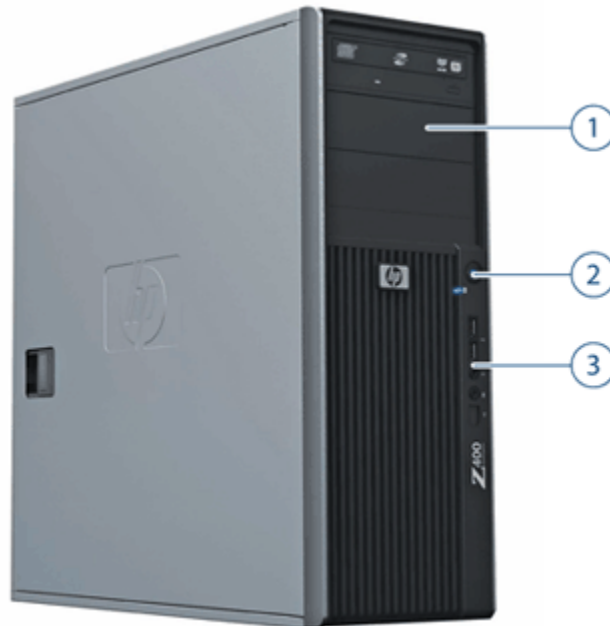
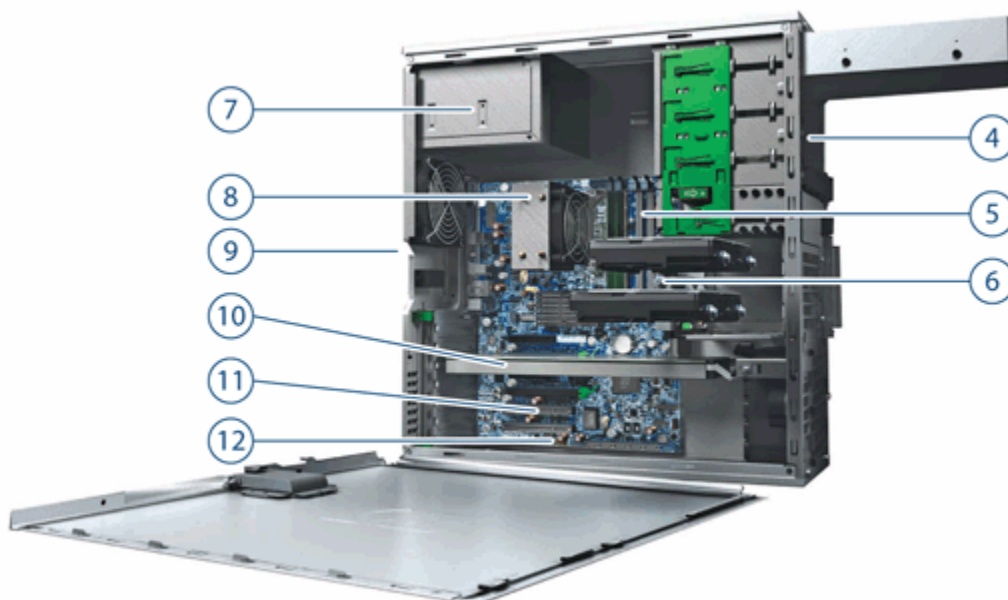


### Overview

HP recommends Windows Vista®  
Business



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



### Overview

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>4. 3 External 5.25" Bays</li> <li>5. 4 DIMM Slots for DDR3 ECC Memory</li> <li>6. 2 Internal 3.5" Bays</li> <li>7. 475W, 85% efficient Power Supply</li> <li>8. Dual/Quad Core Intel 3500 Series Processors</li> </ul> | <ul style="list-style-type: none"> <li>9. Rear I/O: 6 USB 2.0, PS/2 keyboard/mouse<br/>1 RJ-45 to Integrated Gigabit LAN<br/>1 Audio Line In, 1 Audio Line Out, 1 Microphone In</li> <li>10. 2 PCIe x16 Gen2 Slots</li> <li>11.. 1 PCIe x4 Gen2, 1 PCIe x4 Gen1, 2 PCI Slots</li> <li>12. 4 Internal USB 2.0 ports</li> </ul> |
|---|---|

<b>Form Factor</b>	Convertible Minitower
<b>Compatible Operating Systems</b>	<p>Genuine Windows Vista® Business 32-bit*</p> <p>Genuine Windows Vista® Business 64-bit*</p> <p>Genuine Windows Vista® Business 32-bit with downgrade to Windows® XP Professional 32-bit custom installed** (expected available until August 2009)</p> <p>Genuine Windows Vista® Business 64-bit with downgrade to Windows® XP Professional x64 custom installed** (expected available until August 2009)</p> <p>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>)</p> <p>Novell Suse SLED 11 (expected availability May 2009)</p> <p>*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>.</p> <p>**Windows Vista Business disk may also be included for future upgrade if desired. To qualify for this downgrade an end user must be a business (including governmental or educational institutions) and is expected to order at least 25 customer systems with the same custom image.</p>
<b>Available Processors</b>	<p>Intel® Xeon® Processor W3503 2.40 GHz, 4MB cache, 1066 memory, 4.8GT/s QPI, Dual-Core</p> <p>Intel Xeon Processor W3505 2.53 GHz, 4MB cache, 1066 memory, 4.8GT/s QPI, Dual-Core</p> <p>Intel Xeon Processor W3520 2.66 GHz, 8MB cache, 1066 memory, 4.8 GT/s QPI, Quad-Core, HT, Turbo</p> <p>Intel Xeon Processor W3540 2.93 GHz, 8MB cache, 1066 memory, 4.8 GT/s QPI, Quad-Core, HT, Turbo</p> <p>Intel Xeon Processor W3570 3.20 GHz, 8MB cache, 1333 memory, 6.4 GT/s QPI, Quad-Core, HT, Turbo</p>
<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>64-bit computing on Intel® 64 architecture requires a computer system with a processor, chipset, BIOS, operating system, device drivers and applications enabled for Intel 64 architecture. Processor will not operate (including 32-bit operation) without an Intel 64 architecture-enabled BIOS. Performance will vary depending on your hardware and software configurations. See: <a href="http://www.intel.com/info/em64t">http://www.intel.com/info/em64t</a> for more information.</p> <p>Dual-Core and Quad-Core technologies are designed to improve performance of multithreaded software products and hardware-aware multitasking operating systems and may require appropriate operating system software for full benefits; check with software provider to determine suitability; Not all customers or software applications will necessarily benefit from use of these technologies.</p> <p>Intel's numbering is not a measurement of higher performance.</p>
<b>Color</b>	Jack Black/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>• 2 PCI slots (full-height, full-length)</li> <li>• 1 PCI Express Gen2 slot x8 mechanical/x4 electrical</li> <li>• 1 PCI Express Gen1 slot x8 mechanical/x4 electrical</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>• 3 external 5.25" bays</li> </ul> <p><b>NOTE:</b> Third external 5.25" bay is not full depth; maximum depth 170 mm (6.7 inches)</p>
<b>Front I/O</b>	2 USB 2.0, 1 IEEE 1394 (requires optional PCI card to function), 1 audio out, and 1 microphone.
<b>Rear I/O</b>	6 USB 2.0, 1 optional serial port, 2 PS/2, RJ-45 (NIC), 1 audio line in, 1 audio line out, 1 microphone in; audio ports can be retasked to function as line in, line out, microphone, or headphone.
<b>Interfaces Supported</b>	22-in-1 Media Card Reader (optional)
<b>Chassis Dimensions</b> (W x D x H)	Standard minitower orientation: 6.6 x 17.9 x 17.7 in (16.79 x 45.53 x 45.02 cm) Converted desktop orientation: 6.6 x 17.9 x 17.7 in (16.79 x 45.53 x 45.02 cm)
<b>Weight</b>	Exact weights depend upon configuration Minimum: 29.8 lbs (13.5 kg) Standard: 33.2 lbs (15.1 kg) Maximum: 43.2 lbs (19.6 kg)
<b>Temperature</b>	Operating: 40° to 95°F (5° to 35°C)
	Non-operating: -40° to 140° F (-40° to 60° C)
<b>Humidity</b>	Operating: 8% to 85%
	Non-operating: 8% to 90%
<b>Maximum Altitude</b> (non-pressurized)	Operating: 10,000 feet; 3,000 m
	Non-operating: 30,000 feet; 9,100 m
<b>Power Supply</b>	475 watts wide-ranging, active Power Factor Correction, 85% Efficient

### Supported Components

#### Processors

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
<b>Quad-Core Intel® Xeon® Processor 3500 Series with Intel® 64 Architecture</b>				
Intel Xeon W3503, 2.40GHz, 4MB cache, 1066 memory, 4.8GT/s QPI, Dual-Core	Y	N		
Intel Xeon W3505, 2.53GHz, 4MB cache, 1066 memory, 4.8GT/s QPI, Dual-Core	Y	N		
Intel Xeon W3520, 2.66GHz, 8MB cache, 1066 memory, 4.8GT/s QPI, Quad-Core, HT, Turbo	Y	N		
Intel Xeon W3540, 2.93GHz, 8MB cache, 1066 memory, 4.8GT/s QPI, Quad-Core, HT, Turbo	Y	N		
Intel Xeon W3570, 3.20GHz, 8MB cache, 1333 memory, 6.4GT/s, Quad-Core, HT, Turbo	Y	N		

When ordering two processors, the second processor must be the same as the first. Intel processor numbers are not a measurement of higher performance. Processor numbers differentiate features within each processor family, not across different processor families. See: [http://www.intel.com/products/processor\\_number/](http://www.intel.com/products/processor_number/) for details.

Dual-Core and Quad-Core technologies are designed to improve performance of multithreaded software products and hardware-aware multitasking operating systems and may require appropriate operating system software for full benefits; check with software provider to determine suitability; Not all customers or software applications will necessarily benefit from use of these technologies.

64-bit computing on Intel® 64 architecture requires a computer system with a processor, chipset, BIOS, operating system, device drivers and applications enabled for Intel 64 architecture. Processor will not operate (including 32-bit operation) without an Intel 64 architecture-enabled BIOS. Performance will vary depending on your hardware and software configurations. See: <http://www.intel.com/info/em64t> for more information.

Intel's numbering is not a measurement of higher performance.

#### Sub-Section Description/Notes

For hard drives, 1 GB = 1 billion bytes; TB = 1 trillion bytes. Actual formatted capacity is less. Up to 12 GB of hard drive (or system disk) is reserved for the system recovery software (XP and XP Pro). Up to 3 GB of system disk is reserved for system recovery software (Vista).

#### SAS Hard Drives

	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	

#### Sub-Section Description/Notes

Up to (4) 3.5-inch 7200 rpm SATA drives: 160, 250, 320, 500, 1000, 1500 GB; 6.0 TB max  
 Up to (4) 2.5-inch 10K rpm SATA drives: 160, 300 GB 1.2 TB max  
 Up to (4) 3.5-inch 15K rpm SAS devices: 146, 300, 450, 600 GB; 2.42 TB max

Removable Boot Drive option

#### SATA Hard Drives

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



### Supported Components

160 GB 7,200 rpm SATA 3.0 Gb/s with NCQ 3.5" Hard Drive	Y	Y	PV944A
250GB SATA 7200 rpm 3Gb/s 3.5" HDD (for HP Z-Workstations)	Y	Y	PY278AA
320 GB 7,200 rpm SATA 3.0 Gb/s with NCQ 3.5" Hard Drive	Y	Y	FH963AA
500 GB 7,200 rpm SATA 3.0 Gb/s with NCQ 3.5" Hard Drive	Y	Y	PV943A
1 TB 7,200 rpm SATA 3.0 Gb/s with NCQ 3.5" Hard Drive	Y	Y	GE262AA
160 GB 10K rpm SATA with NCQ 2.5" Hard Drive	Y	Y	EW222AA
300 GB 10K rpm SATA with NCQ 2.5" Hard Drive	Y	Y	FM802AA

**NOTE:** SAS Controller, not integrated, is required)

For hard drives, 1 GB = 1 billion bytes; TB = 1 trillion bytes. Actual formatted capacity is less. Up to 12 GB of hard drive (or system disk) is reserved for the system recovery software (XP and XP Pro). Up to 3 GB of system disk is reserved for system recovery software (Vista).

### Hard Drive Controllers

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
<b>Integrated SATA 3.0 Gb/s Controller</b>				
Integrated SATA 3.0 Gb/s	Y	N		
<b>Factory integrated RAID on motherboard for SATA drives</b>				
RAID 0 Configuration - Striped Array	Y	N		See note 1
RAID 0 Data Configuration -- Boot/OS Drive + 2 Drive Striped Array	Y	N		See note 1
RAID 1 Configuration - Mirrored Array	Y	N		See note 1
<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	N	Y	GE258AA	

SATA hardware RAID is not supported on Linux systems. The Linux kernel, with built-in software RAID, provides excellent functionality and performance. It is a good alternative to hardware-based RAID. Please visit

<http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00060684/c00060684.pdf> for RAID capabilities with Linux.

All drives must be identical in type and capacity

All RAID arrays must be less than 2 TB

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

#### Graphics

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes	Supported Multi Mixed
<b>Professional 2D</b>					
NVIDIA Quadro NVS 450 512 MB PCIe Graphics Card	Y	Y	FH519AA	2nd card must be NVS 295	1
NVIDIA Quadro NVS 295 256MB PCIe Graphics Card	Y	Y	FY943AA	2nd card must be NVS 295	2
NVIDIA Quadro NVS 290 256 MB PCIe Graphics Card with 'DMS-59 to Dual DVI cable' included - for Workstations	N	Y	GN502AA	1 or 2 of these cards are supported - 2nd card must be NVS 290 or NVS 440	2
<b>Entry 3D</b>					
NVIDIA Quadro FX 380 256MB PCIe Graphics Card	Y	Y	NB769AA		2
ATI FirePro V3700 256MB PCIe Graphics Card	Y	Y	FY944AA		2
NVIDIA Quadro FX 580 512MB PCIe Graphics Card	Y	Y	FY945AA		2
<b>Mid-range 3D</b>					
NVIDIA Quadro FX 1800 768MB PCIe Graphics Card	Y	Y	FY946AA		2
ATI FirePro V5700 512MB PCIe Graphics Card	Y	Y	FY947AA		2
<b>High End 3D</b>					
NVIDIA Quadro FX 3800 1.0GB PCIe Graphics Card (AVAILABLE JUNE 2009)	Y	Y	FY949AA		1
ATI FirePro V7750 1.0GB PCIe Graphics Card	Y	Y	FY948AA		1
NVIDIA Quadro FX 4800 1.5GB PCIe Graphics Card	Y	Y	FQ138AA		1
NVIDIA Quadro CX - The Accelerator for Creative Suite 4	Y	N			1

### Supported Components

#### Memory

#### CTO

##### PC3-10600 DDR3-1333 ECC Unbuffered DIMMs CTO

1GB (1x1GB) DDR3-1333 ECC Unbuffered RAM 1-CPU  
 2GB (2x1GB) DDR3-1333 ECC Unbuffered RAM 1-CPU  
 3GB (3x1GB) DDR3-1333 ECC Unbuffered RAM 1-CPU  
 4GB (4x1GB) DDR3-1333 ECC Unbuffered RAM 1-CPU  
 4GB (2x2GB) DDR3-1333 ECC Unbuffered RAM 1-CPU  
 6GB (3x2GB) DDR3-1333 ECC Unbuffered RAM 1-CPU  
 8GB (2x4GB) DDR3-1333 ECC Unbuffered RAM 1-CPU  
 8GB (4x2GB) DDR3-1333 ECC Unbuffered RAM 1-CPU  
 12GB (3x4GB) DDR3-1333 ECC Unbuffered RAM 1-CPU  
 16GB (4x4GB) DDR3-1333 ECC Unbuffered RAM 1-CPU

##### Sub-Section Description/Notes

**NOTE:** Configurations less than 1 GB are not supported on Windows Vista 64 or Vista 64 downgrade to XP 64. DIMMs should be distributed across all three memory channels for optimal performance.

Each processor supports up to 3 channels of DDR3 memory. To realize full performance at least 1 DIMM must be inserted into each channel.

#### AMO

PC3-10600 DDR3-1333 ECC Unbuffered DIMMs AMO  
 1GB (1x1GB) DDR3-1333 ECC Unbuffered RAM  
 2GB (1x2GB) DDR3-1333 ECC Unbuffered RAM  
 4GB (1x4GB) DDR3-1333 ECC Unbuffered RAM

**NOTE:** Only unbuffered DDR3 DIMMs are supported.

#### Support Notes

#### Multimedia and Audio Devices

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Integrated Intel/Realtek HD ALC262 Audio	Y	N		
HP Thin USB Powered Speakers	Y	Y	KK912AA	
Creative X-Fi Titanium PCIe Audio Card	Y	Y	NH222AA	

### Supported Components

#### Optical and Removable Storage

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP 16X DVD-ROM SATA Drive	Y	Y	AR629AA	See note 1
HP 16X DVD+-RW SuperMulti SATA Drive	Y	Y	AR630AA	
HP Blu-ray Writer	Y	Y	AR482AA	
1.44 MB Diskette Drive (1 only)	Y	Y	NK360AA	
HP 22-in-1 Media Card Reader Kit (Workstations)	Y	Y	NK361AA	

Actual speeds may vary. Does not permit copying of commercially available DVD movies or other copyright protected materials. Intended for creation and storage of your original material and other lawful uses. Double Layer discs can store more data than single layer discs. However, double-layer discs burned with this drive may not be compatible with many existing single-layer DVD drives and players.

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

**NOTE 1:** Not supported as a 2nd drive option.

#### Controller Cards

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

#### Monitors

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP LP1965 19-inch LCD Monitor	Y	Y	RA373A	
HP LP2275w 22-inch Widescreen LCD Monitor	Y	Y	KE289A	
HP LP2475w 24-inch Widescreen LCD Monitor	Y	Y	KD911A	
HP DreamColor LP2480zx Professional Display	Y	Y	GV546A	
HP LP3065 30-inch Widescreen LCD Monitor	Y	Y	EZ320A	

**NOTE:** Supported by all Operating Systems available from HP (screen size diagonally measured)



### Supported Components

#### Networking and Communications

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Integrated Broadcom 5764 PCIe LOM Controller	Y	N		
Broadcom NetXtreme Gigabit Ethernet Plus NIC (PCIe)	Y	Y	FS215AA	This is a PCI Express card based on the Broadcom 5761 chip.
Intel Gigabit CT Desktop NIC	N	Y	FH969AA	

**NOTE 1:** 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>.

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

#### Racking and Physical Security

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Security Cable with Kensington Lock	N	Y	PC766A	
HP Solenoid Hood Lock & Hood Sensor				
HP (CMT) Solenoid Lock	N	Y	DE618A	
HP xw4/Z4 Depth Adjustable Fixed Rail Rack Kit	N	Y	EK729AA	

#### Input Devices

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP PS/2 Standard Keyboard	Y	Y	DT527A	
HP USB Standard Keyboard	Y	Y	DT528A	
HP PS/2 Optical Scroll Mouse	Y	Y	EY703AA	
HP USB 2-Button Optical Scroll Mouse	Y	Y	DC172B	
HP USB Laser Mouse	Y	Y	GW405AA	
HP USB Optical 3-Button Mouse	Y	Y	DY651A	
HP USB Smart Card Keyboard	N	Y	ED707AA	
HP 2.4GHz Wireless Keyboard & Mouse	N	Y	NB896AA	
HP USB Optical 3-Button 2.9M OEM Mouse	N	Y	ET424AA	
HP SpaceExplorer 3D USB Controller	N	Y	RY429AA	
HP SpacePilot 3D USB Intelligent Controller	N	Y	EF390AA	

### Supported Components

#### Other Hardware

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Configure minitower in desktop orientation	Y	N		
HP ENERGY STAR 5.0 Enabled Configuration	Y	N		
HP Workstation Mouse Pad	Y	N		Japan only.
HP eSATA PCI Cable Kit	Y	Y	GM110AA	
HP Power Cord Kit	N	Y	DM293A	
HP 2nd Serial Port Adapter	N	Y	PA716A	
HP Internal USB Port Kit	N	Y	EM165AA	
HP Optical Bay HDD Mounting Bracket	N	Y	NQ099AA	
HP Workstation to LTO SAS Int. Cable	N	Y	EH925A	
HP Fan and Front Card Guide Kit	N	Y	DY648A	

#### Software

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP Performance Tuning Framework	Y	N		
Roxio Easy Media Creator (CD or DVD burner)	Y	N		
Intervideo WinDVD with DVD player	Y	N		
HP Backup and Recovery	Y	N		Supported on Windows XP ONLY
PDF Complete	Y	N		
Microsoft Office 2007 Small Business Edition	Y	N		
Microsoft Office 2007 Trial Edition	Y	N		
HP Client Manager Software v6.2 (optional download)	Y	N		
HP ProtectTools Security	Y	N		Must select as a Configure to Order Option. Delivered as a "Drop in the Box" CD

### Supported Components

#### Operating Systems

Genuine Windows Vista®  
Business 32-bit

#### Support Notes

Certain Windows Vista product features require advanced or additional hardware. See [www.microsoft.com/windowsvista/getready/hardwarereqs.mspx](http://www.microsoft.com/windowsvista/getready/hardwarereqs.mspx) and [www.microsoft.com/windowsvista/getready/capable.mspx](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 [www.windowsvista.com/upgradeadvisor](http://www.windowsvista.com/upgradeadvisor).

Genuine Windows Vista®  
Business 64-bit

Certain Windows Vista product features require advanced or additional hardware. See [www.microsoft.com/windowsvista/getready/hardwarereqs.mspx](http://www.microsoft.com/windowsvista/getready/hardwarereqs.mspx) and [www.microsoft.com/windowsvista/getready/capable.mspx](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 [www.windowsvista.com/upgradeadvisor](http://www.windowsvista.com/upgradeadvisor).

Genuine Windows Vista®  
Business 32-bit with downgrade  
to Windows® XP Professional  
32-bit custom installed

Windows Vista Business disk may also be included for future upgrade if desired. To qualify for this downgrade an end user must be a business (including governmental or educational institutions) and is expected to order at least 25 customer systems with the same custom image.

Genuine Windows Vista®  
Business 64-bit with downgrade  
to Windows® XP Professional  
x64 custom installed

Windows Vista Business disk may also be included for future upgrade if desired. To qualify for this downgrade an end user must be a business (including governmental or educational institutions) and is expected to order at least 25 customer systems with the same custom image.

HP Linux Installer Kit

see: <http://www.hp.com/workstations/software/linux>

### System Technical Specifications

<b>System Board</b>																																																												
<b>System Board Form Factor</b>	ATX 9.6 x 12 inches (243.84 x 304.8 mm)																																																											
<b>Processor Socket</b>	Single LGA1366																																																											
<b>CPU Bus Speed</b>	QPI: Up to 6.4GT/sec																																																											
<b>Chipset</b>	Intel® X58 Express																																																											
<b>Super I/O Controller</b>	SMSC SCH5327, Rev B																																																											
<b>Memory Expansion Slots</b>	4 DDR3 memory slots																																																											
<b>Memory Type Supported</b>	DDR3, UDIMM (Unbuffered), ECC																																																											
<b>Memory Modes</b>	Channel Interleaved																																																											
<b>Memory Speed Supported</b>	800MHz, 1066MHz and 1333MHz DDR3																																																											
<b>Memory Protection</b>	ECC available on data, parity on address and command																																																											
<b>Memory</b>																																																												
Maximum Memory	<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> <table border="1" data-bbox="686 1021 1161 1350"> <thead> <tr> <th rowspan="2">Capacity</th> <th colspan="4">CPU</th> </tr> <tr> <th>DIMM1</th> <th>DIMM2</th> <th>DIMM3</th> <th>DIMM4</th> </tr> </thead> <tbody> <tr> <td>1GB</td> <td>1GB</td> <td></td> <td></td> <td></td> </tr> <tr> <td>2GB</td> <td>1GB</td> <td>1GB</td> <td></td> <td></td> </tr> <tr> <td>3GB</td> <td>1GB</td> <td>1GB</td> <td>1GB</td> <td></td> </tr> <tr> <td>4GB</td> <td>1GB</td> <td>1GB</td> <td>1GB</td> <td>1GB</td> </tr> <tr> <td>4GB</td> <td>2GB</td> <td>2GB</td> <td></td> <td></td> </tr> <tr> <td>6GB</td> <td>2GB</td> <td>2GB</td> <td>2GB</td> <td></td> </tr> <tr> <td>8GB</td> <td>2GB</td> <td>2GB</td> <td>2GB</td> <td>2GB</td> </tr> <tr> <td>8GB</td> <td>4GB</td> <td>4GB</td> <td></td> <td></td> </tr> <tr> <td>12GB</td> <td>4GB</td> <td>4GB</td> <td>4GB</td> <td></td> </tr> <tr> <td>16GB</td> <td>4GB</td> <td>4GB</td> <td>4GB</td> <td>4GB</td> </tr> </tbody> </table>	Capacity	CPU				DIMM1	DIMM2	DIMM3	DIMM4	1GB	1GB				2GB	1GB	1GB			3GB	1GB	1GB	1GB		4GB	1GB	1GB	1GB	1GB	4GB	2GB	2GB			6GB	2GB	2GB	2GB		8GB	2GB	2GB	2GB	2GB	8GB	4GB	4GB			12GB	4GB	4GB	4GB		16GB	4GB	4GB	4GB	4GB
Capacity	CPU																																																											
	DIMM1	DIMM2	DIMM3	DIMM4																																																								
1GB	1GB																																																											
2GB	1GB	1GB																																																										
3GB	1GB	1GB	1GB																																																									
4GB	1GB	1GB	1GB	1GB																																																								
4GB	2GB	2GB																																																										
6GB	2GB	2GB	2GB																																																									
8GB	2GB	2GB	2GB	2GB																																																								
8GB	4GB	4GB																																																										
12GB	4GB	4GB	4GB																																																									
16GB	4GB	4GB	4GB	4GB																																																								
<b>Memory Configuration (Supported)</b>	<ul style="list-style-type: none"> <li>The 4GB DIMM for Z400 and Z600 is NOT compatible with the 4GB DIMMs offered on the Z800.</li> <li>They are NOT interchangeable.</li> <li>Only ECC DIMMs are supported.</li> </ul>																																																											
<b>PCI Express Connectors (Gen2 Rev 0.7 connectors)</b>	1 x8 PCIe (x4)																																																											
<b>PCI Connectors (5.0V)</b>	2 PCI																																																											
<b>Interfaces Supported</b>	<p><b>SATA</b></p> <p>Integrated 6-channel SATA 3.0Gb/sec controller with RAID 0, 1, 5, 10 and NCQ. (Factory integrated RAID is Microsoft Windows only)</p>																																																											
<b>Serial Attached SCSI</b>	<p>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.</p>																																																											
<b>Integrated RAID</b>	<b>NOTE:</b> Requires identical hard drives (speeds, capacity, interface)																																																											
<b>Integrated Graphics</b>	No																																																											
<b>Network Controller</b>	Integrated HP Gbit LAN by Broadcom																																																											

### System Technical Specifications

<b>External SATA (eSATA)</b>	4 ports are eSATA configurable with optional eSATA After-Market Option cable kit.	
<b>IDE connector</b>	No	
<b>Floppy connector</b>	Yes	
<b>Network Controller</b>	Management capabilities WOL, PXE 2.1 and ASF 2.0	
<b>Serial</b>	1 internal header (requires optional Serial Port Adaptor)	
<b>2nd Serial</b>	No	
<b>Parallel</b>	No	
<b>Audio</b>	High Definition Integrated Realtek ALC262 Audio with Line in, Line Out, Microphone, Headphone	
<b>CD-ROM input/Audio</b>	No	
<b>AUX INPUT; Audio</b>	Yes	
<b>IEEE 1394 Connector(s)</b>	<b>Front</b>	1 IEEE 1394a (requires optional PCI card to function)
	<b>Rear</b>	No
	<b>Internal</b>	No
<b>USB Connector(s)</b>	<b>Front</b>	2 USB 2.0
	<b>Rear</b>	6 USB 2.0
	<b>Internal</b>	2 USB 2.0 headers
<b>HD Integrated Audio</b>	High Definition Integrated Realtek ALC262 Audio with Line in, Line Out, Microphone, Headphone	
<b>Flash ROM</b>	Yes	
<b>Clear Fan Header</b>	No	
<b>CPU Fan Header</b>	Yes	
<b>Chassis Fan Header</b>	1 Rear System Chassis Fan Header, 1 Optional Front Chassis Fan Header	
<b>Front PCI Fan Header</b>	Yes	
<b>Front Control Panel/Speaker Header</b>	Yes	
<b>CMOS Battery Holder - Lithium</b>	Yes	
<b>Integrated Trusted Platform Module</b>	Integrated TPM 1.2	
<b>Power Supply Headers</b>	Yes	
<b>Power Switch, Power LED &amp; Hard Drive LED Header</b>	Yes	
<b>Clear Password Jumper</b>	Yes	
<b>Serial Port</b>	1 internal header (requires optional Serial Port Adaptor)	
<b>Parallel Port</b>	No	
<b>Keyboard/Mouse</b>	USB or PS/2	
<b>Power Supply</b>	475w 80+ BRONZE, Custom	
<b>Operating Voltage Range</b>	90-269 VAC	
<b>Rated Voltage Range</b>	118V	
<b>Rated Line Frequency</b>	400 Hz	
<b>Operating Line Frequency Range</b>	393-407 Hz	
<b>Rated Input Current</b>	10A @ 118 VAC	
<b>Heat Dissipation</b>	Maximum 2027 btu/hr (511 kg-cal/hr)	
<b>Power Supply Fan</b>	92x25 mm variable speed	

### System Technical Specifications

<b>ENERGY STAR® qualified (Config Dependent)</b>	Yes
<b>80 PLUS Compliant</b>	Yes, Bronze
<b>FEMP Standby Power Compliant 115V (Wake-on LAN disabled) (&lt;2W in S5 - Power Off)</b>	Yes
<b>Power consumption in sleep mode (as defined by ENERGY STAR) - Suspend to RAM (S3)</b>	<5W
<b>Built-in Self Test (BIST) LED</b>	Yes
<b>Surge Tolerant Full Ranging Power Supply (withstands power surges up to 2000V)</b>	Yes
<b>Hood Lock Header</b>	Yes
<b>Hood Sensor Header</b>	Yes
<b>ASF 2.0 (Alert Standard Format)</b>	Yes
<b>Z400 Required Power Supply Info</b>	
<b>Power Supply</b>	<b>475 watt custom power supply - (Wide Ranging Active PFC)</b>
<b>Operating Voltage Range</b>	90 - 269 VAC
<b>Rated Voltage Range</b>	100 - 240 VAC      118 VAC
<b>Rated Line Frequency</b>	50-60 Hz      400 Hz
<b>Operating Line Frequency Range</b>	47 - 66 Hz      393 - 407 Hz
<b>Rated Input Current</b>	10 A @ 110-127 VAC      10 A @ 118 VAC 6 A @ 200-240 VAC
<b>Heat Dissipation (Configuration and software dependent)</b>	Typical 954 btu/hr (240.3 kg-cal/hr) Maximum 1977 btu/hr (498.2 kg-cal/hr)
<b>Power Supply Fan</b>	92x25 mm variable speed
<b>Energy Star Compliant (config dependent)</b>	YES
<b>80 PLUS® Compliant</b>	Yes, Bronze
<b>FEMP Standby Power Compliant@115V (Wake-on LAN disabled)(&lt;2W in S5-Power Off)</b>	YES
<b>EuP Compliant@230V (&lt;1 W in S5-Power Off)</b>	YES
<b>Power Consumption in sleep mode (as defined by ENERGY STAR) - Suspend to RAM (S3) (Instantly Available PC) measured at 115V.</b>	<6W
<b>Built-in Self Test LED</b>	YES
<b>Surge Tolerant Full Ranging Power Supply (withstands power surges up to 2000V)</b>	YES
	<a href="#">*Input Voltage Restrictions</a>

### System Technical Specifications

#### System Configuration

#### Example Configuration #1

Processor Info	1x Intel Xeon W3503
Memory Info	1x1GB DDR3 1333 (UDIMM)
Graphics Info	NVS295
Disks/Optical/Floppy	1x160GB SATA / 1 Optical / 0 Floppy
PSU	475W 80 PLUS® BRONZE

#### Energy Consumption

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows Idle (S0)	86.23 W		85.26 W		85.90 W	
Windows Busy Typ(S0)	140.90 W		137.85 W		140.40 W	
Windows Busy Max (S0)	153.20 W		152.96 W		155.00 W	
Sleep (S3)	4.17 W	3.96 W	4.03 W	3.79 W	4.14 W	3.90W
Off (S5)	1.25 W	1.14 W	1.51 W	1.35 W	1.23 W	1.12 W
Zero Power Mode (EuP)	0.31 W		0.61 W		0.29W	

#### Heat Dissipation\*\*

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows Idle (S0)	294.30 btu/hr		290.99 btu/hr		293.18 btu/hr	
Windows Busy Typ(S0)	480.89 btu/hr		470.48 btu/hr		479.19 btu/hr	
Windows Busy Max (S0)	522.87 btu/hr		522.05 btu/hr		529.02 btu/hr	
Sleep (S3)	14.2 btu/hr	13.5 btu/hr	13.8 btu/hr	12.9 btu/hr	14.1 btu/hr	13.3 btu/hr
Off (S5)	4.27 btu/hr	3.89 btu/hr	5.15 btu/hr	4.61 btu/hr	4.20 btu/hr	3.82 btu/hr
Zero Power Mode (EuP)	1.04 btu/hr		2.06 btu/hr		0.98 btu/hr	

## System Technical Specifications

### Example Configuration #2

Processor Info 1 x Intel Xeon W3570  
 Memory Info 4x4GB DDR3 1333MHz (UDIMM)  
 Graphics Info 1xFX4800  
 Disks/Optical/Floppy 4x450GB SAS / 1 Optical / 0 Floppy  
 PSU 475W 80 PLUS® BRONZE

### Energy Consumption

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows Idle (S0)	180.70 W		178.30 W		181.00 W	
Windows Busy Typ(S0)	404.60 W		393.20 W		407.50 W	
Windows Busy Max (S0)	482.80 W		469.10 W		488.60 W	
Sleep (S3)	4.84 W	4.65 W	5.13 W	4.94 W	4.85 W	4.66 W
Off (S5)	1.18 W	1.07 W	1.61 W	1.37 W	1.16 W	1.05W
Zero Power Mode (EuP)	0.32 W		0.61 W		0.29 W	

### Heat Dissipation\*\*

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows Idle (S0)	616.73 btu/hr		608.54 btu/hr		617.75 btu/hr	
Windows Busy Typ(S0)	1380.90 btu/hr		1341.99 btu/hr		1390.80 btu/hr	
Windows Busy Max (S0)	1647.80 btu/hr		1601.04 btu/hr		1667.59 btu/hr	
Sleep (S3)	16.5 btu/hr	15.9 btu/hr	17.5 btu/hr	16.9 btu/hr	16.6 btu/hr	15.9 btu/hr
Off (S5)	4.03 btu/hr	3.65 btu/hr	5.49 btu/hr	4.68 btu/hr	3.96 btu/hr	3.58 btu/hr
Zero Power Mode (EuP)	1.08 btu/hr		2.06 btu/hr		0.98 btu/hr	



### System Technical Specifications

**Example Configuration #3**

Processor Info 1 x Intel Xeon W3520  
 Memory Info 3x1GB DDR3 1333MHz (UDIMM)  
 Graphics Info 1xFX1800  
 Disks/Optical/Floppy 1x250GB SATA / 1 Optical / 0 Floppy  
 PSU 475W 80 PLUS® BRONZE

**Energy Consumption**

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows Idle (S0)	96.70 W		95.10 W		97.71 W	
Windows Busy Typ(S0)	237.99 W		233.03 W		239.04 W	
Windows Busy Max (S0)	268.79 W		267.95 W		274.90 W	
Sleep (S3)	3.89 W	3.65 W	4.20 W	3.96 W	3.83 W	3.61 W
Off (S5)	1.20 W	1.06 W	1.51 W	1.35 W	1.17 W	1.02 W
Zero Power Mode (EuP)	0.31 W		0.60 W		0.29 W	

**Heat Dissipation\*\***

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows Idle (S0)	330.04 btu/hr		324.58 btu/hr		333.48 btu/hr	
Windows Busy Typ(S0)	812.26 btu/hr		795.33 btu/hr		815.84 btu/hr	
Windows Busy Max (S0)	917.38 btu/hr		914.51 btu/hr		938.23 btu/hr	
Sleep (S3)	13.3 btu/hr	12.5 btu/hr	14.3 btu/hr	13.5 btu/hr	13.1 btu/hr	12.3 btu/hr
Off (S5)	4.10 btu/hr	3.60 btu/hr	5.15 btu/hr	4.61 btu/hr	3.99 btu/hr	3.48 btu/hr
Zero Power Mode (EuP)	1.05 btu/hr		2.05 btu/hr		0.97 btu/hr	

### System Technical Specifications

**Example Configuration #4 (Energy Star Compliant)**

Processor Info	1x Intel Xeon W3570
Memory Info	4x2GB DDR3 1333MHz (UDIMM)
Graphics Info	1 x FX4800
Disks/Optical/Floppy	2x1000GB SATA / 1 Optical / 1 Floppy
I/O	1xBroadcom 5761 Gigabit PCIe NIC
PSU	475W 80PLUS® BRONZE

**Energy Consumption**

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
<i>On-Idle (ENERGY STAR® Idle (S0))</i>	99.8 W		97.7 W		100.3 W	
<i>ENERGY STAR® P<sub>MAX</sub></i> <i>Windows running Linkpack and Viewport</i>	323.1 W		316.6 W		325.4 W	
<i>ENERGY STAR® "Sleep" (S3)</i>	4.6 W	-	4.8 W	-	4.6 W	-
<i>ENERGY STAR® "Standby" (Off) (S5)</i>	1.8 W	-	2.1 W	-	1.7 W	-

**Heat Dissipation\*\***

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
<i>On-Idle (ENERGY STAR® Idle (S0))</i>	340.6 btu/hr		333.5 btu/hr		342.3 btu/hr	
<i>ENERGY STAR® P<sub>MAX</sub></i> <i>Windows running Linkpack and Viewport</i>	1102.7 btu/hr		1080.6 btu/hr		1110.6 btu/hr	
<i>ENERGY STAR® "Sleep" (S3)</i>	15.7 btu/hr	-	16.4 btu/hr	-	15.7 btu/hr	-
<i>ENERGY STAR® "Standby" (Off) (S5)</i>	1.8 btu/hr	-	2.1 btu/hr	-	1.7 btu/hr	-

**NOTES:**

\* Energy Star low energy mode

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

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

Declared Noise Emissions (Entry-level and High-end configurations)		
<b>System Configuration (Entry level)</b>	<b>Processor Info</b>	Intel Xeon Processor W3505 2.53 GHz
	<b>Memory Info</b>	4 x 1GB DDR3 1333 MHz
	<b>Graphics Info</b>	NVIDIA Quadro NVS 295
	<b>Disks/Optical/Floppy</b>	1 x 160 GB 7200 RPM SATA / DVD-ROM / No Floppy

<b>Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)</b>		<b>Sound Power ( LWA<sub>d</sub>, bels )</b>	<b>Deskside Sound Pressure</b>
	Idle	3.9 Bels	23 dB
	SATA Hard drive Operating (random reads)	4.2 Bels	25 dB
	Floppy Drive Operating (continuous copy)	4.7 Bels	29 dB
	DVD-ROM Operating (sequential reads)	5.1 Bels	38 dB



### System Technical Specifications

<b>System Configuration (High-end)</b>	<b>Processor Info</b>	Intel Xeon Processor W3570 3.20 GHz
	<b>Memory Info</b>	4 x 1GB DDR3 1333 MHz
	<b>Graphics Info</b>	NVIDIA Quadro FX 4600
	<b>Disks/Optical/Floppy</b>	2 x 450 GB 15K SAS / DVD-ROM / No Floppy

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

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

<b>Physical Security and Serviceability</b>	
<b>Access Panel</b>	Tool-less Includes system board and memory information
<b>Optical Drive</b>	Tool-less
<b>Floppy Drive</b>	Tool-less
<b>Hard Drives</b>	Tool-less
<b>Expansion Cards</b>	Tool-less
<b>Processor Socket</b>	Tool-less
<b>Green User Touch Points</b>	Yes, on tool-free internal chassis components
<b>Color-coordinated Cables and Connectors</b>	Yes
<b>Memory</b>	Tool-less

### System Technical Specifications

<b>System Board</b>	Tool-less
<b>Dual Color Power and HD LED on Front of Computer</b>	Yes
<b>Configuration Record SW</b>	Yes
<b>Over-Temp Warning on Screen</b>	Yes
<b>Restore CD Set</b>	Restores the computer to its original factory shipping image - Can be obtained via HP Support
<b>Dual Function Front Power Switch</b>	Yes, causes a fail-safe power off when held for 4 seconds
<b>Padlock Support</b>	Yes (optional): Locks side cover and secures chassis from theft 0.22-in diameter padlock loop at rear of system
<b>Cable Lock Support</b>	Yes, Kensington Cable Lock (optional): Locks side cover and secures chassis from theft 3 mm x 7 mm slot at rear of system
<b>Universal Chassis Clamp Lock Support</b>	Yes (optional): Locks side cover and locks cables to chassis. Secures chassis from theft and allows multiple units to be chained together when used with optional cable Threaded feature at rear of system
<b>Solenoid Lock and Hood Sensor</b>	Yes (optional) The Solenoid Hood Lock eliminates the need for a physical key by making the chassis lockable through software and a password. You can also lock and unlock the chassis remotely over the network. The Sensor Kit detects when the access panel has been removed
<b>Rear Port Control Cover</b>	Yes, locks rear IO cables to prevent cable theft
<b>Serial, Parallel, USB, Audio, Network, Enable/Disable Port Control</b>	Yes, enables or disables serial, USB, audio, and network ports
<b>Removable Media Write/Boot Control</b>	Yes, prevents ability to boot from removable media on supported devices (and can disable writes to media)
<b>Power-On Password</b>	Yes, prevents an unauthorized person from booting up the workstation
<b>Setup Password</b>	Yes, prevents an unauthorized person from changing the workstation configuration
<b>3.3V Aux Power LED on System PCA</b>	Yes
<b>NIC LEDs (integrated) (Green &amp; Amber)</b>	Yes
<b>CPUs and Heatsinks</b>	A T-15 Torx or flat blade screwdriver is needed to remove the CPU heatsink before the CPU can be removed. CPU removal is tool-less
<b>Power supply diagnostic LED</b>	Yes
<b>Power Button</b>	Yes, ACPI multi-function
<b>Power LED</b>	Yes, blue (normal), red (fault)
<b>Hard drive activity LED</b>	Yes, green
<b>Internal speaker</b>	Yes
<b>System/Emergency ROM Flash Recovery</b>	Recovers corrupted system BIOS.
<b>OS CD (Restore OS CD)</b>	Restores computer to its original factory shipping Operating System - No recovery CDs will ship with Windows XP, Vista or Linux - an ISO image will be available on an HD partition.
<b>ASF 2.0 support (Alert Standard Format)</b>	Industry-standard specification for network alerting in operating system-absent environments
<b>Cooling Solutions</b>	Air cooled forced convection, liquid cooling (optional)

### System Technical Specifications

<b>Power Supply Fans</b>	92 mm x 92 mm x 25 mm 2-wire (non-serviceable)
<b>CPU Heatsink Fan(s)</b>	Mainstream (<=95W): 80 mm x 80 mm x 15 mm 5-wire PWM Performance (>95W): 92 mm x 92 mm x 25 mm 5-wire PWM
<b>Chassis Fans</b>	92 mm x 92mm x 25 mm 4-wire PWM
<b>Memory Fans</b>	No
<b>Insight Diagnostics</b>	<p><b>HP Insight Diagnostics Offline Edition</b></p> <p>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:</p> <ul style="list-style-type: none"> <li>• Run diagnostics</li> <li>• View the hardware configuration of the system</li> </ul> <p><b>Key features and benefits</b></p> <p>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:</p> <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>
<b>Access Panel Key Lock</b>	No
<b>ACPI-Ready Hardware</b>	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>
<b>Trusted Platform Module Chip with optional ProtectTools Software</b>	Yes, Infineon SLB9635TT1.2
<b>Integrated Chassis Handles</b>	No
<b>Power Supply</b>	Requires T15 Torx or flat blade screwdriver
<b>PCI Card Retention</b>	Yes, rear (all), middle (none), front (full-length cards with extender)
<b>Flash ROM</b>	Yes
<b>Diagnostic Power Switch LED on board</b>	Yes
<b>Clear Password Jumper</b>	Yes
<b>Clear CMOS Button</b>	Yes
<b>CMOS Battery Holder for easy Replacement</b>	Yes
<b>DIMM Connectors for easy Upgrade</b>	Yes
<b>HP ProtectTools Security Manager</b>	Yes - Not supported on Microsoft XP x64 or Linux

### System Technical Specifications

<b>BIOS</b>	
<b>BIOS 32-bit Services</b>	Standard BIOS 32-bit Service Directory Proposal v0.4
<b>PCI 3.0 Support</b>	Full BIOS support for PCI Express through industry standard interfaces.
<b>ATAPI</b>	ATAPI Removable Media Device BIOS Specification Version 1.0.
<b>BBS</b>	BIOS Boot Specification v1.01.
<b>WMI Support</b>	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.
<b>BIOS Boot Spec 1.01+</b>	Provides more control over how and from what devices the workstation will boot.
<b>BIOS Power On</b>	Users can define a specific date and time for the system to power on.
<b>ROM Based Computer Setup Utility (F10)</b>	Review and customize system configuration settings controlled by the BIOS.
<b>System/Emergency ROM Flash Recovery with Video</b>	Recovers system BIOS in corrupted Flash ROM.
<b>Replicated Setup</b>	Saves BIOS settings to diskette or USB flash device in human readable file. Repset.exe utility can then replicate these settings on machines being deployed without entering Computer Configuration Utility (F10 Setup).
<b>SMBIOS</b>	System Management BIOS 2.6, for system management information.
<b>Boot Control</b>	Disables the ability to boot from removable media on supported devices.
<b>Memory Change Alert</b>	Alerts management console if memory is removed or changed.
<b>Thermal Alert</b>	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>
<b>Remote ROM Flash</b>	Provides secure, fail-safe ROM image management from a central network console.
<b>ACPI (Advanced Configuration and Power Management Interface)</b>	<ul style="list-style-type: none"> <li>• Allows the system to enter and resume from low power modes (sleep states).]</li> <li>• Enables an operating system to control system power consumption based on the dynamic workload.</li> <li>• Makes 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>
<b>Ownership Tag</b>	A user-defined string stored in non-volatile memory that is displayed in the BIOS splash screen.
<b>Remote Wakeup/Remote Shutdown</b>	System administrators can power on, restart, and power off a client computer from a remote location.
<b>ASF 2.0 Compliant</b>	Allows workstation status to be monitored on a remote console.
<b>Instantly Available PC (Suspend to RAM - ACPI sleep state S3)</b>	Allows for very low power consumption with quick resume time.
<b>Remote System Installation via F12 (PXE 2.1) (Remote Boot from Server)</b>	Allows a new or existing system to boot over the network and download software, including the operating system.
<b>ROM revision levels</b>	Reports the system BIOS revision level in Computer Configuration Utility (F10 Setup). Version is available through an industry standard interface (SMBIOS) so that management SW applications can use and report this information.
<b>System board revision level</b>	<ul style="list-style-type: none"> <li>• Allows management SW to read the revision level of the system board</li> <li>• Revision level is digitally encoded into the HW and cannot be modified.</li> </ul>


### System Technical Specifications

<b>Start-up Diagnostics</b> (Power-on Self-Test)	Assesses system health at boot time with selectable levels of testing.
<b>Auto Setup when new hardware installed</b>	System automatically detects addition of new hardware.
<b>Keyboard-less Operation</b>	The system can be booted without a keyboard.
<b>Localized ROM Setup</b>	Common BIOS image supports System Configuration Utility (F10 Setup) menus in 12 languages with local keyboard mappings.
<b>Asset Tag</b>	The user or MIS to set a unique tag string in non-volatile memory.
<b>Per-slot Control</b>	Allows I/O slot parameters (option ROM enable/disable, bus latency) to be configured individually.
<b>Adaptive Cooling</b>	Control parameters are set according to detected hardware configuration for optimal acoustics.
<b>Pre-boot Diagnostics</b>	(Pre-video) critical errors are reported via beeps and blinks on the power LED.
<b>Industry Standard Specification Support</b>	
<b>Industry Standard</b>	Revision Supported by the BIOS
<b>ACPI</b>	Advanced Configuration and Power Management Interface, Version 2.0c
<b>ASF</b>	Alert Standard Format Specification, Version 2.0
<b>ATA (IDE)</b>	AT Attachment 6 with Packet Interface (ATA/ATAPI-6), Revision 3b
<b>CD Boot</b>	"El Torito" Bootable CD-ROM Format Specification Version 1.0
<b>EDD</b>	<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>
<b>EHCI</b>	Enhanced Host Controller Interface for Universal Serial Bus, Revision 1.0
<b>PCI</b>	<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>
<b>PCI Express</b>	PCI Express Base Specification, Revision 2.0
<b>PMM</b>	POST Memory Manager Specification, Version 1.01
<b>SATA</b>	<ul style="list-style-type: none"> <li>Serial ATA Specification, Revision 1.0a</li> <li>Serial ATA 3.0Gb/s: Extensions to Serial ATA 1.5Gb/s, Revision 1.0</li> </ul>
<b>SPD</b>	PC SDRAM Serial Presence Detect (SPD) Specification, Revision 1.2B
<b>TPM</b>	Trusted Computing Group TPM Specification Version 1.2
<b>UHCI</b>	Universal Host Controller Interface Design Guide, Revision 1.1
<b>USB 1.1</b>	Universal Serial Bus Revision 1.1 Specification
<b>USB 2.0</b>	Universal Serial Bus Revision 2.0 Specification
<b>SMBIOS</b>	System Management BIOS Reference Specification, Version 2.6

### System Software Management and Updating


<b>HP Client Management Solutions</b>	Visit: <a href="http://www.hp.com/go/easydeploy">http://www.hp.com/go/easydeploy</a>
<b>Product Change</b>	<ul style="list-style-type: none"> <li>Program to proactively communicate Product Change Notifications (PCNs) and Customer Advisories by email 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>
<b>Support Software CD &amp; WWW</b>	Yes
<b>HP Client Manager</b>	Visit: <a href="http://www.hp.com/go/easydeploy">http://www.hp.com/go/easydeploy</a>
<b>System Software Manager (free)</b>	Visit: <a href="http://www.hp.com/go/ssm">http://www.hp.com/go/ssm</a>

### System Technical Specifications

<b>Social and Environmental Responsibility</b>	
<b>Eco-Label Certifications &amp; Declarations</b>	<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>● 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>
<b>Batteries</b>	<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> <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>
<b>Restricted Material Usage</b>	<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>● Batteries - Mercury</li> <li>● Batteries - Cadmium</li> <li>● Batteries - Lead (non-rechargeable)</li> <li>● Batteries - Non-rechargeable Alkaline and Carbon-Zinc Batteries</li> <li>● Batteries - Classification as "Not Restricted" for Transport</li> <li>● Brominated Flame Retardants (PBBs, PBDEs, including DecaBDE)</li> <li>● Brominated Flame Retardants (all BFRs in external case plastic parts)</li> <li>● Cadmium and its compounds</li> <li>● Certain Azo Colorants</li> <li>● Chlorinated Hydrocarbons</li> <li>● Chlorinated Paraffins</li> <li>● Formaldehyde</li> <li>● Formaldehyde - emissions</li> <li>● Hexavalent Chromium and its compounds in metallic applications</li> <li>● Hexavalent Chromium and its compounds in non-metallic applications</li> <li>● Lead and its compounds</li> <li>● Lead in paint</li> <li>● Lead in Polyvinyl Chloride (PVC) coating of external cables, wires and cords</li> <li>● Mercury and its compounds</li> <li>● Nickel on external surfaces</li> <li>● Ozone Depleting Substances (ODS)</li> <li>● Polycyclic Aromatic Hydrocarbons (PAH)</li> <li>● Perfluorooctane sulfonates (PFOS) in parts</li> <li>● Perfluorooctane sulfonates (PFOS) in preparations</li> <li>● Polychlorinated Biphenyls (PCBs) and Polychlorinated Terphenyls (PCTs)</li> </ul>
	<p>● DA - 13276 Worldwide QuickSpecs — Version 4 — 4.17.2009 <span style="float: right;">Page 24</span></p>



### System Technical Specifications

	<ul style="list-style-type: none"> <li>• Polychlorinated Naphthalenes</li> <li>• Polyvinyl Chloride (PVC) in external case plastic parts</li> <li>• Radioactive Substances</li> <li>• Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)</li> </ul>
<b>Packaging</b>	<p>HP Workstation product packaging meets the following (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>• Does not contain restricted substances listed in HP Standard 011-1 General Specification for the Environment (see link above).</li> <li>• Does not contain ozone-depleting substances (ODS).</li> <li>• Design packaging materials for ease of disassembly.</li> <li>• Does not contain heavy metals (lead, mercury, cadmium or hexavalent chromium) in excess of 100 ppm sum total for all heavy metals listed.</li> <li>• Maximizes the use of post-consumer recycled content materials in packaging materials.</li> <li>• All packaging material is recyclable.</li> <li>• Reduces 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>
<b>Longevity and Upgrading</b>	<p>This product is designed to be upgraded, possibly extending its useful life by several years. Spare parts are available throughout the warranty period and for up to 5 years after the end of production. Upgradeability features contained in the product include:</p> <p>Intel LGA775 processor socket</p> <ul style="list-style-type: none"> <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> <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>
<b>Packaging Materials</b>	
External	Cardboard carton and insert: 1.536 kg
Internal	LDPE Foam: .366 kg
<b>End-of-Life Management and Recycling</b>	<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>
<b>Hewlett-Packard Corporate Environmental Information</b>	<p>For more information about HP's commitment to the environment:  [link to new HP white paper now in progress]  Global Citizenship Report: <a href="http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html">http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html</a>  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>  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>
<b>Service, Support and Warranty</b>	<p>On-site Warranty and Service (<a href="#">Note 1</a>): One and three-years, limited warranty and service offering delivers on-site, next business-day (<a href="#">Note 2</a>) service for parts and labor and includes free telephone support (<a href="#">Note 3</a>) 8am - 5pm. Global coverage (<a href="#">Note 2</a>) 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.  <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.  <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>
	<p>DA - 13276 Worldwide QuickSpecs — Version 4 — 4.17.2009 <span style="float: right;">Page 25</span></p>

### System Technical Specifications

	<p>HP Care Pack Services extend service contracts beyond the standard warranties. Service starts from date of hardware purchase. To choose the right level of service for your HP product, use the HP Care Pack Services Lookup Tool at <a href="http://www.hp.com/go/lookuptool">http://www.hp.com/go/lookuptool</a>. Additional HP Care Pack Services information by product is available at <a href="http://www.hp.com/hps/carepack">http://www.hp.com/hps/carepack</a>. Service levels and response times for HP Care Packs may vary depending on your geographic location</p>
<b>Additional Information</b>	<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>• Plastic 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 weight)</li><li>• This product is &gt;90% recycle-able when properly disposed of at end of life.</li></ul>

### Technical Specifications - Processors

<b>Processors</b>	Intel Xeon W3503, 2.40GHz, 4MB cache, 1066 memory, 4.8GT/s QPI, Dual-Core
	Intel Xeon W3505, 2.53GHz, 4MB cache, 1066 memory, 4.8GT/s QPI, Dual-Core
	Intel Xeon W3520, 2.66GHz, 8MB cache, 1066 memory, 4.8GT/s QPI, Quad-Core, HT, Turbo
	Intel Xeon W3540, 2.93GHz, 8MB cache, 1066 memory, 4.8GT/s QPI, Quad-Core, HT, Turbo
	Intel Xeon W3570, 3.20GHz, 8MB cache, 1333 memory, 6.4GT/s, Quad-Core, HT, Turbo

---

## Introduction

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

---

## Performance and Features

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

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

---

## Turbo Boost Technology

This technology now built into Xeon 3500 Series Quad-Core processors will increase the speed of your processor on demand (from OS) if the CPU is operating below power / thermal specifications:

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

### Technical Specifications - Hard Drives

<b>HP SAS (Serial Attached SCSI) Hard Drives for HP Workstations</b>	<b>300 GB (15K)</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 (typical reads, includes controller overhead, including settling)</b>	<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>146 GB (15K)</b>	<b>146 GB (15K)</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		
		<b>Seek Time (typical reads, includes controller overhead, including settling)</b>	<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>	86,749,488 - 512 byte blocks		
		<b>Operating Temperature</b>	50° to 95° F (10° to 35° C)		
<b>450 GB (15K)</b>	<b>450 GB (15K)</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 (typical reads, includes controller overhead, including settling)</b>	<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)		

### Technical Specifications - Hard Drives

<b>SATA (Serial ATA) Hard Drives for HP Workstations</b>	<b>160,041,885,696 bytes (10K)</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>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 150 MB/s
		<b>Buffer</b>	16 Mbytes
		<b>Seek Time (typical reads, includes controller overhead, including settling)</b>	<b>Single Track</b> 0.3 ms
			<b>Average</b> 4.6 ms
			<b>Full Stroke</b> 10.2 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)
	<b>1,000,204,886,016 bytes (7,200)</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 (typical reads, includes controller overhead, including settling)</b>	<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>500,107,862,016 bytes (7,200)</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>250 GB</b> (7200 rpm, for HP Z-Workstations)	<b>Capacity</b>		250 GB
	<b>Height</b>		1 in; 2.54 cm
	<b>Width</b>	<b>Media Diameter</b>	3.5 in; 8.9 cm
		<b>Physical Size</b>	4.0 in; 10.17 cm
	<b>Interface</b>	Serial ATA (3.0 Gb/s), Native Command Queuing enabled	
	<b>Synchronous Transfer Rate</b> (Maximum)		300 MB/s
	<b>Buffer</b>		8 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>		488,397,168
	<b>Operating Temperature</b>		41° to 131° F (5° to 55° C)
<b>160,041,885,696 bytes</b> (7,200)	<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>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</b> (Maximum)		300 MB/s
	<b>Buffer</b>		8 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>		312,581,808
	<b>Operating Temperature</b>		41° to 131° F (5° to 55° C)
<b>300,069,052,416 bytes</b> (7,200)	<b>Capacity</b>		300,069,052,416 bytes
	<b>Height</b>		0.6 in; 1.53 cm

### Technical Specifications - Hard Drives

(10K)

<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 (3.0Gb/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>	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)	

**320,072,933,376 bytes**  
(7,200)

<b>Capacity</b>	320,072,933,376 bytes	
<b>Height</b>	0.98 in; 2.5 cm	
<b>Width</b>	<b>Media Diameter</b>	3.5 in; 8.9 cm
	<b>Physical Size</b>	4.0 in; 10.17 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>	8 MB	
<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track</b>	2
	<b>Average</b>	12
	<b>Full Stroke</b>	21
<b>Rotational Speed</b>	7,200 rpm	
<b>Logical Blocks</b>	625,142,448	
<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>	250 MB/s per lane half duplex 500 MB/s per lane full duplex 1,000 MB/s 4-lane half duplex	
	<b>SAS Bandwidth</b>	<b>Half Duplex</b>	Single lane – 300 MB/s Wide Port (2 lanes) – 600 MB/s Wide Port (4 lanes) – 1200 MB/s
		<b>Full Duplex</b>	Single SAS Lane – 600 MB/s Wide Port (2 lanes) – 1200 MB/s Wide Port (4 lanes) – 2400 MB/s
	<b>PCI Card Type</b>	3.3 volt add-in c	
	<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 3 Gb/s 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		
<hr/>			
<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	
	<b>Maximum Number of SCSI DeviceS</b>	32	
	<b>LED Indicators</b>	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 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>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

<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>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 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>Power consumption</b>	22.69 Watts

### 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>	OGL 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>CUDA™ Parallel Processor Cores</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 FX 380 256MB Graphics Card</b>	<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>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="http://download.nvidia.com/novell">http://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

<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>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>	

### Technical Specifications - Graphics

<b>Supported graphics APIs</b>	OpenGL 2.1 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)
	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>
	Linux drivers may be obtained from: <a href="http://ati.amd.com/support/driver.html">http://ati.amd.com/support/driver.html</a>
<b>Power consumption</b>	32 Watts

<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 and one DVI to VGA adapter included
		('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>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>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 and one DVI to VGA adapter included  (‘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>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 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 and one DVI to VGA adapter included ('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>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 2.1 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)  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>  Linux drivers may be obtained from: <a href="http://ati.amd.com/support/driver.html">http://ati.amd.com/support/driver.html</a>
	<b>Power consumption</b>	56 Watts

<b>NVIDIA Quadro FX 3800 1.0GB Graphics Card (NOT AVAILABLE UNTIL JUNE 2009)</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 and one DVI to VGA adapter included  (‘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>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>●</li> </ul>

### Technical Specifications - Graphics

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

<b>ATI FirePro V7750 1.0GB Graphics Card</b>	<p><b>Form Factor</b> 4.40 inches (H) × 13.0 inches (L) (11.18 cm (H) × 33.02 cm (L))</p> <p><b>Graphics Controller</b> ATI FirePro V7750 Graphics Board</p> <p><b>Bus Type</b> PCI Express x16, Generation 2.0</p> <p><b>Memory</b> 1024 MB GDDR3 SDRAM unified graphics memory</p> <p><b>Connectors</b> 2 DisplayPort, 1 Dual-Link DVI-I. One DisplayPort to DVI and one DVI to VGA adapter included ('DisplayPort to VGA' and 'DisplayPort to Dual Link DVI' adapters available as an accessory)</p> <p><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> </p> <p><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> </p> <p><b>Supported graphics APIs</b> OpenGL 2.1 DirectX 10.1</p> <p><b>Available graphics drivers</b> Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit)</p> <p>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></p> <p>Linux drivers may be obtained from: <a href="http://ati.amd.com/support/driver.html">http://ati.amd.com/support/driver.html</a></p>
--	--

### Technical Specifications - Graphics

**Power consumption** 76 Watts

#### NVIDIA Quadro FX 4800 1.5GB PCIe Graphics Card

<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, Two DisplayPort to DVI-D adapters included ('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>
<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  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-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>CUDA™ Parallel Processor Cores</b>	192
<b>Power consumption</b>	146 Watts



### Technical Specifications - Graphics

<b>NVIDIA Quadro CX</b>	<b>Form Factor</b>	4.36" (H) x 10.5" (L) Dual slot card
	<b>Graphics Controller</b>	NVIDIA Quadro CX 1.5GB Graphics Card
	<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. Two DisplayPort to DVI-D adapters included  (‘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>
	<b>RAMDAC</b>	400MHz
	<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)  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>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>CUDA™ Parallel Processor Cores</b>	192
	<b>Power consumption</b>	146 Watts

### Technical Specifications - Multimedia and Audio Devices

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

---

### Technical Specifications - Multimedia and Audio Devices

<b>HP Thin USB Powered Speakers</b>	<b>Frequency Response</b> (- FO to 20kHz 3dB, 24-bit/96kHz input)		
	<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</b> (all conditions non-condensing)	<b>Temperature</b> (operating):	14° to 104° F (-10° to 40° C)
		<b>Relative Humidity</b> (operating):	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 (Creative Labs) X-Fi Titanium PCIe Audio Card</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</b> (20kHz Low-pass filter, A-Weighted)	109dB	
	<b>Total Harmonic Distortion + Noise at 1kHz</b> (20kHz Low-pass filter)	.004%	
	<b>Frequency Response</b> (- 10Hz to 46kHz 3dB, 24-bit/96kHz input)		
	<b>Frequency Response</b> (- 10Hz to 46kHz 3dB, 24-bit/192kHz input)		
	<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 Out via shared 3.5mm mini jack	
	<b>Front Panel Header</b>	Intel HD Audio Compatible (2x5 pin)	

### *Technical Specifications - Multimedia and Audio Devices*

<b>Operating System</b>	Microsoft Windows Vista Business 64 Microsoft Windows Vista Business 32 Microsoft® Windows® XP Professional SP2 Microsoft Windows XP Professional x64 Edition
<b>Minimum System Requirements</b>	<b>System RAM</b> 512MB <b>Operating System</b> Windows Vista 32-bit and 64-bit version or Windows XP 32-bit or 64-bit version

### Technical Specifications - Optical and Removable Storage

**NOTE 1:** Actual speeds may vary. Does not permit copying of commercially available DVD movies or other copyright protected materials. Intended for creation and storage of your original material and other lawful uses. Double Layer discs can store more data than single layer discs. However, double-layer discs burned with this drive may not be compatible with many existing single-layer DVD drives and players.

<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 ± 5%-100 mV ripple p-p 12 VDC ± 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) 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>.

<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)

### Technical Specifications - Optical and Removable Storage

<b>Disc Formats</b>	DVD-RAM DVD+R DVD+RW DVD+R DL DVD-R DL DVD-R DVD-RW CD-R CD-RW	
<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>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) 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 - Optical and Removable Storage

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

#### Kit Contents

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

<b>HP Blu-Ray Writer</b>	<b>Description</b>	5.25-inch, half-height, tray-load		
	<b>Mounting Orientation</b>	Either horizontal or vertical		
	<b>Interface Type</b>	SATA		
	<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>	BD-ROM		
		BD-R		
		BD-RE		
		DVD-RAM		
		DVD+R		
		DVD+RW		
		DVD+R DL		
		DVD-R DL		
		DVD-R		
		DVD-RW		
	CD-R			
CD-RW				
<b>Disc Capacity</b>	<b>DVD-ROM</b>	8.5 GB DL or 4.7 GB standard		
	<b>Blu-ray</b>	50 GB DL or 25 GB standard		
	<b>Full Stroke DVD</b>	< 250 ms (seek)		
	<b>Full Stroke CD</b>	< 210 ms (seek)		
	<b>Blu-ray</b>	Blu-ray		
	<b>Startup Time</b> (Time to drive ready from tray loading)	BD-ROM (SL/DL)	25S / 28S	
		BD-R (SL/DL)	25S / 28S	
		BD-RE (SL/DL)	25S / 28S	
		DVD-ROM (SL/DL)	18S / 18S	
		DVD-R (SL/DL)	25S / 25S	
DVD-RW		25S		
DVD+R (SL/DL)		25S / 25S		
DVD+RW		25S		
DVD-RAM		45S		
CD-ROM		45S		
<b>Maximum Data Transfer Rates</b>	<b>CD ROM Read</b>	CD-ROM	Up to 40X	
		CD-R	Up to 40X	
		CD-RW	Up to 40X	
	<b>DVD ROM Read</b>	DVD-RAM	Up to 5X	
		DVD+RW	Up to 10X	
		DVD-RW	Up to 10X	
		DVD+R DL	Up to 8X	
		DVD-R DL	Up to 8X	
		DVD-ROM	Up to 16X	

### Technical Specifications - Optical and Removable Storage

		DVD-ROM DL	Up to 8X
		DVD+R	Up to 12X
		DVD-R	Up to 12X
	<b>Blu-Ray</b>	BD-ROM	Up to 6X
		BD-ROM DL	Up to 4.8X
		BD-R	Up to 6X
		BD-R DL	Up to 4.8X
		BD-R	Up to 6X
		BD-RE SL/DL	Up to 4.8X
<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 $\pm$ 10%-100 mV ripple p-p	
	<b>DC Current</b>	5 VDC -900 mA typical, 1200 mA maximum 12 VDC -1000 mA typical, 1600 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>	15% to 80%	
	<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) 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.	
	<b>Kit Contents</b>	HP Blue Laser RW Drive, LightScribe software, Roxio Easy Media Creator software, Intervideo WinDVD Software, installation guide.	
<b>Disclaimer</b>	As Blu-Ray is a new format containing new technologies, certain disc, digital connection, compatibility and/or performance issues may arise, and do not constitute defects in the product. Flawless playback on all systems is not guaranteed. In order for some Blu-Ray titles to play, they may require a DVI or HDMI digital connection and your display may require HDCP support. HD-DVD movies cannot be played on this workstation.		



### Technical Specifications - Optical and Removable Storage

<b>HP 22-in-1 Media Card Reader</b>	<b>Description</b>	The Media Card Reader device uses the same physical form factor and mounting as a Floppy Disk Drive. The device connects to a 2x5 two-channel USB header on the motherboard of the system. There is no USB controller card provided. Please see the Disc Formats section below for a list of flash memory card formats that are supported.
	<b>Mounting Orientation</b>	The Media Card Reader can be mounted in a dedicated Floppy Drive bay (if the chassis provides one) or in an appropriate Optical Bay adapter. It will operate in any orientation.
	<b>Interface Type</b>	USB 2.0 (one channel dedicated to the separate USB port; one channel dedicated to the flash memory card slots)
	<b>Dimensions (WxHxD)</b>	4.9 x 4.0 x 1.0 in (124.5 x 101.6 x 25.4 mm)
	<b>Disc Formats</b>	xD-Picture Micro SD Micro SDHC SD SDHC Mini SD Mini SDHC MultiMediaCard (MMC) Reduced Size MultiMediaCard (RS MMC) MultiMedia Card 4.2 (MMC Plus, including MMC Plus HC) Reduced Size MultiMedia Card 4.2 (MMC Mobile, including MMC Mobile HC) CompactFlash Card Type I CompactFlash Card Type II MicroDrive Memory Stick (MS) MagicGate Memory Stick (MG) MagicGate Memory Stick Duo Memory Stick Select Memory Stick Duo (MS Duo) Memory Stick PRO (MS PRO) Memory Stick PRO Duo (MS PRO Duo) Memory Stick PRO-HG Duo  Two additional formats are usable with adapters (not supplied): MMC Micro Memory Stick Micro (M2)

### 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.
		<p>* 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: <a href="http://www.windowsvista.com/upgradeadvisor">http://www.windowsvista.com/upgradeadvisor</a>. For Windows Vista system requirements, visit: <a href="http://www.windowsvista.com/systemrequirements">http://www.windowsvista.com/systemrequirements</a>.</p> <p>Pentium II 266 or above            128-MB RAM            1-GB Hard Drive            CD-ROM drive            Built-in sound system            Available PCI slot</p>
	<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

<b>HP IEEE 1394b FireWire PCIe Card</b>	<b>Data Transfer Rate</b>	Supports up to 800 Mbps
	<b>Devices Supported</b>	IEEE-1394 compliant devices
	<b>Bus Type</b>	PCIe card full height PCIe slots
	<b>Ports</b>	Two IEEE-1394b bilingual 9-Pin Connector (Rear)
	<b>Internal Connectors</b>	One 10-Pin header Custom Connector
	<b>System Requirements</b>	Microsoft Windows XP Professional, Windows XP Home, Windows Vista. Not supported on Linux. Pentium® III or higher processor 128-MB RAM 1-GB Hard Drive CD-ROM drive Built in sound system Available PCI slot
	<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>Compliances</b>	FCC Part 15B, cULus 60950, CE Mark EN55022B(1995)/EN55024-1998 STD, Taiwan BSMI CNS13438, Korea MIC
	<b>Operating Systems Supported</b>	Microsoft Windows XP and Windows Vista

### Technical Specifications - Networking and Communications

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

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

---

<b>Broadcom (5761) NetXtreme Gigabit Ethernet Plus NIC</b>	<b>Connector</b>	RJ-45
	<b>Controller</b>	Broadcom 5761 PCI-Express LAN Controller
	<b>Memory</b>	8 MB NVRAM serial Flash
	<b>Data Rates Supported</b>	10/100/1000 Mbps
	<b>Compliance</b>	IEEE 802.1P, 802.1Q, 802.2, 802.3, 802.3AB, 802.3u, and 802.3x
	<b>Bus Architecture</b>	PCI-Express
	<b>Data Path Width</b>	Single Channel PCI-Express
	<b>Data Transfer Mode</b>	Bus Master DMA
	<b>Hardware Certifications</b>	FCC class B, Canada and US NRTL Mark, C-Tick for Australia, BSMI for Taiwan, VCCI for Japan, MIC for Korea, GOST for Russia, UL listed (E212044), European Union Notice (CE 0682)
	<b>Power Requirement</b>	1.8W @ 3.3V
	<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>	131° F (55° C) with 5% to 95% non-condensing humidity
	<b>Dimensions</b>	2.75 in x 4.13 in (7 cm x 10.5 cm), low profile compatible
	<b>Operating System Driver Support</b>	Windows Vista 32-bit SP1, Windows Vista x64 SP1, Windows XP 32 bit professional, Windows XP x64 .
<b>Management Capabilities</b>	ACPI, WOL and DMI 2.0, PXE 2.0, WfM 2.0, Broadcom mgmt utility, ASF2.0, DASH 1.0 and DASH 1.1 profiles	
<b>Kit Contents</b>	Broadcom NetXtreme Gigabit Ethernet Plus NIC, Broadcom NetXtreme Gigabit Ethernet Plus NIC USB Cable Assembly, CD, drivers, quick install guide, product warranty statement	

---

### Technical Specifications - Networking and Communications

<b>Intel Gigabit CT Desktop NIC</b>	<b>Connector</b>	RJ-45
	<b>Controller</b>	Intel WG82574L Gigabit Ethernet Controller
	<b>Memory</b>	Integrated Dual 48K configurable transmit receive FIFO Buffers
	<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 1.0a
	<b>Data Path Width</b>	X1, 250 MB/s, Bi-directional interface
	<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>	Aux 3.3V, 3.0 Watts in 1000base-T and 2.0 Watts in 100Base-T
	<b>Boot ROM Support</b>	Yes
	<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>	4.75 x 2.25 x 0.8 in (12.1 x 5.7 x 2.0 cm)
	<b>Operating System Driver Support</b>	Windows Vista Business 64, Windows Vista Business 32, Windows XP Professional, Windows XP x64. Red Hat Enterprise Linux 4, Red Hat Enterprise Linux 5.
	<b>Management Capabilities</b>	WOL , PXE, DMI, WFM 2.0
	<b>Kit Contents</b>	Intel Gigabit CT Desktop NIC, low profile bracket, CD containing Intel PROset II NIC drivers, quick install guide, product warranty statement

© Copyright 2009 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.