion Bays</b> (see storage section for more details)	<ul style="list-style-type: none"> <li>• 2 internal 3.5" bays</li> <li>• 1 external 3.5" bay, 3 external 5.25" bays*</li> </ul> <p>* Third external 5.25" bay is not full depth in side orientation.</p>
<b>Front I/O</b>	<p>2 USB 2.0, 1 IEEE 1394 (requires optional PCI card to function), 1 audio out, and 1 microphone.</p> <p><b>NOTE:</b> Although HP Personal Workstations can be ordered with the HP Installer Kit for Linux and an IEEE 1394 card, HP cannot provide customer support for this configuration. Please refer to the Linux Hardware Support Matrix (<a href="http://www.hp.com/support/linux_hardware_matrix">http://www.hp.com/support/linux_hardware_matrix</a>) for details, and to the Linux User Manual (<a href="http://www.hp.com/support/linux_user_manual">http://www.hp.com/support/linux_user_manual</a>) for tips on user-enablement of the IEEE 1394 Card.</p>
<b>Internal I/O</b>	1 USB 2.0 Type A Receptacle, 2 USB 2.0 headers
<b>Rear I/O</b>	7 USB 2.0, 1 serial, 1 optional serial port, parallel port, 2 PS/2, RJ-45 (NIC), 1 External SATA, 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.
<b>Interfaces Supported</b>	1 SATA 3 Gb/s interface (5 internal, 1 external SATA connectors)
<b>On-board RAID Support</b>	SATA (Specific user-configured hardware SAS RAID configurations are supported on this Linux system. Please visit: <a href="http://www.hp.com/support/linux_hardware_matrix">http://www.hp.com/support/linux_hardware_matrix</a> for details.)
<b>Chassis Dimensions</b> (W x D x H)	Standard minitower orientation: 16.8 x 45.6 x 45.0 cm; 6.6 x 17.9 x 17.7 inches Converted desktop orientation: 45.0 x 45.6 x 16.8 cm; 17.7 x 17.9 x 6.6 inches
<b>Weight</b>	Exact weights depend upon configuration Minimum: 13.6 kg (29.9 lbs) Standard: 15.1 kg (33.3 lbs) Maximum: 19.6 kg (43.3 lbs)
<b>Temperature</b>	Operating: 5° to 35°C (40° to 95°F) Non-operating: -40° to 60°C (-40° to 140°F)
<b>Humidity</b>	Operating: 8% to 85% Non-operating: 8% to 90%
<b>Maximum Altitude</b> (non-pressurized)	Operating: 3,000 m; 10,000 feet Non-operating: 9,100 m; 30,000 feet
<b>Power Supply</b>	475 watts wide-ranging, active Power Factor Correction, 85% Efficient
<b>NIC</b>	Integrated HP Gbit LAN by Broadcom
<b>Manageability</b>	Preloaded Manageability Tools (Microsoft Windows® only)

### Supported Components

#### Processors

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
<b>Intel Core™ 2 Duo/Quad-Core Processor with Intel® 64 Architecture</b>				
Intel Core 2 Quad Q9650 Processor / 3.00 GHz, 12 MB L2 cache, 1333 MHz FSB	Y	N		
Intel Core 2 Quad Q9550 Processor / 2.83 GHz, 12 MB L2 cache, 1333 MHz FSB	Y	N		
Intel Core 2 Quad Q9505 Processor / 2.83 GHz, 6 MB L2 cache, 1333 MHz FSB	Y	Y		
Intel Core 2 Quad Q9400 Processor / 2.66 GHz, 6 MB L2 cache, 1333 MHz FSB	Y	Y		
Intel Core 2 Quad Q8400 Processor / 2.66 GHz, 4 MB L2 cache, 1333 MHz FSB	Y	Y		
Intel Core 2 Duo E8600 Processor / 3.33 GHz, 6 MB L2 (shared), 1333 MHz FSB	Y	N		
Intel Core 2 Duo E8500 Processor / 3.16 GHz, 6 MB L2 (shared), 1333 MHz FSB	Y	N		
Intel Core 2 Duo E8400 Processor / 3.00 GHz, 6 MB L2 (shared), 1333 MHz FSB	Y	N		
Intel Core 2 Duo E7600 Processor / 3.06 GHz, 3 MB L2 cache, 1066 MHz FSB	Y	Y		
Intel Core 2 Duo E7500 Processor / 2.93 GHz, 3 MB L2 cache, 1066 MHz FSB	Y	N		
<b>Intel Pentium Dual-Core Processor with Intel® 64 Architecture</b>				
Intel Pentium Dual-Core E5200 Processor / 2.50 GHz, 2 MB L2 cache, 800 MHz FSB	Y	N		

Most Intel Core 2 Duo and Core 2 Quad processors support Intel Virtualization Technology. Intel Virtualization Technology requires a computer system with a processor, chipset, BIOS, virtual machine monitor (VMM), and applications enabled for virtualization technology. Functionality, performance, or other virtualization technology benefits will vary depending on hardware and software configurations.

Intel processor numbers are not a measurement of higher performance. Processor numbers differentiate features within each processor family, not across different processor families. See: [http://www.intel.com/products/processor\\_number/](http://www.intel.com/products/processor_number/) for details. 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/technology/64bitextensions> for more information, including details on which processors support Intel® 64 Architecture, or consult with your system vendor for more information.

### Supported Components

#### SAS Hard Drives

Up to 4 of the following SATA drives, or 4 of the following SAS drives (conditions apply)

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
<b>HP SAS (Serial Attached SCSI) Hard Drives for HP Workstations</b>				
146 GB 15K rpm SAS 3.0 Gb/s 3.5" Hard Drive	Y	Y	EA330AA	
300 GB 15K rpm SAS 3.0 Gb/s 3.5" Hard Drive	Y	Y	EM174AA	
450 GB 15K rpm SAS 3.0 Gb/s 3.5" Hard Drive	Y	Y	FM803AA	
<b>SATA (Serial ATA) Hard Drives for HP Workstations</b>				
80 GB 10K rpm SATA with NCQ Hard Drive	Y	Y	EM172AA	
160 GB 7,200 rpm SATA 3.0 Gb/s with NCQ 3.5" Hard Drive	Y	Y	PV944A	
160 GB 10K rpm SATA with NCQ 2.5" Hard Drive	Y	Y	EW222AA	
250 GB 7,200 rpm SATA 3.0 Gb/s with NCQ 3.5" Hard Drive	Y	Y	EA788A	
500 GB 7,200 rpm SATA 3.0 Gb/s with NCQ 3.5" Hard Drive	Y	Y	PV943A	
1000GB (1TB) SATA 7200 rpm 3.0Gb/s 3.5" HDD	Y	Y	GE262AA	

#### Hard Drive Controllers

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
<b>Factory integrated RAID on motherboard for SATA drives</b>				
RAID 0 Configuration - Striped Array	Y	Y		
RAID 0 Data Configuration -- Boot/OS Drive + 2 Drive Striped Array	Y	Y		
RAID 1 Configuration - Mirrored Array	Y	Y		
<b>Integrated SATA 3.0 Gb/s Controller</b>				
Integrated SATA 3.0 Gb/s Controller, RAID 0, 1, 10, 5 supported	Y	Y		See NOTE 2
<b>LSI 3041E 4-Port SAS 3.0 Gb/s RAID Card</b>				
LSI 3041E 4-Port SAS 3.0 Gb/s RAID Card	Y	Y	EH417AA	See NOTE 2 and 3
<b>LSI MegaRAID® SAS 8888ELP Host Bus Adapter (HBA)</b>				
LSI 8888ELP 8-port SAS HW RAID Card	Y	Y	GE258AA	

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. Specific user-configured hardware SAS RAID configurations are supported on this Linux system. Please visit: [http://www.hp.com/support/linux\\_hardware\\_matrix](http://www.hp.com/support/linux_hardware_matrix) for details.

**NOTE 2:** Specific user-configured hardware SAS RAID configurations are supported on this Linux system. Please visit: [http://www.hp.com/support/linux\\_hardware\\_matrix](http://www.hp.com/support/linux_hardware_matrix) for details.

**NOTE 3:** Not supported when HD drive 1 is SATA

### Supported Components

#### PCI Express Graphics

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes	Supported Multi Mixed
<b>Professional 2D</b>					
NVIDIA Quadro NVS 290 256 MB PCIe Graphics Card with 'DMS-59 to Dual DVI cable' included - for Workstations	Y	Y	GN502AA	1 or 2 of these cards are supported - 2nd card must be NVS 290 or NVS 440	1
HP 'DMS-59 to Dual VGA' Cable Kit	Y	Y	GS567AA		1
NVIDIA Quadro NVS 295 256MB PCIe Graphics Card	Y	Y	FY943AA		1
NVIDIA Quadro NVS 450 512 MB PCIe Graphics Card	Y	Y	FH519AA	Single NVS 450 or NVS 290 + NVS 440 supported; Includes (2) DMS-59 to Dual VGA cables and (2) DMS-59 to Dual DVI cables	1
<b>Entry 3D</b>					
ATI FirePro V3700 256MB PCIe Graphics Card	Y	Y	FY944AA		1
NVIDIA Quadro FX 380 256MB PCIe Graphics Card	Y	Y	NB769AA		1
NVIDIA Quadro FX 580 512MB PCIe Graphics Card	Y	Y	FY945AA		1
<b>Mid-range 3D</b>					
ATI FirePro V5700 512MB PCIe Graphics Card	Y	Y	FY947AA		1
NVIDIA Quadro FX 1800 768MB PCIe Graphics Card	Y	Y	FY946AA		1
<b>High-end 3D</b>					
ATI FirePro V7750 1.0GB PCIe Graphics Card	Y	Y	FY948AA		1
NVIDIA Quadro FX 3800 1.0GB PCIe Graphics Card	Y	Y	FY949AA		1
NVIDIA Quadro FX 4800 1.5GB PCIe Graphics Card	Y	Y	FQ138AA	See NOTE 1	1
Elemental Accelerator Software for NVIDIA Quadro	Y	Y	VH158AA		1

**NOTE 1:** This card consumes 2 PCIe slots, reducing the maximum number of PCI cards in a system

### Supported Components

Memory	Configure To Order (CTO) (One of the following)	Option Kit Part Number	Support Notes
	<b>PC2-6400 ECC Unbuffered DDR2-800 RAM</b>		
	HP 1GB (1x1GB) DDR2-800 non-ECC RAM		
	HP 1GB (1x1GB) DDR2-800 ECC RAM		
	HP 2GB (2x1GB) DDR2-800 non-ECC RAM		
	HP 2GB (2x1GB) DDR2-800 ECC RAM		
	HP 4GB (2x2GB) DDR2-800 ECC RAM		
	HP 4GB (4x1GB) DDR2-800 ECC RAM		
	HP 8GB (4x2GB) DDR2-800 ECC RAM		
	HP 8GB (2x4GB) DDR2-800 ECC RAM		
	HP 12GB (2x2GB, 2x4GB) DDR2-800 ECC RAM		
	HP 16GB (4x4GB) DDR2-800 ECC RAM		
	<b>NOTE:</b> Only unbuffered DDR2 DIMMs are supported. All DIMMs must be either x8 or x16 width.		
	<b>After Market Options (AMO)</b>		
	(Configurations less than 1 GB are not supported on Microsoft Vista 64 or Vista 64 downgrade to XP 64. Please install memory in pairs. Configurations using three DIMMs are not supported by HP.)		
	<b>PC2-6400 ECC Unbuffered DDR2-800 RAM</b>		
	1 GB PC2-6400E DDR2-800 ECC	GH739AA	
	2 GB PC2-6400E DDR2-800 ECC	GH740AA	
	4 GB PC2-6400E DDR2-800 ECC	VH933AA	
	<b>NOTE:</b> Only unbuffered DDR2 DIMMs are supported. All DIMMs must be either x8 or x16 width. Memory must be installed in pairs.		

Multimedia and Audio Devices		Factory		Option Kit	Support Notes
		Configured	Option Kit	Part Number	
	HP Thin USB Powered Speakers	Y	Y	RD628AA	
	Integrated High Definition audio with internal speaker	Y	Y		
	Sound Blaster X-Fi XtremeGamer Audio Card (PCI)	Y	Y	GE257A	

### Supported Components

#### Optical and Removable Storage

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP DVD+/-RW Drive	Y	Y		See NOTE 1
HP DVD-ROM Drive	Y	Y	EW268AA	See NOTE 2
1.44 MB Diskette Drive (1 only)	Y	Y	DY670A	
HP 16-In-1 Media Card Reader with PCI Card	Y	Y	EM718AA	

**NOTE 1:** LightScribe creates a grayscale image similar to black and white photography. LightScribe media required and sold separately. 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.

**NOTE 2:** 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 LP2275w 22-inch Widescreen LCD Monitor	Y	Y		
HP LP2465 24-inch Widescreen LCD Monitor	Y	Y		
HP LP3065 30-inch Widescreen LCD Monitor	Y	Y		

#### Networking and Communications

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Integrated Broadcom 5755 NetXtreme Gigabit Ethernet PCIe NIC	Y	Y		
Broadcom 5751 NetXtreme Gigabit Ethernet PCIe NIC	Y	Y	EA833AA	

"Gigabit" Ethernet indicates compliance with IEEE standard 802.3ab for Gigabit Ethernet, and does not connote actual operating speed of 1 Gb/sec. For high speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required.

**NOTE 1:** 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>.

### Supported Components

#### Input Devices

	Factory		Option Kit	Support Notes
	Configured	Option Kit	Part Number	
HP USB Standard Keyboard	Y	Y	DT528A	
HP PS/2 Standard Keyboard	Y	Y	DT527A	
HP USB Laser Mouse	Y	Y	GW405AA	
HP PS/2 Optical Scroll Mouse	Y	Y	EY703AA	
HP USB 2-Button Optical Scroll Mouse	Y	Y	DC172B	
HP USB Optical 3-Button Mouse	Y	Y	DY651AA	
HP USB Smart Card Keyboard	N	Y		
HP 2.4GHz Wireless Keyboard & Mouse	N	Y	NB896AA	
HP SpaceExplorer 3D USB Controller	N	Y	RY429AA	
HP SpacePilot 3D USB Intelligent Controller	N	Y	EF390AA	

#### Racking and Physical Security

	Factory		Option Kit	Support Notes
	Configured	Option Kit	Part Number	
HP (CMT) Solenoid Lock	Y	Y	DE618A	
Security Cable with Kensington Lock	Y	Y	PC766A	
HP 2006 Business PC Security Lock Kit	Y	Y	PV606AA	
HP xw4/Z4 Depth Adjustable Fixed Rail Rack Kit	Y	Y	EK729AA	

#### Other Hardware

	Factory		Option Kit	Support Notes
	Configured	Option Kit	Part Number	
Configure minitower in desktop orientation	Y	Y		
HP Power Cord Kit	Y	Y	DM293A	Needs specific localization
HP Serial Port Adapter	Y	Y	PA716A	One standard, one optional
HP Internal USB Port Kit	N	Y	EM165AA	Up to two internal USB port kits can be used to provide two internal USB ports
HP Optical Bay HDD Mounting Bracket	Y	Y	DY659A	
Modem RJ11 Adapter Kit	Y	Y	DC131C	

### Supported Components

#### Software

	<b>Factory Configured</b>	<b>Option Kit</b>	<b>Option Kit Part Number</b>	<b>Support Notes</b>
Alert Standard Format specification	Y	Y		
HP Performance Tuning Framework	Y	Y		
HP Backup and Recovery	Y	Y		
PDF Complete	Y	Y		
Microsoft Office 2007 Small Business Edition	Y	Y		
HP ProtectTools Security	Y	Y		
HP RGS PC 3-year Software Assurance	Y	Y		
HP RGS V5 PC Edition	Y	Y		
HP RGS V5 Workstation Edition	Y	Y		
HP RGS Workstation 3-year Software Assurance	Y	Y		
HP RGS V5 Receiver Site License	Y	Y		

### System Technical Specifications

<b>System Board</b>	
System Board Form Factor	ATX 243.84 x 304.8 mm (9.6 x 12 inches)
Processor Socket	Single LGA775
CPU Bus Speed	800, 1066, and 1333 MHz FSB
Chipset	Intel X38 Express North Bridge/ICH9R South Bridge
Super I/O Controller	SMSC SCH5327
Memory Expansion Slots	4 DDR2 memory slots
Memory Type Supported	1.8V DDR2 (ECC memory modules)
Memory Modes	Dual channel
Memory Speed Supported	DDR2 SDRAM PC2-5300E (667 MHz) unbuffered ECC or DDR2 SDRAM PC2-6400E (800 MHz) unbuffered ECC
Memory Protection	ECC available on data, parity on address and command
ECC/Chipkill Parameters	
Maximum Memory	<p>Supports up to 16 GB DDR2-667 or DDR2-800 ECC unbuffered memory</p> <p><b>NOTE:</b> Maximum memory capacities assume 64-bit operating systems, such as genuine Windows® Vista Business 64, XP Professional x64 Edition, Red Hat Linux 64-bit. Genuine Windows Vista Business 32 and XP Professional (32-bit) support up to 4 GB. 32-bit Linux supports up to 8 GB.</p>
	<p>The diagram illustrates three memory configurations for the HP xw4600 Workstation. It shows four DIMM slots labeled 1, 2, 3, and 4.          <ul style="list-style-type: none"> <li><b>single DIMM configuration:</b> A single DIMM is installed in slot 1.</li> <li><b>two DIMM configuration:</b> Two DIMMs are installed in slots 1 and 3, connected to Channel A.</li> <li><b>four DIMM configuration:</b> Four DIMMs are installed in slots 1, 2, 3, and 4, connected to Channel A (slots 1 and 3) and Channel B (slots 2 and 4).</li> </ul> </p>
Memory Configuration (Supported)	<p>PC2-5300E DDR2-667 ECC Unbuffered or PC2-6400E DDR2-800 ECC Unbuffered RAM DIMMs</p> <p>Only Error Checking and Correcting unbuffered DDR2 DIMMs are supported and must be either x8 or x16 width. Memory upgrades are accomplished by adding DIMMs of the same or varied sizes. The Intel chipset supports both PC2-5300 DDR2-667 and the PC2-6400E DDR2-800 ECC unbuffered memory. It is suggested to not mix ECC and non-ECC memory.</p> <p>For best performance the total amount and type of memory loaded into Channel A and Channel B should be the same. If it is not, your computer will see all the RAM installed but will run the memory controller at a lower performance mode. Although not required, for best performance add the memory in pairs rather than as a single DIMM (two 1 GB DIMMs will have better performance than a single 2 GB DIMM). Also, add the memory into both channels (e.g., one in socket 1 and one in socket 3) to take advantage of dual channel performance. If you have unused slots within a channel, make them socket 2 and socket 4. This provides the best margin for the memory bus. If you are only using 1 DIMM, install it in socket 1.</p> <p><b>POSSIBLE MEMORY CONFIGURATIONS</b></p>

### System Technical Specifications

	Not all memory configurations possible are represented below. Please install memory in pairs. Configurations using three DIMMs are not supported by HP.				
DIMM Size		<b>Slot 1</b>	<b>Slot 2</b>	<b>Slot 3</b>	<b>Slot 4</b>
	512 MB (single channel performance configuration)	512 MB			
	1 GB	512 MB		512 MB	
	1 GB				
	2 GB	1 GB		1 GB	
	2 GB	512 MB	512 MB	512 MB	512 MB
	4 GB	1 GB	1 GB	1 GB	1 GB
	4 GB	2 GB		2 GB	
	4 GB				
	6 GB	1 GB	2 GB	1 GB	2 GB
	8 GB	2 GB	2 GB	2 GB	2 GB
	8 GB	4 GB		4 GB	
	16 GB	4 GB	4 GB	4 GB	4 GB
	32 GB				
PCI Express Connectors (Gen2 Rev 0.7 connectors)	2 PCI Express x16 Gen2 Rev 0.7 (75W+75W) 1 PCI Express x8' (x4 electrical) 1 PCI Express x1				
PCI Connectors (5.0V)	2 full length, 1 half-length 33 MHz 32-Bit				
Interfaces Supported	<b>SATA</b>		1 SATA 3.0 Gb/s interface (5 SATA connectors) gen2		
Serial Attached SCSI	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: <a href="http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00060684/c00060684.pdf">http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00060684/c00060684.pdf</a> for RAID capabilities with Linux.)				
Integrated RAID	<ul style="list-style-type: none"> <li>● RAID 0, 1, 5*, or 10* on a single array, up to 4 hard drives depending on the RAID level supported (RAID 0 and 1 available factory integrated)</li> <li>● Support for 1 or 2 RAID arrays on 4-ports for RAID 0 or 1</li> <li>● RAID 1 spare and auto-rebuild</li> <li>● Matrix RAID support</li> <li>● AHCI support for NCQ drives</li> <li>● 3.0 Gb/s drive support</li> </ul> <p><b>NOTE:</b> Specific user-configured hardware SAS RAID configurations are supported on this Linux system. Please visit: <a href="http://www.hp.com/support/linux_hardware_matrix">http://www.hp.com/support/linux_hardware_matrix</a> for details.</p>				
Network Controller	Integrated Broadcom 5755 Gigabit Ethernet LOM				
External SATA (eSATA)	1 dedicated rear eSATA, 1.5 Gbps				
IDE connector	No				
Floppy connector	Yes				
LAN (RJ45)	Yes				
Serial	Yes				
2nd Serial	Yes (requires optional 2nd Serial Port Adapter)				

### System Technical Specifications

Parallel	Yes	
Audio	Integrated high definition digital audio with Line in, Line Out, Microphone, Headphone	
CD-ROM input/Audio	No	
AUX INPUT; Audio	Yes	
USB Connector(s)	<b>Front</b>	2
	<b>Rear</b>	7
	<b>Internal</b>	3 (one Female Type A and one dual channel 2x5 pin header)
Flash ROM	Yes	
Clear Fan Header	Yes	
CPU Fan Header	Yes	
Chassis Fan Header	Yes	
Front PCI Fan Header	Yes	
Front Control Panel/Speaker Header	Yes	
CMOS Battery Holder - Lithium	Yes	
Integrated Trusted Platform Module	TPM 1.2 integrated in Broadcom LOM	
Power Supply Headers	Yes	
Power Switch, Power LED & Hard Drive LED Header	Yes	
Clear Password Jumper	Yes	
Power Supply	475 watt custom power supply	
Operating Voltage Range	90 - 269 VAC	
Rated Voltage Range	100 - 240 VAC 118 VAC	
Rated Line Frequency	50/60 Hz 400Hz	
Operating Line Frequency Range	47 - 66 Hz 393-407 Hz	
Rated Input Current	10 A @ 100-127 VAC; 6A @ 200-240 VAC 10 A @ 118 VAC	
Heat Dissipation	Typical 1419 btu/hr (358 kg-cal/hr) Maximum 2027 btu/hr (511 kg-cal/hr)	
Power Supply Fan	92x25 mm variable speed	
ENERGY STAR® qualified (Config Dependent)	Yes	
80 PLUS Compliant	Yes	
FEMP Standby Power Compliant 115V (Wake-on LAN disabled) (<2W in S5 - Power Off)	Yes	

### System Technical Specifications

Power consumption in sleep mode (as defined by ENERGY STAR) - Suspend to RAM (S3)	<5W		
Surge Tolerant Full Ranging Power Supply (withstands power surges up to 2000V)	Withstands power surges up to 2000V		
Blue Angel Compliant (<5w in S5 - Power Off)	N/A		
Hood Lock Header	Yes		
Hood Sensor Header	Yes		
ASF 2.0 (Alert Standard Format)	Yes		
System Configurations			
Example Configuration #1	<b>Processor Info</b>	1x Pentium Dual Core E4500 (2.20GHz)	
	<b>Memory Info</b>	2x512MB 667MHz	
	<b>Graphics Info</b>	NVS290	
	<b>Disks/Optical/Floppy</b>	1x160GB SATA / 1 Optical / 1 Floppy	
Energy Consumption		<b>115 VAC LAN Enabled</b>	<b>115 VAC LAN Disabled</b>
	<b>Windows Idle (S0)</b>	67.4W	67.4W
	<b>Windows Busy Typ(S0)</b>	89.7W	89.7W
	<b>Windows Busy Max (S0)</b>	114.1W	114.1W
	<b>Sleep (S3)</b>	3.61W	2.82W
	<b>Off (S5)</b>	1.51W	1.30W
Declared Noise Emissions (Entry-level and High-end configurations)			
System Configuration (Entry level)	<b>Processor Info</b>	Single 3.00 GHz Intel Core2 Duo E6850 processor	
	<b>Disks/Optical/Floppy</b>	2x 80 GB 7200 rpm SATA; 1 DVD-ROM/ 1 Floppy	
Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)		<b>Sound Power (LWAd, bels)</b>	<b>Deskside Sound Pressure (LpAm, decibels)</b>
	<b>Idle</b>	3.9 Bels	23 dB
	<b>SATA Hard drive Operating (random reads)</b>	4.2 Bels	25 dB
	<b>Floppy Drive Operating (continuous copy)</b>	4.7 Bels	29 dB
	<b>DVD-ROM Operating (sequential reads)</b>	5.1 Bels	38 dB
System Configuration (High-end)	<b>Processor Info</b>	Single 3.00 GHz Intel Core2 Extreme QX6850 processor	
	<b>Graphics Info</b>	NVIDIA Quadro FX 4600	
	<b>Disks/Optical/Floppy</b>	1x 146 GB 15K rpm SAS / 1 DVD-ROM / 1 Floppy	
Declared Noise Emissions			

### System Technical Specifications

(in accordance with ISO 7779 and ISO 9296)		Sound Power (LWAd, bels)	(LpAm, decibels)
	<b>Idle</b>	4.6 Bels	27 dB
	<b>SATA Hard drive Operating (random reads)</b>	5.2 Bels	35 dB
	<b>Floppy Drive Operating (continuous copy)</b>	5.0 Bels	32 dB
	<b>DVD-ROM Operating (sequential reads)</b>	5.3 Bels	38 dB

Physical Security and Serviceability	
Access Panel	Tool-less
Optical Drive	Tool-less
Floppy Drive	Tool-less
Hard Drives	Tool-less
Expansion Cards	Tool-less
Processor Socket	Requires T-15 Torx or flat blade screwdriver to remove heatsink
Green User Touch Points	Yes, on tool-free internal chassis mechanisms
Color-coordinated Cables and Connectors	Yes
Memory	Tool-less, can be upgraded without removing any internal components
System Board	Tool-less removal
Dual Color Power and HD LED on Front of Computer	green - normal red - fault
Configuration Record SW	Yes
Over-Temp Warning on Screen	Yes
Restore CD Set	Restores the computer to its original factory shipping image
Dual Function Front Power Switch	Also acts as a reset switch when held for 4 seconds
Padlock Support	Padlock loop in rear of chassis. Locks side cover and secures chassis from theft. (0.22" diameter)
Cable Lock Support	Kensington lock slot in rear of chassis. Locks side cover and secures chassis from theft. (3mm x 7mm opening)
Universal Chassis Clamp Lock Support	Threaded feature in rear of chassis. 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.
Solenoid Lock and Hood Sensor	Yes
Rear Port Control Cover	Locks rear IO cables to prevent cable theft.
Serial, Parallel, USB, Audio, Network, Enable/Disable Port Control	Enable or disables serial, USB, audio, and network ports
Removable Media Write/Boot Control	User can prevent the workstation from writing to or booting from removable media
Power-On Password	Prevents an unauthorized person from booting up the computer
Setup Password	Prevents an unauthorized person from changing the system configuration

### System Technical Specifications

System/Emergency ROM Flash Recovery	Recovers corrupted system BIOS.
ASF 2.0 support (Alert Standard Format)	Industry-standard specification for network alerting in operating system-absent environments
Cooling Solutions	Cooling Solutions
Power Supply Fans	92 mm x 92 mm x 25 mm 3-wire fan (non-serviceable)
CPU Heatsink Fan(s)	80 mm x 80 mm x 15 mm 4-wire high frequency PWM
Chassis Fans	92 mm x 92mm x 25 mm 4-wire high frequency PWM
Insight Diagnostics	<ul style="list-style-type: none"> <li>● HP Insight Diagnostics Offline Edition</li> <li>● The diagnostics utility enables you to perform testing and to view critical computer hardware and software configuration information from various sources. This utility enables you to: <ul style="list-style-type: none"> <li>○ Run diagnostics</li> <li>○ View the hardware configuration of the system</li> </ul> </li> <li>● Key features and benefits</li> <li>● HP Insight Diagnostics simplifies the process of effectively identifying, diagnosing, and isolating the hardware issues. In addition to robust management tools, service tools can be invaluable in quickly resolving system problems. To streamline the service process and resolve problems quickly, it is necessary to have the right information available at the time that a service call is placed. The primary information requirement, which is also the one that provides the greatest insight into potential system issues, is the configuration of the system. Insight Diagnostics helps provide higher system availability. Typical uses of the Insight Diagnostics are: <ul style="list-style-type: none"> <li>○ Testing and diagnosing apparent hardware failures</li> <li>○ Documenting system configurations for upgrade planning, standardization, inventory tracking, disaster recovery, and maintenance</li> <li>○ Sending configuration information to another location for more in-depth analysis</li> </ul> </li> </ul>
ACPI-Ready Hardware	<ul style="list-style-type: none"> <li>● Advanced Configuration and Power Management Interface (ACPI) <ul style="list-style-type: none"> <li>○ Allows the system to wake from a low power mode</li> <li>○ Controls system power consumption, making it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system</li> </ul> </li> </ul>

<b>BIOS</b>	
BIOS 32-bit Services	Standard BIOS 32-bit Service Directory Proposal
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 Technical Specifications

System/Emergency ROM Flash Recovery with Video	Recovers corrupted system BIOS
Replicated Setup	Saves BIOS settings to diskette or USB flash device in human readable file. Repset.exe utility can then replicate these settings on machines being deployed without entering Computer Setup Utility (F10)
SMBIOS	System Management BIOS 2.5, previously known as DMI BIOS, for system management information
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"> <li>● NORMAL - normal temperature ranges</li> <li>● ALERTED - excessive temperatures are detected. Raises a flag so action can be taken to avoid shutdown or provide for a smoother system shutdown</li> <li>● SHUTDOWN - excessive temperatures are encountered. Automatically shuts down the computer without warning before hardware component damage occurs</li> </ul>
Remote ROM Flash	Provides secure, fail-safe ROM image management from a central network console
ACPI (Advanced Configuration and Power Management Interface)	<ul style="list-style-type: none"> <li>● Allows the system to enter and resume from low power modes (sleep states)</li> <li>● Controls system power consumption, making it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system</li> <li>● Supports ACPI 2.0 for full compatibility with 64-bit operating systems</li> </ul>
Ownership Tag	A user-defined string stored in non-volatile memory that is displayed in the BIOS splash screen
Remote Wakeup/Remote Shutdown	<ul style="list-style-type: none"> <li>● System administrators can power on, restart, and power off a client computer from a remote location.</li> <li>● Enables cost-effective power consumption when the administrator needs to distribute software, perform security management, or update the ROM.</li> </ul>
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	Identifies system ROM revision levels and reports in Computer Setup Utility (F10).
System board revision level	<ul style="list-style-type: none"> <li>● Allows management SW to read revision level of the system board</li> <li>● Revision level is digitally encoded into the HW and cannot be modified</li> </ul>
Start-up Diagnostics (Power-on Self-Test)	Yes
Industry Standard Specification Support	
Industry Standard	Revision Supported by the BIOS
ACPI	Advanced Configuration and Power Management Interface, Version 2.0
ASF	Alert Standard Format Specification, Version 2.0
CD Boot	"El Torrito" Bootable CD-ROM Format Specification Version 1.0
EDD	<ul style="list-style-type: none"> <li>● Enhanced Disk Drive Specification Version 1.1</li> <li>● BIOS Enhanced Disk Drive Specification Version 3.0</li> </ul>
EHCI	Enhanced Host Controller Interface for Universal Serial Bus, Revision 1.0

### System Technical Specifications

PCI	<ul style="list-style-type: none"> <li>● PCI Local Bus Specification, Revision 2.3</li> <li>● PCI Power Management Specification, Revision 1.1</li> <li>● PCI Firmware Specification, Revision 3.0, Draft .7</li> </ul>
PCI Express	<ul style="list-style-type: none"> <li>● PCI Express Base Specification, Revision 1.1</li> <li>● PCI Express Base Specification, Revision 2.0</li> </ul>
PMM	POST Memory Manager Specification, Version 1.01
SATA	<ul style="list-style-type: none"> <li>● Serial ATA Specification, Revision 1.0a</li> <li>● Serial ATA 3 Gb/s: Extensions to Serial ATA 1.5 Gb/s, Revision 1.0</li> </ul>
SPD	PC SDRAM Serial Presence Detect (SPD) Specification, Revision 1.2B
TPM	Trusted Computing Group TPM Specification Version 1.2
UHCI	Universal Host Controller Interface Design Guide, Revision 1.1
USB 1.1	Universal Serial Bus Revision 1.1 Specification
USB 2.0	Universal Serial Bus Revision 2.0 Specification
SMBIOS	System Management BIOS Reference Specification, Version 2.5

System Software Management and Updating	
HP Client Management Solutions	Visit: <a href="http://www.hp.com/go/easydeploy">http://www.hp.com/go/easydeploy</a>
Product Change	<ul style="list-style-type: none"> <li>● Program to proactively communicate Product Change Notifications (PCNs) and Customer Advisories by e-mail to customers, based on a user-defined profile.</li> <li>● PCNs provide advance notification of hardware and software changes to be implemented in the factory providing time to plan for transition.</li> <li>● Customer Advisories provide concise, effective problem resolution, greatly reducing the need to call technical support.</li> </ul>
Support Software CD & WWW	Yes
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"> <li>● US Energy Star (energy-saving features available on selected configurations -Windows only)</li> <li>● US Federal Energy Management Program (FEMP)</li> <li>● China Energy Conservation Program</li> <li>● IT ECO declaration</li> <li>● Japan PC Green label*</li> </ul> <p>* This product conforms to the examination standards (2003 version) under JEITA's 'PC Green Label System.'</p>
Batteries	<p>This product complies with ISO standards:</p> <ul style="list-style-type: none"> <li>● EU Directive 91/ 157/ EEC</li> <li>● EU Directive 93/ 86/ EEC</li> <li>● EU Directive 98/ 101/ EEC</li> </ul> <p>Batteries used in the product do not contain:</p> <ul style="list-style-type: none"> <li>● Mercury greater than 5ppm by weight</li> </ul>

### System Technical Specifications

	<ul style="list-style-type: none"> <li>● Cadmium greater than 10ppm by weight</li> <li>● Lead greater than 4000ppm by weight</li> </ul> <p>Battery size: CR2032 (coin cell) Battery type: Lithium</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 <a href="http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html">http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html</a>):</p> <ul style="list-style-type: none"> <li>● Asbestos</li> <li>● Certain Azo Colorants</li> <li>● Certain Brominated Flame Retardants - may not be used as flame retardants in plastics</li> <li>● Cadmium</li> <li>● Chlorinated Hydrocarbons</li> <li>● Chlorinated Paraffins</li> <li>● Formaldehyde</li> <li>● Halogenated Diphenyl Methanes</li> <li>● Lead carbonates and sulfates</li> <li>● Lead and Lead compounds</li> <li>● Mercuric Oxide Batteries</li> <li>● Nickel - finishes must not be used on the external surface designed to be frequently handled or carried by the user.</li> <li>● Ozone Depleting Substances</li> <li>● Polybrominated Biphenyls (PBBs)</li> <li>● Polybrominated Diphenyl Ethers (PBDEs)</li> <li>● Polybrominated Biphenyl Oxides (PBBOs)</li> <li>● Polychlorinated Biphenyl (PCB)</li> <li>● Polychlorinated Terphenyls (PCT)</li> <li>● Polyvinyl Chloride (PVC), except for wires and cables and certain retail packaging, has been voluntarily removed from most applications.</li> <li>● Radioactive Substances</li> <li>● Tributyl Tinches (TBT), Triphenyl Tinches (TPT), Tributyl Tin Oxide (TBTO)</li> </ul>
Packaging	<p>HP follows these guidelines to decrease the environmental impact of product packaging:</p> <ul style="list-style-type: none"> <li>● Eliminate the use of heavy metals such as lead, chromium, mercury, and cadmium in packaging materials.</li> <li>● Eliminate the use of ozone-depleting substances (ODS) in packaging materials.</li> <li>● Design packaging materials for ease of disassembly.</li> <li>● Maximize the use of post-consumer recycled content materials in packaging materials.</li> <li>● Use readily recyclable packaging materials such as paper and corrugated materials.</li> <li>● Reduce size and weight of packages to improve transportation fuel efficiency.</li> <li>● Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.</li> </ul>
Longevity and Upgrading	<ul style="list-style-type: none"> <li>● 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. Upgradability features contained in the product include:             <ul style="list-style-type: none"> <li>● Intel LGA775 processor socket</li> <li>● 12 USB ports                 <ul style="list-style-type: none"> <li>○ 7 rear</li> <li>○ 3 internal - 1 Type A</li> <li>○ 2 front</li> </ul> </li> <li>● 3 PCI slots</li> </ul> </li> </ul>

### System Technical Specifications

	<ul style="list-style-type: none"> <li>● 4 PCI Express slots             <ul style="list-style-type: none"> <li>○ 1 PCI Express ×1 slot</li> <li>○ 2 Gen2 PCI Express ×16 slots</li> </ul> </li> </ul>
Packaging Materials	
External	Cardboard carton and insert: 2.70 kg
Internal	LDPE Foam: 0.35 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: <a href="http://www.hp.com/recycle">http://www.hp.com/recycle</a> or contact your nearest HP sales office. Products returned to HP will be recycled, recovered, or disposed of in a responsible manner.</p> <p>[link to new HP white paper now in progress]</p> <p>Global Citizenship Report: <a href="http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html">http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html</a></p> <p>Eco-label certifications:  <a href="http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html">http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html</a></p> <p>ISO 14001 certificates:  <a href="http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html">http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html</a></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 <sup>(Note 1)</sup>: One and three-years, limited warranty and service offering delivers on-site, next business-day <sup>(Note 2)</sup> service for parts and labor and includes free telephone support <sup>(Note 3)</sup> 8am - 5pm. Global coverage <sup>(Note 2)</sup> 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><b>NOTE 1:</b> Terms and conditions may vary by country. Certain restrictions and exclusions apply.</p> <p><b>NOTE 2:</b> 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.</p> <p><b>NOTE 3:</b> 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.</p>
Additional Information	<ul style="list-style-type: none"> <li>● This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2002/95/EC.</li> <li>● This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive - 2002/96/EC.</li> <li>● Plastics parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.</li> <li>● This product contains 0% recycled materials (by wt.)</li> <li>● This product is &gt;90% recyclable when properly disposed of at end of life.</li> </ul>
OS	NA
Processor 1	NA
Processor 2	NA
Memory	NA
Hard Drive	NA
Controller	NA
Optical Drive	NA
Graphics	NA
Floppy Disk Drive	NA
Keyboard	NA
Mouse	NA

### Technical Specifications - Processors

#### Processors

Intel Core 2 Quad Q9650 Processor / 3.00 GHz, 12 MB L2 cache, 1333 MHz FSB	FN699AV
Intel Core 2 Quad Q9400 Processor / 2.66 GHz, 6 MB L2 cache, 1333 MHz FSB	
Intel Core 2 Quad Q8400 Processor / 2.66 GHz, 4 MB L2 cache, 1333 MHz FSB	
Intel Core 2 Quad Q9550 Processor / 2.83 GHz, 12 MB L2 cache, 1333 MHz FSB	KD172AV
Intel Core 2 Quad Q9300 Processor / 2.50 GHz, 6 MB L2 cache, 1333 MHz FSB	KD174AV
Intel Core 2 Quad Q8300 Processor / 2.50 GHz, 4 MB L2 cache, 1333 MHz FSB	NQ408AV
Intel Core 2 Duo E8600 Processor / 3.33 GHz, 6 MB L2 (shared), 1333 MHz FSB	FN698AV
Intel Core 2 Duo E8500 Processor / 3.16 GHz, 6 MB L2 (shared), 1333 MHz FSB	KD175AV
Intel Core 2 Duo E8400 Processor / 3.00 GHz, 6 MB L2 (shared), 1333 MHz FSB	KD176AV
Intel Core 2 Duo E7600 Processor / 3.06 GHz, 3 MB L2 cache, 1066 MHz FSB	
Intel Core 2 Duo E7500 Processor / 2.93 GHz, 3 MB L2 cache, 1066 MHz FSB	NQ410AV

Speeds	System Bus Frequency	Cache Type
3.00 GHz	1333 MHz FSB	12 MB L2 (shared)
2.83 GHz	1333 MHz FSB	12 MB L2 (shared)
2.50 GHz	1333 MHz FSB	6 MB L2 (shared)
2.50 GHz	1333 MHz FSB	4 MB L2 (shared)
3.33 GHz	1333 MHz FSB	6 MB L2 (shared)
3.16 GHz	1333 MHz FSB	6 MB L2 (shared)
3.00 GHz	1333 MHz FSB	6 MB L2 (shared)
2.93 GHz	1333 MHz FSB	3 MB L2 (shared)

Intel Pentium Dual-Core E5200 Processor / 2.50 GHz, 2 MB L2 cache, 800 MHz FSB	NQ409AV
--	---------

Speeds	System Bus Frequency	Cache Type
2.50 GHz	800 MHz FSB	2 MB L2 (shared)

### Technical Specifications - Hard Drives

<b>HP SAS (Serial Attached SCSI) Hard Drives for HP Workstations</b>	<b>450GB SAS 15K rpm 3Gb/s 3.5" HDD</b>	<b>Capacity</b>	450 GB		
		<b>Height</b>	1 in; 2.5 cm		
		<b>Width</b>		<b>Media Diameter</b>	3.5 in; 8.9 cm
				<b>Physical Size</b>	4 in; 10.2 cm
		<b>Interface</b>	SAS		
		<b>Synchronous Transfer Rate (Maximum)</b>	3.0 Gb/s		
		<b>Buffer</b>	16 MB		
		<b>Seek Time</b> (typical reads, includes controller overhead, including settling)		<b>Single Track</b>	0.2 ms
				<b>Average</b>	3.6 ms
				<b>Full Stroke</b>	6.6 ms
		<b>Rotational Speed</b>	15,000 rpm		
		<b>Logical Blocks</b>	879, 097, 968 - 512 byte blocks		
		<b>Operating Temperature</b>	50° to 95° F (10° to 35° C)		
	<b>300GB SAS 15K rpm 3Gb/s 3.5" HDD</b>	<b>Capacity</b>	300 GB		
		<b>Height</b>	1 in; 2.5 cm		
		<b>Width</b>		<b>Media Diameter</b>	3.5 in; 8.9 cm
				<b>Physical Size</b>	4 in; 10.2 cm
		<b>Interface</b>	SAS		
		<b>Synchronous Transfer Rate (Maximum)</b>	3.0 Gb/s		
		<b>Buffer</b>	16 MB		
		<b>Seek Time</b> (typical reads, includes controller overhead, including settling)		<b>Single Track</b>	0.2 ms
				<b>Average</b>	3.5 ms
				<b>Full Stroke</b>	6.7 ms
		<b>Rotational Speed</b>	15,000 rpm		
		<b>Logical Blocks</b>	585,937,500 - 512 byte blocks		
		<b>Operating Temperature</b>	50° to 95° F (10° to 35° C)		
	<b>146GB SAS 15K rpm 3Gb/s 3.5" HDD</b>	<b>Capacity</b>	146 GB		
		<b>Height</b>	1 in; 2.5 cm		
		<b>Width</b>		<b>Media Diameter</b>	3.5 in; 8.9 cm
				<b>Physical Size</b>	4 in; 10.2 cm
		<b>Interface</b>	SAS		
		<b>Synchronous Transfer Rate (Maximum)</b>	3.0 Gb/s		
		<b>Buffer</b>	16 MB		

### Technical Specifications - Hard Drives

<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track</b>	0.2 ms
	<b>Average</b>	3.5 ms
	<b>Full Stroke</b>	6.7 ms
<b>Rotational Speed</b>	15,000 rpm	
<b>Logical Blocks</b>	286,749,488 - 512 byte blocks	
<b>Operating Temperature</b>	50° to 95° F (10° to 35° C)	

#### SATA (Serial ATA) Hard Drives for HP Workstations

##### 300GB SATA 10K rpm SFF in 3.5" Frame HDD

<b>Capacity</b>	300,069,052,416 bytes
<b>Height</b>	1 in; 2.54 cm
<b>Width</b>	<b>Media Diameter</b> 2.5 in; 6.36 cm
	<b>Physical Size</b> 4 in; 10.17 cm
<b>Interface</b>	Serial ATA (3.0 Gb/s), Native Command Queuing enabled
<b>Synchronous Transfer Rate (Maximum)</b>	Up to 300 MB/s
<b>Cache</b>	16 MB
<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track</b> 0.7 ms (maximum)
	<b>Average</b> 4.4 ms
	<b>Full Stroke</b> 9.5 ms
<b>Rotational Speed</b>	10,000 rpm
<b>Logical Blocks</b>	586,072,368
<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)

##### 160GB SATA 10K rpm SFF in 3.5" Frame HDD

<b>Capacity</b>	160,041,885,696 bytes
<b>Height</b>	1 in; 2.54 cm
<b>Width</b>	<b>Media Diameter</b> 2.5 in; 6.36 cm
	<b>Physical Size</b> 4 in; 10.17 cm
<b>Interface</b>	Serial ATA (1.5 Gb/s), Native Command Queuing enabled
<b>Synchronous Transfer Rate (Maximum)</b>	Up to 300 MB/s
<b>Cache</b>	16 MB
<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track</b> 0.7 ms (maximum)
	<b>Average</b> 4.4 ms
	<b>Full Stroke</b> 9.5 ms
<b>Rotational Speed</b>	10,000 rpm
<b>Logical Blocks</b>	312,581,808
<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)

##### 80GB SATA

<b>Capacity</b>	80,026,361,856 bytes
-----------------	----------------------

### Technical Specifications - Hard Drives

<b>10K rpm SFF in 3.5" Frame HDD</b>	<b>Height</b>	1 in; 2.5 cm
	<b>Width</b>	<b>Media Diameter</b> 2.5 in; 6.36 cm
		<b>Physical Size</b> 4 in; 10.2 cm
	<b>Interface</b>	Serial ATA (1.5 Gb/s), Native Command Queuing enabled
	<b>Synchronous Transfer Rate (Maximum)</b>	Up to 300 MB/s
	<b>Buffer</b>	16 MB
	<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track</b> 0.7 ms (maximum)
		<b>Average</b> 4.4 ms
		<b>Full Stroke</b> 19.5 ms
	<b>Rotational Speed</b>	10,000 rpm
	<b>Logical Blocks</b>	156,301,488
<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)	
<b>1000GB (1TB) SATA 7200 rpm 3.0Gb/s 3.5" HDD</b>	<b>Capacity</b>	1,000,204,886,016 bytes
	<b>Height</b>	1 in; 2.5 cm
	<b>Width</b>	<b>Media Diameter</b> 3.5 in; 8.9 cm
		<b>Physical Size</b> 4 in; 10.2 cm
	<b>Interface</b>	Serial ATA (3.0 Gb/s), Native Command Queuing enabled
	<b>Synchronous Transfer Rate (Maximum)</b>	Up to 300 MB/s
	<b>Buffer</b>	32 MB
	<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track</b> 2 ms
		<b>Average</b> 11 ms
		<b>Full Stroke</b> 21 ms
	<b>Rotational Speed</b>	7,200 rpm
<b>Logical Blocks</b>	1,953,525,168	
<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)	
<b>500GB SATA 7200 rpm 3Gb/s 3.5" HDD</b>	<b>Capacity</b>	500,107,862,016 bytes
	<b>Height</b>	1 in; 2.5 cm
	<b>Width</b>	<b>Media Diameter</b> 3.5 in; 8.9 cm
		<b>Physical Size</b> 4 in; 10.2 cm
	<b>Interface</b>	Serial ATA (3.0 Gb/s), Native Command Queuing enabled
	<b>Synchronous Transfer Rate (Maximum)</b>	300 MB/s
	<b>Buffer</b>	16 MB

### Technical Specifications - Hard Drives

	<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track</b>	2 ms	
		<b>Average</b>	11 ms	
		<b>Full Stroke</b>	21 ms	
	<b>Rotational Speed</b>		7,200 rpm	
	<b>Logical Blocks</b>		976,773,168	
	<b>Operating Temperature</b>		41° to 131° F (5° to 55° C)	
<b>250GB SATA 7200 rpm 3Gb/s 3.5" HDD (for HP xw- Workstations)</b>	<b>Capacity</b>		250,059,350,016 bytes	
	<b>Height</b>		1 in; 2.5 cm	
	<b>Width</b>	<b>Media Diameter</b>		3.5 in; 8.9 cm
	<b>Interface</b>	<b>Physical Size</b>		4 in; 10.2 cm
	<b>Synchronous Transfer Rate</b> (Maximum)			Serial ATA (3.0 Gb/s), Native Command Queuing enabled
	<b>Buffer</b>			300 MB/s
	<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track</b>		2 ms
		<b>Average</b>		11 ms
		<b>Full Stroke</b>		21 ms
	<b>Rotational Speed</b>			7,200 rpm
	<b>Logical Blocks</b>			488,397,168
	<b>Operating Temperature</b>			41° to 131° F (5° to 55° C)
	<b>160GB SATA 7200 rpm 3Gb/s 3.5" HDD</b>	<b>Capacity</b>		160,041,885,696 bytes
<b>Height</b>			1 in; 2.5 cm	
<b>Width</b>		<b>Media Diameter</b>		3.5 in; 8.9 cm
<b>Interface</b>		<b>Physical Size</b>		4 in; 10.2 cm
<b>Synchronous Transfer Rate</b> (Maximum)				Serial ATA (3.0 Gb/s), Native Command Queuing enabled
<b>Buffer</b>				300 MB/s
<b>Seek Time</b> (typical reads, includes controller overhead, including settling)		<b>Single Track</b>		2 ms
		<b>Average</b>		11 ms
		<b>Full Stroke</b>		21 ms
<b>Rotational Speed</b>				7,200 rpm
<b>Logical Blocks</b>				312,581,808
<b>Operating Temperature</b>				41° to 131° F (5° to 55° C)

### Technical Specifications - Hard Drive Controllers

<b>LSI 3041E 4-Port SAS 3.0 Gb/s RAID Card</b>	<b>PCI Bus</b>	PCI-Express x4 lanes
	<b>PCI Modes</b>	Bus Master DMA
	<b>RAID Levels</b>	RAID 0, 1, 1E and 10E
	<b>PCI Data Burst Transfer Rate</b>	250MB/s per lane half duplex 500MB/s per lane full duplex 1000MB/s 4-lane half duplex
	<b>SAS Bandwidth</b>	<b>Half Duplex</b> <ul style="list-style-type: none"> <li>Single lane - 300 MBps</li> <li>Wide Port (2 lanes) - 600 MBps</li> <li>Wide Port (4 lanes) - 1200 MBps</li> </ul> <b>Full Duplex</b> <ul style="list-style-type: none"> <li>Single SAS Lane - 600 MBps</li> <li>Wide Port (2 lanes) - 1200 MBps</li> <li>Wide Port (4 lanes) - 2400 MBps</li> </ul>
	<b>PCI Card Type</b>	3.3 volt add-in card
	<b>PCI Voltage</b>	12 V ± 10%
	<b>PCI Power</b>	7.5 Watts
	<b>Bracket</b>	Full height and Low-profile
	<b>Certification Level</b>	PCI-Express 1.0a
	<b>IO Bus</b>	Four 3Gbps SAS/SATA ports
	<b>SAS Processor</b>	LSISAS1064E
	<b>Internal Connectors</b>	Four- SATA x1 connectors
	<b>External Connectors</b>	None
	<b>Maximum Number of SCSI Devices</b>	122
	<b>LED Indicators</b>	On-board activity and fault LEDs
<b>Integrated Mirroring</b>	Integrated Mirroring option available	

---

<b>LSI MegaRAID® SAS 8888ELP Host Bus Adapter (HBA)</b>	<b>PCI Bus</b>	PCI-Express x8 lanes
	<b>PCI Modes</b>	Bus Master DMA
	<b>RAID Levels</b>	RAID 0, 1, and 5 RAID spans 10 and 50
	<b>PCI Data Burst Transfer Rate</b>	Up to 3Gb/s per port
	<b>Full Duplex</b>	Up to 1.5 GB/s
	<b>PCI Voltage</b>	+3.3V Add-in Card
	<b>PCI Power</b>	7.5 Watts
	<b>Certification Level</b>	PCI-Express 1.0a
	<b>IO Bus</b>	Eight 3Gb/s SAS/SATA ports
	<b>Internal Connectors</b>	Two SAS SFF8087 x4
<b>External Connectors</b>	Two SAS SFF8088 x4	

### Technical Specifications - Hard Drive Controllers

**Maximum Number of SCSI  
DeviceS** 32

**LED Indicators** Connector LEDs indicate whether the internal or external connector is active for ports 0-3 and 4-7

### Technical Specifications - Graphics

<b>NVIDIA Quadro NVS 290 256 MB PCIe Graphics Card</b>	<b>Form Factor</b>	Low Profile
	<b>Bus Type</b>	PCIe x16
	<b>Memory</b>	256 MB 400MHz DDR2 SDRAM unified frame buffer, Z-buffer and Texture storage
	<b>Connectors</b>	DMS-59, includes DMS-59 to Dual DVI-I cable. DMS-59 to Dual VGA cable available as an option.
	<b>Maximum Resolution</b>	Dual integrated analog display controllers supporting up to two analog displays at 2048x1536 @ 85Hz on both displays or dual digital displays at 1920x1200 (single-link). NVIEW advanced multi-display desktop and application management seamlessly integrated into Microsoft® Windows®
	<b>RAMDAC</b>	Integrated dual 400MHz
	<b>Image Quality Features</b>	Full-screen, full-frame video playback of HDTV and DVD content DVD-ready motion compensation for MPEG-2 Independent hardware color controls for video overlay Hardware color-space conversion (YUV 4:2:2 and 4:2:0) IDCT motion compensation 5-tap horizontal by 3-tap vertical filtering 8:1 up/down scaling
	<b>Programmable Video Processor</b>	Full-screen, full-frame video playback of HDTV and DVD content DVD-ready motion compensation for MPEG-2 Independent hardware color controls for video overlay Hardware color-space conversion (YUV 4:2:2 and 4:2:0) IDCT motion compensation 5-tap horizontal by 3-tap vertical filtering 8:1 up/down scaling
	<b>Display Output</b>	Dual integrated analog display controllers supporting up to two analog displays at 2048x1536 @ 85Hz on both displays or dual digital displays at 1920x1200 (single-link). NVIEW advanced multi-display desktop and application management seamlessly integrated into Microsoft® Windows®
	<b>Supported Graphics APIs</b>	OpenGL 2.1 & DX10 Support; Shader Model 4.0
	<b>Available Graphics Drivers</b>	Genuine Windows Vista Business(64-bit and 32-bit), Microsoft Windows XP Professional(64-bit and 32-bit)(Provides full native Dual View mode, Span or Big Desktop mode, and Clone mode ) Red Hat Enterprise Linux(RHEL) WS3, WS4 & 5 Desktop/Workstation HP qualified drivers may be preloaded or available from the HP support web site: <a href="http://welcome.hp.com/country/us/eng/software_drivers.html">http://welcome.hp.com/country/us/eng/software_drivers.html</a> . Novell SUSE Linux Enterprise drivers may be obtained from: <a href="ftp://download.nvidia.com/novell">ftp://download.nvidia.com/novell</a> or <a href="http://www.nvidia.com">http://www.nvidia.com</a>
	<b>High-Resolution AntiAliasing</b>	Color planes: 32-bit color buffer Overlay planes: Hardware supported
	<b>Option kit contents</b>	NVIDIA Quadro NVS 290 (256 MB DH) PCIe Graphics Card with full height bracket attached, DMS-59 to Dual DVI cable, Workstation Software Driver CD, documentation.

### Technical Specifications - Graphics

<b>NVIDIA Quadro NVS 295 256MB Graphics Card</b>	<b>Form Factor</b>	2.731 inches (H) × 6.600 inches (L), Half-Height
	<b>Graphics Controller</b>	NVIDIA Quadro NVS 295 Graphics Board
	<b>Bus Type</b>	PCI Express x16, Generation 2.0
	<b>Memory</b>	256 MB GDDR3 SDRAM unified graphics memory
	<b>Connectors</b>	2 DisplayPort Comes with 2 DisplayPort to DVI-D Adapters (‘DisplayPort to VGA’ and ‘DisplayPort to DL DVI’ adapters available as an accessory)
	<b>Maximum Resolution</b>	Two DisplayPort outputs drive two digital displays up to 2560 x 1600
		<b>NOTE:</b> This card supports up to two displays
	<b>Display Output</b>	<ul style="list-style-type: none"><li>• Drives DisplayPort enabled digital displays at resolutions up to 2560 × 1600 at 60 Hz with reduced blanking</li><li>• 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)</li></ul>
	<b>Supported Graphics APIs</b>	OpenGL 3.0 DirectX 10.0
	<b>Available Graphics Drivers</b>	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: <a href="http://welcome.hp.com/country/us/en/support.html">http://welcome.hp.com/country/us/en/support.html</a>  Novell SUSE Linux Enterprise drivers may also be obtained from: <a href="ftp://download.nvidia.com/novell">ftp://download.nvidia.com/novell</a> or <a href="http://www.nvidia.com">http://www.nvidia.com</a>
	<b>Power consumption</b>	22.69 Watts

### Technical Specifications - Graphics

<b>NVIDIA Quadro NVS 450 512 MB PCIe Graphics Card</b>	<b>Form Factor</b>	ATX Full Height, 1/2 length Passive cooling
	<b>Bus Type</b>	PCI Express x16, Generation 2.0
	<b>Memory</b>	512 MB GDDR3 (256MB per GPU)
	<b>Connectors</b>	Four DisplayPort; Four DisplayPort to DVI-D adapters included. (‘DisplayPort to VGA’ and ‘DisplayPort to Dual Link DVI’ adapters available as an accessory)
	<b>Maximum Resolution</b>	DisplayPort connectors support ultra-high-resolution panels (up to 2560 x 1600)
		<b>NOTE:</b> This card supports up to four displays
	<b>Supported Graphics APIs</b>	OpenGL 3.0 Direct X 10.0
	<b>Available Graphics Drivers</b>	Genuine Microsoft Windows Vista(64-bit and 32-bit), Microsoft Windows XP Professional(64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) WS4 & 5 Desktop/Workstation HP qualified drivers may be preloaded or available from the HP support web site: <a href="http://welcome.hp.com/country/us/eng/software_drivers.html">http://welcome.hp.com/country/us/eng/software_drivers.html</a> . Novell SUSE Linux Enterprise drivers may be obtained from: <a href="ftp://download.nvidia.com/novell">ftp://download.nvidia.com/novell</a> or <a href="http://www.nvidia.com">http://www.nvidia.com</a>
	<b>Power consumption</b>	35 Watts
<hr/>		
<b>ATI FirePro V3700 256MB Graphics Card</b>	<b>Form Factor</b>	4.40 inches (H) × 6.70 inches (L) (11.18 cm (H) × 17.02 cm (L))
	<b>Graphics Controller</b>	ATI FirePro V3700 Graphics Board
	<b>Bus Type</b>	PCI Express x16, Generation 2.0
	<b>Memory</b>	256 MB GDDR3 SDRAM unified graphics memory
	<b>Connectors</b>	2 Dual Link DVI-I Two DVI-I to VGA adapters included
	<b>Maximum Resolution</b>	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
		<b>NOTE:</b> This card supports up to two displays
	<b>Shading architecture</b>	Full Shader Model 4.0 <ul style="list-style-type: none"><li>● 40 Stream Processing Units</li><li>● Dynamic load balancing and resource allocation for vertex, geometry, and pixel shaders</li><li>● Common instruction set and texture unit access supported for all types of shaders</li><li>● Dedicated branch execution units and texture address processors</li></ul>
	<b>Supported graphics APIs</b>	OpenGL 3.0 DirectX 10.1
	<b>Available graphics drivers</b>	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)

### Technical Specifications - Graphics

Red Hat Enterprise Linux WS4 (64-bit and 32-bit)

\* WS4 not supported on Z200 & Z200 SFF

Red Hat Enterprise Linux 5 Desktop (64-bit and 32-bit)

SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit)

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

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

**Power consumption** 32 Watts

#### NVIDIA Quadro FX 380 256MB Graphics Card

<b>Form Factor</b>	4.376 inches (H) × 6.60 inches (L)
<b>Graphics Controller</b>	NVIDIA Quadro FX 380 Graphics Board
<b>Bus Type</b>	PCI Express x16, Generation 2.0
<b>Memory</b>	256 MB GDDR3 SDRAM unified graphics memory
<b>Connectors</b>	2 Dual Link DVI-I Two DVI-I to VGA adapters included
<b>Maximum Resolution</b>	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 <b>NOTE:</b> This card supports up to two displays
<b>RAMDAC</b>	Dual Internal 400 MHz DAC
<b>Shading architecture</b>	Full Shader Model 4.0 (OpenGL 2.1/DirectX 10 class) <ul style="list-style-type: none"> <li>• Long fragment programs (unlimited instructions)</li> <li>• Long vertex programs (unlimited instructions)</li> <li>• Looping and subroutines (up to 256 loops per vertex program)</li> <li>• Dynamic flow control</li> <li>• Conditional execution</li> </ul>
<b>Supported graphics APIs</b>	OpenGL 3.0 Direct X 10.0
<b>Available graphics drivers</b>	Genuine Windows Vista Business(64-bit and 32-bit) Microsoft Windows XP Professional(64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) WS4 & 5 Desktop/Workstation  HP qualified drivers may be preloaded or available from the HP support Web site: <a href="http://welcome.hp.com/country/us/en/support.html">http://welcome.hp.com/country/us/en/support.html</a>  Novell SUSE Linux Enterprise drivers may be obtained from: <a href="ftp://download.nvidia.com/novell">ftp://download.nvidia.com/novell</a> or <a href="http://www.nvidia.com">http://www.nvidia.com</a>
<b>High-level Shader Languages</b>	<ul style="list-style-type: none"> <li>• Optimized compiler for Cg and Microsoft HLSL</li> <li>• OpenGL 2.1 and DirectX 10 support</li> <li>• Open source compiler</li> </ul>
<b>CUDA™ Parallel Processor Cores</b>	16
<b>Power consumption</b>	33.91 Watts

### Technical Specifications - Graphics

<b>NVIDIA Quadro FX 580 512MB Graphics Card</b>	<b>Form Factor</b>	4.376 inches (H) × 6.60 inches (L)
	<b>Graphics Controller</b>	NVIDIA Quadro FX 580 Graphics Board
	<b>Bus Type</b>	PCI Express x16, Generation 2.0
	<b>Memory</b>	512MB GDDR3 SDRAM unified graphics memory
	<b>Connectors</b>	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)
	<b>Maximum Resolution</b>	<ul style="list-style-type: none"><li>• Two DisplayPort outputs drive two digital displays up to 2560 x 1600</li><li>• 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</li></ul>
		<b>NOTE:</b> This card supports up to two displays
	<b>RAMDAC</b>	Single Internal 400 MHz DAC
	<b>Shading architecture</b>	Full Shader Model 4.0 (OpenGL 2.1/DirectX 10 class) <ul style="list-style-type: none"><li>• Long fragment programs (unlimited instructions)</li><li>• Long vertex programs (unlimited instructions)</li><li>• Looping and subroutines (up to 256 loops per vertex program)</li><li>• Dynamic flow control</li><li>• Conditional execution</li></ul>
	<b>Supported graphics APIs</b>	OpenGL 3.0 Direct X 10.0
	<b>Available graphics drivers</b>	Genuine Windows Vista Business(64-bit and 32-bit) Microsoft Windows XP Professional(64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) WS4 & 5 Desktop/Workstation  HP qualified drivers may be preloaded or available from the HP support Web site: <a href="http://welcome.hp.com/country/us/en/support.html">http://welcome.hp.com/country/us/en/support.html</a>  Novell SUSE Linux Enterprise drivers may be obtained from: <a href="ftp://download.nvidia.com/novell">ftp://download.nvidia.com/novell</a> or <a href="http://www.nvidia.com">http://www.nvidia.com</a>
	<b>High-level Shader Languages</b>	<ul style="list-style-type: none"><li>• Optimized compiler for Cg and Microsoft HLSL</li><li>• OpenGL 2.1 and DirectX 10 support</li><li>• Open source compiler</li></ul>
	<b>CUDA™ Parallel Processor Cores</b>	32
	<b>Power consumption</b>	40 Watts

### Technical Specifications - Graphics

<b>ATI FirePro V5700 512MB Graphics Card</b>	<b>Form Factor</b>	4.40 inches (H) × 6.70 inches (L) (11.18 cm (H) × 17.02 cm (L))
	<b>Graphics Controller</b>	ATI FirePro V5700 Graphics Board
	<b>Bus Type</b>	PCI Express x16, Generation 2.0
	<b>Memory</b>	512 MB GDDR3 SDRAM unified graphics memory
	<b>Connectors</b>	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)
	<b>Maximum Resolution</b>	<ul style="list-style-type: none"><li>• Two DisplayPort outputs drive two digital displays up to 2560 x 1600</li><li>• 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</li></ul>
		<b>NOTE:</b> This card supports up to two displays
	<b>Shading architecture</b>	Full Shader Model 4.0 <ul style="list-style-type: none"><li>• 320 Stream Processing Units</li><li>• Dynamic load balancing and resource allocation for vertex, geometry, and pixel shaders</li><li>• Common instruction set and texture unit access supported for all types of shaders</li><li>• Dedicated branch execution units and texture address processors</li></ul>
	<b>Supported graphics APIs</b>	OpenGL 3.0 DirectX 10.1
	<b>Available graphics drivers</b>	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 &amp; 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: <a href="http://welcome.hp.com/country/us/en/support.html">http://welcome.hp.com/country/us/en/support.html</a>
	<b>Power consumption</b>	56 Watts

### Technical Specifications - Graphics

<b>NVIDIA Quadro FX 1800 768MB Graphics Card</b>	<b>Form Factor</b>	4.376 inches (H) x 7.8 inches (L)
	<b>Graphics Controller</b>	NVIDIA Quadro FX 1800 Graphics Board
	<b>Bus Type</b>	PCI Express x16, Generation 2.0
	<b>Memory</b>	768MB GDDR3 SDRAM unified graphics memory
	<b>Connectors</b>	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)
	<b>Maximum Resolution</b>	<ul style="list-style-type: none"><li>• Two DisplayPort outputs drive two digital displays up to 2560 x 1600</li><li>• 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</li></ul>
		<b>NOTE:</b> This card supports up to two displays
	<b>RAMDAC</b>	Single Internal 400 MHz DAC
	<b>Shading Architecture</b>	Full Shader Model 4.0 (OpenGL 2.1/DirectX 10 class) <ul style="list-style-type: none"><li>• Long fragment programs (unlimited instructions)</li><li>• Long vertex programs (unlimited instructions)</li><li>• Looping and subroutines (up to 256 loops per vertex program)</li><li>• Dynamic flow control</li><li>• Conditional execution</li></ul>
	<b>Supported Graphics APIs</b>	OpenGL 3.0 Direct X 10.0
	<b>Available Graphics Drivers</b>	Genuine Windows Vista Business(64-bit and 32-bit) Microsoft Windows XP Professional(64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) WS4 & 5 Desktop/Workstation  HP qualified drivers may be preloaded or available from the HP support Web site: <a href="http://welcome.hp.com/country/us/en/support.html">http://welcome.hp.com/country/us/en/support.html</a>  Novell SUSE Linux Enterprise drivers may be obtained from: <a href="ftp://download.nvidia.com/novell">ftp://download.nvidia.com/novell</a> or <a href="http://www.nvidia.com">http://www.nvidia.com</a>
	<b>High-level Shader Languages</b>	<ul style="list-style-type: none"><li>• Optimized compiler for Cg and Microsoft HLSL</li><li>• OpenGL 2.1 and DirectX 10 support</li><li>• Open source compiler</li></ul>
	<b>CUDA™ Parallel Processor Cores</b>	64.
	<b>Power consumption</b>	59 Watts

### Technical Specifications - Graphics

<b>ATI FirePro V7750 1.0GB Graphics Card</b>	<b>Form Factor</b>	4.40 inches (H) × 13.0 inches (L) (11.18 cm (H) × 33.02 cm (L))
	<b>Graphics Controller</b>	ATI FirePro V7750 Graphics Board
	<b>Bus Type</b>	PCI Express x16, Generation 2.0
	<b>Memory</b>	1024 MB GDDR3 SDRAM unified graphics memory
	<b>Connectors</b>	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)
	<b>Maximum Resolution</b>	<ul style="list-style-type: none"><li>• Two DisplayPort outputs drive two digital displays up to 2560 x 1600</li><li>• 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</li></ul>
		<b>NOTE:</b> This card supports up to two displays
	<b>Shading architecture</b>	Full Shader Model 4.0 <ul style="list-style-type: none"><li>• 320 Stream Processing Units</li><li>• Dynamic load balancing and resource allocation for vertex, geometry, and pixel shaders</li><li>• Common instruction set and texture unit access supported for all types of shaders</li><li>• Dedicated branch execution units and texture address processors</li></ul>
	<b>Supported graphics APIs</b>	OpenGL 3.0 DirectX 10.1
	<b>Available graphics drivers</b>	Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux 4 (64-bit and 32-bit) Red Hat Enterprise Linux 5 Desktop (64-bit and 32-bit) SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit)  HP qualified drivers may be preloaded or available from the HP support Web site: <a href="http://welcome.hp.com/country/us/en/support.html">http://welcome.hp.com/country/us/en/support.html</a>
	<b>Power consumption</b>	76 Watts

### Technical Specifications - Graphics

<b>NVIDIA Quadro FX 3800 1.0GB Graphics Card</b>	<b>Form Factor</b>	4.376 inches (H) x 9.0 inches (L) Single slot card
	<b>Graphics Controller</b>	NVIDIA Quadro FX 3800 Graphics Board
	<b>Bus Type</b>	PCI Express x16, Generation 2.0
	<b>Memory</b>	1GB GDDR3 SDRAM unified graphics memory
	<b>Connectors</b>	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)
	<b>Maximum Resolution</b>	<ul style="list-style-type: none"> <li>● Two DisplayPort outputs drive two digital displays up to 2560 x 1600</li> <li>● 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</li> </ul>
		<b>NOTE:</b> This card supports up to two displays
	<b>RAMDAC</b>	Single Internal 400 MHz DAC
	<b>Shading architecture</b>	Full Shader Model 4.0 (OpenGL 2.1/DirectX 10 class) <ul style="list-style-type: none"> <li>● Long fragment programs (unlimited instructions)</li> <li>● Long vertex programs (unlimited instructions)</li> <li>● Looping and subroutines (up to 256 loops per vertex program)</li> <li>● Dynamic flow control</li> <li>● Conditional execution</li> </ul>
	<b>Supported graphics APIs</b>	OpenGL 3.0 Direct X 10.0
	<b>Available graphics drivers</b>	Genuine Windows Vista Business(64-bit and 32-bit) Microsoft Windows XP Professional(64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) WS4 & 5 Desktop/Workstation  HP qualified drivers may be preloaded or available from the HP support Web site: <a href="http://welcome.hp.com/country/us/en/support.html">http://welcome.hp.com/country/us/en/support.html</a>  Novell SUSE Linux Enterprise drivers may be obtained from: <a href="ftp://download.nvidia.com/novell">ftp://download.nvidia.com/novell</a> or <a href="http://www.nvidia.com">http://www.nvidia.com</a>
	<b>High-level Shader Languages</b>	<ul style="list-style-type: none"> <li>● Optimized compiler for Cg and Microsoft HLSL</li> <li>● OpenGL 2.1 and DirectX 10 support</li> <li>● Open source compiler</li> </ul>
	<b>CUDA™ Parallel Processor Cores</b>	192
	<b>Power consumption</b>	107.9 Watts

### Technical Specifications - Graphics

<b>NVIDIA Quadro FX 4800 1.5GB PCIe Graphics Card</b>	<b>Form Factor</b>	4.36" (H) x 10.5" (L) Dual slot card
	<b>Graphics Controller</b>	NVIDIA Quadro FX 4800 graphics board
	<b>Bus Type</b>	PCI Express x16, Generation 2.0
	<b>Memory</b>	1.5 GB GDDR3 SDRAM unified graphics memory
	<b>Connectors</b>	2 DisplayPort, 1 Dual-Link DVI-I, 1 3-pin Mini DIN stereo output, One DisplayPort to DVI-D adapter included (‘DVI to VGA’, ‘DisplayPort to VGA’ and ‘DisplayPort to Dual Link DVI’ adapters available as an accessory)
	<b>Maximum Resolution</b>	<ul style="list-style-type: none"> <li>● 2 DisplayPort connectors support ultra-high-resolution panels (up to 2560 x 1600)</li> <li>● Dual-link DVI-I output drives one digital display at resolutions up to 2560 x 1600 @ 60Hz</li> <li>● Internal 400 MHz DACs—One analog display up to 2048 x 1536 @ 85Hz</li> </ul> <p><b>NOTE:</b> This card supports up to two displays</p>
	<b>Shading Architecture</b>	<ul style="list-style-type: none"> <li>● Full Shader Model 4.0 (OpenGL 2.1/DirectX 10 class)</li> <li>● Long fragment programs (unlimited instructions)</li> <li>● Long vertex programs (unlimited instructions)</li> <li>● Looping and subroutines (up to 256 loops per vertex program)</li> <li>● Dynamic flow control</li> <li>● Conditional execution</li> </ul>
	<b>Supported Graphics APIs</b>	OpenGL 3.0 Direct X 10.0
	<b>Available Graphics Drivers</b>	Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) WS4 & 5 Desktop/Workstation Qualified drivers may be preloaded or available from the HP support Web site: <a href="http://welcome.hp.com/country/us/eng/software_drivers.html">http://welcome.hp.com/country/us/eng/software_drivers.html</a> Novell SUSE Linux Enterprise drivers may be obtained from: <a href="ftp://download.nvidia.com/novell">ftp://download.nvidia.com/novell</a> or <a href="http://www.nvidia.com">http://www.nvidia.com</a>
	<b>High-Resolution AntiAliasing</b>	<ul style="list-style-type: none"> <li>● Rotated Grid Full-Scene Antialiasing (RG FSAA)</li> <li>● 32xFSAA dramatically reduces visual aliasing artifacts or "jaggies" at resolution up to 1920 x 1200</li> <li>● 64x FSAA SLI Mode</li> </ul>
	<b>High-level Shader Languages</b>	<ul style="list-style-type: none"> <li>● Optimized compiler for Cg and Microsoft HLSL</li> <li>● OpenGL 2.1 and DirectX 10 support</li> <li>● Open source compiler</li> </ul>
	<b>Power consumption</b>	146 Watts

---

<b>Elemental Accelerator Software for NVIDIA Quadro</b>	<b>Form Factor</b>	Drop in box CD
---	--------------------	----------------

### Technical Specifications - Multimedia and Audio Devices

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

<b>SoundBlaster X-Fi XtremeGamer Audio Card (PCI)</b>	<b>24-bit Analog-to-Digital conversion of analog inputs</b>	96kHz sample rate
	<b>24-bit Digital-to-Analog conversion of digital sources</b>	96kHz to analog 7:1 speaker output
	<b>24-bit Digital-to-Analog conversion of stereo digital sources</b>	8, 11.025, 16, 22.05, 24, 32, 44.1, 48 and 96kHz
	<b>16-bit to 24-bit recording sampling rates</b>	16-bit/44.1kHz, 16-bit/48kHz, 24-bit/44.1kHz, 24-bit/48kHz and 24-bit/96kHz with direct monitoring
	<b>Enhanced SoundFont support</b>	Up to 24-bit resolution
	<b>Signal-to-Noise Ratio (20kHz Low-pass filter, A-Weighted)</b>	Stereo Output 109dB Front and Rear Channels 109dB Center, Subwoofer and Side Channels 109dB
	<b>Total Harmonic Distortion + Noise at 1kHz (20kHz Low-pass filter)</b>	0.004%
	<b>Frequency Response (-3dB, 24-bit/96kHz input)</b>	10Hz to 46kHz
	<b>Frequency Response (-3dB, 24-bit/192kHz input)</b>	10Hz to 46kHz

### Technical Specifications - Multimedia and Audio Devices

<b>Speaker and Headphone connections</b>	Stereo to 7.1 (Line Out via three 3.5mm mini jacks)
<b>Flexijack</b>	Line In/ Microphone In/Optical Outi via shared 3.5mm mini jack
<b>Auxiliary Line Level Input</b>	4-pin molex connector
<b>Front Panel Header</b>	Intel HD Audio Compatible (1x10 pin)
<b>Operating System</b>	EntMicrosoft Windows Vista Business 64 Microsoft Windows Vista Business 32 Microsoft® Windows® XP Professional SP2 Microsoft Windows XP Professional x64 Edition

### Technical Specifications - Optical and Removable Storage

**NOTE:** 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.

<b>HP DVD+/-RW Drive</b>	<b>Description</b>	5.25-inch, half-height, tray-load			
	<b>Mounting Orientation</b>	Either horizontal or vertical			
	<b>Interface Type</b>	SATA/ATAPI			
	<b>Dimensions (WxHxD)</b>	5.9 x 1.7 x 8.0 in (15.0 x 4.4 x 20.3 cm)			
	<b>Disc Formats</b>	DVD-RAM			
		DVD+R			
		DVD+RW			
		DVD+R DL			
		DVD-R DL			
		DVD-R			
		DVD-RW			
		CD-R			
	<b>Disc Capacity</b>	<b>DVD-ROM</b>	8.5 GB DL or 4.7 GB standard		
		<b>Full Stroke DVD</b>	< 250 ms (seek)		
		<b>Full Stroke CD</b>	< 210 ms (seek)		
	<b>Maximum Data Transfer Rates</b>	<b>CD ROM Read</b>	CD-ROM, CD-R Up to 40X CD-RW Up to 32X		
		<b>DVD ROM Read</b>	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		
<b>Power</b>	<b>Source</b>		SATA DC power receptacle		
	<b>DC Power Requirements</b>	5 VDC ± 5%-100 mV ripple p-p			
		12 VDC ± 5%-200 mV ripple p-p			
<b>Operating Environmental</b> (all conditions non-condensing)	<b>DC Current</b>	5 VDC -1000 mA typical, 1600 mA maximum 12 VDC -600 mA typical, 1400 mA maximum			
	<b>Temperature</b>	41° to 122° F (5° to 50° C)			
	<b>Relative Humidity</b>	10% to 90%			
<b>Operating Systems Supported</b>	<b>Maximum Wet Bulb Temperature</b>	86° F (30° C)			
	<b>Operating Systems Supported</b>	Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows 2000,			

### Technical Specifications - Optical and Removable Storage

Windows XP Professional or Windows XP Home 32\*.  
Red Hat Enterprise Linux(RHEL) WS4\*\*, 5  
Desktop/Workstation  
Novell SLED 10 & SLED 11

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

\*Certain Windows Vista product features require advanced or additional hardware. See <http://microsoft.com/windowsvista/getready/hardwarereqs.mspx> and <http://www.microsoft.com/windowsvista/getready/capable.mspx> for details. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit <http://www.windowsvista.com/upgradeadvisor>. Windows Vista Business disk also included for future upgrade if desired. 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

### Technical Specifications - Optical and Removable Storage

<b>HP DVD-ROM Drive</b>	<b>Description</b>	5.25-inch, half-height, tray-load	
	<b>Mounting Orientation</b>	Either horizontal or vertical	
	<b>Interface Type</b>	SATA/ATAPI	
	<b>Dimensions (WxHxD)</b>	5.9 x 1.7 x 8.0 in (15.0 x 4.4 x 20.3 cm)	
	<b>Disc Capacity</b>	<b>DVD-ROM</b> Single layer: Up to 4.7 GB Double layer: Up to 8.5 GB	
	<b>Access Times</b>	<b>DVD-ROM Single Layer</b>	< 140 ms (typical)
		<b>CD-ROM Mode 1</b>	< 125 ms (typical)
		<b>Full Stroke DVD</b>	< 250 ms (seek)
		<b>Full Stroke CD</b>	< 210 ms (seek)
		<b>Power</b>	<b>Source</b> SATA DC power receptacle
		<b>DC Power Requirements</b> 5 VDC $\pm$ 5%-100 mV ripple p-p 12 VDC $\pm$ 5%-200 mV ripple p-p	
		<b>DC Current</b> 5 VDC - <1000 mA typical, < 1600 mA maximum 12 VDC - < 600 mA typical, < 1400 mA maximum	
	<b>Operating Environmental</b> (all conditions non-condensing)	<b>Temperature</b>	41° to 122° F (5° to 50° C)
<b>Relative Humidity</b>		10% to 90%	
<b>Maximum Wet Bulb Temperature</b>		86° F (30° C)	
<b>Operating Systems Supported</b>		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>. Windows Vista Business disk also included for future upgrade if desired. For Windows Vista system requirements, visit: <http://www.windowsvista.com/systemrequirements>.

\*\* RHEL WS4 not supported on Z200/Z200SFF

<b>HP 16-In-1 Media Card</b>	<b>Interface Type</b>	USB 2.0 High-speed device
------------------------------	-----------------------	---------------------------

### Technical Specifications - Optical and Removable Storage

<b>Reader with PCI Card</b>	<b>Dimensions (WxHxD)</b>	5.7 x 5.86 x 1.68 in (145 x 148.9 x 42.7 mm)
	<b>Supported Media Types</b>	MicroSD (T-Flash, including MicroSD HC) Memory Stick Micro MS Micro (M2)
	<b>Operating Environmental Temperature</b> (all conditions non-condensing)	<b>Operating Extremes</b> Test Parameters/Conditions - Power applied, unit operating on system $\pm 5\%$ nominal supply voltage. 10°C 10% R.H. = 24 hours 10°C 90% R.H. = 24 hours 20°C 90% R.H. = 24 hours 30°C 90% R.H. = 24 hours 40°C 90% R.H. = 24 hours 50°C 90% R.H. = 24 hours 50°C 10% R.H. = 24 hours <b>Storage Extremes</b> Test Parameters/Conditions 60°C @ 80% R.H. for 96 hours -30°C @ 20% R.H. for 48 hours No power applied Delta °C < 1.0°C/min Delta % R.H. < 1.5% R.H./min
	<b>Certifications/Approvals</b>	USB-IF, WHQL, Compliant with USB Mass Storage Class Bulk only Transport Specification Rev. 1.0, Compliant Intel Front Panel I/O Connectivity Design Guide V. 1.2 FCC, CE, BSMI, C-Tick, VCCI, MIC, cUL, TUV-T
	<b>Operating Systems Supported</b>	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. See <a href="http://www.microsoft.com/windowsvista/getready/hardwarereqs.mspx">http://www.microsoft.com/windowsvista/getready/hardwarereqs.mspx</a> and <a href="http://www.microsoft.com/windowsvista/getready/capable.mspx">http://www.microsoft.com/windowsvista/getready/capable.mspx</a> 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 <a href="http://www.windowsvista.com/upgradeadvisor">http://www.windowsvista.com/upgradeadvisor</a> . Windows Vista Business disk also included for future upgrade if desired. For Windows Vista system requirements, visit <a href="http://www.windowsvista.com/systemrequirements">http://www.windowsvista.com/systemrequirements</a> .
	<b>Kit Contents</b>	Media reader in 5.25" bracket with USB cable attached, PCI card with full height bracket attached, ½ height bracket for PCI card, Install Guide, IO & Security Software and Documentation CD
	<b>Weight</b>	4 lbs (1.81 kg)
	<b>Advance Protocol Support</b>	Supports hardware ECC (Error Correction Code) function Supports hardware CRC (Cyclic Redundancy Check) function Supports MS 4-bit parallel transfer mode Supports MS-PRO 4-bit parallel transfer mode Supports SD 4-bit parallel transfer mode

### Technical Specifications - Optical and Removable Storage

Supports high-speed 50Mhz SD 4-bit card (version 1.1)

Support high-speed 52Mhz MultiMediaCard 8-bit card (version 4.x)

### Technical Specifications - Networking and Communications

**NOTE:** "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.

<b>Integrated Broadcom 5755 NetXtreme Gigabit Ethernet PCIe NIC</b>	<b>Operating System Driver Support</b>	Red Hat Enterprise Linux(RHEL) WS4, 5 Desktop/Workstation Novell SLES 9 & SLE 10
---	--	---

<b>Broadcom 5751 NetXtreme Gigabit Ethernet PCIe NIC</b>	<b>Connector</b>	RJ-45
	<b>Controller</b>	Broadcom 5751 PCI-Express LAN Controller
	<b>Memory</b>	Integrated 96Kb frame buffer memory
	<b>Data Rates Supported</b>	10/100/1000 Mbps
	<b>Compliance</b>	IEEE 802.1P, 802.1Q, 802.2, 802.3, 802.3AB and 802.3u compliant, 802.3x flow control
	<b>Bus Architecture</b>	PCI-E
	<b>Data Path Width</b>	Single channel, PCI-E
	<b>Data Transfer Mode</b>	Bus-master DMA
	<b>Hardware Certifications</b>	FCC, B, CE, TUV- cTUVus Mark Canada and United States, TUV- GS Mark for European Union
	<b>Power Requirement</b>	3.1 watts @ +3.3V AUX supply with 5V tolerance
	<b>Boot ROM Support</b>	Yes
	<b>Network Transfer Mode</b>	Full-duplex Half-duplex (not available for the 1000BASE-T transceiver)
	<b>Network Transfer Rate</b>	10BASE-T (half-duplex) 10 Mbps 10BASE-T (full-duplex) 20 Mbps 100BASE-TX (half-duplex) 100 Mbps 100BASE-TX (full-duplex) 200 Mbps 1000BASE-T (full-duplex) 2000 Mbps
	<b>Operating Temperature</b>	32° to 131°F (0° to 55° C)
	<b>Operating Humidity</b>	85% at 131° F (55° C)
	<b>Dimensions</b>	4.4 x 2.2 x 0.08 in (11.2 x 5.5 x 2 cm)
	<b>Operating System Driver Support</b>	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) WS3, WS4, 5 Desktop/Workstation Novell SLES 9 & SLE 10 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>.

### Technical Specifications - Networking and Communications

**Management Capabilities** ACPI, WOL and DMI 2.0, PXE 2.0, WfM 2.0, Broadcom mgmt utility

**Kit Contents** Broadcom 5751, CD, Broadcom 5751 Netxtreme Gigabit PCIe NIC, drivers, quick install guide, product warranty statement

### Technical Specifications - Controller Cards

<b>HP FireWire/IEEE 1394a PCI Card</b>	<b>Data Transfer Rate</b>	Burst Data Rate up to 400 Mbps
	<b>Device Interface Protocol</b>	IEEE-1394a
	<b>Devices Supported</b>	IEEE-1394 compliant devices
	<b>Bus Type</b>	PCI card with brackets for low profile and full height PCI slots.
	<b>Certification Level</b>	FCC Part 15B, cULus 60950, CE Mark EN55022B(1995)/EN55024-1998 STD, Taiwan BSMI CNS13438, Korea MIC
	<b>Ports</b>	Two IEEE 1394 6-Pin Connector (Rear)
	<b>Internal Connectors</b>	One 10-Pin (9 Contacts) Custom Connector
	<b>System Requirements</b>	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

<b>Temperature - Operating</b>	50° to 131° F (10° to 55° C)
<b>Temperature - Storage</b>	-22° to 140° F (-30° to 60° C)
<b>Relative Humidity - Operating</b>	20% to 80%
<b>Operating Systems Supported</b>	Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32*

\* Certain Windows Vista product features require advanced or additional hardware. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit: <http://www.windowsvista.com/upgradeadvisor>. For Windows Vista system requirements, visit: <http://www.windowsvista.com/systemrequirements>.

### Technical Specifications - Controller Cards

<sup>i</sup> Support for all peripherals and parts on Microsoft Windows Vista Business 64 is subject to the expected availability of Microsoft Vista Business 64 in CQ1 2008

© Copyright 2010 Hewlett-Packard Development Company, L.P.  
The information contained herein is subject to change without notice.

All rights reserved. Microsoft, Windows, Windows Vista, and Windows XP are registered trademarks or trademarks of Microsoft Corporation in the U.S. and/or other countries. Intel, the Intel logo, Pentium, and Pentium Inside are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries. Linux is a registered trademark of Linus Torvalds in the United States and other countries.

Warranty - year(s) Protected by HP Services, including a 3 years parts, 3 years labor, and 3 years onsite service (3/3/3) standard warranty. Terms and conditions vary by country. Certain restrictions and exclusions apply.