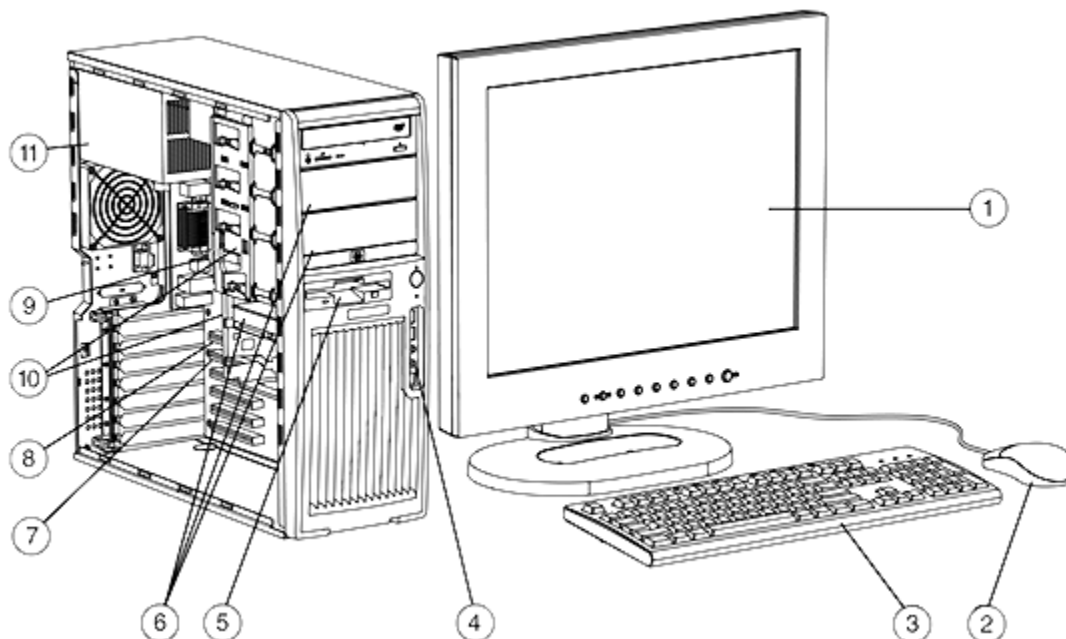


### Overview

HP recommends Windows Vista® Business



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

### Overview

#### At A Glance

- Choice of Operating Systems:
  - Genuine Windows Vista® Business 32-bit
  - Genuine Windows Vista® Business 64-bit
  - Genuine Windows Vista® 32-bit downgrade to Genuine Microsoft® Windows® XP Professional 32-bit
  - Genuine Windows Vista® 64-bit downgrade to Genuine Microsoft® Windows® XP Professional 64-bit
  - Red Hat Enterprise Linux® WS 4 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>) Red Flag Linux v5 (available in China only)  
For detailed OS/hardware support information for Linux, see: [http://www.hp.com/support/linux\\_hardware\\_matrix](http://www.hp.com/support/linux_hardware_matrix)
- Intel Core™ 2 Extreme processor with Intel® 64 Architecture
  - Quad-Core
  - 1333 MHz Front Side Bus
  - 8 MB L2 cache (2x4 MB shared)
  - Virtualization Technology on most processors
- Intel Core™ 2 Quad-Core processor with Intel® 64 Architecture
  - Quad-Core
  - 1066 MHz Front Side Bus
  - 8 MB L2 cache (2x4 MB shared)
  - Virtualization Technology available with most processor options.
- Intel Core™ 2 Duo processor with Intel® 64 Architecture
  - Dual-Core
  - 800 or 1333 MHz Front Side Bus
  - 2 or 4 MB shared L2 cache
  - Virtualization Technology
- Intel® Pentium® Dual-Core Processor with Intel® 64 Architecture
  - Dual-core
  - 800 MHz Front Side Bus
  - 1 MB dedicated L2 cache
- Intel X38 Express chipset
- Integrated HP Gbit LAN by Broadcom
- 1333, 1066 or 800 MHz processor front side bus support
- Convertible and tool-less minitower chassis
- 4 PCI Express /3 PCI slots
- Dual channel ECC DDR2 memory at 667 or 800 MHz
- Six channel SATA Controller with RAID\* (Factory integrated RAID is Microsoft Windows only)
- Realtek integrated high definition audio with internal speaker
- Pre-loaded Manageability tools (Microsoft Windows only)
- ENERGY STAR 4.0 Compliance with energy-saving features available on selected configurations (Not supported by Linux)
- Protected by HP Services, including a 3 years parts, 3 years labor, and 3 years onsite service (3/3/3) standard warranty. Terms and conditions vary by country. Certain restrictions and exclusions apply.

\*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.

### Standard Features - Specs

#### Processor and Speed – All processors feature Intel® 64 Architecture

One of the following

Intel Core 2 Extreme QX6850 processor / 3.0 GHz, 4 MB x 2, 1333 FSB, Quad-Core  
Intel Core 2 Quad Q6700 processor / 2.66 GHz, 4 MB x 2, 1066 FSB, Quad-Core  
Intel Core 2 Quad Extreme QX9650 processor / 3.00 GHz, 4 MB x 2, 1066 FSB, Quad-Core  
Intel Core 2 Quad Extreme Q6600 processor / 2.40 GHz, 4 MB x 2, 1066 FSB, Quad-Core  
Intel Core 2 Duo E6850 Processor/ 3.00 GHz, 4 MB L2 (shared), 1333 MHz FSB, Dual-Core  
Intel Core 2 Duo E6750 Processor/ 2.66 GHz, 4 MB L2 (shared), 1333 MHz FSB, Dual-Core  
Intel Core 2 Duo E6550 Processor/ 2.33 GHz, 4 MB L2 (shared), 1333 MHz FSB, Dual-Core  
Intel Core 2 Duo E4500 Processor/ 2.20 GHz, 2 MB L2 (shared), 800 MHz FSB, Dual-Core  
Intel Pentium Dual-Core Processor E2180/ 2.00 GHz, 1 MB L2 (shared), 800 MHz FSB, Dual-Core

All processors except the Pentium Dual-Core E2180 and Intel Core 2 Duo E4500 support Intel Virtualization Technology. Intel Virtualization Technology requires a computer system with a processor, chipset, BIOS, virtual machine monitor (VMM) and applications enabled for virtualization technology. Functionality, performance or other virtualization technology benefits will vary depending on hardware and software configurations.

Intel processor numbers are not a measurement of higher performance. Processor numbers differentiate features within each processor family, not across different processor families. See [http://www.intel.com/products/processor\\_number/](http://www.intel.com/products/processor_number/) for details. Intel® 64 Architecture requires a computer system with a processor, chipset, BIOS, operating system, device drivers, and applications enabled for Intel® 64 Architecture. Processor will not operate (including 32-bit operation) without an Intel® 64 Architecture-enabled BIOS.

Performance will vary depending on your hardware and software configurations. See <http://www.intel.com/technology/64bitextensions> for more information including details on which processors support Intel® 64 Architecture or consult with your system vendor for more information.

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#### Operating System –

One of the following

Genuine Windows Vista® Business 32-bit  
Genuine Windows Vista® Business 64-bit  
Genuine Windows Vista® 32-bit downgrade to Genuine Microsoft® Windows® XP Professional 32-bit  
Genuine Windows Vista® 64-bit downgrade to Genuine Microsoft® Windows® XP Professional 64-bit  
Preloaded:  
Red Hat Enterprise Linux® WS 4 64-bit  
Or  
Red Flag Linux v5 (available in China only)  
HP 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](http://www.hp.com/support/linux_hardware_matrix)

### Standard Features - Specs

1-3 Hard Disk Drives – Up to 3 of the following SATA drives, or 3 of the following SAS drives		Windows Vista <sup>i</sup>	Windows XP	Red Hat Linux
<b>SATA Hard Drives</b>				
	80 GB 7200 rpm SATA 3.0 Gb/s NCQ	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop
	160 GB 7200 rpm SATA 3.0 Gb/s NCQ	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop
	250 GB 7200 rpm SATA 3.0Gb/s NCQ	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop
	500 GB 7200 rpm SATA 3.0Gb/s NCQ	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop
	1 TB 7200 rpm SATA 3.0 Gb/s NCQ	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop
	80 GB 10K rpm SATA NCQ	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop
	160 GB 10K rpm SATA NCQ	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop
<b>Serial Attached SCSI (SAS) Hard Drives (SAS controller required)</b>				
	73 GB 15K rpm SAS 3.0 Gb/s	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop
	146 GB 15K rpm SAS 3.0 Gb/s	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop
	300 GB 15K rpm SAS 3.0 Gb/s	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop

4th Hard Disk Drive – One of the following (not supported with 2nd optical drive)		Windows Vista <sup>i</sup>	Windows XP	Red Hat Linux
<b>SATA 3.0 Gb/s Hard Drives</b>				
	160 GB 7200 rpm SATA 3.0 Gb/s NCQ drive	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop
	1 TB 7200 rpm SATA 3.0 Gb/s NCQ	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop
<b>Serial Attached SCSI (SAS) Drives (SAS controller required)</b>				
	300 GB 15K rpm SAS 3.0 Gb/s drive	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop
	146 GB 15K rpm SAS 3.0 Gb/s	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop
	300 GB 15K rpm SAS 3.0 Gb/s	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop

Factory Integrated RAID (on motherboard for SATA drives)		Windows Vista <sup>i</sup>	Windows XP	Red Hat Linux
	RAID 0 Configuration - Striped Array (SATA or SAS)	32-Bit, 64-Bit	32-Bit, 64-Bit	Not supported
	RAID 0 Data Configuration -	32-Bit, 64-Bit	32-Bit, 64-Bit	Not supported
	RAID 1 Configuration - Mirrored Array (SATA or SAS, 2 drive max.)	32-Bit, 64-Bit	32-Bit, 64-Bit	Not supported
All drives must be identical in type and capacity				
All RAID arrays must be less than 2 TB	<b>NOTE:</b> Requires identical hard drives (speeds, capacity, interface). (HW RAID functionality not supported by Linux)			

### Standard Features - Specs

Drive controllers	Windows Vista <sup>i</sup>	Windows XP	Red Hat Linux
Integrated 6-channel SATA 3.0 Gb/s controller with RAID* 0, 1, 5, 10 and NCQ	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop
Optional 4-port SAS LSI 3041E 3.0 Gb/s RAID* Card**	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop

**NOTE:**

\* 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.

\*\* Not supported when HD drive 1 is SATA

Memory – One of the following	Windows Vista	Windows XP	Red Hat Linux
<b>DDR2-667 ECC Unbuffered RAM DIMMs</b>			
HP 512 MB (1 x 512 MB) PC2-5300E DDR2-667 ECC	32-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop
HP 1 GB (2 x 512 MB) PC2-5300E DDR2-667 ECC	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop
HP 2 GB (2 x 1 GB) PC2-5300E DDR2-667 ECC	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop
<b>DDR2-800 ECC Unbuffered RAM DIMMs</b>			
HP 512 MB (1 x 512 MB) PC2-6400E DDR2-800 ECC	32-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop
HP 1 GB (2 x 512 MB) PC2-6400E DDR2-800 ECC	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop
HP 2 GB (2 x 1 GB) PC2-6400E DDR2-800 ECC	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop
HP 3 GB (2 x 512 + 2 x 1 GB) PC2-6400E DDR2-800 ECC	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop
HP 4 GB (2 x 2 GB) PC2-6400E DDR2-800 ECC	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop
HP 4 GB (4 x 1 GB) PC2-6400E DDR2-800 ECC	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop
HP 8 GB (4 x 2 GB) PC2-6400E DDR2-800 ECC	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop

**NOTE:** Only unbuffered DDR2 DIMMs are supported. All DIMMs must be either x8 or x16 width.

### Standard Features - Specs

Removable Storage		Windows Vista <sup>i</sup>	Windows XP	Red Hat Linux
0 or 1 floppy drive Up to 2 optical drives	<b>FDD Floppy drive</b>			
	1.44 MB Diskette Drive (1 only)	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop
	<b>Optical drives</b>			
	SATA 16X DVD-ROM*	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop
	SATA 48X CD-RW/DVD-ROM Combo Drive	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop
	SATA 16X DVD+/-RW, Supermulti with Lightscribe**	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop

\* Not supported as a 2nd drive option.  
 \*\* LightScribe creates a grayscale image similar to black and white photography. LightScribe media required and sold separately. Double-layer discs can store more data than single layer discs. However, double-layer discs burned with this drive may not be compatible with many existing single-layer DVD drives and players.

Input Devices		Windows Vista <sup>i</sup>	Windows XP	Red Hat Enterprise Linux
<b>Keyboard</b> – One of the following	PS/2 Standard Keyboard	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop
	USB Standard Keyboard	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop
<b>Mouse</b> – One of the following	PS/2 2-Button Scroll Mouse (optical)	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop
	USB 2-Button Scroll Mouse (optical)	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop
	USB 3-Button Mouse (optical)	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop

Audio		Windows Vista <sup>i</sup>	Windows XP	Red Hat Linux
Integrated High Definition audio with internal speaker	Integrated High Definition audio with internal speaker	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop
	Sound Blaster X-Fi XtremeMusic Audio Card	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop (configure-to-order expected availability in March 2008)

NIC (Network Interface Controller)		Windows Vista <sup>i</sup>	Windows XP	Red Hat Enterprise Linux
	Integrated PCIe Broadcom 5755 Netxtreme Gigabit Ethernet NIC	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop

### Standard Features - Specs

PCI Express Graphics	Windows Vista <sup>i</sup>	Windows XP	Red Hat Linux
<b>Professional 2D</b>			
NVIDIA Quadro NVS 290 PCIe (256 MB) - 1 or 2 of these cards are supported - 2nd card must be NVS 290 or NVS 440	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop
NVIDIA Quadro NVS 440 PCIe (256 MB) - 1 or 2 of these cards are supported - 2nd card must be NVS 290 or NVS 440	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop
<b>Entry 3D</b>			
NVIDIA Quadro FX 370 PCIe (256 MB) - 1 or 2 of these cards are supported - 2nd card must match first	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop
NVIDIA Quadro FX 570 PCIe (256 MB) - 1 or 2 of these cards are supported - 2nd card must match first	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop
<b>Mid-range 3D</b>			
NVIDIA Quadro FX 1700 PCIe (512 MB) - 1 or 2 of these cards are supported - 2nd card must match first	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop
ATI FireGL V5600 PCIe (512 MB) - 1 or 2 of these cards are supported - 2nd card must match first	32-Bit, 64-Bit	32-Bit, 64-Bit	Not supported
<b>High-end 3D</b>			
NVIDIA Quadro FX 3500 PCIe (256 MB)	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop
NVIDIA Quadro FX 4600 PCIe (768 MB)**	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop
** This card consumes 2 PCIe slots, reducing the maximum number of PCI cards in a system			

Miscellaneous	Windows Vista <sup>i</sup>	Windows XP	Red Hat Linux
Solenoid lock and hood sensor	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop
Configure minitower in desktop orientation	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop
HP IEEE 1394a 3-Port PCI Card	32-Bit, 64-Bit	32-Bit, 64-Bit	Not Supported

### Standard Features - Specs

Software	Windows Vista <sup>1</sup>	Windows XP	Red Hat Linux
<b>Standard</b>			
Alert Standard Format specification	N/A	N/A	N/A
<b>Standard</b>			
Alert Standard Format specification	32-Bit, 64-Bit	32-Bit, 64-Bit	N/A
HP Performance Tuning Framework	32-Bit, 64-Bit	32-Bit, 64-Bit	N/A
HP Backup and Recovery	32-Bit, 64-Bit	32-Bit, 64-Bit	N/A
PDF Complete	32-Bit, 64-Bit	32-Bit, 64-Bit	N/A
<b>Optional</b>			
PDF Complete	32-Bit	32-Bit, 64-Bit	N/A
<b>Optional</b>			
Microsoft Office 2007 Small Business Edition	32-Bit	32-Bit, 64-Bit	N/A
HP ProtectTools Security	32-Bit	32-Bit, 64-Bit	N/A
Symantec AntiVirus for Vista	32-Bit, 64-Bit	N/A	N/A
Symantec AntiVirus for XP	N/A	32-Bit, 64-Bit	N/A

<b>Form Factor</b>	Minitower
<b>Color</b>	Carbonite/Alloy metallic
<b>Convertibility</b>	Yes. 5.25" drives rotate for Minitower or Desktop orientation.
<b>Expansion Slots</b> (see system board section for more details)	<ul style="list-style-type: none"> <li>• 3 PCI slots (full-height, full-length)</li> <li>• 1 PCI Express x8 slot (x4 functionality)</li> <li>• 1 PCI Express x1 slot (half length)</li> <li>• 2 PCI Express x16 Gen2 slots (one dedicated for graphics)</li> </ul>
<b>Expansion Bays</b> (see storage section for more details)	<ul style="list-style-type: none"> <li>• 2 internal 3.5" bays</li> <li>• 1 external 3.5" bay, 3 external 5.25" bays*</li> </ul> <p><b>NOTE:</b> Third external 5.25" bay is not full depth in side orientation.</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>NOTE:</b> Although HP Personal Workstations can be ordered with the HP Installer Kit for Linux and an IEEE 1394 card, HP cannot provide customer support for this configuration. Please refer to the Linux Hardware Support Matrix ( <a href="http://www.hp.com/support/linux_hardware_matrix">http://www.hp.com/support/linux_hardware_matrix</a> ) for details, and to the Linux User Manual ( <a href="http://www.hp.com/support/linux_user_manual">http://www.hp.com/support/linux_user_manual</a> ) for tips on user-enablement of the IEEE 1394 Card.
<b>Internal I/O</b>	1 USB 2.0 Type A Receptacle, 2 USB 2.0 headers
<b>Rear I/O</b>	7 USB 2.0, 1 serial, 1 optional serial port, parallel port, 2 PS/2, RJ-45 (NIC), 1 External SATA, 1 audio line in, 1 audio line out, 1 microphone in; audio ports can be retasked to function as line in, line out, microphone, or headphone.
<b>Interfaces Supported</b>	1 SATA 3 Gb/s interface (5 internal, 1 external SATA connectors)
<b>On-board RAID Support</b>	SATA only
<b>Chassis Dimensions</b> (W x D x H)	Standard minitower orientation: 6.6 x 17.9 x 17.7 inches; 16.8 x 45.6 x 45.0 cm Converted desktop orientation: 17.7 x 17.9 x 6.6 inches; 16.8 x 45.0 x 45.6 cm
<b>Weight</b>	Exact weights depend upon configuration Minimum: 29.9 lbs (13.6 kg) Standard: 33.3 lbs (15.1 kg) Maximum: 43.3 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%



## Standard Features - Specs

<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, 80 PLUS Efficient Surge immunity up to 2000V	

### Preconfigured Global SKUs

<b>xw4600/XS3.00/F250</b> <b>/S2.0/FX570z/p</b> <b>SKU: KK961AW#ABA</b>	<b>OS</b>	Genuine Windows Vista® 32-bit downgrade to Genuine Microsoft® Windows® XP Professional 32-bit
	<b>Base unit</b>	HP xw4600 Workstation base unit
	<b>Localization kit</b>	HP xw4600 Workstation localization kits
	<b>Processor 1</b>	Intel Core 2 Duo E6850 Processor/ 3.00 GHz, 4 MB L2 (shared), 1333 MHz FSB, Dual-Core
	<b>Memory</b>	2 GB (2 x 1 GB) PC2-6400E DDR2-800 ECC
	<b>Hard Drive</b>	HP 250 GB 7200 rpm SATA 3.0Gb/s NCQ
	<b>Controller</b>	NA
	<b>Optical Drive</b>	SATA 16X DVD+/-RW, Supermulti with Lightscribe
	<b>Graphics</b>	NVIDIA Quadro FX 570 PCIe (256 MB)
	<b>Floppy disk drive</b>	NA
	<b>Keyboard</b>	HP PS/2 standard keyboard
	<b>Mouse</b>	HP USB optical scroll mouse
	<b>Security</b>	HP ProtectTools Security Software

<b>xw4600/XS3.00/F250</b> <b>/S2.0/+290d/s</b> <b>SKU: KK962AW#ABA</b>	<b>OS</b>	Genuine Windows Vista® 32-bit downgrade to Genuine Microsoft® Windows® XP Professional 32-bit
	<b>Base unit</b>	HP xw4600 Workstation base unit
	<b>Localization kit</b>	HP xw4600 Workstation localization kits
	<b>Processor 1</b>	Intel Core 2 Duo E6850 Processor/ 3.00 GHz, 4 MB L2 (shared), 1333 MHz FSB, Dual-Core
	<b>Memory</b>	2 GB (2 x 1 GB) PC2-6400E DDR2-800 ECC
	<b>Hard Drive</b>	HP 250 GB 7200 rpm SATA 3.0Gb/s NCQ
	<b>Controller</b>	NA
	<b>Optical Drive</b>	SATA 16X DVD+/-RW, Supermulti with Lightscribe
	<b>Graphics</b>	NVIDIA Quadro NVS 290 PCIe (256 MB)
	<b>Graphics (card 2)</b>	NVIDIA Quadro NVS 290 PCIe (256 MB)
	<b>Floppy disk drive</b>	NA
	<b>Keyboard</b>	HP PS/2 standard keyboard
	<b>Mouse</b>	HP PS/2 scroll mouse
	<b>Security</b>	NA

### After-Market Options

PCI-Express Graphics	Windows Vista <sup>i</sup>	Windows XP	Red Hat Linux	Part Number
<b>Professional 2D Multi Display Solutions</b>				
NVIDIA Quadro NVS 290 PCIe (256 MB) - 1 or 2 of these cards are supported - 2nd card may be NVS 290 or NVS 440	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop	GN502AA
NVIDIA Quadro NVS 440 PCIe (256 MB) - 1 or 2 of these cards are supported - 2nd card may be NVS 290 or NVS 440	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop	PT453A
HP 'DMS-59 to Dual VGA' Cable Kit	32-Bit, 64-Bit	32-Bit	WS 4 & 5 Desktop	GS567AA
<b>Entry 3D</b>				
NVIDIA Quadro FX 370 PCIe (256 MB) - 1 or 2 of these cards are supported - 2nd card must match first	32-Bit, 64-Bit	32-Bit	WS 4 & 5 Desktop	GP528AA
NVIDIA Quadro FX 570 PCIe (256 MB) - 1 or 2 of these cards are supported - 2nd card must match first	32-Bit, 64-Bit	32-Bit	WS 4 & 5 Desktop	GR521AA
<b>Mid-range 3D</b>				
NVIDIA Quadro FX 1700 PCIe (512 MB) - 1 or 2 of these cards are supported - 2nd card must match first	32-Bit, 64-Bit	32-Bit	WS 4 & 5 Desktop	GP529AA
ATI FireGL V5600 PCIe (512 MB)	32-Bit, 64-Bit	32-Bit, 64-Bit	Not supported	GT346AA
<b>High-end 3D</b>				
NVIDIA Quadro FX 3500 PCIe (256 MB)	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop	ES357AA
NVIDIA Quadro FX 4600 PCIe (768 MB)**	Not supported	32-Bit, 64-Bit	WS 4 & 5 Desktop	RV706AA
** This card consumes 2 PCIe slots, reducing the maximum number of PCI cards in a system				

### After-Market Options

Hard Drives	Windows Vista <sup>i</sup>	Windows XP	Red Hat Linux	Part Number
<b>SATA Hard Drives</b>				
HP 80 GB 10K rpm SATA	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop	EM172AA
HP 160 GB 10K rpm SATA	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop	EW222AA
HP 160 GB 7200 rpm SATA 3.0 Gb/s NCQ	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop	PV944A
HP 250 GB 7200 rpm SATA 3.0 Gb/s NCQ	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop	EA788AA
HP 500 GB 7200 rpm SATA 3.0 Gb/s NCQ	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop	PV943A
HP 1 TB 7200 rpm SATA 3.0 Gb/s NCQ	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop	GE262AA
<b>SAS Hard Drives</b>				
73 GB 15K rpm SAS 3.0 Gb/s	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop	EA329AA
146 GB 15K rpm SAS 3.0 Gb/s	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop	EA330AA
300 GB 15K rpm SAS 3.0 Gb/s	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop	EM174AA

Controllers	Windows Vista <sup>i</sup>	Windows XP	Red Hat Linux	Part Number
<b>SCSI Controllers</b>				
LSI 3041E 4-Port SAS 3 Gb/s controller, supports RAID 0, 1 1E and 10E	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop	EH417AA

**NOTE:** 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.

### After-Market Options

Input Devices	Windows Vista <sup>1</sup>	Windows XP	Red Hat Linux	Part Number
<b>Keyboards</b>				
HP PS/2 Standard Keyboard	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop	DT527A
HP USB Standard Keyboard	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop	DT528A
HP USB Smart Card Keyboard (Carbonite/Silver)	32-Bit, 64-Bit	32-Bit, 64-Bit	Not Supported	ED707AA
<b>Pointing Devices</b>				
HP PS/2 2-Button Scroll Mouse (optical)	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop	DD440B
HP USB 2-Button Scroll Mouse (optical)	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop	DC172B
HP USB 3-button mouse (optical)	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop	DY651A
HP USB SpacePilot USB 3D Input Device	32-Bit, 64-Bit	32-Bit, 64-Bit	Not Supported	EF390AA
HP SpaceExplorer USB 3D Input Device	32-Bit, 64-Bit	32-Bit, 64-Bit	Not Supported	RY429AAA

Networking / Communications	Windows Vista <sup>1</sup>	Windows XP	Red Hat Linux	Part Number
<b>NICs</b>				
Intel Pro 1000 PT Gigabit PCI Express Network Interface Card (NIC)	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop	EH352AA
Broadcom NetXtreme Gigabit Ethernet PCIe NIC	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop	EA833AA
Agere PCI High-Speed 56K International SoftModem*	32-Bit, 64-Bit	32-Bit, 64-Bit		EK694AA

**NOTE:** \* 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>

### After-Market Options

Memory (Unbuffered DIMMs)		Windows Vista <sup>1</sup>	Windows XP	Red Hat Linux	Part Number
Configurations less than 1 GB are not supported on Microsoft Vista 64 or Vista64 downgrade to XP64. Please install memory in pairs. Configurations using three DIMMs are not supported by HP.	<b>PC2-5300 DDR2-667 DIMMs (ECC Unbuffered)</b>				
	512 MB (1 x 512 MB) PC2-5300E DDR2-667 ECC	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop	PV940A
	512 MB (1 x 512 MB) PC2-6400E DDR2-800 ECC	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop	GH738AA
	1 GB (1 x 1 GB) PC2-5300E DDR2-667 ECC	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop	PV941A
	1 GB (1 x 1 GB) PC2-6400E DDR2-800 ECC	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop	GH739AA
	2 GB (1 x 2 GB) PC2-6400E DDR2-800 ECC	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop	GH740AA

Monitors	TFT displays	Part Number
	HP LP3065 30-inch Widescreen LCD Monitor	EZ320A4
	HP LP2465 24-inch Widescreen LCD Monitor	EF224A4
	HP LP2065 20-inch LCD Monitor	EF227A4
	HP L1965 19-inch LCD Monitor	RA373AA

Multimedia		Windows Vista <sup>1</sup>	Windows XP	Red Hat Linux	Part Number
	Adaptec Fireconnect 2100 Firewire (1394a) PCI Card (Windows only)	32-Bit, 64-Bit	32-Bit, 64-Bit	Not supported	PA997A
	HP FireWire 800 IEEE 1394b PCI Card	Not supported	32-Bit, 64-Bit	Not supported*	EA327AA

\* Although HP Personal Workstations can be ordered with the HP Installer Kit for Linux and an IEEE 1394a card, HP cannot provide customer support for this configuration. Please refer to the Linux Hardware Support Matrix ([http://www.hp.com/support/linux\\_hardware\\_matrix](http://www.hp.com/support/linux_hardware_matrix)) for details, and to the Linux User Manual ([http://www.hp.com/support/linux\\_user\\_manual](http://www.hp.com/support/linux_user_manual)) for tips on user-enablement of the IEEE 1394a Card.

Audio		Windows Vista <sup>1</sup>	Windows XP	Red Hat Linux	Part Number
	SoundBlaster X-Fi XtremeGamer Audio Card (Windows only)	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop (AMO expected availability in December 2007)	GE257AA
	HP USB Powered Speakers	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop	RD628AA

### After-Market Options

Removable Storage Devices	Windows Vista <sup>i</sup>	Windows XP	Red Hat Linux	Part Number
<b>FDD Floppy drive</b>				
1.44 MB Diskette Drive (1 only)	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop	DY670A
<b>Optical drives</b>				
SATA 16X DVD-ROM*	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop	EW268AA
SATA 48X CD-RW/DVD-ROM Combo Drive	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop	EW267AA
SATA 16X DVD+/-RW, Supermulti with Lightscribe**	32-Bit, 64-Bit	32-Bit, 64-Bit	WS 4 & 5 Desktop**	EW269AA
<b>Other storage options</b>				
HP 16-In-1 Media Card Reader with PCI Card	32-Bit, 64-Bit	32-Bit, 64-Bit	Not supported	EM718AA
* Cannot be 2nd drive.				
** LightScribe creates a grayscale image similar to black and white photography. LightScribe media required and sold separately. Double-layer discs can store more data than single layer discs. However, double-layer discs burned with this drive may not be compatible with many existing single-layer DVD drives and players. LightScribe software works with Microsoft Windows XP and Vista only.)				

Security	Part Number
HP Solenoid Hood Lock/Sensor Kit	DE618A
Kensington Security Cable & Lock	PC766A

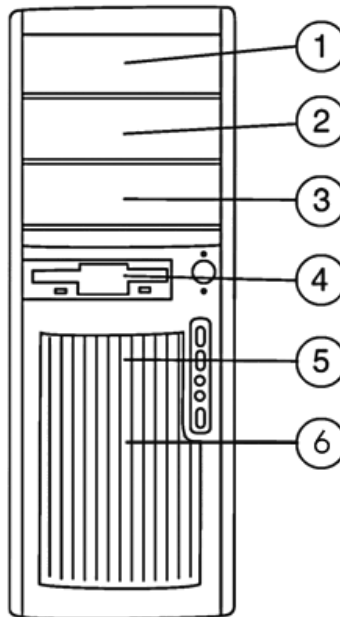
Racking Options	Part Number
HP xw4000 Depth Adjustable Fixed Rail Rack Kit	EK729AA

Other Devices	Part Number
Modem RJ11 Adapter Kit	DC131C
2nd serial port adapter	PA716A
Front Card Guide and Fan Guide Kit	DY648A
HP Optical Bay HDD Mounting Bracket	DY659A
HP Power Cord Kit	DM293A
HP Internal USB Port Kit	EM165AA

Software	Windows Vista <sup>i</sup>	Windows XP	Red Hat Linux	Part Number
HP RGS PC 3-year Software Assurance	TBD	TBD	TBD	GN039AA
HP RGS V5 PC Edition	TBD	TBD	TBD	GN038AA
HP RGS V5 Receiver Site License	TBD	TBD	TBD	GN034AA
HP RGS V5 Workstation Edition	TBD	TBD	TBD	GN035AA
HP RGS Workstation 3-year Software Assurance	TBD	TBD	TBD	GN036AA

## Storage Specifications

Tower configuration



### Convertible Minitower

	Quantity Supported	Position Supported	Controller
Optional Diskette Drive	1	4	Diskette
Optical Disk Drives	2	1, 2	SATA
Hard Disk Drives	2 standard (2 additional in Optical Bays via adapter) (4 SATA, 4 SAS)	5, 6 (and 2 or 3, for 3rd or 4th drives using optical bays, adapter kit(s) required)	SATA (and/or optional SAS) Factory Integrated RAID* 0, 1 User configurable SATA RAID 0, 1, 5, 10 standard

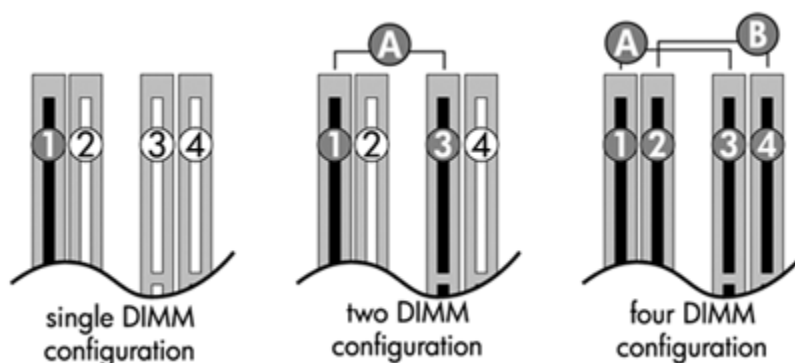
\* **NOTE:** Hardware RAID is not supported on Linux systems. The Linux kernel, with built-in software RAID, provides excellent, functionality and performance. It is a good alternative to hardware-based RAID. Please visit <http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00060684/c00060684.pdf> for RAID capabilities with Linux. Linux does not support the mixing of SATA and SAS drives.

## Memory

### PC2-5300E DDR2-667 ECC Unbuffered or PC2-6400E DDR2-800 ECC Unbuffered RAM DIMMs

Only Error Checking and Correcting unbuffered DDR2 DIMMs are supported and must be either x8 or x16 width. Memory upgrades are accomplished by adding DIMMs of the same or varied sizes. The Intel chipset supports both PC2-5300 DDR2-667 and the PC2-6400E DDR2-800 ECC unbuffered memory. It is suggested to not mix ECC and non-ECC memory.

For best performance the total amount and type of memory loaded into Channel A and Channel B should be the same. If it is not, your computer will see all the RAM installed but will run the memory controller at a lower performance mode. Although not required, for best performance add the memory in pairs rather than as a single DIMM (two 512 MB DIMMs will have better performance than a single 1 GB DIMM). Also, add the memory into both channels (e.g. one in socket 1 and one in socket 3) to take advantage of dual channel performance. If you have unused slots within a channel, make them socket 2 and socket 4. This provides the best margin for the memory bus. If you are only using 1 DIMM, install it in socket 1.



### MAXIMUM MEMORY

Supports up to 8 GB DDR2-667 or DDR2-800 ECC unbuffered memory

### POSSIBLE MEMORY CONFIGURATIONS

Not all memory configurations possible are represented below. Please install memory in pairs. Configurations using three DIMMs are not supported by HP.

DIMM Size	Slot			
	1	2	3	4
512 MB (single channel performance configuration)	512 MB			
1 GB	512 MB		512 MB	
2 GB	1 GB		1 GB	
2 GB	512 MB	512 MB	512 MB	512 MB
4 GB	1 GB	1 GB	1 GB	1 GB
4 GB	2 GB		2 GB	
6 GB	1 GB	2 GB	1 GB	2 GB
8 GB	2 GB	2 GB	2 GB	2 GB

### Technical Specifications

<b>System Board</b>	
Processor Socket	Single LGA775
CPU Bus Speed Supported	800, 1066 and 1333 MHz FSB
Chipset	Intel X38 Express North Bridge/ICH9R South Bridge
Super I/O Controller	SMSC SCH5327
System Board Form Factor	ATX 9.6 x 12 inches (243.84 x 304.8 mm)
Memory Expansion Slots	4 DDR2 memory slots
Memory Type Supported	1.8V DDR2 (ECC memory modules)
Memory Speed Supported	DDR2 SDRAM PC2-5300E (667 MHz) unbuffered ECC or DDR2 SDRAM PC2-6400E (800 MHz) unbuffered ECC
Maximum Memory	8 GB (4 DIMM slots)  <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.
Memory Protection	ECC available on data, parity on address and command
Memory Modes	Dual channel
PCI Express Connectors (Gen2 Rev 0.7 connectors)	2 PCI Express x16 Gen2 Rev 0.7 (75W+75W) 1 PCI Express x8' (x4 electrical) 1 PCI Express x1
PCI Connectors (5.0V)	2 full length, 1 half-length 33 MHz 32-Bit
Serial Attached SCSI (SAS) Supported	(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.)
SATA Interface Supported	1 SATA 3.0 Gb/s interface (5 SATA connectors); gen2
Integrated SATA RAID	<ul style="list-style-type: none"> <li>RAID 0, 1, 5*, or 10* on a single array, up to 4 hard drives depending on the RAID level supported (RAID 0 and 1 available factory integrated)</li> <li>Support for 1 or 2 RAID arrays on 4-ports for RAID 0 or 1</li> <li>RAID 1 spare and auto-rebuild</li> <li>Matrix RAID support</li> <li>AHCI support for NCQ drives</li> <li>3.0 Gb/s drive support</li> </ul> <p><b>NOTE:</b> 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>
External SATA (eSATA)	1 dedicated rear eSATA, 1.5 Gbps
Network Controller	Integrated Broadcom 5755 Gigabit Ethernet LOM
USB 2.0 Connectors	Front: 2 Rear: 7 Internal: 3 (one Female Type A and one dual channel 2x5 pin header)
IDE connector	No
Floppy connector	Yes

### Technical Specifications

LAN (RJ45)	Yes
Serial	Yes
2nd Serial	Yes (requires optional 2nd Serial Port Adapter)
Parallel	Yes
Audio	Integrated high definition digital audio with Line in, Line Out, Microphone, Headphone
CD-ROM input/Audio)	No
AUX INPUT; Audio)	Yes
Flash ROM	Yes
Clear CMOS Button	Yes
CPU Fan Header	Yes
Chassis Fan Header	Yes
Front PCI Fan Header	Yes
Front Control Panel/Speaker Header	Yes
CMOS Battery Holder - Lithium	Yes
Hood Lock Header	Yes
Hood Sensor Header	Yes
Integrated Trusted Platform Module	TPM 1.2 integrated in Broadcom LOM
ASF 2.0 (Alert Standard Format)	Yes
Power Supply Headers	Yes
Power Switch, Power LED & Hard Drive LED Header	Yes
Password Clear Header	Yes

<b>Power Supply</b>	475 watt custom power supply - (Wide Ranging, Active PFC)	
Operating Voltage Range	90 - 269 VAC	
Rated Voltage Range	100 - 240 VAC	118 VAC
Rated Line Frequency	50/60 Hz	400Hz
Operating Line Frequency Range	47 - 66 Hz	393-407 Hz
Rated Input Current	10 A @ 100-127 VAC 6A @ 200-240 VAC	10 A @ 118 VAC
Heat Dissipation	Typical 1419 btu/hr (358 kg-cal/hr) Maximum 2027 btu/hr (511 kg-cal/hr)	
Power Supply Fan	92x25 mm variable speed	
Energy Star 4.0 Compliant	Yes	
80 PLUS® Compliant	Yes	
Blue Angel Compliant (<5w in S5 - Power Off)	N/A	
FEMP Standby Power Compliant @115V (<2W in S5 - Power Off)	Yes	

### Technical Specifications

Power Consumption in ES Mode - Suspend to RAM (S3) (Instantly Available PC)	<5W
Surge Tolerant Full Ranging Power Supply	Withstands power surges up to 2000V

### Cooling

Chassis Fan	92 mm x 92mm x 25 mm 4-wire high frequency PWM
Power Supply Fan	92 mm x 92 mm x 25 mm 3-wire fan (non-serviceable)
Processor Heatsink Fan	80 mm x 80 mm x 15 mm 4-wire high frequency PWM
Optional Front Chassis Fan (AMO only)	92 mm x 92 mm x 25 mm 4-wire high frequency PWM

### BIOS Features

PCI 3.0 Support	Full BIOS support for PCI Express through industry standard interfaces.
ASF 2.0 Compliant	Allows workstation status to be monitored on a remote console.
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.
Instantly Available PC (Suspend to RAM - ACPI sleep state S3)	Allows for very low power consumption with quick resume time
ROM Based Computer Setup Utility (F10)	Review and customize system configuration settings controlled by the BIOS.
Remote System Installation via F12 (PXE) (Remote Boot from Server)	Allows a new or existing system to boot over the network and download software, including the operating system
System/Emergency ROM Flash Recovery with Video	Recovers corrupted system BIOS
Serial, USB, Audio, Network, Enable/Disable Port Control	Enable or disables serial, USB, audio, and network ports
Removable Media Write Control/ 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
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)
Memory Change Alert (Requires HP Client Manager Software)	Alerts management console if memory is removed or changed
Thermal Alert (Requires HP Client Manager Software)	Monitors the temperature state within the chassis. Three modes: <ul style="list-style-type: none"> <li>● NORMAL - normal temperature ranges</li> <li>●</li> <li>●</li> </ul>



### Technical Specifications

	<ul style="list-style-type: none"> <li>ALERTED - excessive temperatures are detected. Raises a flag so action can be taken to avoid shutdown or provide for a smoother system shutdown</li> <li>SHUTDOWN - excessive temperatures are encountered. Automatically shuts down the computer without warning before hardware component damage occurs</li> </ul>
Remote ROM Flash	Provides secure, fail-safe ROM image management from a central network console
Remote Wakeup	<ul style="list-style-type: none"> <li>System administrators can power on, restart, and power off a client computer from a remote location.</li> </ul>
ACPI (Advanced Configuration and Power Management Interface)	<ul style="list-style-type: none"> <li>Allows the system to enter and resume from low power modes (sleep states)</li> <li>Controls system power consumption, making it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system</li> <li>Supports ACPI 2.0 for full compatibility with 64-bit operating systems</li> </ul>
SMBIOS	System Management BIOS 2.5, previously known as DMI BIOS, for system management information
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 applications can use and report this information
System board revision level	<ul style="list-style-type: none"> <li>Allows management SW to read revision level of the system board</li> <li>Revision level is digitally encoded into the HW and cannot be modified</li> </ul>
Ownership Tag	A user-defined string stored in non-volatile memory that is displayed in the BIOS splash screen
Remote ROM Flash	Provides secure, fail-safe ROM image management from a central network console
Remote Wakeup/ Remote Shutdown	<ul style="list-style-type: none"> <li>System administrators can power on, restart, and power off a client computer from a remote location.</li> <li>Enables cost-effective power consumption when the administrator needs to distribute software, perform security management, or update the ROM.</li> </ul>
ROM Based Setup (F10) and Start-up Diagnostics	Yes

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
ATAPI	ATAPI Removable Media Device BIOS Specification Version 1.0
BBS	BIOS Boot Specification v1.01
BIOS 32-bit Services	Standard BIOS 32-bit Service Directory Proposal
CD Boot	"El Torrito" Bootable CD-ROM Format Specification Version 1.0
EDD	<ul style="list-style-type: none"> <li>Enhanced Disk Drive Specification Version 1.1</li> <li>BIOS Enhanced Disk Drive Specification Version 3.0</li> </ul>
EHCI	Enhanced Host Controller Interface for Universal Serial Bus, Revision 1.0
PCI	<ul style="list-style-type: none"> <li>PCI Local Bus Specification, Revision 2.3</li> <li>PCI Power Management Specification, Revision 1.1</li> <li>PCI Firmware Specification, Revision 3.0, Draft .7</li> </ul>
PCI Express	PCI Express Base Specification, Revision 1.1 PCI Express Base Specification, Revision 2.0
PMM	POST Memory Manager Specification, Version 1.01
SATA	<ul style="list-style-type: none"> <li>Serial ATA Specification, Revision 1.0a</li> <li>Serial ATA 3 Gb/s: Extensions to Serial ATA 1.5 Gb/s, Revision 1.0</li> </ul>
SMBIOS	System Management BIOS Reference Specification, Version 2.5
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



### Technical Specifications

<b>Serviceability Features of System</b>	
Access Panel	Tool-less
Optical Drives	Tool-less
Floppy Drive	Tool-less
Hard Drives	Tool-less
Expansion Cards	Tool-less
Green user touch points	Yes, on tool-free internal chassis mechanisms
Color-coordinated cables and connectors	Yes
Memory	Tool-less, can be upgraded without removing any internal components
System Board	Tool-less removal
Dual Color Power and HD LED on Front of Computer (Indicates Normal Operations and Fault Conditions)	green – normal red – fault
System/Emergency ROM Flash Recovery with Video	Recovers corrupted system BIOS.
Configuration Record SW	Yes
Over-Temp Warning on Screen (Requires IM Agents)	Yes
Restore CD set	Restores the computer to its original factory shipping image
Processor ZIF Socket for easy Upgrade	Requires T-15 Torx or flat blade screwdriver to remove heatsink
ASF 2.0 support (Alert Standard Format)	Industry-standard specification for network alerting in operating system-absent environments
Dual Function Front Power Switch	Also acts as a reset switch when held for 4 seconds

<b>System Software Updating</b>	
Product Change Notification	<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>
Remote ROM Flash	Provides secure, fail-safe ROM image management from a central network console
Remote Wakeup/Remote Shutdown	<ul style="list-style-type: none"> <li>• System administrators can power on, restart, and power off a client computer from a remote location.</li> <li>• Enables cost-effective power consumption when the administrator needs to distribute software, perform security management, or update the ROM.</li> </ul>
ROM Based Setup (F10) and Start-up Diagnostics	Yes
Support Software CD & WWW	Yes

### Technical Specifications

Other deployment & management features	
HP Client Management Solutions	Visit <a href="http://www.hp.com/go/easydeploy">http://www.hp.com/go/easydeploy</a>

Security Features	
Padlock support	Padlock loop in rear of chassis. Locks side cover and secures chassis from theft. (0.22" diameter)
Cable Lock Support	Kensington lock slot in rear of chassis. Locks side cover and secures chassis from theft. (3mm x 7mm opening)
Universal chassis clamp lock support	Threaded feature in rear of chassis. Locks side cover and locks cables to chassis. Secures chassis from theft and allows multiple units to be chained together when used with optional cable.
Solenoid lock and hood sensor	Yes
Rear Port Control Cover (optional)	Locks rear IO cables to prevent cable theft.
Serial, Parallel, USB Enable/Disable	Enable or disable serial, parallel or USB ports and hide them from the operating system
Removable Media Write/Boot Control	Prevents the computer from being booted from removable media on supported devices (and can disable writes to media)
Power-On Password	Prevents an unauthorized person from booting up the computer
Setup Password	Prevents an unauthorized person from changing the system configuration

Other Features	
ACPI-Ready Hardware	<p>Advanced Configuration and Power Management Interface (ACPI).</p> <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>

Insight Diagnostics	<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>
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### Technical Specifications

<b>Service and Support</b>	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
	<a href="#">Note 1</a> : Terms and conditions may vary by country. Certain restrictions and exclusions apply.
	<a href="#">Note 2</a> : 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.
	<a href="#">Note 3</a> : 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.

<b>Eco-Label Certifications &amp; Declarations</b>	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:
	<ul style="list-style-type: none"> <li>• US Energy Star (energy-saving features available on selected configurations -Windows only)</li> <li>• US Federal Energy Management Program (FEMP)</li> <li>• China Energy Conservation Program</li> <li>• IT ECO declaration</li> <li>• Japan PC Green label*</li> </ul> <p><b>*NOTE:</b> This product conforms to the examination standards (2003 version) under JEITA's 'PC Green Label System.'</p>

### Energy Consumption and Noise Emissions - THE FOLLOWING FIGURES ARE ESTIMATES AND MAY BE SUBJECT TO CHANGE

#### System Configuration

<b>Example Configuration #1</b>	Processor Info	1x Pentium Dual Core E4500 (2.20GHz)
	Memory Info	2x512MB 667MHz
	Graphics Info	NVS290
	Disks/Optical/Floppy	1x160GB SATA / 1 Optical / 1 Floppy

#### Energy Consumption

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows Idle (S0)	67.4W		66.4W		65.5W	
Windows Busy Typ(S0)	89.7W		88.4W		88.2W	
Windows Busy Max (S0)	114.1W		109.6W		110.0W	
Sleep (S3)	3.61W	2.82W	3.89W	3.12W	3.61W	2.82W
Off (S5)	1.51W	1.30W	1.81W	1.60W	1.50W	1.28W

### Technical Specifications

#### Heat Dissipation\*\*

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows Idle (S0)	230.1 btu/hr		226.6 btu/hr		223.6 btu/hr	
Windows Busy Typ(S0)	306.3 btu/hr		301.6 btu/hr		300.9 btu/hr	
Windows Busy Max (S0)	389.4 btu/hr		374.1 btu/hr		375.4 btu/hr	
Sleep (S3)	12.3 btu/hr	9.62 btu/hr	13.3 btu/hr	10.6 btu/hr	12.3 btu/hr	9.62 btu/hr
Off (S5)	5.15 btu/hr	4.44 btu/hr	6.18 btu/hr	5.46 btu/hr	5.12 btu/hr	4.37 btu/hr

#### Example Configuration #2

Processor Info 1xCore 2 Extreme QX6850 (2.93GHz)  
 Memory Info 2x1GB 800MHz  
 Graphics Info FX1700  
 Disks/Optical/Floppy 2x73 GB SAS / 2 Optical / 1 Floppy

#### Energy Consumption

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows Idle (S0)	113W		108W		113W	
Windows Busy Typ(S0)	138W		133W		138W	
Windows Busy Max (S0)	186W		178W		183W	
Sleep (S3)	3.70W	2.90W	3.95W	3.20W	3.70W	2.90W
Off (S5)	1.52W	1.30W	1.81W	1.58W	1.50W	1.28W

#### Heat Dissipation\*\*

	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows Idle (S0)	386 btu/hr		369 btu/hr		386 btu/hr	
Windows Busy Typ(S0)	471 btu/hr		454 btu/hr		471 btu/hr	
Windows Busy Max (S0)	635 btu/hr		608 btu/hr		625 btu/hr	
Sleep (S3)	12.6 btu/hr	9.89 btu/hr	13.5 btu/hr	10.9 btu/hr	12.6 btu/hr	9.89 btu/hr
Off (S5)	5.19 btu/hr	4.44 btu/hr	6.18 btu/hr	5.39 btu/hr	5.12 btu/hr	4.37 btu/hr

#### Example Configuration #3

Processor Info 1x Intel Core 2 Duo E6850 (3.0 GHz)  
 Memory Info 2x1 GB  
 Graphics Info FX1700  
 Disks/Optical/Floppy 2 SATA / 1 Optical / 0 Floppy

### Technical Specifications

#### Energy Consumption

	115 VAC	230 VAC	100 VAC
On-Idle (ENERGY STAR® Idle (S0))	76.3W	75.3W	76.6W
ENERGY STAR® PTEC (Total Energy Consumption) Windows running Linpack and Viewperf	162.3W	159.6W	163.2W
ENERGY STAR® "Sleep" (S3)	3.7W	4.1W	3.8W
ENERGY STAR® "Standby" (Off) (S5)	1.5W	1.8W	1.5W

#### Heat Dissipation\*\*

	115 VAC	230 VAC	100 VAC
On-Idle (ENERGY STAR® Idle (S0))	260 btu/hr	257 btu/hr	261 btu/hr
ENERGY STAR® PTEC (Total Energy Consumption) Windows running Linpack and Viewperf	554 btu/hr	545 btu/hr	557 btu/hr
ENERGY STAR® "Sleep" (S3)	12.6 btu/hr	14.0 btu/hr	13.0 btu/hr
ENERGY STAR® "Standby" (Off) (S5)	5.12 btu/hr	6.14 btu/hr	5.12 btu/hr

#### NOTES:

\* Energy Star low energy mode

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

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

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

System Configuration (Entry-level)	Processor Info Disks/Optical/Floppy	Single 3.00 GHz Intel Core2 Duo E6850 processor 2x 80 GB 7200 rpm SATA / 1 DVD-ROM / 1 Floppy	Sound Power (LWAd, bels)	Deskside Sound Pressure (LpAm, decibels)
<b>Declared Noise Emissions</b> (in accordance with ISO 7779 and ISO 9296)	<b>Idle</b>		3.9 Bels	23 dB
	<b>SATA Hard drive Operating</b> (random reads)		4.2 Bels	25 dB
	<b>Floppy Drive Operating</b> (continuous copy)		4.7 Bels	29 dB
	<b>DVD-ROM Operating</b> (sequential reads)		5.1 Bels	38 dB
System Configuration (High-end)	Processor Info Graphics Info Disks/Optical/Floppy	Single 3.00 GHz Intel Core2 Extreme QX6850 processor NVIDIA Quadro FX 4600 1x 146 GB 15K rpm SAS / 1 DVD-ROM / 1 Floppy	Sound Power (LWAd, bels)	Deskside Sound Pressure (LpAm, decibels)
<b>Declared Noise Emissions</b> (in accordance with ISO 7779 and ISO 9296)	<b>Idle</b>		4.6 Bels	27 dB



### Technical Specifications

<b>SAS Hard drive Operating</b> (random reads)	5.2 Bels	35 dB
<b>Floppy Drive Operating</b> (continuous copy)	5.0 Bels	32 dB
<b>DVD-ROM Operating</b> (sequential reads)	5.3 Bels	38 dB

### Longevity and Upgrading

This product is designed to be upgraded, possibly extending its useful life by several years. Spare parts are available throughout the warranty period and for up to 5 years after the end of production. Upgradeability features contained in the product include:

- Intel LGA775 processor socket
- 12 USB ports
  - 7 rear
  - 3 internal - 1 Type A
  - 2 front
- 3 PCI slots
- 4 PCI Express slots
  - 1 PCI Express ×1 slot
  - 2 Gen2 PCI Express ×16 slots
  - 1 PCI Express ×8 (×4) slot
- 5 storage bays
- 4 memory slots

### 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

### 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.

Packaging Materials

External	Cardboard carton and insert	2.70 kg
Internal	LDPE Foam	0.35 kg

### 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](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

### Technical Specifications

- Chlorinated Hydrocarbons
- Chlorinated Paraffins
- Formaldehyde
- Halogenated Diphenyl Methanes
- Lead carbonates and sulfates
- Lead and Lead compounds
- Mercuric Oxide Batteries
- 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 (PBDEs)
- 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 Tin Oxide (TBO), Triphenyl Tin Oxide (TPTO), Tributyl Tin Oxide (TBO)

### 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.

### 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>

## Technical Specifications - Audio

<b>High Definition Integrated Realtek ALC262 Audio</b>	<b>Type</b>	Integrated
	<b>High Definition Codec</b>	Yes
	<b>SPDIF</b>	No
	<b>External audio jacks</b>	One front stereo analog microphone-in One front stereo headphone-out One rear line-in One rear line-out One rear stereo analog microphone-in
	<b>Internal audio connectors</b>	AUX-IN line-level analog input
	<b>Retasking</b>	<b>NOTE:</b> *Rear audio port are re-taskable as Line-In, Line-Out, Microphone-In, or Headphone-Out with Optional driver, available only through download from HP support website and not supported by default. External Speakers need to be powered externally.
	<b>Sampling</b>	44.1kHz/48 kHz/96kHz/192kHz (output only)
	<b>Wavetable Syntheses (software)</b>	Yes - Uses OS soft wavetable
	<b>Internal audio speaker power rating</b>	1.5 W
	<b>Internal Speaker</b>	Yes
	<b>Microphone features</b>	Stereo Microphone supporting: Acoustic echo cancellation Noise suppression Beam forming

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<b>Sound Blaster X-Fi XtremeMusic (PCI)</b>	<b>Audio Quality</b>	Total Harmonic Distortion + Noise at 1kHz (20kHz Low-pass filter) = 0.004%
	<b>Signal to Noise Ratio (SNR)</b>	Signal-to-Noise Ratio (20kHz Low-pass filter, A-Weighted) <ul style="list-style-type: none"> <li>● Stereo Output: 109dB</li> <li>● Front and Rear Channels: 109dB</li> <li>● Center, Subwoofer and Side Channels: 109dB</li> </ul>
	<b>Sound Conversion</b>	24-bit Analog-to-Digital conversion of analog inputs at 96kHz sample rate  24-bit Digital-to-Analog conversion of digital sources at 96kHz to analog 7.1 speaker output  24-bit Digital-to-Analog conversion of stereo digital sources at 192kHz to stereo output
	<b>Recording/Sampling Rate</b>	44.1, 48 and 96kHz
	<b>ASIO 2.0 support</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 24-bit/96kHz
	<b>DACs</b>	24-bit/192kHz
	<b>Voice Support</b>	128 voices
	<b>Max. Channels in 3D Positional Audio</b>	7.1
	<b>EAX® ADVANCED HD™ 5.0 support</b>	Yes including EAX® MacroFX™, EAX® PurePath™ and Environment FlexiFX™

### Technical Specifications - Audio

<b>Connectors</b>	FlexiJack (Performing a 3-in-1 function, Digital In / Line In / Microphone) via 3.50 mm minijack Line level out (Front / Rear / Center / Subwoofer / Rear Center) via 3.50 mm minijacks AUX_IN line-level analog input via 4-pin Molex connector on card One AD_Link (26 pin) connector for linking to the X-Fi I/O Console (upgrade option)										
<b>Dimensions</b>	7.25" x5" x .9"										
<b>Additional product features</b>	<table border="0"> <tr> <td style="vertical-align: top;"><b>Movies</b></td> <td>THX Certification Dolby Digital EX 6.1 Playback DTS-ES 6.1 Playback</td> </tr> <tr> <td style="vertical-align: top;"><b>Music</b></td> <td>X-Fi 24-bit Crystalizer CMSS-3D SuperRip</td> </tr> <tr> <td style="vertical-align: top;"><b>Audio Creation</b></td> <td>Pristine audio playback quality with a near transparent SRC engine Up to eight 24 bit hardware effects ASIO recording with latency as low as one millisecond 24-bit SoundFont® sampling 3D MIDI</td> </tr> <tr> <td style="vertical-align: top;"><b>Gaming</b></td> <td>EAX ADVANCED HD 5.0</td> </tr> <tr> <td style="vertical-align: top;"><b>Software Bundle</b></td> <td>Doom 3 Sound Blaster EAX patch Entertainment Mode Audio Creation Mode Game Mode Mode Switcher Audio Console Creative MediaSource Creative MediaSource DVD-Audio Player DTS Neo:6 Settings Karaoke Player Entertainment Center Smart Recorder SoundFont Bank Manager Speaker Connection Wizard THX Setup Console Vienna SoundFont Studio Volume Panel WaveStudio Console Launcher Creative Media Toolbox Creative Diagnostics</td> </tr> </table>	<b>Movies</b>	THX Certification Dolby Digital EX 6.1 Playback DTS-ES 6.1 Playback	<b>Music</b>	X-Fi 24-bit Crystalizer CMSS-3D SuperRip	<b>Audio Creation</b>	Pristine audio playback quality with a near transparent SRC engine Up to eight 24 bit hardware effects ASIO recording with latency as low as one millisecond 24-bit SoundFont® sampling 3D MIDI	<b>Gaming</b>	EAX ADVANCED HD 5.0	<b>Software Bundle</b>	Doom 3 Sound Blaster EAX patch Entertainment Mode Audio Creation Mode Game Mode Mode Switcher Audio Console Creative MediaSource Creative MediaSource DVD-Audio Player DTS Neo:6 Settings Karaoke Player Entertainment Center Smart Recorder SoundFont Bank Manager Speaker Connection Wizard THX Setup Console Vienna SoundFont Studio Volume Panel WaveStudio Console Launcher Creative Media Toolbox Creative Diagnostics
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<b>Minimum system requirements</b>	<table border="0"> <tr> <td style="vertical-align: top;"><b>System RAM</b></td> <td>256MB</td> </tr> <tr> <td style="vertical-align: top;"><b>Hard disk</b></td> <td>600MB free space Available PCI 2.1 slot for the audio card CD-ROM/CD-RW or CD/DVD-ROM required for software installation</td> </tr> <tr> <td style="vertical-align: top;"><b>Operating System</b></td> <td>Microsoft Windows XP Service Pack 2 (SP2)</td> </tr> </table>	<b>System RAM</b>	256MB	<b>Hard disk</b>	600MB free space Available PCI 2.1 slot for the audio card CD-ROM/CD-RW or CD/DVD-ROM required for software installation	<b>Operating System</b>	Microsoft Windows XP Service Pack 2 (SP2)				
<b>System RAM</b>	256MB										
<b>Hard disk</b>	600MB free space Available PCI 2.1 slot for the audio card CD-ROM/CD-RW or CD/DVD-ROM required for software installation										
<b>Operating System</b>	Microsoft Windows XP Service Pack 2 (SP2)										

### Technical Specifications - Communications

<b>Integrated PCI Express Broadcom BCM5755 NetXtreme Gigabit Ethernet Network Controller LoM</b>	<b>Connector</b> <b>Controller</b> <b>Memory</b> <b>Data rates supported</b> <b>Compliance</b> <b>Bus architecture</b> <b>Data path width</b> <b>Data path speed</b> <b>Data transfer mode</b> <b>Hardware certifications</b> <b>Power requirement</b> <b>Boot ROM support</b> <b>Network transfer rate</b>  <b>Operating system driver support</b>  <b>Management capabilities</b> <b>Alerting</b>	RJ-45 Broadcom 5755 PCI-E LAN Controller Integrated 48KB receive buffer and 8KB transmit buffer 10/100/1000 Mbps IEEE 802.3, 802.3AB and 802.3u compliant, 802.3x flow control PCIe 1.0a X1 2.5Gbit per sec per direction transfer rate Bus-master DMA  1.5 watts @ +3.3V AUX supply Yes 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  Microsoft Windows Vista Business 32 and 64, Microsoft Windows XP Professional, Microsoft Windows XP Professional x64 Edition, Red Hat Enterprise Linux WS 4 & 5 Desktop  WOL, PXE  ASF 2.0
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<b>Intel Pro 1000 PT PCI Express Gigabit NIC (Part# EH352AA)</b>	<b>Connector</b> <b>Controller</b> <b>Memory</b> <b>Data rates supported</b> <b>Compliance</b>  <b>Bus architecture</b> <b>Data path width</b> <b>Data transfer mode</b> <b>Hardware certifications</b> <b>Power requirement</b> <b>Boot ROM support</b> <b>Network transfer rate</b>  <b>Environmental</b>  <b>Dimensions</b>	RJ-45 Intel 82572EI Gigabit Ethernet Controller Integrated Dual 48K configurable transmit receive FIFO Buffers 10/100/1000 Mbps IEEE 802.1P, 802.1Q, 802.2, 802.3, 802.3AB and 802.3u compliant, 802.3x flow control  PCIe 1.0a X1, 250MB/s, Bi-directional interface Bus-master DMA FCC, B, CE, TUV- cTUVus Mark Canada and United States, TUV- GS Mark for European Union Aux 3.3V, 3.0 Watts in 1000base-T and 2.0 Watts in 100Base-T Yes 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, 1000 Mbps  <b>Operating temperature</b> 32° to 131° F (0° to 55° C) <b>Operating humidity</b> 85% at 131° F (55° C)  6.4 x 2.6 x 0.8 inches; 16.3 x 6.6 x 1.9 cm)
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### Technical Specifications - Communications

<b>Operating system driver support</b>	Microsoft Windows Vista Business 32 and 64, Microsoft Windows XP Professional, Red Hat Enterprise Linux WS 4 and 5 Desktop
<b>Management capabilities</b>	ASF, WOL , PXE, DMI, WFM 2.0.
<b>Kit contents</b>	Intel Pro 1000 PT PCI Express Gigabit NIC, CD containing Intel PROset II NIC drivers, quick install guide, product warranty statement

<b>Broadcom BCM5751 NetXtreme Gigabit Ethernet Controller (PCIe)</b> (Part# EA833AA)	<b>Connector</b>	RJ-45
	<b>Controller</b>	Broadcom 5751 PCI-E 1.0a LAN Controller
	<b>Memory</b>	Integrated 96Kb frame buffer memory
	<b>Data rates supported</b>	10/100/1000 Mbps
	<b>Compliance</b>	IEEE 802.3, 802.3AB and 802.3u compliant, 802.3x flow control
	<b>Bus architecture</b>	PCIe 1.0a
	<b>Data path width</b>	X1
	<b>Data path speed</b>	2.5Gbit per sec per direction transfer rate
	<b>Data transfer mode</b>	Bus-master DMA
	<b>Hardware certifications</b>	FCC class B, NRTL Mark Canada and United States, C-Tick for Australia, BSMI for Taiwan, VCCI for Japan, MIC for Korea, GOST for Russia
	<b>Power requirement</b>	3.1 watts @ +3.3V AUX supply
	<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, 1000 Mbps
<b>Environmental</b>	<b>Operating temperature</b>	32° to 131° F (0° to 55° C)
	<b>Operating humidity</b>	85% at 131° F (55° C)
<b>Dimensions</b>	4.4 x 2.2 x 0.08 inches; 11.2 x 5.5 x .2 cm	
<b>Operating system driver support</b>	Microsoft Windows Vista Business 32 and 64, Microsoft Windows XP, Red Hat Enterprise Linux 4 and 5 Desktop	
<b>Management capabilities</b>	WOL, PXE , Remote cable management	
<b>Alerting</b>	ASF 2.0	
<b>Kit contents</b>	Broadcom 5751, CD, Broadcom NetXtreme Gigabit Ethernet PCI NIC, drivers, quick install guide, product warranty statement	

<b>Agere Systems PCI International Softmodem</b>	<b>Data Transmission</b>	Technology speeds: 56,000 Kbps maximum downstream data, controllerless <b>NOTE:</b> 56 Kbps technology refers to download speeds only and requires compatible modems at server sites. Other conditions may limit modem speed. FCC limitations allow a maximum of 53 Kbps during download transmissions.
	<b>Data Speeds</b>	(Upload only) 33,600/31,200/28,800/26,400/21,600/19,200/16,800/14,400/12,000/9,600/7,200/4,800/2,400/1,200/300
	<b>Data Standards</b>	ITU-T V.90, ITU-T, ITU-T V.34, V.44, V.42, V.42bis21, V.32bis, Bell 212A, and Bell 103

### Technical Specifications - Communications

<b>Fax Speeds</b>	14,400/12,000/9,600/7,200/4,800/2,400/1,200/300 b/s
<b>Fax Mode Capabilities</b>	ITU-T T.31 class 1 FAX, V. 17, V.29, V.27ter, and V.21 Channel 2
<b>Error Correction and Data Compression</b>	V.44, 42bis, V.42 and MNP2-5
<b>Power Management</b>	ACPI; PPMI 1.1 and wake support with PME and Vaux; meets PCI 2.3 requirements and PC 2001 requirements
<b>Upgradeability</b>	Driver upgradeable for future enhancements
<b>Video</b>	ITU-T V.80 video ready interface
<b>Other</b>	TIA/EIA 602 standard AT command set Integrated DTE interface with speeds of up to 115.2 Kbps, parallel 16550a UART-compatible interface Optional ring wakeup signal
<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)
<b>Operating Humidity</b>	20% to 90%, non-condensing
<b>Operating System Support</b>	Microsoft Windows XP Professional, Microsoft Windows XP Professional x64 Edition
<b>OS Driver Support</b>	Microsoft Windows XP Professional, Microsoft Windows XP Professional x64 Edition
<b>Power</b>	Requires a 3.3-V auxiliary power rail on PCI bus Uses only one PCI load (i.e., one grant/request pair), one shared IRQ, one electrical load
<b>Chipset</b>	Agere Systems SV92PL - Integrated PCI interface with 5-V tolerant buffers and CardBus support
<b>Dimensions (L X H)</b>	Complies with PCI low profile specifications-6.7 x 2.3 inches; 17.0 x 5.8 cm and supports high- and low-profile brackets
<b>Connection</b>	Single RJ-11 connector
<b>Other Features</b>	Digital line protection, call progress monitoring via on-board piezo device, support for high profile and low profile brackets, PnP ID support
<b>Safety</b>	UL recognized to UL 1950, 3rd edition (U.S. and Canada); IEC 950 (TUV, NEMKO, DEMKO, SEMKO); CE Mark, EC 950 (TUV, NEMKO, DEMKO, SEMKO, CE mark
<b>EMC</b>	FCC Part 15, IC ES003, EN 55022, 3rd edition, EN 55024, annex A, EN 61000-4-6, EN 61000-4-8
<b>Telecom</b>	FCC Part 68, IC-CS-03 (Canada); Worldwide PTT approvals Not available in Korea or the Republic of South Africa.
<b>Health</b>	Bare PCB material compliant to 94V-0 or better (marked as such)
<b>Other</b>	PC 2001 compliant, PCI version 2.3, WHQL approved; ACPI compliant
<b>Kit Contents</b>	DC132D : Agere Systems PCI International Softmodem with full-height bracket attached, additional low-profile bracket, RJ11 modem cable, driver and documentation CD. <b>NOTE: RJ11 modem adapter is not included.</b> DC131C #xxx: RJ11 modem adapter kit for use with DC132D #ACP: Austria, #ABW: Belgium (Dutch/Flemish), #AKN: Bosnia, Herzegovna, Croatia, Slovenia, Yugoslavia (Slovenian), #AKB: Czech Republic (Czech) & Slovakia, #ABF: France, #ABD: Germany, #AB7:

## Technical Specifications - Controllers

<b>LSI SAS3041E Serial Attach SCSI (SAS) Host Bus Adapter (HBA)</b> (Part# EH417AA)	<b>PCI Bus</b>	PCI-Express x4 lanes	
	<b>PCI Modes</b>	Bus Master DMA	
	<b>PCI data burst transfer rate</b>	1.0 GBps ( half duplex ) 2.0 GBps ( full duplex )	
	<b>SAS Bandwidths</b>	<b>Half Duplex</b>	<b>Full Duplex</b>
		Single lane – 300 MBps	Single SAS Lane – 600 MBps
		Wide Port (2 lanes) – 600 MBps	Wide Port (2 lanes) – 1200 MBps
		Wide Port (4 lanes) – 1200 MBps	Wide Port (4 lanes) – 2400 MBps
	<b>PCI Card Type</b>	3.3 volt add-in card	
	<b>PCI Voltage</b>	12 V ± 10%	
	<b>PCI Form Factor</b>	6.6" x 2.731" (Low-profile)	
	<b>PCI Power</b>	7.5 Watts	
	<b>Bracket</b>	Full height and Low-profile	
	<b>Certification Level</b>	PCI-Express 1.0a	
	<b>IO Bus</b>	Four 3Gbps SAS/SATA ports	
	<b>SAS Processor</b>	LSISAS1064E	
	<b>Internal Connectors</b>	Four- SATA x1 connectors	
	<b>External Connectors</b>	None	
	<b>Integrated RAID Levels</b>	RAID 0, 1, 1E, and 10E	
	<b>Max. Number of Physical Devices</b>	122	
	<b>LED Indicators</b>	On-board activity and fault LEDs	
	<b>Integrated Mirroring</b>	Integrated Mirroring option available	
	<b>Environments</b>	<b>Operating</b>	<b>Storage</b>
	<b>Temperature</b>	32° to 140° F (0° to 60° C)	-49° to 221° F (-45° to +105° C)
	<b>Relative Humidity</b>	5% to 90% non-condensing	5% to 90% non-condensing
	<b>MTBF</b>	>200,000 hours	
	<b>Compliances</b>	EMC: Class B-US (CFR 47, P15B); Canada (ICES-003); Japan (V-3/02.04); Europe (EN55022/EN55024); Australia/New Zealand (AS/NZS 3548); Safety: EN60950	
	<b>Operating system support</b>	Microsoft Vista Business 32 and 64, Microsoft Windows XP Professional, Microsoft Windows XP Professional x64, Red Hat Enterprise Linux WS 4 and 5 Desktop	
	<b>Kit contents</b>	Controller card, driver CD, LED cables, user documentation and warranty card.	

## Technical Specifications - Hard Drives

<b>Serial ATA Hard Drives 1 TB</b> (7,200 rpm)	<b>Capacity</b>	1,000,204,886,016 bytes		
	<b>Height</b>	1 inches; 2.54 cm		
	<b>Width</b>	Media diameter: 3.5 inches; 8.89 cm Physical size: 4 inches; 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>Cache</b>	32 MB		
	<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track</b>	2.0 ms	
		<b>Average</b>	14.5 ms	
		<b>Full-Stroke</b>	33 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 GB</b> (7,200 rpm)	<b>Capacity</b>	500,107,862,016 bytes	
<b>Height</b>		1 inches; 2.54 cm		
<b>Width</b>		Media diameter: 3.5 inches; 8.89 cm Physical size: 4 inches; 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>Cache</b>		16 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>		976,773,168		
<b>Operating Temperature</b>		41° to 131° F (5° to 55° C)		
<b>250 GB</b> (7,200 rpm)		<b>Capacity</b>	250,059,350,016 bytes	
	<b>Height</b>	1 inches; 2.54 cm		
	<b>Width</b>	Media diameter: 3.5 inches; 8.89 cm Physical size: 4 inches; 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>Cache</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>		488,397,168
	<b>Operating Temperature</b>		41° to 131° F (5° to 55° C)
<b>160 GB</b> (7,200 rpm)	<b>Capacity</b>		160,041,885,696 bytes
	<b>Height</b>		1 inches; 2.54 cm
	<b>Width</b>		Media diameter: 3.5 inches; 8.89 cm Physical size: 4 inches; 10.2 cm
	<b>Interface</b>		Serial ATA (3.0 Gb/s), Native Command Queuing enabled
	<b>Synchronous Transfer Rate</b> (Maximum)		Up to 300 MB/s
	<b>Cache</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>80 GB</b> (7,200 rpm)	<b>Capacity</b>		80,026,361,856 bytes
	<b>Height</b>		1 inches; 2.54 cm or less
	<b>Width</b>		Media diameter: 3.5 inches; 8.89 cm Physical size: 4 inches; 10.2 cm
	<b>Interface</b>		Serial ATA (3.0 Gb/s), Native Command Queuing enabled
	<b>Synchronous Transfer Rate</b> (Maximum)		Up to 300 MB/s
	<b>Cache</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>		156,301,488
	<b>Operating Temperature</b>		41° to 131°F (5° to 55°C)

### Technical Specifications - Hard Drives

<b>160 GB</b> (10k rpm)	<b>Capacity</b>	160,041,885,696 bytes		
	<b>Height</b>	1 inches; 2.54 cm		
	<b>Width</b>	Media diameter: 3.5 inches; 8.89 cm Physical size: 4 inches; 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>Cache</b>	16 Mbytes		
	<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<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>80 GB</b> (10k rpm)	<b>Capacity</b>	80,026,361,856 bytes	
		<b>Height</b>	1 inches; 2.54 cm	
<b>Width</b>		Media diameter: 3.0 inches; 7.62 cm Physical size: 4 inches; 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>Cache</b>		16 Mbytes		
<b>Seek Time</b> (typical reads, includes controller overhead, including settling)		<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>		156,301,488		
<b>Operating Temperature</b>		41° to 131° F (5° to 55° C)		

## Technical Specifications - Hard Drives

<b>Serial Attached SCSI (SAS) Hard Drives</b>	<b>300 GB</b> (15k rpm)	<b>Capacity</b>	300,000,000,000 bytes		
		<b>Height</b>	1.0 in (25.4mm)		
		<b>Width</b>	4.0 in (101.6mm)		
		<b>Interface</b>	SAS		
		<b>Synchronous Transfer Rate (Maximum)</b>	Up to 300 MB		
		<b>Cache</b>	16 MB		
		<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track</b>	0.2 ms	
			<b>Average</b>	3.5 ms	
			<b>Full-Stroke</b>	7.0 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>73 GB</b> (15k rpm)	<b>Capacity</b>	73,407,865,856 bytes
<b>Height</b>	1.0 in (25.4mm)				
<b>Width</b>	4.0 in (101.6mm)				
<b>Interface</b>	SAS				
<b>Synchronous Transfer Rate (Maximum)</b>	Up to 300 MB				
<b>Cache</b>	16 MB				
<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track</b>			0.2 ms	
	<b>Average</b>			3.5 ms	
	<b>Full-Stroke</b>			7.4 ms	
<b>Rotational Speed</b>	15,000 rpm				
<b>Logical Blocks</b>	143,374,738 - 512 byte blocks				
<b>Operating Temperature</b>	50° to 95° F (10° to 35° C)				
	<b>146 GB</b> (15k rpm)			<b>Capacity</b>	146,815,737,856 bytes
		<b>Height</b>	1.0 in (25.4mm)		
		<b>Width</b>	4.0 in (101.6mm)		
		<b>Interface</b>	SAS		
		<b>Synchronous Transfer Rate (Maximum)</b>	Up to 300 MB		
		<b>Cache</b>	16 MB		
		<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track</b>	0.2 ms	
			<b>Average</b>	3.5 ms	
			<b>Full-Stroke</b>	7.4 ms	
		<b>Rotational Speed</b>	15,000 rpm		
		<b>Logical Blocks</b>	286,749,488 - 512 byte blocks		
		<b>Operating Temperature</b>	50° to 95° F (10° to 35° C)		

### Technical Specifications - Peripherals

<p><b>HP IEEE 1394a FireWire 4-Port PCI Card</b> (Part# PA997A)</p>	<p><b>Device Interface Protocol</b></p> <p><b>Data Rate</b></p> <p><b>Devices Supported</b></p> <p><b>Bus Interface</b></p> <p><b>Physical</b></p> <p><b>Environmental</b></p> <p><b>Ports</b></p> <p><b>Connectors</b></p> <p><b>Minimum System Requirements</b></p> <p><b>Regulatory Agency Approval</b></p>	<p>IEEE-1394a</p> <p>400 Mbps</p> <p>IEEE-1394 compliant devices</p> <p>PCI</p> <p>PCI card with brackets for low profile and full height PCI slots.</p> <p><b>Operating temperature</b> 50° to 131° F (10° to 55° C)</p> <p><b>Non-operating temperature</b> -22° to 140° F (-30° to 60° C)</p> <p><b>Relative humidity</b> 20% to 80%</p> <p>Two IEEE1394 6-Pin Connector (Rear)</p> <p>One 10-Pinches; 9 Contacts) Custom Connector (Internal)</p> <p>Microsoft Windows Vista Business 32 and 64, Microsoft Windows XP Professional, Windows XP Home, not supported on Linux</p> <p>Pentium II 266 or above</p> <p>128-MB RAM</p> <p>1-GB Hard Drive</p> <p>CD-ROM drive</p> <p>Built-in sound system</p> <p>Available PCI slot</p> <p>FCC Part 15B, cULus 60950, CE Mark EN55022B(1995)/EN55024-1998 STD, Taiwan BSMI CNS13438, Korea MIC</p>
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<p><b>HP IEEE 1394b FireWire 800 3-Port PCI Card</b> (Windows XP Only) (Part# EA327AA)</p>	<p><b>Device Interface Protocol</b></p> <p><b>Data Rate</b></p> <p><b>Devices Supported</b></p> <p><b>Bus Interface</b></p> <p><b>Physical</b></p> <p><b>Environmental</b></p> <p><b>Ports</b></p> <p><b>Connectors</b></p> <p><b>Minimum System Requirements</b></p> <p><b>Regulatory Agency Approval</b></p>	<p>IEEE-1394</p> <p>800 Mbps</p> <p>IEEE-1394 compliant devices</p> <p>PCI</p> <p>PCI card with brackets for low profile and full height PCI slots.</p> <p><b>Operating temperature</b> 50° to 131° F (10° to 55° C)</p> <p><b>Non-operating temperature</b> -22° to 140° F (-30° to 60° C)</p> <p><b>Relative humidity</b> 20% to 80%</p> <p>Two IEEE-1394b bilingual 9-Pin Connector (Rear)</p> <p>One 10-Pin header Custom Connector (Internal)</p> <p>Microsoft Windows XP Professional, Windows XP Home, not supported on Linux</p> <p>Pentium III</p> <p>128-MB RAM</p> <p>1-GB Hard Drive</p> <p>CD-ROM drive</p> <p>Built-in sound system</p> <p>Available PCI slot</p> <p>FCC Part 15B, cULus 60950, CE Mark EN55022B(1995)/EN55024-1998 STD, Taiwan BSMI CNS13438, Korea MIC</p>
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### Technical Specifications - Peripherals

<b>PS/2 OR USB Standard Keyboard</b>	<b>Physical characteristics</b>	<b>Keys</b>	104, 105, 106, 107, 109 layout (depending upon country)
		<b>Dimensions (L x W x H)</b>	18.0 x 6.4 x 0.98 inches ; 45.8 x 16.3 x 2.5 cm
	<b>Electrical</b>	<b>Weight</b>	2 lbs (0.9 kg) minimum
		<b>Operating voltage</b>	+ 5VDC $\pm$ 5%
		<b>Power consumption</b>	50-mA maximum (with three LEDs ON)
		<b>ESD</b>	CE level 4, 15-kV air discharge
	<b>Mechanical</b>	<b>EMI – RFI</b>	Conforms to FCC rules for a Class B computing device
		<b>Microsoft PC 99 – 2001</b>	Functionally compliant
		<b>Languages</b>	38 available
		<b>Keycaps</b>	Low-profile design
		<b>Switch actuation</b>	55-g nominal peak force with tactile feedback
		<b>Switch life</b>	20 million keystrokes (using Hasco modified tester)
		<b>Switch type</b>	Contamination-resistant switch membrane
		<b>Key-leveling mechanisms</b>	For all double-wide and greater-length keys
		<b>Cable length</b>	6 ft (1.8 m)
		<b>Microsoft PC 99 - 2001</b>	Mechanically compliant
	<b>Environmental</b>	<b>Acoustics</b>	43-dBA maximum sound pressure level
		<b>Operating temperature</b>	50° to 122° F (10° to 50° C)
		<b>Non-operating temperature</b>	-22° to 140° F (-30° to 60° C)
		<b>Operating humidity</b>	10% to 90% (non-condensing at ambient)
		<b>Non-operating humidity</b>	20% to 80% (non-condensing at ambient)
		<b>Operating shock</b>	40 g, six surfaces
		<b>Non-operating shock</b>	80 g, six surfaces
		<b>Operating vibration</b>	2-g peak acceleration
		<b>Non-operating vibration</b>	4-g peak acceleration
		<b>Drop (out of box)</b>	26 in (66 cm) on carpet, six-drop sequence
	<b>Drop (in box)</b>	42 in (107 cm) on concrete, 16-drop sequence	
	<b>Operating system support</b>	Microsoft Windows XP Professional, Microsoft Windows XP Professional x64 Edition, Red Hat Enterprise Linux WS 4 and 5 Desktop	
	<b>Approvals</b>	UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC	
	<b>Ergonomic compliance</b>	ANSI HFS 100, ISO 9241-4, and TUVGS	
	<b>Kit contents</b>	Keyboard, keyboard software media, installation guide, warranty card, safety and comfort	

### Technical Specifications - Peripherals

<b>HP 2-button Optical Scroll Mouse (USB)</b>	<b>Dimensions (H x L x W)</b>	1.5 x 4.5 x 2.5 inches; 3.8 x 11.6 x 6.3 cm
	<b>Weight</b>	0.27 lb (0.12 kg)
	<b>Cable length</b>	72.8 inches; 185 cm
	<b>System requirements</b>	Microsoft Windows XP, Red Hat Enterprise Linux WS 4 & 5 Desktop

<b>HP Optical 3-Button Mouse (USB)</b>	<b>Dimensions/Weight</b>	<b>Height</b>	1.5 inches; 3.6 cm
		<b>Length</b>	4.5 inches; 11.56 cm
		<b>Width</b>	2.2 inches; 6.19 cm
	<b>Environmental</b>	<b>Weight</b>	3.80 oz (108 g)
		<b>Operating temperature</b>	32° to 104° F (0° to 40° C)
		<b>Non-operating temperature</b>	-4° to 140° F (-20° to 60° C)
	<b>Mechanical</b>	<b>Operating humidity</b>	10% to 90% (non condensing at ambient)
		<b>Tracking speed</b>	6 in/s Maximum
		<b>Switch life</b>	3,000,000 operations
		<b>Switch type</b>	Micro-switches
		<b>Tracking mechanism life</b>	155 miles (250 km) at average speed of 10 in/s
		<b>Cable length</b>	6 feet; 1.8 m

<b>HP SpaceExplorer USB 3D Input Device</b>	<b>Physical Characteristics</b>	<b>Dimensions (L x W x H)</b>	7.6 x 5.4 x 2.3 in (194 x 139 x 58mm)
		<b>Weight</b>	1.36 lbs (0.62 kg)
		<b>Palmrest</b>	Sculpted
	<b>Mechanical</b>	<b>Buttons</b>	15 reprogrammable speed keys
		<b>Motion Controller</b>	Six degrees of freedom motion control through the X, Y, Z axis (pitch, roll, yaw)
		<b>Device Sensitivity</b>	Adjustable to preference
	<b>Operating System Supported</b>	Microsoft Windows Vista Business 32 and 64, Microsoft Windows XP Professional or XP x64, not supported in Linux	
	<b>Regulatory Approvals</b>	FCC, CE	

### Technical Specifications - Peripherals

<b>HP SpacePilot</b> (USB – Windows XP Only)	<b>Physical Characteristics</b>	<b>Dimensions (L x W x H)</b>	9.3 x 5.6 x 2.0 inches; 236 x 143 x 53 mm
		<b>Weight</b>	1.875 lb (0.85 kg)
		<b>Palmrest</b>	Sculpted
	<b>Mechanical</b>	<b>Buttons</b>	21+ programmable speed keys 15 reprogrammable
		<b>LCD Viewing Area (W x H)</b>	4.0 x 1.0 inches; 102.4 x 30.2mm
	<b>System Requirements</b>	<b>Active Area (W x H)</b>	3.7 x 1.0 inches; 93.4 x 26.2mm
		<b>Display Format</b>	240 x 64
		<b>Motion Controller</b>	Six degrees of freedom motion control through the X, Y, Z axis (pitch, roll, yaw)
		<b>Device Sensitivity</b>	Adjustable to preference
		<b>Operating System Supported</b>	USB 1.1 or 2.0
		<b>Regulatory Approvals</b>	Microsoft Windows Vista Business 32 and 64, Microsoft Windows XP, not supported in Linux
			FCC, CE

### Technical Specifications - Optical Devices

<b>HP 16X Max SATA DVD-ROM Drive</b>	<b>Form Factor</b>	5.25-inch, half-height, tray-load		
	<b>Orientation</b>	Either horizontal or vertical		
	<b>Interface type</b>	SATA/ATAPI		
	<b>Disc capacity</b>	Single layer: Up to 4.7 GB (6 times capacity of CD-ROM) Double layer: Up to 8.5 GB (12 times capacity of CD-ROM)		
	<b>Dimensions (W x H x D)</b>	5.9 x 1.7 x 8.0 in (15.0 x 4.4 x 20.3 cm)		
	<b>Weight (max)</b>	2.6 lb (1.2 kg)		
	<b>Read speeds</b>	<b>DVD+R/-R/+RW/-RW/+R DL /-R DL</b>	Up to 8X	
		<b>DVD-ROM</b>	Up to 16X	
		<b>DVD-RAM</b>	Up to 4X	
		<b>CD-ROM, CD-R</b>	Up to 48X	
		<b>CD-RW</b>	Up to 32X	
	<b>Removable Storage - Media Compatibility - DVD-ROM</b>			
	<b>Media</b>	<b>Read</b>	<b>Write</b>	
<b>CD-ROM</b>	Yes	No		
<b>CD-R</b>	Yes	No		
<b>CD-RW</b>	Yes	No		
<b>DVD-ROM</b>	Yes	No		
<b>DVD-ROM DL</b>	Yes	No		
<b>DVD-RAM</b>	Yes	No		
<b>DVD+R</b>	Yes	No		
<b>DVD+R DL</b>	Yes	No		
<b>DVD+RW</b>	Yes	No		
<b>DVD-R</b>	Yes	No		
<b>DVD-RW</b>	Yes	No		
<b>DVD-R DL</b>	Yes	No		
<b>Access times</b> (typical reads, including setting)	<b>Random</b>	DVD: < 140 ms (typical), CD: < 125 ms (typical)		
	<b>Full Stroke</b>	DVD: < 250 ms (seek), CD: < 210 ms (seek)		
	<b>Cache Buffer</b>	2 MB (minimum)		
<b>Power</b>	<b>Data Transfer Modes</b>	ATA PIO mode 4 (16.7 MB/s); ATA Multi-word DMA mode 2 (16.7 MB/s); ATA UltraDMA Mode 3 (44.4 MB/s -default)		
	<b>Source</b>	SATA DC power receptacle		
	<b>DC Power Requirement</b>	5 VDC ± 5%-100 mV ripple p-p 12 VDC ± 5%-200 mV ripple p-p		
<b>Environmental</b> (all conditions non-condensing)	<b>DC Current</b>	5 VDC - <1000 mA typical, < 1600 mA maximum 12 VDC - < 600 mA typical, < 1400 mA maximum		
	<b>Temperature</b> (operating)	41° to 122° F (5° to 50° C)		
	<b>Relative Humidity</b> (operating)	10% to 90%		

### Technical Specifications - Optical Devices

	<b>Maximum Wet Bulb Temperature (operating)</b>	86° F (30° C)
<b>Operating Systems Supported</b>	Windows Vista Business 32 and 64*, Windows XP Professional or Red Hat Enterprise Linux WS 4 & 5 Desktop, No driver is required for this device. Native support is provided by the operating system.	
	<p><b>*NOTE:</b> 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>	
<b>Option kit contents</b>	HP 16X Max SATA DVD-ROM Drive, Intervideo WinDVD and installation guide.	

#### HP 48X SATA CD-RW/DVD-ROM Combo Drive

<b>Form Factor</b>	5.25-inch, half-height, tray-load	
<b>Orientation</b>	Either horizontal or vertical	
<b>Interface type</b>	SATA/ATAPI	
<b>Disc capacity</b>	Single layer: Up to 4.7 GB (6 times capacity of CD-ROM) Double layer: Up to 8.5 GB (12 times capacity of CD-ROM)	
<b>Dimensions (W x H x D)</b>	5.9 x 1.7 x 8.0 in (15.0 x 4.4 x 20.3 cm)	
<b>Weight (max)</b>	2.6 lb (1.2 kg)	
<b>Write speed</b>	<b>CD-R</b>	Up to 48X
	<b>CD-RW</b>	Up to 32X
<b>Read speeds</b>	<b>DVD+R/-R/+RW/-RW/+R DL /-R DL</b>	Up to 8X
	<b>DVD-ROM</b>	Up to 16X
	<b>CD-ROM, CD-R</b>	Up to 48X
	<b>CD-RW</b>	Up to 32X
<b>Buffer Size</b>	1.5MB (Min)	
<b>Access times (typical reads, including setting)</b>	<b>Random</b>	DVD: < 140 ms (typical), CD: < 125 ms (typical)
	<b>Full Stroke</b>	DVD: < 250 ms (seek), CD: < 210 ms (seek)
<b>Power</b>	<b>Source</b>	SATA DC power receptacle
	<b>DC Power Requirement</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>Total Drive Power (standby mode)</b>	< 2.5 Watt
<b>Environmental (all conditions non-condensing)</b>	<b>Temperature (operating)</b>	41° to 122° F (5° to 50° C)
	<b>Relative Humidity (operating)</b>	10% to 90%

### Technical Specifications - Optical Devices

	<b>Maximum Wet Bulb Temperature</b> (operating)	86° F (30° C)
<b>Operating Systems Supported</b>	Windows Vista Business 64*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32*, Red Hat Linux WS 4, 32/64-bit OS. 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 <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> .	
<b>Option kit contents</b>	HP 48X Max SATA CD-RW/DVD-ROM Combo Drive, Roxio Easy Media Creator version 9, Intervideo WinDVD, CD-R media, high-speed CD-RW media, and installation guide.	

<b>HP 16X Max SATA DVD+/-RW LightScribe Drive</b>	<b>Form Factor</b>	5.25-inch, half-height, tray-load		
	<b>Orientation</b>	Either horizontal or vertical		
	<b>Interface type</b>	SATA/ATAPI		
	<b>Disc capacity</b>	8.5 GB DL or 4.7 GB standard		
	<b>Dimensions (W x H x D)</b>	5.9 x 1.7 x 8.0 in (15.0 x 4.4 x 20.3 cm)		
	<b>Weight (max)</b>	2.6 lb (1.2 kg)		
	<b>Write speed</b>	<b>DVD+R</b>	Up to 16X	
		<b>DVD+RW</b>	Up to 8X	
		<b>DVD+R DL</b>	Up to 8X	
		<b>DVD-R DL</b>	Up to 4X	
		<b>DVD-R</b>	Up to 16X	
		<b>DVD-RW</b>	Up to 6X	
		<b>DVD-RAM</b>	Up to 12X	
		<b>CD-R</b>	Up to 48X	
		<b>CD-RW</b>	Up to 32X	
		<b>Read speeds</b>	<b>DVD-RAM</b>	Up to 12X
<b>DVD+RW, DVD-RW, DVD+R DL, DVD-R DL</b>	Up to 8X			
<b>DVD-ROM, DVD+R, DVD-R</b>	Up to 16X			
<b>CD-ROM, CD-R</b>	Up to 48X			
<b>CD-RW</b>	Up to 32X			
<b>Access times</b> (typical reads, including setting)	<b>Random</b>		DVD: < 130 ms (typical), CD: < 120 ms (typical)	
	<b>Full Stroke</b>	DVD: < 240 ms (seek), CD: < 200 ms (seek)		
<b>Power</b>	<b>Source</b>	SATA DC power receptacle		
	<b>DC Power Requirement</b>	5 VDC ± 5%-100 mV ripple p-p		
		12 VDC ± 5%-200 mV ripple p-p		

### Technical Specifications - Optical Devices

	<b>DC Current</b>	5 VDC - <1000 mA typical, < 1600 mA maximum 12 VDC - < 600 mA typical, < 1400 mA maximum
	<b>Total Drive Power</b> (standby mode)	< 2.5 Watt
<b>Environmental</b> (all conditions non-condensing)	<b>Temperature</b> (operating)	41° to 122° F (5° to 50° C)
	<b>Relative Humidity</b> (operating)	10% to 90%
	<b>Maximum Wet Bulb Temperature</b> (operating)	86° F (30° C)
<b>Operating Systems Supported</b>	Windows Vista Business 64* (64-bit expected availability in July 2007), Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32*, Red Hat Linux WS 4 & 5 Desktop (32/64-bit OS). 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>	
<b>Option kit contents</b>	HP 16X DVD+-RW SuperMulti LightScribe drive, LightScribe software, Roxio Easy Media Creator version 9, Intervideo WinDVD Software, installation guide, and DVD+R media. Software is Microsoft Windows only.	

## Technical Specifications - Graphics

<b>NVIDIA Quadro NVS 440, 256 MB Quad Head</b> (Part# PT453AA)	<b>Form Factor</b>	ATX
	<b>Graphics Controller</b>	2 nv43 2D graphics processor units (GPUs)
	<b>VGA controller</b>	Integrated into the Quadro GPU
	<b>Bus Type</b>	PCI-E x16
	<b>RAMDAC</b>	Dual 350 MHz
	<b>Memory</b>	256 MB DDR frame buffer and Texture storage (128MB per GPU)
	<b>Connector</b>	Two DMS-59
	<b>Controller clock speed</b>	250 MHz
	<b>Color planes</b>	32-bit color buffer
	<b>Overlay planes</b>	1 16-bit Video overlay plane
	<b>Maximum pixel clock</b>	350 MHz
	<b>Multi-Monitor Support</b>	Up to 4 analog or digital monitors
	<b>Single DVI Support</b>	Yes
	<b>Dual DVI Support</b>	Yes
	<b>High-definition Video Processor (HDVP)</b>	32-Bit color 2048 x 1536 @ 60 Hz maximum resolution 2D rendering engine optimized for 32-, 24-, 16-, 15-, and 8-bpp modes
	<b>High-definition Video Processor (HDVP)</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>Available graphics drivers</b>	Microsoft Windows XP (Provides full native Dual View mode, Span or Big Desktop mode, and Clone mode ) 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> .

**\*NOTE:** Graphics card uses "reduced blanking" timing and may not work with all panels at this resolution.

<b>NVIDIA Quadro NVS 290, 256 MB Dual Head</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>Connector</b>	DMS-59, includes DMS-59 to Dual DVI-I cable. DMS-59 to Dual VGA cable available as an option.
	<b>Display resolution support</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>Color planes</b>	32-bit color buffer
	<b>Overlay planes</b>	Hardware supported
	<b>nView Architecture</b>	Advanced multi-display desktop & application management seamlessly integrated into Microsoft Windows®.
	<b>Multi-Monitor Support</b>	Dual monitor support

### Technical Specifications - Graphics

<b>DVI Support</b>	DMS-59 (to dual DVI-SL)
<b>High-definition Video Processor (HDVP)</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>Supported Graphics APIs</b>	OpenGL 2.1 & DirectX Support; Shader Model 4.0
<b>Available graphics drivers</b>	Microsoft Windows Vista Business 32 and 64, Microsoft Windows XP (Provides full native Dual View mode, Span or Big Desktop mode, and Clone mode), 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: <a href="http://welcome.hp.com/country/us/eng/software_drivers.html">http://welcome.hp.com/country/us/eng/software_drivers.html</a> .

<b>NVIDIA Quadro FX 370 PCI-Express graphics controller</b>	<b>Form Factor</b>	ATX
	<b>Bus Type</b>	PCI-Express x16
	<b>Memory</b>	256MB 400MHz DDR2 SDRAM unified frame buffer, Z-buffer and Texture storage
	<b>Connectors</b>	DVI-I (dual-link) and DVI-I (single-link)
	<b>Display resolution support</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) and 3840x2400 (dual-link). NVIEW advanced multi-display desktop and application management seamlessly integrated into Microsoft® Windows®
	<b>RAMDAC</b>	Integrated dual 400MHz
	<b>Architecture Features</b>	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
	<b>Power consumption</b>	<50 W
	<b>Shading Architecture</b>	Fully programmable GPU (OpenGL 2.1/DirectX 10 class) Vertex/Pixel Shader 4.0 Shading Support (HLSL, GLSL, CgFX)
	<b>Supported Graphics APIs</b>	OpenGL 2.1 & SM4.0 and DirectX10 Support
<b>Available graphics drivers</b>	Microsoft Windows Vista 32 and 64, Microsoft Windows XP, 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: <a href="http://welcome.hp.com/country/us/eng/software_drivers.html">http://welcome.hp.com/country/us/eng/software_drivers.html</a> .	

### Technical Specifications - Graphics

<b>NVIDIA Quadro FX 570 PCI-Express graphics controller</b>	<b>Form Factor</b>	ATX
	<b>Bus Type</b>	PCI-Express x16
	<b>Memory</b>	256MB 400MHz DDR2 SDRAM unified frame buffer, Z-buffer and Texture storage
	<b>Connectors</b>	DVI-I (dual-link) and DVI-I (single-link)
	<b>Display resolution support</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) and 3840x2400 (dual-link). NVIEW advanced multi-display desktop and application management seamlessly integrated into Microsoft® Windows®
	<b>RAMDAC</b>	Integrated dual 400MHz
	<b>Architecture Features</b>	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
	<b>Power consumption</b>	<60 W
	<b>Shading Architecture</b>	Fully programmable GPU (OpenGL 2.1/DirectX 10 class) Vertex/Pixel Shader 4.0 Shading Support (HLSL, GLSL, CgFX)
	<b>Supported Graphics APIs</b>	OGL 2.1 & SM4.0 and DirectX10 Support
	<b>Available graphics drivers</b>	Microsoft Windows Vista 32 and 64, Microsoft Windows XP, 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: <a href="http://welcome.hp.com/country/us/eng/software_drivers.html">http://welcome.hp.com/country/us/eng/software_drivers.html</a> .

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<b>NVIDIA Quadro FX 1700 PCI-Express graphics controller</b>	<b>Form Factor</b>	ATX
	<b>Bus Type</b>	PCI-Express x16
	<b>Memory</b>	512 MB 4000MHz DDR2 SDRAM unified frame buffer, Z-buffer and Texture storage
	<b>Connectors</b>	DVI-I (dual-link) and DVI-I (dual-link)
	<b>Display resolution support</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) and 3840x2400 (dual-link). NVIEW advanced multi-display desktop and application management seamlessly integrated into Microsoft® Windows®
	<b>RAMDAC</b>	Integrated dual 400MHz
	<b>Architecture Features</b>	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

### Technical Specifications - Graphics

	Hardware OpenGL overlay planes H/W accelerated pixel readback 3rd generation occlusion culling AA on scan-out
<b>Power consumption</b>	<75 W
<b>Shading Architecture</b>	Fully programmable GPU (OpenGL 2.1/DirectX 10 class) Vertex/Pixel Shader 4.0 Shading Support (HLSL, GLSL, CgFX)
<b>Supported Graphics APIs</b>	OpenGL 2.1 & SM4.0 and DirectX10 Support
<b>Available graphics drivers</b>	Microsoft Windows Vista 32 and 64, Microsoft Windows XP, 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: <a href="http://welcome.hp.com/country/us/eng/software_drivers.html">http://welcome.hp.com/country/us/eng/software_drivers.html</a> .

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<b>ATI FireGL V5600 PCI-Express graphics controller</b>	<b>Form Factor</b>	ATX
	<b>Graphics Controller</b>	R520
	<b>Bus Type</b>	PCI Express x16
	<b>Memory</b>	512 MB of unified frame buffer, Z-buffer and Texture storage and a 128-bit Ring-Bus memory controller
	<b>Connectors</b>	Two dual-link DVI connectors with analog/digital outputs
	<b>Maximum Resolution</b>	Dual Link digital support for 3840 x 2400 @ 60Hz. Ideal for 30-inch widescreen displays.
	<b>RAMDAC</b>	Dual 10-bit per channel 400MHz
	<b>Ring Bus memory controller</b>	<ul style="list-style-type: none"> <li>512-bit internal ring bus for highly efficient memory reads</li> </ul>
	<b>Display output</b>	Programmable intelligent arbitration logic <ul style="list-style-type: none"> <li>Up to 16-bit per RGB color component High Dynamic Range output (HDR)</li> </ul>
	<b>Shading Architecture</b>	Programmable piecewise linear gamma correction, color correction, and color space conversion (10-bits per color) <ul style="list-style-type: none"> <li>Supports Full Shader Model 4.0</li> </ul>
	<b>Supported Graphics APIs</b>	120 shader processing unit DirectX 10 and OpenGL 2.1 advanced
	<b>Available graphics drivers</b>	Microsoft Windows XP Professional 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> . HP-tested Windows XP and Linux
	<b>Available Graphics Drivers</b>	Microsoft Windows Vista 32 and 64, Microsoft Windows XP, 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: <a href="http://welcome.hp.com/country/us/eng/software_drivers.html">http://welcome.hp.com/country/us/eng/software_drivers.html</a> .
	<b>Option kit Contents</b>	PCA with ATX bracket, DVI to VGA converters, CD and manual

### Technical Specifications - Graphics

<b>NVIDIA Quadro FX 3500, 256 MB</b> (Part# ES357AA)	<b>Form Factor</b>	ATX
	<b>Bus Type</b>	PCI-Express x16
	<b>Memory</b>	256 MB 700 MHz GDDR3 SDRAM unified frame buffer, Z-buffer and Texture storage
	<b>Connectors</b>	2 dual-link DVI-I + 3-pin Mini DIN stereo output
	<b>Display resolution support</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) and 3840x2400 (dual-link). NVIEW advanced multi-display desktop and application management seamlessly integrated into Microsoft Windows
	<b>RAMDAC</b>	Dual 400 MHz integrated
	<b>Architecture Features</b>	256-bit memory interface 128-bit IEEE floating-point precision graphics pipeline 128-bit color precision 12-bit sub-pixel precision 8x FSAAs at 1920x1200, 4x at 2048x1536, rotated grid FSAAs sampling algorithm Hardware accelerated antialiased 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 3840x2400 (24Hz) SLI Link
	<b>Shading Architecture</b>	Fully programmable GPU Long fragment programs (up to 65,536 instructions) Long vertex programs (up to 65,536 instructions) Looping and subroutines (up to 256 loops per vertex program) Dynamic flow control Conditional execution
	<b>Supported Graphics APIs</b>	OpenGL 2.0 DirectX 9.0
	<b>Available Graphics Drivers</b>	Microsoft Windows Vista Business 32 and 64, Microsoft Windows XP Professional; Linux - Full Open GL implementation, complete with NVIDIA and ARB extensions. 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> .
	<b>Maximum Resolution</b>	Dual DVI-I output – drives dual digital displays at resolutions up to 1920x1200 @ 60Hz (single-link) and 3840x2400 @ 24Hz (dual-link). Internal 400MHz RAMDACs – drives dual analog displays up to 2048x1536 @ 75Hz each

### Technical Specifications - Graphics

<b>NVIDIA Quadro FX 4600 (768 MB)</b>	<b>Graphics controller</b>	NVIDIA Quadro FX 4600 Workstation GPU
	<b>Bus Type</b>	PCI Express x16
	<b>RAMDAC</b>	Dual 400 MHz integrated
	<b>Memory</b>	768 MB GDDR3 SDRAM unified graphics memory
	<b>Connectors</b>	2 Dual-Link DVI-I analog/digital monitor outputs, 1 3-pin Mini DIN stereo output, DVI-I to VGA adapters included
	<b>Multi-monitor Support</b>	Dual integrated display controllers supporting up to 2048x1536 @ 75Hz (analog) or 3840x2400 @ 41Hz (digital) on both displays
	<b>NVIDIA Quadro FX 4600 Architecture</b>	384-bit memory interface 67.2 GB/sec. memory bandwidth Full 128-bit floating point color precision 12-bit subpixel precision 65,536 fragment instruction 65,536 vertex instruction 3D volumetric textures Single-system powerwall Hardware accelerated antialiased points & lines Hardware OpenGL® overlay planes Hardware accelerated two-sided lighting Hardware accelerated clipping planes Hardware two-sided lighting 3rd-generation occlusion culling OpenGL quad-buffered stereo Hardware-Accelerated Pixel Read-Back
	<b>Shading Architecture</b>	16 textures per pixel in fragment programs Window ID clipping functionality Hardware accelerated line stippling Fully programmable GPU (OpenGL2.0/DirectX 9.0c class) Long fragment programs (up to 65,536 instructions) Long vertex programs (up to 65,536 instructions) Looping and subroutines (up to 256 loops per vertex program) Dynamic flow control Conditional execution
	<b>High-level Shader Languages</b>	Optimized compiler for Cg and Microsoft® HLSL OpenGL 2.0 and DirectX 9.0c support Open source compiler
	<b>High-resolution Antialiasing</b>	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
	<b>Display Resolution Support</b>	Dual Dual Link DVI-I output-drives digital displays at resolutions up to 3840 x 2400 @ 41Hz Internal 400 MHz DACs - Two analog displays up to 2048x1536 @ 75 Hz each
	<b>nView Architecture</b>	Advanced multi-display desktop & application management seamlessly integrated into Microsoft Windows®.
	<b>Supported Graphics APIs</b>	OpenGL 2.0 ICD with immediate mode support for all OGL primitive types, DirectX 10 compatible
	<b>Available Graphics drivers</b>	Microsoft Windows XP Professional, 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: <a href="http://welcome.hp.com/country/us/eng/software_drivers.html">http://welcome.hp.com/country/us/eng/software_drivers.html</a>

### Technical Specifications - Monitors

#### HP L1965 19-inch LCD Panel Monitor

<b>Type</b>	Active matrix, thin film transistor (TFT)
<b>Viewable Image Area</b>	19 inches; 48.25 cm maximum viewable (diagonal)
<b>Screen Opening (WxH)</b>	14.9 x 12.0 inches; 38.0 x 30.5 cm
<b>Viewing Angle (typical)</b>	178 degrees horizontal/178 degrees vertical (10:1 minimum contrast ratio)
<b>Brightness (typical)</b>	300 nits (cd/m <sup>2</sup> )
<b>Contrast Ratio (typical)</b>	1000:1 (typical)
<b>Response Rate (typical)</b>	6 ms (typical gray to gray)**
<b>Pixel Pitch</b>	0.294 mm
<b>Backlight Lamp Life (to half brightness)</b>	50K hours

\* **NOTE:** All performance specifications represent the typical specifications provided by HP's component manufacturers; actual performance may vary either higher or lower.

\*\***NOTE:** 20 ms rise and fall

#### Video/Other Inputs

<b>Plug and Play</b>	Yes (supports VESA DDC2B and DDC/CI; PC2001 compliant)
<b>Self Powered USB 2.0 Hub</b>	One upstream, four downstream ports (cable included)
<b>Input Signal</b>	Two DVI-I connectors (VGA analog or digital)
<b>Input Impedance</b>	75 ohms ± 2%
<b>Sync Input</b>	Separate sync (HSYNC/VSYNC); composite sync, Sync on Green (activated through on-screen display)
<b>Video Cable</b>	One DVI-D to DVI-D, and 1 DVI-I to VGA cables

#### Signal Interface/ Performance

<b>Video Cable Length</b>	71 in (1.8 m)
<b>Horizontal Frequency</b>	24 to 83 kHz
<b>Vertical Frequency</b>	48 to 76 Hz
<b>Native Resolution</b>	1280 x 1024 @ 75 Hz analog 1280 x 1024 @ 60 Hz digital
<b>Maximum Resolution (Analog)</b>	1280 x 1024 @ 75 Hz analog
<b>Maximum Resolution (Digital)</b>	1280 x 1024 @ 75 Hz analog
<b>Preset VESA Graphic Modes (non-interlaced)</b>	640 x 480 @ 60 Hz, 72 Hz, 75 Hz 720 x 400 @ 70 Hz 800 x 600 @ 60 Hz, 72 Hz, 75 Hz 1024 x 768 @ 60 Hz, 70 Hz, 75 Hz 1280 x 1024 @ 60 Hz, 75 Hz
<b>Preset MAC Mode</b>	832 x 624 @ 75 Hz 1152 x 870 @ 75 Hz
<b>Preset VGA Mode</b>	640 x 480 @ 60 Hz, 72 Hz
<b>Preset SUN Mode</b>	1152 x 900 @ 76 Hz
<b>Fail Safe Mode</b>	Yes (limits out of range signal messages)
<b>Maximum Pixel Clock Speed</b>	140 MHz

### Technical Specifications - Monitors

	<b>User Programmable Modes</b>	Yes, 15
	<b>Anti-Glare</b>	Yes
	<b>Anti-Static</b>	Yes
	<b>AssetControl</b>	Yes (accessible on HP Compaq Business Desktops featuring Intelligent Manageability)
	<b>Default Color Temperature</b>	Yes (6500k, 9300k, SRGB, Custom User)
<b>On Screen Display (OSD) Controls</b>	<b>Buttons or Switches</b>	Power on/off; 3-button OSD; second level OSD buttons include dual-input switch, dedicated auto adjust switch
	<b>Languages</b>	English, Spanish, French, German, Netherlands, Italian, Japanese, Simplified Chinese
	<b>User Controls</b>	Size and Positioning Contrast Brightness Clock, Clock Phase Selectable Color Temperature Serial Number Mode Displayed Sleep Timer Input Selection Factory Reset
<b>Power</b>	<b>Power Supply</b>	Auto-ranging, 90 to 265 VAC; internal power supply
	<b>Input Power</b>	100 ~ 240 VAC
	<b>Nominal Current</b>	1.5 A maximum
	<b>Frequency</b>	50 ~ 60 Hz
	<b>Typical Power Consumption</b>	< 35 watts
	<b>Maximum</b>	< 55 watts
	<b>Power Saving</b>	< 2 watts
	<b>Off Mode</b>	0 watts (when master power switch is in the off position)
	<b>Power Cable Length</b>	74.8 in (1.9 m); non-captive
<b>Mechanical</b>	<b>Dimensions (H x W x D)</b>	<b>Unpacked with stand</b> 14.85 min to 18.79 max x 15.9 x 8.78 inches (37.72 min to 47.72 max x 40.39 x 22.29 cm)
		<b>Base Area (Footprint D x W)</b> 8.78 x 11.88 inches (22.29 x 30.18 cm)
		<b>Panel only (without stand) (H x W x D)</b> 12.96 x 15.9 x 2.4 inches (32.91 x 40.39 x 6.1 cm)
	<b>Weight</b>	<b>Unpacked with stand</b> 15.6 lbs (7.06 kg) <b>Unpacked without stand</b> 9.26 lbs (4.19 kg) <b>Packaged</b> 20.5 lbs (9.27 kg)
	<b>Bezel Width</b>	12.5 mm left and right, 12.75 mm top and bottom
	<b>Tilt Range</b>	-4 degrees to +30 degrees
	<b>Swivel Range</b>	± 45 degrees horizontal swivel
	<b>Height Adjustable</b>	Yes (4 in/100mm adjustment range)

### Technical Specifications - Monitors

<b>Environmental</b>	<b>Pivot Rotation</b>	Yes, 90 degrees
	<b>Base</b>	Ships attached and is removable
	<b>Temperature – Operating</b>	41° to 95° F (5° to 35° C)
	<b>Temperature – Non-operating</b>	-4° to 140° F (-20° to 60° C)
	<b>Humidity – Operating</b>	20% to 80%
	<b>Humidity – Non-operating</b>	5% to 95%
	<b>Altitude – Operating</b>	0 to 12,000 ft (0 to 3,658 m)
	<b>Altitude – Non-operating</b>	0 to 40,000 ft (0 to 12,192 m)
<b>Environmental Data</b>	<b>Eco-Label Certifications and Declarations</b>	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:

- US Energy Star
- CECP

<b>Energy Consumption</b> (in accordance with US Energy Star test method)	<b>AC Input Voltage at 100 VAC +/- 5 VAC, 50 Hz +/- 3 Hz</b>	<b>AC Input Voltage at 115 VAC +/- 5 VAC, 60 Hz +/- 3 Hz</b>	<b>AC Input Voltage at 230 VAC +/- 5 VAC, 50 Hz +/- 3 Hz</b>
Normal Operation	35.7 watts	35.6 watts	35.1 watts
Sleep	1.08 watts	1.14watts	1.23 watts
Off	0.93 watts	0.94 watts	0.92 watts
<b>Heat Dissipation*</b>	100 VAC, 50 Hz	115 VAC, 60 Hz	230 VAC, 50 Hz
Normal Operation	121.7 BTU/hr	121.4 BTU/hr	119.7 BTU/hr
Sleep	3.68 BTU/hr	3.89 BTU/hr	4.19 BTU/hr
Off	3.17 BTU/hr	3.21 BTU/hr	3.14 BTU/hr

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

<b>Longevity and Upgrading</b>	Upgradeability features contained in the product include: One upstream and four downstream USB ports
<b>Ergonomics</b>	The monitor meets the ergonomic requirement of EN-ISO 13406-2 for flat panel displays.
<b>Additional Information</b>	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.  Display meets the requirement for low frequency electromagnetic fields per MPR-II, TCO, and prEN50279 A/B/C.  This product contains 100% recycled materials (by

wt.)

This product is 100% recyclable when properly disposed of at end of life.

#### Packaging Materials

- Corrugated - 0.955 kg
- Plastic (other) - 0.055 kg
- Polystyrene - 0.24 kg

#### 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](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
- 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 Biphenyl 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 Tin (TBT), Triphenyl Tin (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

		<p>such as paper and corrugated materials.</p> <ul style="list-style-type: none"> <li>● Reduce size and weight of packages to improve transportation fuel efficiency.</li> <li>● Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.</li> </ul>
	<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:          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>Options</b>	<b>HP Silver Flat Panel Speaker Bar</b>	<p>Powered directly by the monitor or PC, seamlessly attaches to the monitor's bezel to bring full multimedia support to select HP flat panel monitors. Features include dual speakers with full sound range and external jack for headphones. Sold separately, part number EE418AA. For more information, refer to the HP Flat Panel Speaker Bar QuickSpecs.</p>
<b>Other</b>	<b>Accessories Included</b>	<p>One DVI-D to DVI-D cable, one DVI-I to VGA cable, one USB cable, and CD-ROM with Pivot Pro software, HP Display Assistant software, and HP Display LiteSaver software.</p>
	<b>Software</b>	<p>Pivot Pro software from Portrait Displays, Inc. interacts with your PC's native graphics driver to enable seamless portrait screen redraws with a simple mouse-click or keyboard command. Pivot Pro supports 90-degree portrait and landscape views. Language support is available in English, Japanese, French, German, Spanish, Italian, and Traditional and Simplified Chinese.</p> <p>HP Display Assistant is a software utility that allows monitor adjustment, color calibration, and security/asset management using the Display Data Channel Command Interface (DDC/CI) protocol of the connected desktop PC.</p> <p>HP Display LiteSaver feature allows you to schedule Sleep mode at preset times to help protect the monitor against image retention, drastically lower power consumption and energy costs, and extend the lifespan of the monitor.</p>

### Technical Specifications - Monitors

	<b>User Guide Languages</b>	English, Bahasa, B. Portuguese, French, LA Spanish, Korean, Simplified Chinese, Traditional Chinese, Japanese, Danish, Dutch, Finnish, German, Italian, Norwegian, Swedish, Greek, Polish, Russian, Slovenian, Turkish
	<b>Warranty Languages</b>	English
	<b>Color</b>	Carbonite, two-tone carbonite and silver (EMEA only)
	<b>VESA Mounting</b>	Yes (swing arm/wall mount not included); base must be removed for mounting options)
	<b>VESA External Mounting</b>	Yes (standard 4 hole pattern, 100 mm)
	<b>Kensington Lock-ready</b>	Yes
<b>Certification and Compliance</b>		Australian ACA Approval, Canadian Requirements/CSA, CE Marking, China CCIB/CCEE Approval, CISPR Requirements, Eastern European Approvals, Energy Star Compliant, FCC Approval, German Ergonomic (TUV and GS Mark), ISO 13406-2 Compliant (Pixel Defect Guidelines), Mexican NOM Approval, MPR-II Compliant, PC2001 Compliant, PC99 Certified, S. Korean MIC Approval, Taiwan BSMI Approval, TCO 99 or 03 depending on region (emissions, ergonomics, environment), TUV-Ergo, UL Listed, VCCI Approvals, Microsoft® Windows® Certification
<b>Compatibility</b>		VESA Video Signal Standard (VSIS) Compliant video cards have been tested and proven compatible for use with the HP LP1965 Flat Panel Monitor. Recommended for use with HP products.
<b>Service and Warranty</b>		Three years parts, labor, and on-site service. 24-hour, 90-day, toll-free technical support. Replacement options may include second business day on-site service, or next business day direct replacement, at HP's sole discretion. With direct replacement, HP will ship a replacement display product directly to you. Using the prepaid shipping labels provided, return your failed display to HP in the same packaging as the replacement. Certain restrictions and exclusions apply. For details see your product warranty or contact HP Customer Support.

<b>HP LP2065 20-inch LCD Monitor</b>	<b>Panel</b>	<b>Type</b>	20-inch Active Matrix TFT (thin film transistor)
		<b>Viewable Image Area</b>	20.1 in (51 cm) (diagonal)
		<b>Screen Opening</b>	16.2 x 12.17 inches; 41.1 x 30.9 cm (W x H)
		<b>Viewing Angle</b> (typical)*	Up to 178° horizontal/178° vertical (10:1 minimum contrast ratio)
		<b>Brightness</b> (typical)*	Up to 300 nits (cd/m <sup>2</sup> )
		<b>Contrast Ratio</b> (typical)*	Up to 800:1
		<b>Response Rate</b> (typical)*	8 ms (gray to gray), 16 ms (rise + fall)
		<b>Pixel Pitch</b>	0.255 mm
		<b>Backlight Lamp Life</b>	45K hours (to half brightness)
	<b>On Screen Display (OSD) Controls</b>	<b>Buttons or Switches</b>	Input select, auto adjust/OSD up, OSD down, OSD menu select, power
	<b>Languages</b>	English, French, German, Spanish, Italian, Dutch, and Japanese	

### Technical Specifications - Monitors

	<b>User Controls</b>	Brightness, contrast, positioning, color temperature, individual color control, serial number display, full screen resolutions, clock, clock phase, input selection, image control (including scaling), and factory reset	
<b>Signal Interface/ Performance</b>	<b>Horizontal Frequency</b>	30 to 94 kHz (VGA input); 30 to 92 KHz (DVI input for modes with pixel clock less than 157 MHz)	
	<b>Vertical Frequency</b>	48 to 85 Hz (VGA input); 30 to 92 KHz (DVI input for modes with pixel clock less than 157 MHz)	
	<b>Native Resolution</b>	1600 x 1200 @ 60 Hz (recommended)	
	<b>Preset VESA Graphic Modes (non-interlaced)</b>		1600 x 1200 @ 60 Hz, 75 Hz (VGA input)
			1280 x 1024 @ 60 Hz, 75 Hz, 85 Hz
			1280 x 960 @ 60 Hz
			1152 x 900 @ 66 Hz
			1024 x 768 @ 60 Hz, 75 Hz, 85 Hz
			800 x 600 @ 60 Hz, 85 Hz
			640 x 480 @ 60 Hz, 75 Hz, 85 Hz
		<b>Text Mode</b>	720 x 400 @ 70 Hz
		<b>Mac Mode</b>	1152 x 870 @ 75 Hz and 832 x 624 @ 75 Hz
		<b>Sun Mode</b>	1152 x 900 @ 66 Hz
	<b>Maximum Pixel Clock Speed</b>	202 MHz (VGA input); 162 MHz (DVI input)	
	<b>User Programmable Modes</b>	Yes, 10	
	<b>Anti-Glare</b>	Yes	
	<b>Anti-Static</b>	Yes	
	<b>Default Color Temperature</b>	6500 K	
<b>Video Input</b>	<b>Plug and Play</b>	Yes	
	<b>Input Signal</b>	Four connectors, including one 15-pin mini D-sub VGA, one DVI-I (VGA analog and digital input), one composite video, and one s-video	
	<b>Self Powered USB 2.0 Hub</b>	One upstream, four downstream ports (cable included)	
	<b>Input Signal</b>	Two DVI-I connectors (dual VGA analog or dual digital input possible)	
	<b>Input Impedance</b>	75 ohms $\pm$ 10%	
	<b>Sync Input</b>	Separate sync (HSYNC/VSYNC); composite sync, Sync on Green	
	<b>Video Cable</b>	Two VGA to DVI-I; two DVI-D to DVI-I	
	<b>Video Cable Length</b>	5.9 ft (1.8 m)	
<b>Power</b>	<b>Input Power</b>	Auto-Ranging, 90 to 132 VAC and 195 to 265 VAC; internal power supply, 50 Hz/60 Hz	
	<b>Frequency</b>	47.5 to 63 Hz	
	<b>Typical Power Consumption</b>	55 watts (without USB ports); 70 watts (USB ports fully loaded)	
	<b>Maximum</b>	< 75 W	

### Technical Specifications - Monitors

	<b>Power Saving</b>	< 2 watts
	<b>Power Cable Length</b>	5.9 ft (1.8 m)
<b>Mechanical</b>	<b>Dimensions (H x W x D)</b>	<b>Unpacked with stand</b> 16.7 to 21.8 x 17.4 x 8.67 inches; 42.5 to 55.5 x 44.3 x 22.0 cm
		<b>Unpacked w/o stand (head only)</b> 13.58 x 17.4 x 3.42 inches; 34.5 x 44.3 x 8.7 cm
	<b>Packaged</b>	11.77 x 22.2 x 16.77 inches; 29.9 x 56.4 x 42.6 cm
	<b>Weight</b>	<b>Unpacked</b>
<b>Packaged</b>		26.3 lb (11.95 kg)
	<b>Tilt Range</b>	-5° to + 25° vertical tilt
	<b>Swivel Range</b>	-45° to + 45°
	<b>Height Adjustable</b>	Yes, range 5.1 in (13.0 cm)
	<b>Pivot Rotation</b>	Yes
	<b>Base</b>	Detachable, ships attached
<b>Environmental</b>	<b>Temperature – Operating</b>	46° to 95° F (10° to 35° C)
	<b>Temperature – Non-operating</b>	6° to 140° F (-10° to 60° C)
	<b>Humidity – Operating</b>	20% to 80% non-condensing
	<b>Humidity – Non-operating</b>	5% to 85%
	<b>Altitude – Operating</b>	+12,000 ft (+3,657.6 m)
	<b>Altitude – Non-operating</b>	+40,000 ft (+12,192 m)
<b>Options</b>	<b>HP Silver Flat Panel Speaker Bar - Part number: EE418AA</b>	Powered directly by the monitor or the PC, the Speaker Bar seamlessly attaches to the monitor's lower bezel to bring full audio support to select HP flat panel monitors. Features include dual speakers with full sound range and external jack for headphones. Sold separately. For more information, refer to the HP Silver Flat Panel Speaker Bar QuickSpec.
<b>Other</b>	<b>Accessories Included</b>	VGA to DVI-I cable – connects the graphic card's VGA connector to the monitor's input #1 or 2 (DVI-I analog) connector.
		DVI-D to DVI-I cable – connects the graphic card's DVI-D digital connector to the monitor's input #1 or #2 (DVI-I digital) connector.
	<b>User Guide Languages</b>	English, B. Portuguese, French, LA Spanish, Korean, S. Chinese, T. Chinese, Bahasa, Japanese, Danish, Finnish, German, Norwegian, Spanish, Swedish, Greek, Polish, Russian, Slovenian, Turkish

### Technical Specifications - Monitors

	<b>Software</b>	HP Display Assistant Utility makes it possible to adjust displays settings through the PC using two-way communication via DDCI. HP Display Lite Saver allows ability to power up and down display at predetermined hours of the day to save power and backlight life. Pivot Pro software from Portrait Displays, Inc. interacts with your PC's native graphics driver to enable seamless portrait screen redraws with a simple mouse-click or keyboard command. Pivot Pro supports 90-degree portrait and landscape views. Language support is available in English, Japanese, French, German, Spanish, Italian, and Traditional and Simplified Chinese.
	<b>User Guide Languages</b>	English
	<b>Warranty Languages</b>	English
	<b>Color</b>	Carbonite/Silver
	<b>VESA External Mounting</b>	Yes (Standard 4 hole pattern, 100 mm)
	<b>Kensington Lock-Ready</b>	Yes
<b>Certification and Compliance</b>		Canadian Requirements/CSA, CE Marking, CISPR Requirements, Energy FCC Approval, ISO 13406-2 Pixel Defect Guidelines, Mexican NOM Approval,, MPR-II Compliant, PC2001 Compliant, PC99 Certified, TCO 03 (emissions, ergonomics, environment), TUV-Ergo, UL Listed, VCCI Approvals, Microsoft Windows Certification (Microsoft Windows XP)
<b>Compatibility</b>		Compatible with platforms using the VESA standard video modes. Recommended for use with HP products.
<b>Service and Warranty</b>		Three years parts, labor, and on-site service. 24-hour 365-day 1-800 technical support. Replacement options include 2nd business day on-site service or next business day direct replacement. With direct replacement, HP will ship a replacement display product directly to you. Using the shipping labels provided, return your failed display to HP. Certain restrictions and exclusions apply. For details, contact HP Customer Support.

### Technical Specifications - Monitors

**HP LP2465 24-inch  
Widescreen LCD  
Monitor**

**Panel**

**Type** 24-inch Active Matrix TFT (thin film transistor)  
**Viewable Image Area** 24 inches; 60.96 cm  
 (diagonal)  
**Screen Opening** 20.47 x 12.83 inches; 52.0 x 32.6 cm  
 (W x H)  
**Viewing Angle** (typical)\* 178° H/ 178° V (10:1 minimum contrast ratio)  
**Brightness** (typical)\* 500 nits (cd/m<sup>2</sup>)  
**Contrast Ratio** (typical)\* 1000:1  
**Response Rate** 8 ms (typical gray to gray)  
 (typical)\*  
**Pixel Pitch** 0.270 mm  
**Backlight Lamp Life** 50K hours  
 (to half brightness)

\*Response time 13 ms rise and fall, 6 ms gray to gray.

**On Screen Display  
(OSD) Controls**

**Buttons or Switches** Input Select, Auto Adjust, OSD Up, OSD  
 Down, OSD Menu Select, Power  
**Languages** English, French, German, Spanish, Italian,  
 Japanese, Dutch  
**User Controls** Brightness, contrast, positioning, color  
 temperature, individual color control, serial  
 number display, full screen resolutions, clock,  
 clock phase, input selection (includes  
 separate direct access key for dedicated  
 swap between inputs 1 and 2), factory reset

**Signal Interface/  
Performance**

**Horizontal Frequency** 30 to 94 kHz (VGA input); 30 to 92 KHz (DVI  
 input) (for modes with pixel clock less than  
 157 MHz)  
**Vertical Frequency** 48 to 85 Hz (VGA and DVI input)  
**Native Resolution** 1920 x 1200 @ 60 Hz (recommended)  
 (native aspect ratio of 16:10)  
**Preset VESA Graphic  
Modes** (non-interlaced) 1920 x 1200 @ 60 Hz  
 1600 x 1200 @ 60 Hz, 75 Hz  
 1280 x 1024 @ 60 Hz, 75 Hz, 85 Hz  
 1280 x 960 @ 60 Hz  
 1152 x 900 @ 66 Hz  
 1024 x 768 @ 60 Hz, 75 Hz, 85 Hz  
 800 x 600 @ 60 Hz, 75 Hz  
 640 x 480 @ 60 Hz, 75 Hz  
**Text Mode** 720 x 400 @ 70 Hz  
**Mac Mode** 1152 x 870 @ 75 Hz and 832 x 624 @ 75 Hz  
**Sun Mode** 1152 x 900 @ 66 Hz  
**Maximum Pixel Clock  
Speed** 202 MHz (VGA input); 162 MHz (DVI input)  
**User Programmable  
Modes** Yes, 20  
**Anti-Glare** Yes  
**Anti-Static** Yes  
**Default Color  
Temperature** 6500 K

### Technical Specifications - Monitors

<b>Video/Other Inputs</b>	<b>Plug and Play</b>	Yes	
	<b>Self Powered USB 2.0 Hub</b>	One upstream, four downstream ports (located on side of monitor, cable included)	
	<b>Input Signal</b>	Two DVI-I (VGA analog and digital) inputs	
	<b>Input Impedance</b>	75 ohms ± 10%	
	<b>Sync Input</b>	Separate sync (HSYNC/VSYNC); composite sync, Sync on Green	
	<b>Video Cable</b>	VGA to DVI-I; DVI-D to DVI-D	
	<b>Video Cable Length</b>	5.9 ft (1.8 m)	
	<b>Power</b>	<b>Input Power</b>	Auto-Ranging, 90 to 132 VAC and 195 to 265 VAC; internal power supply, 50 Hz/60 Hz
		<b>Frequency</b>	47.5 to 63 Hz
		<b>Typical Power Consumption</b>	75 watts
<b>Maximum</b>		< 110 watts	
<b>Power Saving</b>		< 2 watts	
<b>Power Cable Length</b>		6.2 ft (1.9 m)	
<b>Mechanical</b>	<b>Dimensions (H x W x D)</b>	<b>Unpacked w/ stand</b> 14.6 (min) to 19.7 (max) x 22 x 9.1 in (37.1 (min) to 50.1 (max) x 55.4 x 23.2 cm)	
		<b>Unpacked w/o stand (head only)</b> 14.4 x 22 x 3.7 in (36.6 x 55.84 x 9.2 cm)	
		<b>Packaged</b> 11.7 x 22.1 x 25.6 in (29.8 x 56.0 x 65.1 cm)	
	<b>Weight</b>	<b>Unpacked</b> 23.6 lbs (10.7 kg )	
		<b>Packaged</b> 23.6 lbs (10.7 kg )	
	<b>Tilt Range</b>	-5° to + 25° vertical	
	<b>Swivel Range</b>	-45° to + 45°	
	<b>Height Adjustable</b>	Yes, range 5.1 in (130 mm)	
	<b>Pivot Rotation</b>	Yes	
	<b>Base</b>	Detachable, ships detached	
<b>Environmental</b>	<b>Temperature – Operating</b>	46° to 95° F (10° to 35° C)	
	<b>Temperature – Non-operating</b>	6° to 140° F (-10° to 60° C)	
	<b>Humidity – Operating</b>	20% to 80% non-condensing	
	<b>Humidity – Non-operating</b>	5% to 85%	
	<b>Altitude – Operating</b>	+12,000 ft (+3,657.6 m)	
	<b>Altitude – Non-operating</b>	+40,000 ft (+12,192 m)	
	<b>Other</b>	<b>Accessories Included</b> VGA to DVI-I cable – connects the graphic card's VGA connector to the monitor's input #2 (DVI-I analog) connector DVI-D to DVI-D cable – connects the graphic card's DVI-D digital connector to the monitor's	

### Technical Specifications - Monitors

		input #2 (DVI-I digital) connector
	<b>Software</b>	<p>Pivot Pro software from Portrait Displays, Inc. interacts with your PC's native graphics driver to enable seamless portrait screen redraws with a simple mouse-click or keyboard command. Pivot Pro supports 90-degree portrait and landscape views. Language support is available in English, Japanese, French, German, Spanish, Italian, and Traditional and Simplified Chinese.</p> <p>HP Display Assistant is a software utility that allows monitor adjustment, color calibration, and security/asset management using the Display Data Channel Command Interface (DDC/CI) protocol of the connected desktop PC.</p> <p>HP Display LiteSaver feature allows you to schedule Sleep mode at preset times to help protect the monitor against image retention, drastically lower power consumption and energy costs, and extend the lifespan of the monitor.</p>
	<b>User Guide Languages</b>	English, B. Portuguese, French, LA Spanish, Korean, S. Chinese, T. Chinese, Bahasa, Japanese, Danish, Finnish, German, Norwegian, Spanish, Swedish, Greek, Polish, Russian, Slovenian, Turkish
	<b>Warranty Languages</b>	English, Canadian French, LA Spanish, Brazilian Portuguese, Danish, German, Castilian Spanish, French, Italian, Dutch, Norwegian, Finnish, Swedish, Bahasa Indonesian, Korean, T. Chinese, S. Chinese
	<b>Color</b>	Carbonite/silver
	<b>VESA External Mounting</b>	Yes (Standard 4 hole pattern, 100 mm)
	<b>Kensington Lock-Ready</b>	Yes
<b>Options</b>	<b>HP Silver Flat Panel Speaker Bar - Part number: EE418AA</b>	<p>Powered directly by the monitor or PC, the Speaker Bar seamlessly attaches to the monitor's lower bezel to bring full audio support to select HP flat panel monitors. Features include dual speakers with full sound range and an external jack for headphones. Sold separately. For more information, refer to the HP Flat Panel Speaker Bar QuickSpec.</p>
<b>Certification and Compliance</b>		<p>Australian ACA Approval, Canadian Requirements/CSA, CE Marking, China CCIB/CCEE Approval, CISPR Requirements, Eastern European Approvals, FCC Approval, German Ergonomic (TUV and GS Mark), ISO 9241-3,7,8 VDT Guidelines, ISO 13406-2 Pixel Defect Guidelines, Mexican NOM Approval, MIC Requirements (New Zealand), MPR-II Compliant, Nordic Approvals (Nemko, Fimko, Demko, Semko), PC2001 Compliant, PC99 Certified, S. Korean MIC Approval, Taiwan BSMI Approval, TCO 03 (emissions, ergonomics, environment), TUV-Ergo, UL Listed, VCCI Approvals, Microsoft Windows Certification</p>

### Technical Specifications - Monitors

	(Microsoft Windows 98, Microsoft Windows 2000, and Microsoft Windows XP)
<b>Compatibility</b>	Compatible with platforms using the VESA standard video modes. Recommended for use with HP products.
<b>Service and Warranty</b>	Three years parts, labor, and on-site service. 24-hour, 90-day, toll-free technical support. Replacement options may include second business day on-site service, or next business day direct replacement, at HP's sole discretion. With direct replacement, HP will ship a replacement display product directly to you. Using the prepaid shipping labels provided, return your failed display to HP in the same packaging as the replacement. Certain restrictions and exclusions apply. For details see your product warranty or contact HP Customer Support.

#### HP LP3065 30-inch Widescreen LCD Monitor

<b>Panel</b>	<b>Type</b>	30.0-inch Wide Format Active Matrix TFT (thin film transistor)
	<b>Viewable Image Area</b> (diagonal)	29.77 in (75.623 cm)
	<b>Screen Opening</b> (W x H)	25.3 x 15.8 in (64.3 x 40.3 cm)
	<b>Viewing Angle</b> (typical)*	Up to 178° H/ 178° V (10:1 minimum contrast ratio)
	<b>Brightness</b> (typical)*	300 nits (cd/m <sup>2</sup> )
	<b>Contrast Ratio</b> (typical)*	1000:1
	<b>Response Rate</b> (typical)*	12 ms (8 ms average gray to gray)
	<b>Pixel Pitch</b>	0.250 mm
	<b>Backlight Lamp Life</b> (to half brightness)	40K hours
	<b>Color Gamut</b>	92% of NTSC
<b>On Screen Display (OSD) Controls</b>	<b>Buttons or Switches</b>	Input select, brightness up, brightness down, power
	<b>User Controls</b>	Brightness, input selection
<b>Signal Interface/ Performance</b>	<b>Horizontal Frequency</b>	100 KHz
	<b>Vertical Frequency</b>	60 Hz
	<b>Native Resolution</b>	2560 x 1600 @ 60 Hz (native aspect ratio of 16:10)
	<b>Pixel Clock Speed</b>	275 MHz
	<b>Anti-Glare</b>	Yes
	<b>Anti-Static</b>	Yes
	<b>Default Color Temperature</b>	6500 K

### Technical Specifications - Monitors

<b>Video/Other Inputs</b>	<b>Plug and Play</b>	Yes	
	<b>Self Powered USB 2.0 Hub</b>	One upstream, four downstream ports (located on side of monitor, cable included)	
	<b>Input Signal</b>	Three dual-link DVI-D inputs (Windows PC and graphics card that supports DVI ports with dual-link digital bandwidth and VESA DDC standard for plug-and-play setup requires a DVI-D dual-link graphic card that supports WQXGA (2560 x 1600) resolution.)	
	<b>Video Cable</b>	Two dual-link DVI cables	
<b>Power</b>	<b>Video Cable Length</b>	5.9 ft (1.8 m)	
	<b>Input Power</b>	Auto-Ranging, 100 to 240 VAC; internal power supply, 50 Hz/60 Hz	
	<b>Typical Power Consumption</b>	118 watts	
	<b>Maximum</b>	< 176 watts	
	<b>Power Saving</b>	< 2 watts	
<b>Mechanical</b>	<b>Power Cable Length</b>	5.9 ft (1.8 m)	
	<b>Dimensions (H x W x D)</b>	<b>Unpacked w/ stand</b>	19.3 to 23.2 x 27.2 x 9.5 in (49.0 to 59.0 x 69.2 x 24.0 cm)
		<b>Unpacked w/o stand</b>	17.9 x 27.2 x 3.3 in (45.5 x 69.2 x 8.4 cm)
		<b>Packaged</b>	22.4 x 31.1 x 14.9 in (56.8 x 79.0 x 37.8 cm)
	<b>Weight</b>	<b>Unpacked</b>	30.6 lbs (13.9 kg)
	<b>Tilt Range</b>	-5° to + 30° vertical	
	<b>Swivel Range</b>	-45° to + 45°	
	<b>Height Adjustable</b>	Yes, range 5.1 in (100 mm)	
	<b>Pivot Rotation</b>	No	
	<b>Base</b>	Detachable, ships detached	
<b>Environmental</b>	<b>Temperature – Operating</b>	46° to 95° F (10° to 35° C)	
	<b>Temperature – Non-operating</b>	6° to 140° F (-10° to 60° C)	
	<b>Humidity – Operating</b>	20% to 80% non-condensing	
	<b>Humidity – Non-operating</b>	5% to 85%	
	<b>Altitude – Operating</b>	+12,000 ft	
	<b>Altitude – Non-operating</b>	+40,000 ft	
	<b>Environmental Data</b>	<b>Eco-Label Certifications and Declarations</b>	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: <ul style="list-style-type: none"> <li>● US Energy Star</li> <li>● US Federal Energy Management Program (FEMP)</li> <li>● IT Eco Declaration</li> <li>●</li> <li>●</li> </ul>



### Technical Specifications - Monitors

- TCO 03
- Taiwan Green Mark
- CECP
- Korea Eco-label
- EPEAT - Silver

	AC Input Voltage at 100 VAC +/- 5 VAC, 50 Hz +/- 3 Hz	AC Input Voltage at 115 VAC +/- 5 VAC, 60 Hz +/- 3 Hz	AC Input Voltage at 230 VAC +/- 5 VAC, 50 Hz +/- 3 Hz
<b>Energy Consumption</b> (in accordance with US Energy Star test method)			
<b>Normal Operation</b>	102.8 watts	101.7 watts	100.4watts
<b>Sleep<sup>1</sup></b>	2 watts	2 watts	2 watts
<b>Off</b>	0.05 watts	0.06 watts	0.25 watts
<b>Heat Dissipation<sup>2</sup></b>			
<b>Normal Operation</b>	350.8 BTU/hr	347.0 BTU/hr	342.6 BTU/hr
<b>Sleep</b>	6.8 BTU/hr	6.8 BTU/hr	6.8 BTU/hr
<b>Off</b>	0.2 BTU/hr	0.2 BTU/hr	0.9 BTU/hr

#### NOTES

<sup>1</sup>This sleep status ignore the input sync signal check cycle when metering the model in sleep mode.

<sup>2</sup>Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.

#### Longevity and Upgrading

Upgradeability features contained in the product include:

One upstream and four downstream USB ports

#### Ergonomics

The monitor meets the ergonomic requirement of EN-ISO 13406-2 for flat panel displays.

#### 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.

This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).

This product is in compliance with the IEEE 1680 (EPEAT) standard at the SILVER level, see [www.epeat.net](http://www.epeat.net).

Plastics parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.

Display meets the requirement for low frequency electromagnetic fields per MPR-II, TCO, and prEN50279 A/B/C.

This product contains 0% recycled materials (by

wt.)

This product is 97.6% recyclable when properly disposed of at end of life.

#### Packaging Materials

- Corrugated Paper 2.19 kg
- PE-LD Bags 0.09 kg
- EPS Molded Foam 1.07 kg

#### RoHS Compliance

Hewlett-Packard is committed to compliance with all applicable environmental laws and regulations, including the European Union Restriction of Hazardous Substances (RoHS) Directive. HP's goal is to exceed compliance obligations by meeting the requirements of the RoHS Directive on a worldwide basis. By July 1, 2006, RoHS substances will be virtually eliminated (virtually = to levels below legal limits) for all HP electronic products subject to the RoHS Directive, except where it is widely recognized that there is no technically feasible alternative (as indicated by an exemption under the EU RoHS Directive).

#### 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](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
- 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 Biphenyl 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 Tin (TBT), Triphenyl Tin (TPT),

### Technical Specifications - Monitors

		Tributyl Tin Oxide (TBTO)
	<b>Packaging</b>	<p>HP follows these guidelines to decrease the environmental impact of product packaging:</p> <ul style="list-style-type: none"> <li>● Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials.</li> <li>● Eliminate the use of ozone-depleting substances (ODS) in packaging materials.</li> <li>● Design packaging materials for ease of disassembly.</li> <li>● Maximize the use of post-consumer recycled content materials in packaging materials.</li> <li>● Use readily recyclable packaging materials such as paper and corrugated materials.</li> <li>● Reduce size and weight of packages to improve transportation fuel efficiency.</li> <li>● Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.</li> </ul>
	<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:            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>Other</b>	<b>Accessories Included</b>	Two dual link DVI-D to DVI-D cables - connects the graphic card's DVI-D digital connector to the monitor's input (DVI-D digital) connectors; power cord
	<b>Software</b>	HP Display LiteSaver feature allows you to schedule Sleep mode at preset times to help protect the monitor against image retention, drastically lower power consumption and energy costs, and extend the lifespan of the monitor.
	<b>User Guide Languages</b>	English, B. Portuguese, French, LA Spanish, Korean, S. Chinese, T. Chinese, Bahasa, Japanese, Danish, Finnish, German, Norwegian, Spanish, Swedish, Greek, Polish, Russian, Slovenian, Turkish

### Technical Specifications - Monitors

	<b>Warranty Languages</b>	English, Canadian French, LA Spanish, Brazilian Portuguese, Danish, German, Castilian Spanish, French, Italian, Dutch, Norwegian, Finnish, Swedish, Bahasa Indonesian, Korean, T. Chinese, S. Chinese
	<b>Color</b>	Carbonite
	<b>VESA External Mounting</b>	Yes (Standard 4 hole pattern, 100 mm)
	<b>Kensington Lock-Ready</b>	Yes
<b>Options</b>	<b>HP Flat Panel Speaker Bar - Part number: EE418AA</b>	Powered directly by the monitor or PC, the Speaker Bar seamlessly attaches to the monitor's lower bezel to bring full audio support to select HP flat panel monitors. Features include dual speakers with full sound range and an external jack for headphones. Sold separately. For more information, refer to the HP Flat Panel Speaker Bar QuickSpec.
	<b>Certification and Compliance</b>	Australian ACA Approval, Canadian Requirements/CSA, CE Marking, China CCIB/CCEE Approval, CISPR Requirements, Eastern European Approvals, Compliant, FCC Approval, German Ergonomic (TUV and GS Mark), ISO 9241-3,7,8 VDT Guidelines, ISO 13406-2 Pixel Defect Guidelines, Mexican NOM Approval, MIC Requirements (New Zealand), MPR-II Compliant, Nordic Approvals (Nemko, Fimko, Demko, Semko), S. Korean MIC Approval, Taiwan BSMI Approval, TCO 99 (emissions, ergonomics, environment), TUV-Ergo, UL Listed, VCCI Approvals.
	<b>Compatibility</b>	Compatible with platforms using the VESA standard video modes. Recommended for use with HP products.
	<b>Service and Warranty</b>	Three years parts, labor, and on-site service. 24-hour, 90-day, toll-free technical support. Replacement options may include second business day on-site service, or next business day direct replacement, at HP's sole discretion. With direct replacement, HP will ship a replacement display product directly to you. Using the prepaid shipping labels provided, return your failed display to HP in the same packaging as the replacement. Certain restrictions and exclusions apply. For details see your product warranty or contact HP Customer Support.

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

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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.

