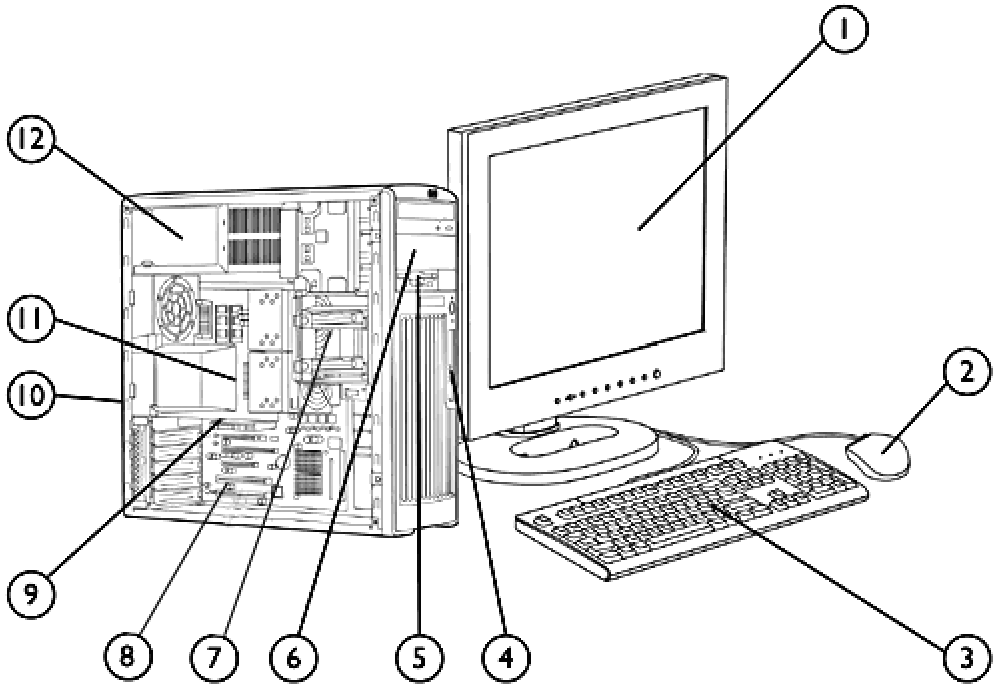
Overview

HP recommends Windows Vista® Business



1. Monitor (sold separately)
2. Mouse (USB or PS/2)
3. Standard Keyboard (USB or PS/2)
4. Front IO: 2 USB 2.0, IEEE-1394 (optional), headphone out and microphone in
5. 3.5" external bay for optional floppy drive
6. 2 external 5.25" bays
7. 2 internal 3.5" bays (convertible to 3 internal 2.5" bays)
8. 2 PCI, 2 PCI Express x8 mechanical/x4 electrical
9. 2 PCI Express x16 Gen2 Graphics Bus
10. 5 USB 2.0 (rear), 1 USB 2.0 (internal), 1 standard serial port (only available via internal header with optional module), 2 PS/2, 1 RJ-45, audio line in, audio line out, and microphone in.
11. Dual-Core or Quad-Core Intel® Xeon® Processors
12. 650 watt 80 PLUS high efficiency power supply

Form Factor	Minitower
Compatible Operating Systems	Genuine Windows Vista® Business 64-bit* Genuine Windows Vista® Business 32-bit* Genuine Windows Vista® 64-bit downgrade to Genuine Microsoft® Windows® XP Professional 64-bit** Genuine Windows Vista® 32-bit downgrade to Genuine Microsoft® Windows® XP Professional 32-bit** Red Hat Enterprise Linux® WS 5 64-bit HP Linux Installer Kit for Linux (includes drivers for both 32-bit & 64-bit OS versions of Red Hat Enterprise Linux WS4 and WS5 see: http://www.hp.com/workstations/software/linux) For detailed OS/hardware support information for Linux, see: http://www.hp.com/support/linux_hardware_matrix * Certain Windows Vista product features require advanced or additional hardware. See http://www.microsoft.com/windowsvista/getready/hardwarereqs.mspx and http://www.microsoft.com/windowsvista/getready/capable.mspx for details. Windows Vista Upgrade

	Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit http://www.windowsvista.com/upgradeadvisor. Windows Vista Business disk also included for future upgrade if desired. ** 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.
Available Processors	Quad-Core Intel Xeon Processor with Intel® 64 Architecture One or two Quad-Core Intel Xeon Processor 5400 Sequence, 12 MB total L2 cache (2 x 6 MB shared):* • Quad-Core Intel Xeon Processor E5405/ 2.00 GHz, 1333 MHz FSB, 80 watt • Quad-Core Intel Xeon Processor E5410/ 2.33 GHz, 1333 MHz FSB, 80 wat • Quad-Core Intel Xeon Processor E5420/ 2.50 GHz, 1333 MHz FSB, 80 watt • Quad-Core Intel Xeon Processor E5430/ 2.66 GHz, 1333 MHz FSB, 80 watt • Quad-Core Intel Xeon Processor E5440/ 2.83 GHz, 1333 MHz FSB, 80 watt • Quad-Core Intel Xeon Processor E5450/ 3.00 GHz, 1333 MHz FSB, 80 watt Dual-Core Intel Xeon Processors with Intel® 64 Architecture One or two Dual-Core Intel Xeon Processor 5200 Sequence* • Intel Xeon E5205/ 1.86GHz, 6 MB L2, 1066 MHz FSB, 65 watt • Intel Xeon E5240/ 3.00GHz, 6 MB L2, 1333 MHz FSB, 65 watt • Intel Xeon X5260/ 3.33 GHz, 6 MB L2, 1333 MHz FSB, 80 watt • Intel Xeon X5270/ 3.50 GHz, 6 MB L2, 1333 MHz FSB, 80 watt
Available Processor Disclaimers	* When ordering two processors, the second processor must be the same as the first. Intel processor numbers are not a measurement of higher performance. Processor numbers differentiate features within each processor family, not across different processor families. See: http://www.intel.com/products/processor_number/ for details. Intel® 64 Architecture requires a computer system with a processor, chipset, BIOS, operating system, device drivers, and applications enabled for Intel 64 Architecture. Processors will not operate (including 32-bit operation) without an Intel 64 Architecture-enabled BIOS. Performance will vary depending on your hardware and software configurations. See: http://www.intel.com/info/em64t for more information. Quad-Core and Dual-Core are new technologies designed to improve performance of multithreaded software products and hardware-aware multitasking operating systems and may require appropriate operating system software for full benefits; check with software provider to determine suitability; Not all customers or software applications will necessarily benefit from use of these technologies.
Additional Details	• HP Linux Installer Kit for Linux (includes drivers for both 32-bit & 64-bit OS versions of Red Hat Enterprise Linux WS4 and WS5; see: http://www.hp.com/workstations/software/linux) • Quad-Core Intel® Xeon® Processor 5400 Sequence (12 MB L2 cache) or Dual-Core Intel Xeon Processor 5200 Sequence (6 MB L2 cache) • 1333 MHz Front Side Bus support • 4-channel 667 MHz FB-DIMM Memory Subsystem • Up to 32 GB Memory capacity with 8 DIMM slots and 4 GB DIMMs • PCI Express I/O and PCIe x16 Gen2 • Integrated Broadcom 5755 Gigabit LAN on Motherboard (LoM) • 6 channels of Serial ATA (SATA) 3.0 Gb/s natively supported internally • SATA RAID 0 and RAID 1 support standard on motherboard • SAS RAID 0 and RAID 1 supported using the LSI 3041E PCIe controller • SATA optical drives • High Definition integrated audio with internal speaker • ENERGY STAR compliance with energy-saving features available on selected configurations through June '09. (Not supported by Linux) • Protected by HP Services, including a 3 years parts, 3 years labor, and 3 years onsite service (3/3/3)

	standard warranty. Terms and conditions vary by country. Certain restrictions and exclusions apply.

Supported Components

Processors

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Quad-Core Intel Xeon Processor 5400 Series with Intel® 64 Architecture				
Intel Xeon E5450/ 3.00 GHz, 12MB L2, 1333 MHz, FSB, 80W	Y	Y	GX574AA	
Intel Xeon E5440/ 2.83 GHz, 12MB L2, 1333 MHz, FSB, 80W	Y	Y	GX573AA	
Intel Xeon E5430/ 2.66 GHz, 12MB L2, 1333 MHz, FSB, 80W	Y	Y	GX572AA	
Intel Xeon E5420/ 2.50 GHz, 12MB L2, 1333 MHz, FSB, 80W	Y	Y	GX571AA	
Intel Xeon E5410/ 2.33 GHz, 12MB L2, 1333 MHz, FSB, 80W	Y	Y	GX570AA	
Intel Xeon E5405/ 2.00 GHz, 12MB L2, 1333 MHz, FSB, 80W	Y	Y	GX569AA	
Dual-Core Intel Xeon Processors with Intel® 64 Architecture				
Intel Xeon X5270/ 3.50 GHz, 6 MB L2, 1333 MHz FSB, 80 watt	Y	Y	FP479AA	
Intel Xeon X5260/ 3.33 GHz, 6 MB L2, 1333 MHz FSB, 80 watt	Y	Y	GX568AA	
Intel Xeon E5240/ 3.00 GHz, 6 MB L2, 1333 MHz FSB, 65 watt	Y	Y	KY198AA	
Intel Xeon E5205/ 1.86 GHz, 6 MB L2, 1066 MHz FSB, 65 watt	Y	Y	GX566AA	

NOTE 1: When ordering two processors, the second processor must be the same as the first. Intel processor numbers are not a measurement of higher performance. Processor numbers differentiate features within each processor family, not across different processor families. See: http://www.intel.com/products/processor_number/ for details.

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

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

Supported Components

Memory

Sub-Section Description/Notes: One of the following

Configure To Order (CTO)	Support Notes
PC2-5300F DDR2-667 ECC Full Buffered DIMM CTO	
HP 512MB (1x512) DDR2-667 ECC FBD RAM	
HP 1GB (2x512) DDR2-667 ECC FBD RAM	
HP 2GB (2x1GB) DDR2-667 ECC FBD RAM	
HP 4GB (2x2GB) DDR2-667 ECC FBD RAM	
HP 4GB (4x1GB) DDR2-667 ECC FBD RAM	
HP 8GB (4x2GB) DDR2-667 ECC FBD RAM	
HP 16GB (4x4GB) DDR2-667 ECC FBD RAM	
HP 16GB (8x2GB) DDR2-667 ECC FBD RAM	
HP 16GB(8x2GB)DDR2-667 ECC FBD RAM RISER	
HP 32GB (16x2GB) DDR2-667 ECC FBD RAM	

Sub-Section Description/Notes: Dual Channel is only supported when the system is configured with DDR2 symmetric memory (i.e., 2 x 256).

After Market Options (AMO)	
PC2-5300F DDR2-667 ECC Fully Buffered DIMM AMO	
512 MB (1 x 512 MB)	EM159AA; supported with minimum of 1GB of total system memory
1 GB (1 x 1 GB)	EM160AA
2 GB (1 x 2 GB)	EM161AA
4 GB (1 x 4 GB)	EM162AA

PCI Express Graphics

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes	Supported Multi Mixed
Professional 2D					
NVIDIA Quadro NVS 290 256 MB PCIe Graphics Card with 'DMS-59 to Dual DVI cable' included – for Workstations	Y	Y	GN502AA	1 or 2 of these cards are supported – 2nd card must be NVS 440 or NVS 290	2 X
NVIDIA Quadro NVS 440 256MB PCIe Graphics Card	Y	Y	PT453A	Dual NVS 440 or NVS 290 + NVS 440 supported.	2 X

Supported Components

NVIDIA Quadro NVS 450 512 MB PCIe Graphics Card	Y	Y	FH519AA	Dual NVS 450 or NVS 290 + NVS 450 supported.	2	X
Entry 3D						
NVIDIA Quadro FX 370 256 MB PCIe Graphics Card	Y	Y	GP528AA	1 or 2 of these cards are supported. (see note 1)	2	
NVIDIA Quadro FX 570 256 MB PCIe Graphics Card	Y	Y	GR521AA	1 or 2 of these cards are supported. (see note 1)	2	
Mid-range 3D						
ATI FireGL V5600 512 MB PCIe Graphics Card	Y	Y	GT346AA	1 or 2 of these cards are supported. (see note 1); Not supported on Red Hat Enterprise Linux	2	
NVIDIA Quadro FX 1700 512 MB PCIe Graphics Card	Y	Y	GP529AA	1 or 2 of these cards are supported. (see note 1)	2	
High-end 3D						
NVIDIA Quadro FX 3700 512MB PCI-Express Graphics Card	Y	Y	KD506AA	single card only	1	
NVIDIA Quadro FX 4600 (PCIe x16, 768 MB, Dual Dual-Link DVI, Stereo) Graphics Card	Y	Y	RV706AA	single card only	1	
NVIDIA Quadro FX 4800 1.5GB PCIe Graphics Card	Y	Y	FQ138AA		1	
NVIDIA Quadro CX – The Accelerator for Creative Suite	Y	N		FX4800 card required	1	
ATI FireGL V7700 512MB PCIe Graphics Card	Y	Y	KT979AA		1	

Supported Components

NOTE 1: 2nd graphics card must match 1st.
I/O card must also be Gen2 in order to realize PCI Express Base 2.0 Specification (also known as PCIe Gen2) graphics performance.

SAS Hard Drives

Sub-Section Description/Notes: To mix SAS and SATA drives, the first hard drive must be SAS. (Drives cannot be mixed under Linux).

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP SAS (Serial Attached SCSI) Hard Drives for HP Workstations				
73 GB SAS 10K rpm SFF HDD	Y	Y	GE259AA	2.5" SAS Small Form Factor Hard Drives
146 GB SAS 10K rpm SFF HDD	Y	Y	GE261AA	2.5" SAS Small Form Factor Hard Drives
73 GB SAS 15K rpm 3Gb/s HDD	Y	Y	EA329AA	3.5" SAS Hard Drives
146GB SAS 15K rpm 3Gb/s 3.5" HDD	Y	Y	EA330AA	3.5" SAS Hard Drives
300GB SAS 15K rpm 3Gb/s 3.5" HDD	Y	Y	EM174AA	3.5" SAS Hard Drives
450GB SAS 15K rpm 3Gb/s 3.5" HDD	Y	Y	FM803AA	3.5" SAS Hard Drives

Sub-Section Description/Notes: Up to 2 of the following 3.5" SATA and 3.5" 15K SAS drives, or 3 of the 2.5" small form factor (SFF) 10K SAS drives are allowed
(2.5" SFF drives cannot be mixed with 3.5" drives)
1 GB = 1 billion bytes. Actual formatted capacity is less. Up to 8 GB of hard drive (or system disk) is reserved for the system recovery software (XP and XP Pro). Up to 12 GB of system disk is reserved for system recovery software. (Vista)

SATA Hard Drives

SATA (Serial ATA) Hard Drives for HP Workstations				
80GB SATA 7200 rpm 3Gb/s 3.5" HDD	Y	Y	PY276AA	
160GB SATA 7200 rpm 3Gb/s 3.5" HDD	Y	Y	PV944A	
250GB SATA 7200 rpm 3Gb/s 3.5" HDD (for HP xw-Workstations)	Y	Y	EA788AA	
500GB SATA 7200 rpm 3Gb/s 3.5" HDD	Y	Y	PV943A	
1000GB (1TB) SATA 7200 rpm 3.0Gb/s 3.5" HDD	Y	Y	GE262AA	
80GB SATA 10K rpm SFF in 3.5" Frame HDD	Y	Y	EM172AA	
160GB SATA 10K rpm SFF in 3.5" Frame HDD	Y	Y	EW222AA	
300GB SATA 10K rpm SFF in 3.5" Frame HDD	Y	Y	FM802AA	

Supported Components

Sub-Section Description/Notes: 1 GB = 1 billion bytes. Actual formatted capacity is less. Up to 8 GB of hard drive (or system disk) is reserved for the system recovery software (XP and XP Pro). Up to 12 GB of system disk is reserved for system recovery software. (Vista)

(SAS Controller, not integrated, is required)

Hard Drive Controllers

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
LSI 3041E 4-Port SAS 3.0 Gb/s RAID Card	Y	Y	EH417AA	Native Command Queuing is not supported on this card at this time.
Factory integrated RAID on motherboard for SATA drives				
RAID 0 Configuration - Striped Array	Y	N		See note 1
RAID 1 Configuration - Mirrored Array	Y	N		See note 1
Integrated SATA 3.0 Gb/s Controller				
Integrated SATA 3.0 Gb/s Controller, RAID 0, 1, 10, 5 supported	Y	N		
LSI MegaRAID® SAS 8888ELP Host Bus Adapter (HBA)				
LSI 8888ELP 8-port SAS HW RAID Card	Y	Y	GE258AA	

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

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

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.

Multimedia and Audio Devices

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
SoundBlaster X-Fi XtremeGamer Audio Card (PCI)	Y	Y	GE257AA	
HP Satellite Speakers	Y	Y	ZD929AA	
HP Thin USB Powered Speakers	Y	Y	RD628AA	
Integrated Intel/Realtek HD ALC262 Audio	Y	N		

Supported Components

Optical and Removable Storage		Factory Configured	Option Kit	Option Kit Part Number	Support Notes
	HP 16X DVD-ROM SATA Drive	Y	Y	EW268AA	See NOTE 1
	HP 16X DVD+-RW SuperMulti SATA Drive	Y	Y	EW269AA	See NOTE 2
	1.44 MB Diskette Drive (1 only)	Y	Y	DY670A	
	HP 16-In-1 Media Card Reader with PCI Card	Y	Y	EM718AA	

NOTE 1: Not supported as a 2nd Optical Drive.
NOTE 2: Actual speeds may vary. Does not permit copying of commercially available DVD movies or other copy-right 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. LightScribe creates a monochrome image. LightScribe media required and sold separately.

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

Controller Cards		Factory Configured	Option Kit	Option Kit Part Number	Support Notes
	HP FireWire 800 IEEE-1394b 3-Port PCI Card	Y	Y	EA327AA	
	HP FireWire/IEEE 1394a PCI Card	Y	Y	PA997A	

Supported Components

Input Devices	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP USB Laser Mouse	Y	Y	GW405AA	
HP USB Optical 3-Button Mouse	Y	Y	DY651A	
HP PS/2 Standard Keyboard	Y	Y	DT527A	See note 1
HP USB Smart Card Keyboard	Y	Y	ED707AA	Not supported by Red Hat Enterprise Linux
HP USB Standard Keyboard	Y	Y	DT528A	See note 1
HP SpaceExplorer 3D USB Controller	Y	Y	RY429AA	Not supported by Red Hat Enterprise Linux
HP SpacePilot 3D USB Intelligent Controller	Y	Y	EF390AA	Not supported by Red Hat Enterprise Linux

NOTE 1: Choose one of the two Factory configured keyboard options

Racking and Physical Security	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP xw6X00 Depth Adjustable Sliding Rail Rack Kit (for use with IT racks only)	N	Y	DY663A	
HP Business PC Security Lock Kit	Y	Y	PV606AA	
HP Optical Bay HDD Mounting Bracket	N	Y	DY659A	
HP (CMT) Solenoid Lock	Y	Y	DE618A	
Security Cable with Kensington Lock	N	Y	PC766A	

Monitors	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP LP3065 30-inch Widescreen LCD Monitor	Y	Y		
HP LP2465 24-inch Widescreen LCD Monitor	Y	Y		
HP LP2065 20-inch LCD Monitor	Y	Y		
HP LP1965 19-inch LCD Monitor	Y	Y		

NOTE: Supported by all Operating Systems available from HP

Supported Components

Other Hardware

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP Workstation Mouse Pad	Y	N		
HP ENERGY STAR 4.0 Enabled Configuration	Y	N		
HP Power Cord Kit	Y	Y	DM293A	

* Maximum of one FireWire card in a system at a time is supported.

Software

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP RGS PC 3-year Software Assurance	N	Y	GN039AA	
HP RGS V5 PC Edition	N	Y	GN038AA	
HP RGS V5 Workstation Edition	N	Y	GN035AA	
HP RGS Workstation 3-year Software Assurance	N	Y	GN036AA	
HP RGS V5 Receiver Site License	N	Y	GN034AA	
Alert Standard Format specification	Y	Y		
HP Performance Tuning Framework	Y	Y		
Roxio Easy Media Creator (CD or DVD burner)	Y	Y		
Intervideo WinDVD with DVD player	Y	Y		
HP Backup and Recovery	Y	Y		
PDF Complete	Y	Y		
Microsoft Office 2007 Small Business Edition	N	Y	Optional	
Microsoft Office 2007 Trial Edition	N	Y	Optional	
HP Client Manager Software v6.2 (optional download)	N	Y	Optional	
HP ProtectTools Security	N	Y	Optional	

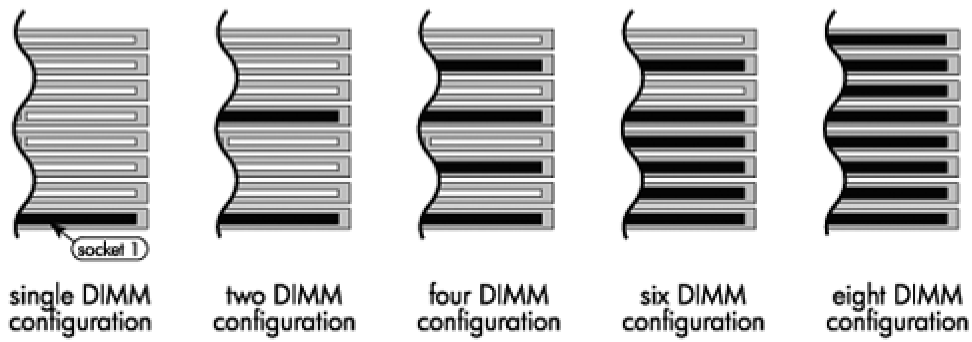
Operating Systems

	Support Notes
Genuine Windows Vista® Business 64-bit	Certain Windows Vista product features require advanced or additional hardware. See http://www.microsoft.com/windowsvista/getready/hardwarereqs.mspx and http://www.microsoft.com/windowsvista/getready/capable.mspx for details. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit http://www.windowsvista.com/upgradeadvisor. Windows Vista Business disk also included for future upgrade if desired.
HP Linux Installer Kit	
Genuine Windows Vista® Business 64-bit with downgrade to Windows® XP Professional x64 custom installed	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.

Supported Components

Genuine Windows Vista® Business 32-bit with downgrade to Windows® XP Professional 32-bit custom installed	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 32-bit	Certain Windows Vista product features require advanced or additional hardware. See http://www.microsoft.com/windowsvista/getready/hardwarereqs.mspx and http://www.microsoft.com/windowsvista/getready/capable.mspx for details. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit http://www.windowsvista.com/upgradeadvisor. Windows Vista Business disk also included for future upgrade if desired.
Red Hat Enterprise Linux Workstation 5 (64-bit version)	For detailed OS/hardware support information for Linux, see: http://www.hp.com/support/linux_hardware_matrix

System Technical Specifications

System Board	
System Board Form Factor	9.8"x12.0"
Processor Socket	Dual LGA 771
Chipset	Intel® 5400
Super I/O Controller	SMSC SCH5327
DIMM Connectors (FBD DDR2)	8
Memory	
Maximum Memory	Supports up to 32 GB of DDR2 FB-DIMM SDRAM.
	Intel 5400X Chipset 
Memory Configuration (Supported)	POSSIBLE MEMORY CONFIGURATIONS Not all memory configurations possible are represented below.
Intel 5400X Chipset	Requires PC2-5300F DDR2-667 ECC Registered Fully Buffered DIMMs. The Intel 5400chipset supports ECC Registered DDR2 667 MHz FB-DIMMs only. The motherboard has 8 DIMM slots. Use only fully buffered, PC2-5300F DIMMs. Match multiple DIMMs by size and type. Use HP memory only. If using only one DIMM, install in socket 1 (bottom DIMM slot when rear inputs/outputs of motherboard are facing left). If using 2 DIMMs, install in sockets 1 & 5, matched by size and type. For more than two DIMMs, pairs MUST be matched by size and type in sockets 1 and 3, 5 and 7, 2 and 4, and 6 and 8; this may require moving the DIMM in socket 5 to socket 3.

System Technical Specifications

		Slot 1	Slot 2	Slot 3	Slot 4	Slot 5	Slot 6	Slot 7	Slot 8
DIMM Size	**512 MB** (single channel performance configuration)	**512 MB**							
	1 GB	**1 GB**							
	1 GB								
	2 GB	**1 GB**				**1 GB**			
	2 GB	**512 MB**		**512 MB**		**512 MB**		**512 MB**	
	4 GB	**2 GB**				**2 GB**			
	4 GB	**1 GB**		**1 GB**		**1 GB**		**1 GB**	
	4 GB								
	6 GB	**1 GB**	**1 GB**	**1 GB**	**1 GB**	**1 GB**		**1 GB**	
	8 GB	**2 GB**		**2 GB**		**2 GB**		**2 GB**	
	8 GB								
	16 GB								
	32 GB								

PCI Express Connectors (Gen2 Rev 0.7 connectors)	2 PCI Express x16 Gen2 graphics 2 PCI Express (x8 mechanically, x4 electrically)	
PCI Connectors (5.0V)	2 full length 33 MHz 32-Bit	
Integrated RAID	IntegrIntegrated SATA RAID ● RAID 0, RAID 1*, RAID 5 ● Supports one RAID array with 2-3 drives ● RAID 0 configuration – striped array (supported and configure to order) ● RAID 1 configuration – mirrored array (supported and configure to order) ● RAID 5 parity striping (supported but not configure to order) **NOTES**: * NOTE: HW RAID functionality not supported by Linux. Use SW RAID functionality provided in the Red Hat Operating system instead.	
SATA Connectors	6 ports/connectors (Include 2 are eSATA configurable with optional eSATA After-Market Option cable kit)	
IEEE 1394a or 1394b	No integrated 1394a or 1394b – optional PCI card required. Cable from Front IO can be plugged into PCI Card. Not supported in Linux	
USB Connector(s)	**Front**	2 on header for front
	Rear	5
	Internal	1
HD Integrated Audio	High Definition Integrated Realtek ALC262 Audio with Line in, Line Out, Microphone, Headphone	
Flash ROM	Yes	
CPU Fan Header	One for each CPU socket	
Chassis Fan Header	2 Rear System Chassis Fan Header 1 Optional Front Chassis Fan Header	

System Technical Specifications

Front Control Panel/Speaker Header	Yes
CMOS Battery Holder – Lithium	Yes
Power Supply Headers	Yes
Power Switch, Power LED & Hard Drive LED Header	Yes
Power Supply	650 watt custom power supply (Wide Ranging, Active PFC)
Operating Voltage Range	90 – 269 VAC
Rated Voltage Range	100 – 240 VAC 118 VAC
Rated Line Frequency	50/60Hz 400Hz
Operating Line Frequency Range	47–66Hz 393–407 Hz
Rated Input Current	10 A @ 100–127VAC; 6 A @ 200-240 VAC 10 A @ 118 VAC
Heat Dissipation	Typical = 434 btu/hr (109 kg-cal/hr) Maximum = 964 btu/hr (243 kg-cal/hr)
Power Supply Fan	92x25 mm variable speed
ENERGY STAR® qualified (Config Dependent)	YES
80 PLUS Compliant	YES
FEMP Standby Power Compliant 115V (Wake-on LAN disabled) (<2W in S5 - Power Off)	YES
Power consumption in sleep mode (as defined by ENERGY STAR) **–** Suspend to RAM (S3)	<5W
Surge Tolerant Full Ranging Power Supply (withstands power surges up to 2000V)	Withstands power surges up to 2000V
Hood Lock Header	Yes
Hood Sensor Header	Yes Integrated in Front Control Panel Cable
Multibay Header	No

System Technical Specifications

Integrated Gigabit Ethernet	Integrated Broadcom 5755 Gigabit Ethernet LoM	
Wake on LAN	Yes	
ASF 1.0/2.0 (Alert Standard Format)	Yes	
TPM	Integrated	
Password Clear Header	Yes	
CD-ROM ; analog audio cable	No	
AUX ; analog audio in	Yes	
Clear CMOS Button	Yes	
Chassis Speaker Header	Yes (Integrated in Front Control Panel Cable)	
System Configurations		
Example Configuration #1	**Processor Info**	1x Intel Xeon 1.86GHz, Dual Core, 5430
	Memory Info	2x567MB DR 667MHz
	Graphics Info	1xNVS290
	Disks/Optical/Floppy	1x80GB 15k SAS / 2 Optical / 1 Floppy

Energy Consumption		**115 VAC LAN Enabled**	**115 VAC LAN Disabled**	**230 VAC LAN Enabled**	**230 VAC LAN Disabled**	**100 VAC LAN Enabled**	**100 VAC LAN Disabled**
	Windows Idle (S0)	102.4W	102.4W	100W	100W	100.3W	100.3W
	Windows Busy Typ(S0)	142.2W	142.2W	139.3W	139.3W	142.6W	142.6W
	Windows Busy Max (S0)	145.2W	145.2W	144.9W	144.9W	146.5W	146.5W
	Sleep (S3)	2.4W	2.9W	3.5W	3.2W	3.1W	2.8W
	Off (S5)	2.1W	1.8W	2.4W	2.1W	2 W	1.36W
Heat Dissipation		**115 VAC LAN Enabled**	**115 VAC LAN Disabled**	**230 VAC LAN Enabled**	**230 VAC LAN Disabled**	**100 VAC LAN Enabled**	**100 VAC LAN Disabled**
	Windows Idle (S0)	349.6 btu/hr	349.6 btu/hr	341.3 btu/hr	341.3 btu/hr	342.3 btu/hr	342.3 btu/hr
	Windows Busy Typ(S0)	485.3 btu/hr	485.3 btu/hr	475.4 btu/hr	475.4 btu/hr	486.7 btu/hr	486.7 btu/hr
	Windows Busy Max (S0)	495.6 btu/hr	495.6 btu/hr	494.6 btu/hr	494.6 btu/hr	500 btu/hr	500 btu/hr
	Sleep (S3)	8.3 btu/hr	9.7 btu/hr	11.8 btu/hr	10.9 btu/hr	10.6 btu/hr	9.4 btu/hr
	Off (S5)	7.2 btu/hr	6 btu/hr	8.2 btu/hr	7.3 btu/hr	6.9 btu/hr	6 btu/hr

System Technical Specifications

Declared Noise Emissions (Entry-level and High-end configurations)			
System Configuration (Entry level)	**Processor Info**	Dual Intel Xeon E5410 2.33Ghz processors	
	Memory Info	2x 160GB	
	Graphics Info	7200 rpm SATA	
	Disks/Optical/Floppy	1 DVD-ROM/ 1 Floppy	
Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)		**Sound Power (LWAd, bels)**	**Deskside Sound Pressure (LpAm, decibels)**
	Idle	4.1 Bels	24 dB
	SATA Hard drive Operating (random reads)	4.2 Bels	25 dB
	Floppy Drive Operating (continuous copy)	4.8 Bels	33 dB
	DVD-ROM Operating (sequential reads)	5.1 Bels	36 dB
System Configuration (High-end)	**Processor Info**	Dual Intel Xeon E5450 3.0GHz processors	
	Memory Info	2x146GB 15k SAS	
	Graphics Info	nVidia FX4600	
	Disks/Optical/Floppy	1 DVD-ROM/ 1 Floppy	
Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)		**Sound Power (LWAd, bels)**	**Deskside Sound Pressure (LpAm, decibels)**
	Idle	4.7 Bels	29 dB
	SATA Hard drive Operating (random reads)	4.9 Bels	31 dB
	Floppy Drive Operating (continuous copy)	5.1 Bels	36 dB
	DVD-ROM Operating (sequential reads)	5.3 Bels	27 dB

Physical Security and Serviceability	
Access Panel	Tool-less, one-handed Access Panel Key Lock (standard): Prevents removal of the access panel and all internal components including optical and floppy drives
Optical Drive	Tool-less
Floppy Drive	Tool-less
Hard Drives	Tool-less
Expansion Cards	Tool-less
Processor Socket	Yes
Green User Touch Points	Yes, on tool-free internal chassis mechanisms
Color-coordinated Cables and Connectors	Yes
Memory	Tool-less

System Technical Specifications

Dual Color Power and HD LED on Front of Computer	green – normal red – fault
Configuration Record SW	Yes
Over-Temp Warning on Screen	Yes
Restore CD Set	Restores the computer to its original factory shipping image – Can be obtained via HP Support
Dual Function Front Power Switch	Also acts as a reset switch when held for 4 seconds
Padlock Support	(optional) Prevents entire system theft and discourages access panel removal. 7mm diameter padlock loop at rear of system.
Cable Lock Support	(optional) May prevent entire system theft; Kensington locks to tether systems to the desk. 3mm x 7mm slot at rear of system.
Universal Chassis Clamp Lock Support	(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.
Solenoid Lock and Hood Sensor	(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.
Serial, Parallel, USB, Audio, Network, Enable/Disable Port Control	Enable or disables serial, parallel, USB, audio, and network ports
Removable Media Write/Boot Control	User can prevent the workstation from writing to or booting from removable media
Power-On Password	Prevents an unauthorized person from booting up the computer
Setup Password	Prevents an unauthorized person from changing the system configuration
CPUs and Heatsinks	Requires T15 Torx driver, can be upgraded without removing any internal components except processor heat sink.
Power supply diagnostic LED	Yes, dual function: AC OK & power OK
Power Button	Yes, ACPI multi-function
Power LED	Yes, dual color LED indicates normal operation and faults.
Hard drive activity LED	Yes
Internal speaker	Yes, used for pre-boot diagnostic beep codes
System/Emergency ROM Flash Recovery	Recovers corrupted system BIOS.
OS CD (Restore OS CD)	Restores computer to its original factory shipping image; No recovery CDs will ship with Windows XP, Vista or Linux – an ISO image will be available on an HD partition.
ASF 2.0 support (Alert Standard Format)	Industry-standard specification for network alerting in operating system-absent environments
Power Supply Fans	92 mm x 92 mm x 25 mm variable speed
CPU Heatsink Fan(s)	80 mm x 80 mm x15 mm 4-wire high frequency PWM
Chassis Fans	Two 92 mm x 92 mm x 25 mm 4-wire high frequency PWM

System Technical Specifications

Memory Fans	92 mm x 92 mm x 25 mm 4-wire high frequency PWM
Access Panel Key Lock	Prevents removal of the access panel and all internal components including optical and floppy drives
Trusted Platform Module Chip with optional ProtectTools Software	Yes

BIOS	
BIOS 32-bit Services	Standard BIOS 32-Bit Service Directory Proposal
PCI 3.0 Support	Full BIOS support for PCI Express through industry standard interfaces.
ATAPI	ATAPI Removable Media Device BIOS Specification Version 1.0
BBS	BIOS Boot Specification v1.01
WMI Support	WMI is Microsoft's implementation of Web-Based Enterprise Management (WBEM) for Windows. WMI is fully compliant with the Distributed Management Task Force (DMTF) Common Information Model (CIM) and WBEM specifications.
BIOS Boot Spec 1.01+	Provides more control over how and from what devices the workstation will boot.
BIOS Power On	Users can define a specific date and time for the system to power on.
ROM Based Computer Setup Utility (F10)	Review and customize system configuration settings controlled by the BIOS.
System/Emergency ROM Flash Recovery with Video	Recovers corrupted system BIOS
Replicated Setup	Saves BIOS settings to diskette or USB flash device in human readable file. Repset.exe utility can then replicate these settings on machines being deployed without entering Computer Setup Utility (F10)
SMBIOS	System Management BIOS 2.5, previously known as DMI BIOS, for system management information
Boot Control	Prevents ability to boot from removable media on supported devices (and can disable writes to media)
Memory Change Alert	Alerts management console if memory is removed or changed
Thermal Alert	Monitors the temperature state within the chassis. Three modes: • NORMAL – normal temperature ranges • ALERTED – excessive temperatures are detected. Raises a flag so action can be taken to avoid shutdown or provide for a smoother system shutdown • SHUTDOWN – excessive temperatures are encountered. Automatically shuts down the computer without warning before hardware component damage occurs
Remote ROM Flash	Provides secure, fail-safe ROM image management from a central network console
ACPI (Advanced Configuration and Power Management Interface)	Allows the system to enter and resume from low power modes (sleep states) 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 Supports ACPI 2.0 for full compatibility with 64-bit operating systems
Ownership Tag	A user-defined string stored in non-volatile memory that is displayed in the BIOS splash screen
Remote Wakeup/Remote Shutdown	• System administrators can power on, restart, and power off a client computer from a remote location. • Enables cost-effective power consumption when the administrator needs to distribute software, perform security management, or update the ROM.
ASF 2.0 Compliant	Allows workstation status to be monitored on a remote console.

System Technical Specifications

Instantly Available PC (Suspend to RAM – ACPI sleep state S3)	Allows for very low power consumption with quick resume time
Remote System Installation via F12 (PXE 2.1) (Remote Boot from Server)	Allows a new or existing system to boot over the network and download software, including the operating system
ROM revision levels	Identifies system ROM revision levels and reports in Computer Setup Utility (F10). Version is stored in an industry standard memory location (SMBIOS) so that management SW
System board revision level	Allows management SW to read revision level of the system board Revision level is digitally encoded into the HW and cannot be modified
Start-up Diagnostics (Power-on Self-Test)	Yes
Industry Standard Specification Support	
Industry Standard	Revision Supported by the BIOS
ACPI	Advanced Configuration and Power Management Interface, Version 2.0
ASF	Alert Standard Format Specification, Version 2.0
ATA (IDE)	AT Attachment 6 with Packet Interface (ATA/ATAPI-6), Revision 3b
CD Boot	"El Torito" Bootable CD-ROM Format Specification Version 1.0
EDD	● Enhanced Disk Drive Specification Version 1.1 ● BIOS Enhanced Disk Drive Specification Version 3.0
EHCI	Enhanced Host Controller Interface for Universal Serial Bus, Revision 1.0
PCI	● PCI Local Bus Specification, Revision 2.3 ● PCI Power Management Specification, Revision 1.1 ● PCI Firmware Specification, Revision 3.0, Draft .7
PCI Express	PCI Express Base Specification, Revision 1.0a
PMM	POST Memory Manager Specification, Version 1.01
SATA	● Serial ATA Specification, Revision 1.0a ● Serial ATA 3 Gb/s: Extensions to Serial ATA 1.5 Gb/s, Revision 1.0 ● eSATA up to 3.0 Gb/s
SPD	PC SDRAM Serial Presence Detect (SPD) Specification, Revision 1.2B
TPM	Trusted Computing Group TPM Specification Version 1.2
UHCI	Universal Host Controller Interface Design Guide, Revision 1.1
USB 1.1	Universal Serial Bus Revision 1.1 Specification
USB 2.0	Universal Serial Bus Revision 2.0 Specification
SMBIOS	System Management BIOS Reference Specification, Version 2.5

System Software Management and Updating	
HP Client Management Solutions	Visit: http://www.hp.com/go/easydeploy
Product Change	Program to proactively communicate Product Change Notifications (PCNs) and Customer Advisories by

System Technical Specifications

	email to customers, based on a user-defined profile. PCNs provide advance notification of hardware and software changes to be implemented in the factory providing time to plan for transition. Customer Advisories provide concise, effective problem resolution, greatly reducing the need to call technical support.
Support Software CD & WWW	Yes
Social and Environmental Responsibility	
Eco-Label Certifications & Declarations	This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks: ● ENERGY STAR 4.0 (Configuration dependent, Microsoft Windows only) ● US Federal Energy Management Program (FEMP) ● China Energy Conservation Program ● IT ECO declaration ● Japan PC Green label* * This product conforms to the examination standards (2003 version) under JEITA's 'PC Green Label System.'
Batteries	This product complies with ISO standards: ● EU Directive 91/ 157/ EEC ● EU Directive 93/ 86/ EEC ● EU Directive 98/ 101/ EEC Batteries used in the product do not contain: ● Mercury greater than 5ppm by weight ● Cadmium greater than 10ppm by weight ● Lead greater than 4000ppm by weight Battery size: CR2032 (coin cell) Battery type: Lithium
Restricted Material Usage	This product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html): ● Asbestos ● Certain Azo Colorants ● Certain Brominated Flame Retardants – may not be used as flame retardants in plastics ● Cadmium ● Chlorinated Hydrocarbons ● Chlorinated Paraffins ● Formaldehyde ● Halogenated Diphenyl Methanes ● Lead carbonates and sulfates ● Lead and Lead compounds ● Mercuric Oxide Batteries

System Technical Specifications

	• Nickel - finishes must not be used on the external surface designed to be frequently handled or carried by the user. • Ozone Depleting Substances • Polybrominated Biphenyls (PBBs) • Polybrominated Diphenyl Ethers (PBBEs) • Polybrominated Biphenyl Oxides (PBBOs) • Polychlorinated Biphenyl (PCB) • Polychlorinated Terphenyls (PCT) • Polyvinyl Chloride (PVC), except for wires and cables and certain retail packaging, has been voluntarily removed from most applications. • Radioactive Substances • Tributyl Tinches (TBT), Triphenyl Tinches (TPT), Tributyl Tin Oxide (TBTO)
Packaging	HP follows these guidelines to decrease the environmental impact of product packaging: • Eliminate the use of heavy metals such as lead, chromium, mercury, and cadmium in packaging materials. • Eliminate the use of ozone-depleting substances (ODS) in packaging materials. • Design packaging materials for ease of disassembly. • Maximize the use of post-consumer recycled content materials in packaging materials. • Use readily recyclable packaging materials such as paper and corrugated materials. • Reduce size and weight of packages to improve transportation fuel efficiency. • Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.
Longevity and Upgrading	This product is designed to be upgraded, possibly extending its useful life by several years. Spare parts are available throughout the warranty period and for up to 5 years after the end of production. Upgradability features contained in the product include: • Intel LGA771 processor socket • 8 USB ports (5 rear, 2 front, 1 internal) • 2 PCI slots and 4 PCI Express slots • 5/6 storage bays (2 – 3.5 inch OR 3 - 2.5" internal, 1 – 3.5 inch FDD, 2 – 5.25 inch removable) • 8 memory slots
Packaging Materials	
External	Cardboard carton and insert: 2.70 kg
Internal	LDPE Foam: 0.35 kg
End-of-Life Management and Recycling	Hewlett-Packard offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: http://www.hp.com/recycle or contact your nearest HP sales office. Products returned to HP will be recycled, recovered, or disposed of in a responsible manner.
Hewlett-Packard Corporate Environmental Information	For more information about HP's commitment to the environment: [link to new HP white paper now in progress] Global Citizenship Report: http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html Eco-label certifications: http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html ISO 14001 certificates: http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html
Service, Support and Warranty	On-site Warranty and Service (Note 1): This three-year, limited warranty and service offering delivers three years of on-site, next business-day (Note 2) service for parts and labor and includes free telephone support (Note 3) 24 x 7. Global coverage (Note 2) ensures that any product purchased in one country and transferred to another, non-restricted country will remain fully covered under the original warranty and service offering **NOTE 1:** Terms and conditions may vary by country. Certain restrictions and exclusions apply. **NOTE 2:** On-site service may be provided pursuant to a service contract between HP and an authorized HP

System Technical Specifications

	third-party provider, and is not available in certain countries. Global service response times are based on commercially reasonable best effort and may vary by country. **NOTE 3:** Technical telephone support applies only to HP-configured, HP and HP-qualified, third-party hardware and software. Toll-free calling and 24 x 7 support may not be available in some countries.
Additional Information	• This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2002/95/EC. • This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive - 2002/96/EC. • Plastics parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043. • This product contains 0% recycled materials (by wt.) • This product is >90% recycle-able when properly disposed of at end of life.
Processor 1	Intel Xeon E5410/ 2.33 GHz, 12MB L2, 1333 MHz, FSB, 80W
Processor 2	Intel Xeon E5410/ 2.33 GHz, 12MB L2, 1333 MHz, FSB, 80W
Memory	HP 4 GB PC2-5300F ECC Registered DDR2 667 MHz FB-DIMM
Hard Drive	
Optical Drive	
Graphics	
Keyboard	HP PS/2 Standard Keyboard
Mouse	
Processor 1	Intel Xeon E5410/ 2.33 GHz, 12MB L2, 1333 MHz, FSB, 80W
Processor 2	

Technical Specifications - Processors

Processors	Intel Xeon E5450/ 3.00 GHz, 12MB L2, 1333 MHz, FSB, 80W	GX574AA
	Intel Xeon E5440/ 2.83 GHz, 12MB L2, 1333 MHz, FSB, 80W	GX573AA
	Intel Xeon E5430/ 2.66 GHz, 12MB L2, 1333 MHz, FSB, 80W	GX572AA
	Intel Xeon E5420/ 2.50 GHz, 12MB L2, 1333 MHz, FSB, 80W	GX571AA
	Intel Xeon E5410/ 2.33 GHz, 12MB L2, 1333 MHz, FSB, 80W	GX570AA
	Intel Xeon E5405/ 2.00 GHz, 12MB L2, 1333 MHz, FSB, 80W	GX569AA

Introduction

The Quad-Core Intel® Xeon® Processor 5400 Series is a workstation processor utilizing four 45-nm Hi-k next generation Intel® Core™ microarchitecture cores. The processor is manufactured on Intel's 45 nanometer process technology combining high performance with the power efficiencies of a low-power microarchitecture. These processors maintain the tradition of compatibility with IA-32 software. Some key features include on-die, primary 32-kB instruction cache and 32-kB write-back data cache in each core and 12 MB (2 x 6MB) Level 2 cache with Intel® Advanced Smart Cache Architecture. The 1333 MHz Front Side Bus (FSB) is a quad-pumped bus running off a 333 MHz system clock making 10.66 GBytes per second data transfer rates possible. The 1600 MHz Front Side Bus (FSB) is a quad-pumped bus running off a 400 MHz system clock making 12.80 GBytes per second data transfer rates possible. Quad-Core Intel Xeon Processor 5400 Series supports Enhanced Intel SpeedStep® Technology*. This technology enables the processor to switch between multiple frequency and voltage points, which results in platform power savings.

In addition, the Quad-Core Intel® Xeon® Processor 5400 Series supports the Execute Disable Bit functionality. When used in conjunction with a supporting operating system, Execute Disable allows memory to be marked as executable or non executable. This feature can prevent some classes of viruses that exploit buffer overrun vulnerabilities and can thus help improve the overall security of the system.

NOTE: When ordering two processors, the second processor must be the same as the first. Intel's numbering is not a measurement of higher performance. Processor numbers differentiate features within each processor family, not across different processor families. See: http://www.intel.com/products/processor_number/ for details.

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

Quad-Core and Dual-Core 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.

Performance and Features

- Quad-core processing
- Significantly increases performance headroom over previous generation dual-core processors
- Helps boost an operating system's ability to multitask
- 1333 and 1600 MHz Front Side Bus
- 12 MB shared L2 cache
- Reduces latency and maximizes the use of main memory-to-processor bandwidth
- Cache is dynamically allocated between cores, as needed
- Intel Extended Memory 64 Technology (EM64T)
- Enhanced Halt State (C1E)

Technical Specifications - Processors

- Demand Based Switching
- Enhanced Intel SpeedStep Technology
- Virtualization Technology
- Supports software-based virtualization
- Enables migration of 64-bit O/Ss and applications to virtual environments
- Smart Memory Access
- Intel Thermal Monitor 2

NOTE: Not supported on the E5405 processor.

Service and Support

The Quad-Core Intel Xeon Processor 5400 Sequence has a one-year limited warranty or the remainder of the warranty of the HP product in which they are installed. Technical support is available seven days a week, 24 hours a day by phone, as well as online support forums. Certain restrictions and exclusions apply.

Speeds	System Bus Frequency	Cache Type
3.00 GHz	1333 MHz	12MB L2
2.83 GHz	1333 MHz	12MB L2
2.66 GHz	1333 MHz	12MB L2
2.50 GHz	1333 MHz	12MB L2
2.33 GHz	1333 MHz	12MB L2
2.00 GHz	1333 MHz	12MB L2

Maximum Virtual Memory Limited by OS

SIMD Extensions Supported SSE2, SSE3 and SSE4.1

Processors	Intel Xeon E5205/ 1.86 GHz, 6 MB L2, 1066 MHz FSB, 65 watt	GX566AA
	Intel Xeon E5240/ 3.00 GHz, 6 MB L2, 1333 MHz FSB, 65 watt	KY198AA
	Intel Xeon X5260/ 3.33 GHz, 6 MB L2, 1333 MHz FSB, 80 watt	GX568AA
	Intel Xeon X5270/ 3.50 GHz, 6 MB L2, 1333 MHz FSB, 80 watt	FP479AA

Speeds	System Bus Frequency	Cache Type
1.86 GHz	1066 MHz FSB	L2
3.00 GHz	1333 MHz FSB	L2
3.33 GHz	1333 MHz FSB	L2
3.50 GHz	1333 MHz FSB	L2

Technical Specifications - Graphics

NVIDIA Quadro NVS 290 256 MB PCIe Graphics Card	**Form Factor**	Low Profile
	Bus Type	PCIe x16
	Memory	256 MB 400MHz DDR2 SDRAM unified frame buffer, Z-buffer and Texture storage
	Connectors	DMS-59, includes DMS-59 to Dual DVI-I cable. DMS-59 to Dual VGA cable available as an option.
	Maximum Resolution	Dual integrated analog display controllers supporting up to two analog displays at 2048x1536 @ 85Hz on both displays or dual digital displays at 1920x1200 (single-link). NVIEW advanced multi-display desktop and application management seamlessly integrated into Microsoft® Windows®
	RAMDAC	Integrated dual 400MHz
	Image Quality Features	Full-screen, full-frame video playback of HDTV and DVD content DVD-ready motion compensation for MPEG-2 Independent hardware color controls for video overlay Hardware color-space conversion (YUV 4:2:2 and 4:2:0) IDCT motion compensation 5-tap horizontal by 3-tap vertical filtering 8:1 up/down scaling
	Programmable Video Processor	Full-screen, full-frame video playback of HDTV and DVD content DVD-ready motion compensation for MPEG-2 Independent hardware color controls for video overlay Hardware color-space conversion (YUV 4:2:2 and 4:2:0) IDCT motion compensation 5-tap horizontal by 3-tap vertical filtering 8:1 up/down scaling
	Display Output	Dual integrated analog display controllers supporting up to two analog displays at 2048x1536 @ 85Hz on both displays or dual digital displays at 1920x1200 (single-link). NVIEW advanced multi-display desktop and application management seamlessly integrated into Microsoft® Windows®
	Supported Graphics APIs	OGL 2.1 & DX10 Support; Shader Model 4.0
	Available Graphics Drivers	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: http://welcome.hp.com/country/us/eng/software_drivers.html. Novell SUSE Linux Enterprise drivers may be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
	High-Resolution AntiAliasing	Color planes: 32-bit color buffer Overlay planes: Hardware supported
	Option kit contents	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

NVIDIA Quadro NVS 440 256 MB Graphics Controller	**Form Factor**	ATX
	Graphics Controller	2 nv43 2D graphics processor units (GPUs)
	VGA controller	Integrated into the Quadro GPU
	Bus Type	PCI-E x16
	RAMDAC	Dual 350 MHz
	Memory	256 MB DDR frame buffer and Texture storage (128MB per GPU)
	Connector	Two DMS-59
	Controller clock speed	250 MHz
	Color planes	32-bit color buffer
	Overlay planes	1 16-bit Video overlay plane
	Maximum pixel clock	350 MHz
	Multi-Monitor Support	Up to 4 analog or digital monitors
	Single DVI Support	Yes
	Dual DVI Support	Yes
	High-definition Video Processor (HDVP)	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
	Available graphics drivers	Microsoft Windows Vista Business 32 or 64, Microsoft Windows XP Professional, Microsoft Windows XP Professional x64 Edition, Linux - Full Open GL implementation, complete with NVIDIA and ARB extensions. HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/eng/software_drivers.html.

NVIDIA Quadro NVS 450 512 MB PCIe Graphics Card	**Form Factor**	ATX Full Height, 1/2 length Passive cooling
	Bus Type	PCI Express x16, Generation 2.0
	Memory	512 MB GDDR3 (256MB per GPU)
	Connectors	Four DisplayPort; Four DisplayPort to DVI-D adapters included. ('DisplayPort to VGA' and 'DisplayPort to Dual Link DVI' adapters available as an accessory)
	Maximum Resolution	DisplayPort connectors support ultra-high-resolution panels (up to 2560 x 1600)
	Supported Graphics APIs	OpenGL 3.0 Direct X 10.0
	Available Graphics Drivers	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: http://welcome.hp.com/country/us/eng/software_drivers.html. Novell SUSE Linux Enterprise drivers may be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
	Power consumption	35 Watts
NVIDIA Quadro FX 370 256 MB PCIe Graphics Card	**Form Factor**	ATX
	Bus Type	PCI-Express x16
	Memory	256 MB 400MHz DDR2 SDRAM unified frame buffer, Z-buffer and Texture storage
	Connectors	DVI-I (dual-link) and DVI-I (single-link)
	Maximum Resolution	Dual integrated analog display controllers supporting up to two analog displays at 2048x1536 @ 85Hz on both displays or dual digital displays at 1920x1200 (single-link) and 3840x2400 (dual-link). NVIEW advanced multi-display desktop and application management seamlessly integrated into Microsoft® Windows®
	RAMDAC	Integrated dual 400MHz
	Display Output	Dual integrated analog display controllers supporting up to two analog displays at 2048x1536 @ 85Hz on both displays or dual digital displays at 1920x1200 (single-link) and 3840x2400 (dual-link). NVIEW advanced multi-display desktop and application management seamlessly integrated into Microsoft® Windows®
	Shading Architecture	Fully programmable GPU (OpenGL 2.1/DirectX 10 class) Vertex/Pixel Shader 4.0 Shading Support (HLSL, GLSL, CgFX)
	Supported Graphics APIs	OGL 2.1 & SM4.0 and DirectX10 Support
	Available Graphics Drivers	Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) WS3, WS4 & 5 Desktop/Workstation Qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/eng/software_drivers.html Novell SUSE Linux Enterprise drivers may be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
	High-Resolution AntiAliasing	High Resolution Anti-Aliasing PureVideo 2 engine supports AES 128-bit decryption GPU Computing (HW/SW including CUDA SDK 3D Textures LightSpeed Memory Architecture II 128-bit color precision Hardware accelerated anti-aliased points and lines Hardware OpenGL overlay planes H/W accelerrated pixel readback 3rd generation occlusion culling AA on scan-out
	Power consumption	<50 W

Technical Specifications - Graphics

NVIDIA Quadro FX 570 256 MB PCIe Graphics Card	**Form Factor**	ATX
	Bus Type	PCI-Express x16
	Memory	256 MB 400MHz DDR2 SDRAM unified frame buffer, Z-buffer and Texture storage
	Connectors	DVI-I (dual-link) and DVI-I (dual-link)
	Maximum Resolution	Dual integrated analog display controllers supporting up to two analog displays at 2048x1536 @ 85Hz on both displays or dual digital displays at 1920x1200 (single-link) and 3840x2400 (dual-link). NVIEW advanced multi-display desktop and application management seamlessly integrated into Microsoft® Windows®
	RAMDAC	Integrated dual 400MHz
	Shading Architecture	Fully programmable GPU (OpenGL 2.1/DirectX 10 class) Vertex/Pixel Shader 4.0 Shading Support (HLSL, GLSL, CgFX)
	Supported Graphics APIs	OGL 2.1 & SM4.0 and DirectX10 Support
	Available Graphics Drivers	Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) WS3, WS4 & 5 Desktop/Workstation Qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/eng/software_drivers.html Novell SUSE Linux Enterprise drivers may be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
	High-Resolution AntiAliasing	High Resolution Anti-Aliasing PureVideo 2 engine supports AES 128-bit decryption GPU Computing (HW/SW including CUDA SDK 3D Textures LightSpeed Memory Architecture II 128-bit color precision Hardware accelerated anti-aliased points and lines Hardware OpenGL overlay planes H/W accelerrated pixel readback 3rd generation occlusion culling AA on scan-out
	Option kit contents	PCA with ATX bracket, DVI to VGA converters, HDTV dongle, CD and manual.
	Power consumption	<60 W

Technical Specifications - Graphics

ATI FireGL V5600 512 MB PCIe Graphics Card	**Form Factor**	ATX
	Graphics Controller	R520
	Bus Type	PCI Express x16
	Memory	512 MB f unified frame buffer, Z-buffer and Texture storage and a 128-bit Ring-Bus memory controller
	Connectors	Two dual-link DVI connectors with analog/digital outputs
	Maximum Resolution	Dual Link digital support for 3840 x 2400 @ 60Hz. Ideal for 30-inch widescreen displays.
	RAMDAC	Dual 10-bit per channel 400MHz
	Ring Bus Memory Controller	512-bit internal ring bus for highly efficient memory reads Programmable intelligent arbitration logic
	Display Output	Up to 16-bit per RGB color component High Dynamic Range output (HDR) Programmable piecewise linear gamma correction, color correction, and color space conversion (10-bits per color)
	Shading Architecture	Supports Full Shader Model 4.0 120 shader processing unit
	Supported Graphics APIs	DirectX 10 and OpenGL 2.1 advanced
	Available Graphics Drivers	Microsoft Windows XP Professional qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/eng/software_drivers.html. HP-tested Windows XP and Microsoft Windows Vista 32 and 64, Microsoft Windows XP. HP qualified drivers may be preloaded or available from the HP support web site: http://welcome.hp.com/country/us/eng/software_drivers.html.
	Option kit contents	PCA with ATX bracket, DVI to VGA converters, CD and manual.

NVIDIA Quadro FX 1700 512 MB PCIe Graphics Card	**Form Factor**	ATX
	Bus Type	PCI Express x16
	Memory	512 MB 400 MHz DDR2 SDRAM unified frame buffer, Z-buffer and Texture storage
	Connectors	DVI-I (dual-link) and DVI-I (dual-link) and HD-out (a separate cable - not included - is required to use HD TV monitors)
	Maximum Resolution	Dual integrated analog display controllers supporting up to two analog displays at 2048x1536 @ 85Hz on both displays or dual digital displays at 1920x1200 (single-link) and 3840x2400 (dual-link).
	RAMDAC	Integrated dual 400MHz
	Display Output	Dual integrated analog display controllers supporting up to two analog displays at 2048x1536 @ 85Hz on both displays or dual digital displays at 1920x1200 (single-link) and 3840x2400 (dual-link). NVIEW advanced multi-display desktop and application management seamlessly integrated into Microsoft® Windows®
	Shading Architecture	Fully programmable GPU (OpenGL 2.1/DirectX 10 class) Vertex/Pixel Shader 4.0 Shading Support (HLSL, GLSL, CgFX)

Technical Specifications - Graphics

	Supported Graphics APIs	OGL 2.1 & SM4.0 and DirectX10 Support
	Available Graphics Drivers	Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) WS3, WS4 & 5 Desktop/Workstation Qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/eng/software_drivers.html Novell SUSE Linux Enterprise drivers may be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
	High-Resolution AntiAliasing	High Resolution Anti-Aliasing PureVideo 2 engine supports AES 128-bit decryption GPU Computing (HW/SW including CUDA SDK 3D Textures LightSpeed Memory Architecture II 128-bit color precision Hardware accelerated anti-aliased points and lines Hardware OpenGL overlay planes H/W accelerated pixel readback 3rd generation occlusion culling AA on scan-out
	Option kit contents	PCA with ATX bracket, DVI to VGA converters, CD and manual.
	Power consumption	<75 W

NVIDIA Quadro FX 3700 Graphics Card	**Form Factor**	ATX
	Graphics Controller	NVIDIA NV71GL-U
	Bus Type	PCI Express x16
	Memory	512MB 700MHz GDDR3 SDRAM unified frame buffer, Z-buffer and Texture storage
	Connectors	2 dual-link DVI-I + 3-pin Mini DIN stereo output
	Maximum Resolution	Dual DVI-I output - drives dual digital displays at resolutions up to 2560x1600 @ 60Hz Internal 400MHz RAMDACs - drives dual analog displays up to 2048x1536 @ 85Hz each
	RAMDAC	Dual 400MHz integrated
	Display Output	Dual integrated analog display controllers supporting up to two analog displays at 2048x1536 @ 85Hz on both displays or dual digital displays at 2560x1600 @ 60Hz. NVIEW advanced multi-display desktop and application management seamlessly integrated into Microsoft® Windows®
	Shading Architecture	Fully programmable GPU (OpenGL 2.0/DirectX 9.0c class) Long fragment programs (unlimited instructions) Long vertex programs (unlimited instructions) Looping and subroutines (up to 256 loops per vertex program) Dynamic flow control Conditional execution
	Supported Graphics APIs	OpenGL 2.1 DirectX 10.0

Technical Specifications - Graphics

	Available Graphics Drivers	Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) WS3, WS4 & 5 Desktop/Workstation Qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/eng/software_drivers.html Novell SUSE Linux Enterprise drivers may be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
	High-Resolution AntiAliasing	256-bit memory interface 128-bit IEEE floating-point precision graphics pipeline 128-bit color precision 32x FSAA dramatically reduces visual aliasing artifacts at resolution up to 1920x1200 Hardware accelerated anti-aliased points and lines Hardware OpenGL overlay planes Hardware accelerated two-sided lighting Hardware accelerated clipping planes 3rd generation occlusion culling 3D volumetric texture support Quad-buffered stereo Dual Link DVI enabling driving digital displays up to 2560x1600 @ 60Hz SLI Link
	Option kit contents	PCA with ATX bracket, DVI to VGA converters, CD and manual

NVIDIA Quadro FX 4600 768 MB PCIe Graphics Card	**Graphics Controller**	NVIDIA Quadro FX 4600 graphics card
	Bus Type	PCI Express x16
	Memory	768 MB GDDR3 SDRAM unified graphics memory
	Connectors	2 Dual-Link DVI-I analog/digital monitor outputs, 1 3-pin Mini DIN stereo output, DVI-I to VGA adapters included
	Maximum Resolution	Dual integrated display controllers supporting up to 2560x1600 @ 60Hz (both analog and digital) on both displays
	RAMDAC	Dual 400 MHz integrated
	Image Quality Features	High-resolution Antialiasing: 12-bit subpixel sampling precision enhances AA quality Rotated-grid full-scene antialiasing (RG FSAA) 16x FSAA dramatically reduces visual aliasing artifacts or "jaggies" at resolution up to 1920x1200
	Display Output	Dual integrated display controllers supporting up to 2560x1600 @ 60Hz (both analog and digital) on both displays
	Shading Architecture	Fully programmable GPU (OpenGL 2.1/DirectX 10 class) Long fragment programs (unlimited instructions) Long vertex programs (unlimited instructions) Looping and subroutines (up to 256 loops per vertex program) Dynamic flow control Conditional execution
	Supported Graphics APIs	OpenGL 2.1 ICD with immediate mode support for all OGL primitive types DirectX 9.0c
	Available Graphics	Genuine Windows Vista Business (64-bit and 32-bit)

Technical Specifications - Graphics

	Drivers	Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) WS3, WS4 & 5 Desktop/Workstation HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html Novell SUSE Linux Enterprise drivers may be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
	High-Resolution Antialiasing	128-bit color precision Unlimited fragment instruction Unlimited vertex instruction 3D volumetric texture support Single-system powerwall 12 pixels per clock rendering engine Hardware accelerated antialiased points & lines Hardware OpenGL overlay planes Hardware accelerated two-sided lighting Hardware accelerated clipping planes 3rd-generation occlusion culling 16 textures per pixel in fragment programs Window ID clipping functionality Hardware accelerated line stippling nView Architecture: Advanced multi-display desktop & application management seamlessly integrated into Microsoft Windows®.
	High-level Shader Languages	Optimized compiler for Cg and Microsoft® HLSL OpenGL 2.1 and DirectX 9.0c support Open source compiler
NVIDIA Quadro FX 4800 1.5GB PCIe Graphics Card	**Form Factor**	4.36" (H) x 10.5" (L) Dual slot card
	Graphics Controller	NVIDIA Quadro FX 4800 graphics board
	Bus Type	PCI Express x16, Generation 2.0
	Memory	1.5 GB GDDR3 SDRAM unified graphics memory
	Connectors	2 DisplayPort, 1 Dual-Link DVI-I, 1 3-pin Mini DIN stereo output, Two DisplayPort to DVI-D adapters included ('DisplayPort to VGA' and 'DisplayPort to Dual Link DVI' adapters available as an accessory)
	Maximum Resolution	• 2 DisplayPort connectors support ultra-high-resolution panels (up to 2560 x 1600) • Dual-link DVI-I output drives one digital display at resolutions up to 2560 x 1600 @ 60Hz • Internal 400 MHz DACs-One analog display up to 2048 x 1536 @ 85Hz

Technical Specifications - Graphics

	Shading Architecture	• Full Shader Model 4.0 (OpenGL 2.1/DirectX 10 class) • Long fragment programs (unlimited instructions) • Long vertex programs (unlimited instructions) • Looping and subroutines (up to 256 loops per vertex program) • Dynamic flow control • Conditional execution
	Supported Graphics APIs	OpenGL 3.0 Direct X 10.0
	Available Graphics Drivers	Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) WS4 & 5 Desktop/Workstation Qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/eng/software_drivers.html Novell SUSE Linux Enterprise drivers may be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com
	High-Resolution AntiAliasing	• Rotated Grid Full-Scene Antialiasing (RG FSAA) • 32xFSAA dramatically reduces visual aliasing artifacts or "jaggies" at resolution up to 1920 x 1200 • 64x FSAA SLI Mode
	High-level Shader Languages	• Optimized compiler for Cg and Microsoft HLSL • OpenGL 2.1 and DirectX 10 support • Open source compiler
	Power consumption	146 Watts
NVIDIA Quadro CX	**Form Factor**	4.36" (H) x 10.5" (L) Dual slot card
	Graphics Controller	NVIDIA Quadro CX 1.5GB Graphics Card
	Bus Type	PCI Express x16, Generation 2.0
	Memory	1.5 GB GDDR3 SDRAM unified graphics memory
	Connectors	2 DisplayPort, 1 Dual-Link DVI-I, 1 3-pin Mini DIN stereo output. Two DisplayPort to DVI-D adapters included ('DisplayPort to VGA' and 'DisplayPort to Dual Link DVI' adapters available as an accessory)
	Maximum Resolution	• 2 DisplayPort connectors support ultra-high-resolution panels (up to 2560 x 1600) • Dual-link DVI-I output drives one digital display at resolutions up to 2560 x 1600 @ 60Hz • Internal 400 MHz DACs-One analog display up to 2048 x 1536 @ 85Hz
	RAMDAC	400MHz
	Shading Architecture	• Full Shader Model 4.0 (OpenGL 2.1/DirectX 10 class) • Long fragment programs (unlimited instructions) • Long vertex programs (unlimited instructions) • Looping and subroutines (up to 256 loops per vertex program) • Dynamic flow control • Conditional execution

Technical Specifications - Graphics

	Supported Graphics APIs	OpenGL 2.1 Direct X 10.0
	Available Graphics Drivers	Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/eng/software_drivers.html
	High-Resolution AntiAliasing	• Rotated Grid Full-Scene Antialiasing (RG FSAA) • 32xFSAA dramatically reduces visual aliasing artifacts or "jaggies" at resolution up to 1920 x 1200 • 64x FSAA SLI Mode
	High-level Shader Languages	• Optimized compiler for Cg and Microsoft HLSL • OpenGL 2.1 and DirectX 10 support • Open source compiler
	Power consumption	146 Watts

ATI FireGL V7700 512MB PCIe Graphics Card	**Form Factor**	ATX
	Graphics Controller	RV670
	Bus Type	PCI Express x16 (PCI 2.0)
	Memory	512 MB unified frame buffer, Z-buffer and Texture storage and a 256-bit Ring-Bus memory controller
	Connectors	One DisplayPort Output One dual-link DVI connector One stereo 3D Output
	Maximum Resolution	Dual Link digital support for 2560 x 1600 @ 60Hz. Ideal for 30-inch widescreen displays.
	RAMDAC	Dual 10-bit per channel 400MHz
	Ring Bus Memory Controller	512-bit internal ring bus for highly efficient memory reads Programmable intelligent arbitration logic
	Display Output	Up to 16-bit per RGB color component High Dynamic Range output (HDR) Programmable piecewise linear gamma correction, color correction, and color space conversion (10-bits per color)
	Shading Architecture	Supports Full Shader Model 4.0 320 shader processing unit
	Supported Graphics APIs	DirectX 10.1 and OpenGL 2.1 advanced
	Available Graphics Drivers	Microsoft Windows Vista 32 and 64, Microsoft Windows XP HP qualified drivers may be preloaded or available from the HP support web site: http://welcome.hp.com/country/us/eng/software_drivers.html.
	Option kit contents	PCA with ATX bracket, DVI to VGA converters, CD and manual.

Technical Specifications - Hard Drives

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

	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.2 ms
		Average	3.5 ms
		Full Stroke	6.7 ms
	Rotational Speed	15,000 rpm	
	Logical Blocks	86,749,488 - 512 byte blocks	
	Operating Temperature	50 to 95 F (10 to 35 C)	
73 GB SAS 15K rpm 3Gb/s HDD	**Capacity**	73 GB	
	Height	1 in; 2.5 cm	
	Width	**Media Diameter**	3.5 in; 8.9 cm
		Physical Size	4 in; 10.2 cm
	Interface	SAS	
	Synchronous Transfer Rate (Maximum)	3.0 Gb/s	
	Buffer	16 Mbytes	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.2 ms
		Average	3.5 ms
		Full Stroke	6.7 ms
	Rotational Speed	15,000 rpm	
	Logical Blocks	143,374,738 - 512 byte blocks	
	Operating Temperature	50 to 95 F (10 to 35 C)	
146 GB SAS 10K rpm SFF HDD	**Capacity**	146 GB	
	Height	0.583 in; 1.5 cm	
	Width	**Media Diameter**	2.5 in; 6.36 cm
		Physical Size	2.76 in; 7 cm
	Interface	SAS	
	Synchronous Transfer Rate (Maximum)	1.5 Gb/s	
	Buffer	16 Mbytes	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.4 ms
		Average	<4.0 ms
		Full Stroke	<8.2 ms
	Rotational Speed	10,000 rpm	
	Logical Blocks	286,749,488 - 512 byte blocks	
	Operating Temperature	50 to 95 F (10 to 35 C)	
73 GB SAS	**Capacity**	73 GB	

Technical Specifications - Hard Drives

	10K rpm SFF HDD	**Height**	0.583 in; 1.5 cm	
		Width	**Media Diameter**	2.5 in; 6.36 cm
			Physical Size	2.76 in; 7 cm
		Interface	SAS	
		Synchronous Transfer Rate (Maximum)	1.5 Gb/s	
		Buffer	16 Mbytes	
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.4 ms
			Average	4.0 ms
			Full Stroke	8.2 ms
		Rotational Speed	10,000 rpm	
		Logical Blocks	143,374,738 - 512 byte blocks	
		Operating Temperature	50 to 95 F (10 to 35 C)	
SATA (Serial ATA) Hard Drives for HP Workstations	**300GB SATA 10K rpm SFF in 3.5" Frame HDD**	**Capacity**	300,069,052,416 bytes	
		Height	1 in; 2.54 cm	
		Width	**Media Diameter**	2.5 in; 6.36 cm
			Physical Size	4 in; 10.17 cm
		Interface	Serial ATA (3.0 Gb/s), Native Command Queuing enabled	
		Synchronous Transfer Rate (Maximum)	Up to 300 MB/s	
		Cache	16 MB	
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.7 ms (maximum)
			Average	4.4 ms
			Full Stroke	9.5 ms
		Rotational Speed	10,000 rpm	
		Logical Blocks	586,072,368	
		Operating Temperature	41° to 131° F (5° to 55° C)	
	160GB SATA 10K rpm SFF in 3.5" Frame HDD	**Capacity**	160,041,885,696 bytes	
		Height	1 in; 2.5 cm	
		Width	**Media Diameter**	2.5 in; 6.36 cm
			Physical Size	4 in; 10.2 cm
		Interface	Serial ATA (1.5 Gb/s), Native Command Queuing enabled	
		Synchronous Transfer Rate (Maximum)	Up to 300 MB/s	
		Buffer	16 MB	

Technical Specifications - Hard Drives

	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.7 ms (maximum)
		Average	4.4 ms
		Full Stroke	9.5 ms
	Rotational Speed	10,000 rpm	
	Logical Blocks	312,581,808	
	Operating Temperature	41° to 131° F (5° to 55° C)	
80GB SATA 10K rpm SFF in 3.5" Frame HDD	**Capacity**	80,026,361,856 bytes	
	Height	1 in; 2.5 cm	
	Width	**Media Diameter**	2.5 in; 6.36 cm
		Physical Size	4 in; 10.2 cm
	Interface	Serial ATA (1.5 Gb/s), Native Command Queuing enabled	
	Synchronous Transfer Rate (Maximum)	Up to 300 MB/s	
	Buffer	16 Mbytes	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.7 ms (maximum)
		Average	4.4 ms
		Full Stroke	19.5 ms
	Rotational Speed	10,000 rpm	
	Logical Blocks	156,301,488	
	Operating Temperature	41° to 131° F (5° to 55° C)	
1000GB (1TB) SATA 7200 rpm 3.0Gb/s 3.5" HDD	**Capacity**	1,000,204,886,016 bytes	
	Height	1 in; 2.5 cm	
	Width	**Media Diameter**	3.5 in; 8.9 cm
		Physical Size	4 in; 10.2 cm
	Interface	Serial ATA (3.0 Gb/s), Native Command Queuing enabled	
	Synchronous Transfer Rate (Maximum)	Up to 300 MB/s	
	Buffer	32 MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	2 ms
		Average	11 ms
		Full Stroke	21 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	1,953,525,168	
	Operating Temperature	41° to 131° F (5° to 55° C)	
500GB SATA	**Capacity**	500,107,862,016 bytes	

Technical Specifications - Hard Drives

7200 rpm 3Gb/s 3.5" HDD	**Height**	1 in; 2.5 cm	
	Width	**Media Diameter**	3.5 in; 8.9 cm
		Physical Size	4 in; 10.2 cm
	Interface	Serial ATA (3.0 Gb/s), Native Command Queuing enabled	
	Synchronous Transfer Rate (Maximum)	300 MB/s	
	Buffer	16 MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	2 ms
		Average	11 ms
		Full Stroke	21 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	976,773,168	
	Operating Temperature	41° to 131° F (5° to 55° C)	

250GB SATA 7200 rpm 3Gb/s 3.5" HDD (for HP xw-Workstations)	**Capacity**	250,059,350,016 bytes	
	Height	1 in; 2.5 cm	
	Width	**Media Diameter**	3.5 in; 8.9 cm
		Physical Size	4 in; 10.2 cm
	Interface	Serial ATA (3.0 Gb/s), Native Command Queuing enabled	
	Synchronous Transfer Rate (Maximum)	300 MB/s	
	Buffer	16 MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	2 ms
		Average	11 ms
		Full Stroke	21 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	488,397,168	
	Operating Temperature	41° to 131° F (5° to 55° C)	

160GB SATA 7200 rpm 3Gb/s 3.5" HDD	**Capacity**	160,041,885,696 bytes	
	Height	1 in; 2.5 cm	
	Width	**Media Diameter**	3.5 in; 8.9 cm
		Physical Size	4 in; 10.2 cm
	Interface	Serial ATA (3.0 Gb/s), Native Command Queuing enabled	
	Synchronous Transfer Rate (Maximum)	300 MB/s	
	Buffer	8 MB	

Technical Specifications - Hard Drives

	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	2 ms
		Average	11 ms
		Full Stroke	21 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	312,581,808	
	Operating Temperature	41° to 131° F (5° to 55° C)	
80GB SATA 7200 rpm 3Gb/s 3.5" HDD	**Capacity**	80,026,361,856 bytes	
	Height	1 in; 2.5 cm	
	Width	**Media Diameter**	3.5 in; 8.9 cm
		Physical Size	4 in; 10.2 cm
	Interface	Serial ATA (3.0 Gb/s)	
	Synchronous Transfer Rate (Maximum)	300 MB/s	
	Buffer	8 MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	2 ms
		Average	11 ms
		Full Stroke	21 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	156,301,488	
	Operating Temperature	41° to 131° F (5° to 55° C)	

Technical Specifications - Hard Drive Controllers

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

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

Technical Specifications - Hard Drive Controllers

Maximum Number of SCSI DeviceS	32
LED Indicators	Connector LEDs indicate whether the internal or external connector is active for ports 0-3 and 4-7

Technical Specifications - Multimedia and Audio Devices

SoundBlaster X-Fi XtremeGamer Audio Card (PCI)	**24-bit Analog-to-Digital conversion of analog inputs**	96kHz sample rate
	24-bit Digital-to-Analog conversion of digital sources	96kHz to analog 7:1 speaker output
	24-bit Digital-to-Analog conversion of stereo digital sources	8, 11.025, 16, 22.05, 24, 32, 44.1, 48 and 96kHz
	16-bit to 24-bit recording sampling rates	16-bit/44.1kHz, 16-bit/48kHz, 24-bit/44.1kHz, 24-bit/48kHz and 24-bit/96kHz with direct monitoring
	Enhanced SoundFont support	Up to 24-bit resolution
	Signal-to-Noise Ratio (2okHz Low-pass filter, A-Weighted)	Stereo Output 109dB Front and Rear Channels 109dB Center, Subwoofer and Side Channels 109dB
	Total Harmonic Distortion + Noise at 1kHz (20kHz Low-pass filter)	0.004%
	Frequency Response (-3dB, 24-bit/96kHz input)	10Hz to 46kHz
	Frequency Response (-3dB, 24-bit/192kHz input)	10Hz to 46kHz
	Speaker and Headphone connections	Stereo to 7.1 (Line Out via three 3.5mm mini jacks)
	Flexijack	Line In/ Microphone In/Optical Outi via shared 3.5mm mini jack
	Auxiliary Line Level Input	4-pin molex connector
	Front Panel Header	Intel HD Audio Compatible (1x10 pin)
	Operating System	EntMicrosoft Windows Vista Business 64 Microsoft Windows Vista Business 32 Microsoft® Windows® XP Professional SP2 Microsoft Windows XP Professional x64 Edition

Technical Specifications - Multimedia and Audio Devices

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

Technical Specifications - Optical and Removable Storage

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

HP DVD+/-RW Drive	**Description**	5.25-inch, half-height, tray-load
	Mounting Orientation	Either horizontal or vertical
	Interface Type	SATA/ATAPI

Technical Specifications - Optical and Removable Storage

Dimensions (WxHxD)	5.9 x 1.7 x 8.0 in (15.0 x 4.4 x 20.3 cm)		
Disc Formats	DVD-RAM DVD+R DVD+RW DVD+R DL DVD-R DL DVD-R DVD-RW CD-R CD-RW		
Disc Capacity	**DVD-ROM**	8.5 GB DL or 4.7 GB standard	
	Full Stroke DVD	< 250 ms (seek)	
	Full Stroke CD	< 210 ms (seek)	
Maximum Data Transfer Rates	**CD ROM Read**	CD-ROM, CD-R Up to 40X CD-RW Up to 32X	
	DVD ROM Read	DVD-RAM	Up to 12X
		DVD+RW	Up to 8X
		DVD-RW	Up to 8X
		DVD+R DL	Up to 8X
		DVD-R DL	Up to 8X
		DVD-ROM	Up to 16X
		DVD-ROM DL	Up to 8X
		DVD+R	Up to 16X
		DVD-R	Up to 16X
Power	**Source**	SATA DC power receptacle	
	DC Power Requirements	5 VDC ± 5%-100 mV ripple p-p 12 VDC ± 5%-200 mV ripple p-p	
	DC Current	5 VDC -1000 mA typical, 1600 mA maximum 12 VDC -600 mA typical, 1400 mA maximum	
Operating Environmental (all conditions non-condensing)	**Temperature**	41° to 122° F (5° to 50° C)	
	Relative Humidity	10% to 90%	
	Maximum Wet Bulb Temperature	86° F (30° C)	
	Operating Systems Supported	Windows 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	

Technical Specifications - Optical and Removable Storage

		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. * 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.

HP 16-In-1 Media Card Reader with PCI Card	**Interface Type**	USB 2.0 High-speed device	
	Dimensions (WxHxD)	5.7 x 5.86 x 1.68 in (145 x 148.9 x 42.7 mm)	
	Supported Media Types	MicroSD (T-Flash, including MicroSD HC) Memory Stick Micro MS Micro (M2)	
	Operating Environmental (all conditions non-condensing)	**Temperature**	Operating Extremes Test Parameters/Conditions - Power applied, unit operating on system ±5% nominal supply voltage. 10°C 10% R.H. = 24 hours 10°C 90% R.H. = 24 hours 20°C 90% R.H. =24 hours 30°C 90% R.H. = 24 hours 40°C 90% R.H. = 24 hours 50°C 90% R.H. = 24 hours 50°C 10% R.H. = 24 hours Storage Extremes Test Parameters/Conditions 60°C @ 80% R.H. for 96 hours -30°C @ 20% R.H. for 48 hours No power applied Delta °C < 1.0°C/min Delta % R.H. < 1.5% R.H./min
	Certifications/Approvals	USB-IF, WHQL, Compliant with USB Mass Storage Class Bulk only Transport Specification Rev. 1.0, Compliant Intel Front Panel I/O Connectivity Design Guide V. 1.2 FCC, CE, BSMI, C-Tick, VCCI, MIC, cUL, TUV-T	
	Operating Systems Supported	Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32*. No driver is required for this device. Native support is provided by the operating	

Technical Specifications - Optical and Removable Storage

	system. * Certain Windows Vista product features require advanced or additional hardware. See http://www.microsoft.com/windowsvista/getready/hardwarereqs.mspx and http://www.microsoft.com/windowsvista/getready/capable.mspx for details. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit http://www.windowsvista.com/upgradeadvisor. Windows Vista Business disk also included for future upgrade if desired. For Windows Vista system requirements, visit http://www.windowsvista.com/systemrequirements.
Kit Contents	Media reader in 5.25" bracket with USB cable attached, PCI card with full height bracket attached, ½ height bracket for PCI card, Install Guide, IO & Security Software and Documentation CD
Weight	4 lbs (1.81 kg)
Advance Protocol Support	Supports hardware ECC (Error Correction Code) function Supports hardware CRC (Cyclic Redundancy Check) function Supports MS 4-bit parallel transfer mode Supports MS-PRO 4-bit parallel transfer mode Supports SD 4-bit parallel transfer mode Supports high-speed 50Mhz SD 4-bit card (version 1.1) Support high-speed 52Mhz MultiMediaCard 8-bit card (version 4.x)

Technical Specifications - Networking and Communications

NOTE 1: The term "10/100/1000" or "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.

Broadcom 5751 NetXtreme Gigabit Ethernet PCIe NIC	**Connector**	RJ-45
	Controller	Broadcom 5751 PCI-Express LAN Controller
	Memory	Integrated 96Kb frame buffer memory
	Data Rates Supported	10/100/1000 Mbps
	Compliance	IEEE 802.1P, 802.1Q, 802.2, 802.3, 802.3AB and 802.3u compliant, 802.3x flow control
	Bus Architecture	PCI-E
	Data Path Width	Single channel, PCI-E
	Data Transfer Mode	Bus-master DMA
	Hardware Certifications	FCC, B, CE, TUV- cTUVus Mark Canada and United States, TUV- GS Mark for European Union
	Power Requirement	3.1 watts @ +3.3V AUX supply with 5V tolerance
	Boot ROM Support	Yes
	Network Transfer Mode	Full-duplex Half-duplex (not available for the 1000BASE-T transceiver)
	Network Transfer Rate	10BASE-T (half-duplex) 10 Mbps 10BASE-T (full-duplex) 20 Mbps 100BASE-TX (half-duplex) 100 Mbps 100BASE-TX (full-duplex) 200 Mbps 1000BASE-T (full-duplex) 2000 Mbps
	Operating Temperature	32° to 131°F (0° to 55° C)
	Operating Humidity	85% at 131° F (55° C)
	Dimensions	4.4 x 2.2 x 0.08 in (11.2 x 5.5 x 2 cm)
	Operating System Driver Support	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.
	Management Capabilities	ACPI, WOL and DMI 2.0, PXE 2.0, WfM 2.0, Broadcom mgmt utility
	Kit Contents	Broadcom 5751, CD, Broadcom 5751 Netxtreme Gigabit PCIe NIC, drivers, quick install guide, product warranty statement

Technical Specifications - Networking and Communications

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

Technical Specifications - Controller Cards

HP FireWire® 800 IEEE-1394b 3-Port PCI Card	**Data Transfer Rate**	Supports up to 800 Mb/s
	Devices Supported	IEEE-1394 compliant devices
	Bus Type	PCI card with brackets for low profile and full height PCI slots
	Ports	Two IEEE-1394b bilingual 9-Pin Connectors (Rear)
	Internal Connectors	One 10-Pin header Custom Connector
	System Requirements	Microsoft® Windows® XP Professional, Windows XP Home Not supported on Linux. Pentium® III or higher processor 128 MB RAM 1 GB Hard Drive CD-ROM drive Built-in sound system Available PCI slot
	Temperature - Operating	50° to 131° F (10° to 55° C)
	Temperature - Storage	-22° to 140° F (-30° to 60° C)
	Relative Humidity - Operating	20% to 80%
	Compliances	FCC Part 15B, cULus 60950, CE Mark EN55022B(1995)/EN55024-1998 STD, Taiwan BSMI CNS13438, Korea MIC
	Operating Systems Supported	Microsoft Windows XP Only

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

Technical Specifications - Controller Cards

	1-GB Hard Drive CD-ROM drive Built-in sound system Available PCI slot
Temperature - Operating	50° to 131° F (10° to 55° C)
Temperature - Storage	-22° to 140° F (-30° to 60° C)
Relative Humidity - Operating	20% to 80%
Operating Systems Supported	Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32* * Certain Windows Vista product features require advanced or additional hardware. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit: http://www.windowsvista.com/upgradeadvisor. For Windows Vista system requirements, visit: http://www.windowsvista.com/systemrequirements.