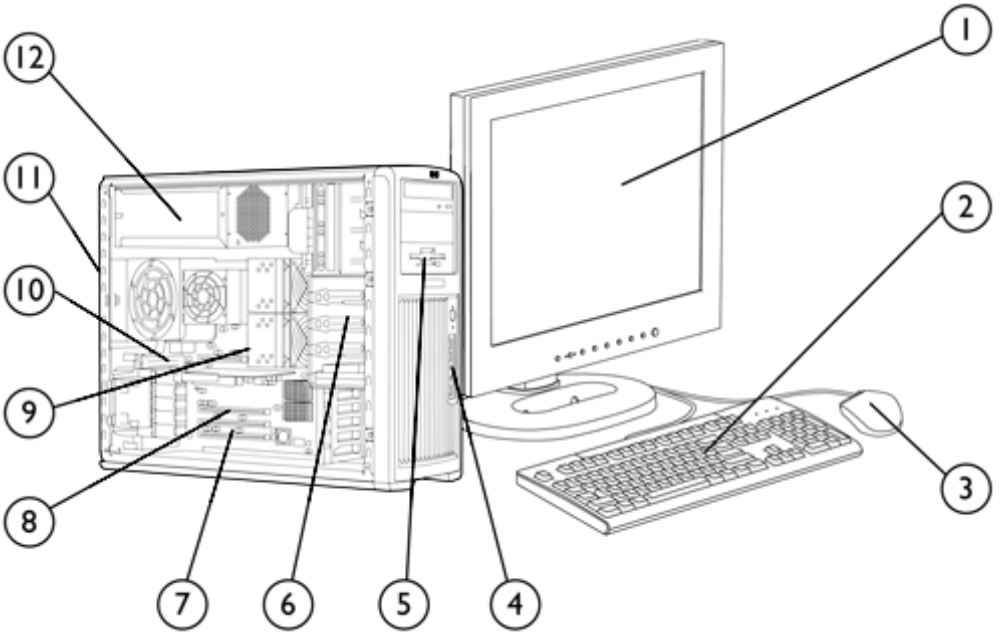
*Overview*

**HP recommends Windows Vista™ Business**




1. Monitor (sold separately)
2. Standard Keyboard (USB or PS/2)
3. Mouse (USB or PS/2)
4. Front IO: 2 USB 2.0, IEEE-1394a (standard), headphone and microphone
5. 5.25"" external bay for optional diskette drive, optical drive or other 5.25"/3.5" device
6. 5 internal 3.5" bays, 3 external 5.25" bays
7. 1 PCI slot, 3 PCI-X slots, 1 PCIe x8 (4x electrically), 1 PCIe 16 (4x electrically)
8. 1 PCI Express x16 Graphics Bus
9. Dual-Core or Quad-Core Intel® Xeon® Processors
10. 8 DIMM slots for DDR2 FB-DIMM memory
11. 5 USB 2.0, 1 standard serial port, 1 parallel port, 2 PS/2, 1 RJ-45, audio in/out, microphone, 2 IEEE-1394b
12. 800 watt power supply

## At A Glance

- 64-Bit Quad-Core Intel® Xeon® Processor 5300 Sequence (8 MB L2 cache) or Dual-Core Intel® Xeon® Processor 5100 Sequence (4 MB L2 cache)
- 1066 & 1333 MHz Front Side Bus support
- 4-channel 667 MHz FB-DIMM memory subsystem
- Up to 32 GB memory capacity
- Choice of Operating Systems:
  Genuine Windows® XP Professional
  Genuine Windows XP Professional x64 Edition (see http://www.hp.com/workstations/pws/windowsxp64/ for details)
  Red Hat Enterprise Linux® WS 3 (32- or 64-Bit version)
  Preloaded: Red Hat Enterprise Linux WS 4 (Update 4 or later) (32- or 64-Bit version)
- HP Linux Installer Kit (see http://www.hp.com/workstations/software/linux):
  - Red Hat Enterprise Linux WS 4 (Update 4 or later) (32- or 64-bit version)
  - Red Hat Enterprise Linux WS 3 (Update 8) (32 or 64 bit version)
  - For detailed OS/hardware support information for linux, see: http://www.hp.com/support/linux_hardware_matrix
- PCI Express I/O and graphics
- Integrated Broadcom 5752 LoM
- 6 channels of Serial ATA (SATA) and 4 channels of Serial Attached SCSI (SAS) 3.0Gb/s natively supported internally; SATA RAID level 0, 1, 5 and 10 and SAS RAID level 0, 1 available on motherboard (Factory integrated RAID is Microsoft Windows only)

*Overview*

- High Definition integrated audio with internal speaker
- Pre-loaded Manageability Tools (Microsoft Windows only)
- Energy Star Compliance with energy-saving features (Microsoft Windows only)
- 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.

*Standard Features - Custom Components*

**Processor and Speed** – Up to 2 of the following

**Quad-Core Intel Xeon Processor with Intel® 64 Architecture**

One or two Quad-Core Intel Xeon Processor 5100 Sequence, 8 MB total L2 cache (2 x 4 MB shared):*
Quad -Core Intel® Xeon® Processor 5310/ 1.60 GHz,1066 MHz FSB
Quad -Core Intel® Xeon® Processor 5320/ 1.86 GHz,1066 MHz FSB
Quad -Core Intel® Xeon® Processor 5335/ 2.00 GHz,1333 MHz FSB **
Quad -Core Intel® Xeon® Processor 5345/ 2.33 GHz,1333 MHz FSB
Quad -Core Intel® Xeon® Processor 5355/ 2.66 GHz,1333 MHz FSB**

**NOTE***: When ordering two processors, the second processor must be the same as the first. Intel processor numbers are not a measurement of higher performance. Processor numbers differentiate features within each processor family, not across different processor families. See http://www.intel.com/products/processor_number/ for details. Intel® 64 Architecture requires a computer system with a processor, chipset, BIOS, operating system, device drivers, and applications enabled for Intel 64 Architecture. 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.

**Dual-Core Intel Xeon Processors with Intel® 64 Architecture**

One or two Dual-Core Intel Xeon Processor 5000 Sequence*
3.00 GHz/667
3.20 GHz/1066
3.73 GHz/1066

One or two Dual-Core Intel Xeon Processor 5100 Sequence**
Intel Xeon 5110/ 1.60 GHz, 4MB L2, 1066 MHz FSB
Intel Xeon 5120/ 1.86 GHz, 4MB L2, 1066 MHz FSB Intel Xeon 5130/ 2.00 GHz, 4MB L2, 1333 MHz FSB
Intel Xeon 5140/ 2.33 GHz, 4MB L2, 1333 MHz FSB Intel Xeon 5150/ 2.66 GHz, 4MB L2, 1333 MHz FSB
Intel Xeon 5160/ 3.00 GHz, 4MB L2, 1333 MHz FSB

**NOTE***: When ordering two processors, the second processor must be the same as the first. Intel processor numbers are not a measurement of higher performance. Processor numbers differentiate features within each processor family, not across different processor families. See http://www.intel.com/products/processor_number/ for details. Intel® 64 Architecture requires a computer system with a processor, chipset, BIOS, operating system, device drivers, and applications enabled for Intel® 64 Architecture. 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 XP Professional SP2

Genuine Windows XP Professional x64 (expected availability with Intel Xeon processor 5100 sequence only in 2H 2006)

Red Hat Enterprise Linux WS 3 (32 & 64-Bit available an After Market Option only)
Red Hat Enterprise Linux WS 4 (32 & 64-Bit)

HP Linux Installer Kit (see http://www.hp.com/workstations/software/linux):
Red Hat Enterprise Linux Workstation 4 (Update 4 or later) (32- or 64-bit version)
Red Hat Enterprise Linux Workstation 3 (Update 8) (32 or 64 bit version)
For detailed OS/hardware support information for linux, see:
http://www.hp.com/support/linux_hardware_matrix

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*Standard Features - Custom Components*

| | | | |
|---|---|---|---|
| **1-5 Hard Disk Drives** - Up to 5 SATA drives , or 4 SAS drives | **SATA Hard Drive** | **Windows XP** | **Red Hat Linux** |
| | 80 GB 7200 rpm SATA 3.0Gb/s drive | 32-Bit, 64-Bit | WS 3, WS 4 |
| | 160 GB 7200 rpm SATA 3.0Gb/s NCQ** drive | 32-Bit, 64-Bit | WS 3, WS 4 |
| | 250 GB 7200 rpm SATA 3.0Gb/s NCQ** drive | 32-Bit, 64-Bit | WS 3, WS 4 |
| | 500 GB 7200 rpm SATA 3.0Gb/s NCQ** drive | 32-Bit, 64-Bit | WS 3, WS 4 |
| | 750 GB 7200 rpm SATA 3.0Gb/s NCQ** drive | 32-Bit, 64-Bit | WS 3, WS 4 |
| | 80 GB 10K rpm SATA NCQ** drive | 32-Bit, 64-Bit | WS 3, WS 4 |
| | 160 GB 10K rpm SATA NCQ** drive | 32-Bit, 64-Bit | WS 3, WS 4 |
| | **SAS Hard Drive** (SAS Controller included on the system board) | | |
| | 146 GB 10K rpm SAS 3.0Gb/s drive | 32-Bit, 64-Bit | WS 3, WS 4 |
| | 300 GB 10K rpm SAS 3.0Gb/s drive | 32-Bit, 64-Bit | WS 3, WS 4 |
| | 73 GB 15K rpm SAS 3.0Gb/s drive | 32-Bit, 64-Bit | WS 3, WS 4 |
| | 146 GB 15K rpm SAS 3.0Gb/s drive | 32-Bit, 64-Bit | WS 3, WS 4 |
| | 300 GB 15K rpm SAS 3.0Gb/s drive | 32-Bit, 64-Bit | WS 3, WS 4 |
| | **NOTE:** *Mixing SATA and SAS hard drives is ok with Windows XP (32- or 64-Bit) only. **NCQ (Native Command Queuing) not supported in Red Hat Enterprise Linux | | |

| | | | |
|---|---|---|---|
| **Factory Integrated RAID on motherboard for SATA and SAS drives** | | **Windows XP** | **Red Hat Linux** |
| | RAID 0 Configuration - Striped Array<br>Minimum of 2 hard drives needed. All hard drives must be identical (size/speed/type/bus/functional capabilities). | 32-Bit, 64-Bit | Not supported |
| | RAID 0 Configuration - Data Array<br>Minimum of 3 SATA hard drives needed. All hard drives must be identical (size/speed/type/bus/functional capabilities). | 32-Bit, 64-Bit | Not supported |
| | RAID 1 Configuration - Mirrored Array<br>Minimum of 2 SATA or 2 SAS hard drives needed. All hard drives must be identical (size/speed/type/bus/functional capabilities). | 32-Bit, 64-Bit | Not supported |
| | RAID 10 Configuration - Striped/Mirrored Array<br>Minimum of 4 hard drives needed. All hard drives must be identical (size/speed/type/bus/functional capabilities). | 32-Bit, 64-Bit | Not supported |
| | RAID 5 Configuration - Parity Array (available August 2006)<br>Minimum of 3 SATA hard drives needed. All SATA hard drives must be identical (size/speed/type/bus/functional capabilities). | 32-Bit, 64-Bit | Not supported |

| | | | |
|---|---|---|---|
| **Controllers** | | **Windows XP** | **Red Hat Linux** |
| | Integrated SATA 3.0Gb/s controller (RAID levels 0, 1, 10, 5) | 32-Bit, 64-Bit | WS 3 & WS 4- no hardware RAID |
| | Integrated SAS controller (RAID levels 0, 1, 10) | 32-Bit, 64-Bit | WS3 & WS4- no hardware RAID |
| | HP SAS Back Panel Connector kit (No internal SAS hard drives can be ordered with this option) | 32-Bit, 64-Bit | WS 3, W S4 |

*Standard Features - Custom Components*

| **Memory -** One of the following | | **Windows XP** | **Red Hat Linux** |
|---|---|---|---|
| | HP 512 MB (1x512 MB) PC2-5300F DDR2-667 ECC Fully Buffered DIMM | 32-Bit, 64-Bit | WS 3, WS 4 |
| | HP 1 GB (2 x 512 MB) PC2-5300F DDR2-667 ECC Fully Buffered DIMM | 32-Bit, 64-Bit | WS 3, WS 4 |
| | HP 2 GB (2 x 1 GB) PC2-5300F DDR2-667 ECC Fully Buffered DIMM | 32-Bit, 64-Bit | WS 3, WS 4 |
| | HP 3 GB (2 x 1GB + 2 x 512 MB) PC2-5300F DDR2-667 ECC Fully Buffered DIMM | 32-Bit, 64-Bit | WS 3, WS 4 |
| | HP 4 GB (2 x 2 GB) PC2-5300F DDR2-667 ECC Fully Buffered DIMM | 32-Bit, 64-Bit | WS 3, WS 4 |
| | HP 4 GB (4 x 1 GB) PC2-5300F DDR2-667 ECC Fully Buffered DIMM | 32-Bit, 64-Bit | WS 3, WS 4 |
| | HP 6 GB (6 x 1 GB) PC2-5300F DDR2-667 ECC Fully Buffered DIMM | 32-Bit, 64-Bit | WS 3, WS 4 |
| | HP 8 GB (4 x 2 GB) PC2-5300F DDR2-667 ECC Fully Buffered DIMM | 32-Bit, 64-Bit | WS 3, WS 4 |
| | HP 8 GB (8 x 1 GB) PC2-5300F DDR2-667 ECC Fully Buffered DIMM | 32-Bit, 64-Bit | WS 3, WS 4 |
| | HP 16 GB (8 x 2 GB) PC2-5300F DDR2-667 ECC Fully Buffered DIMM | 32-Bit, 64-Bit | WS 3, WS 4 |
| | HP 32 GB (8 x 4 GB) PC2-5300F DDR2-667 ECC Fully Buffered DIMM | 32-Bit, 64-Bit | WS 3, WS 4 |

| **1 -2 Removable storage** (Up to 2 of the following drives) | | **Windows XP** | **Red Hat Linux** |
|---|---|---|---|
| | No Floppy Drive option | N/A | N/A |
| | 1.44-MB Diskette Drive | 32-Bit, 64-Bit | WS 3, WS 4 |
| | No Optical Drive option | N/A | N/A |
| | 48X CD-ROM * | 32-Bit, 64-Bit | WS 3, WS 4 |
| | 16X DVD-ROM | 32-Bit, 64-Bit | WS 3, WS 4 |
| | 48X CD-RW/DVD-ROM Combo | 32-Bit, 64-Bit | WS 3, WS 4 |
| | 16X DVD+/-RW, DL, LightScribe** (Windows only) | 32-Bit, 64-Bit | WS 3, WS 4 |

**NOTES**:*May only order one. ** 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** | **Keyboard - One of the following*** | **Windows XP** | **Red Hat Linux** |
|---|---|---|---|
| | No Keyboard option | N/A | N/A |
| | PS/2 Standard Keyboard | 32-Bit, 64-Bit | WS 3, WS 4 |
| | USB Standard Keyboard | 32-Bit, 64-Bit | WS 3, WS 4 |
| | **Mouse - One of the following*** | | |
| | No Mouse option | N/A | N/A |
| | PS/2 2-Button Scroll Mouse (mechanical) | 32-Bit, 64-Bit | WS 3, WS 4 |
| | USB 2-Button Scroll Mouse (optical) | 32-Bit, 64-Bit | WS 3, WS 4 |
| | USB 3-Button Mouse (optical) | 32-Bit, 64-Bit | WS 3, WS 4 |

**NOTE**:* Mixing PS/2 and USB Keyboards and Mice are not supported with Linux OS.

*Standard Features - Custom Components*

| **Audio** | | **Windows XP** | **Red Hat Linux** |
|---|---|---|---|
| | Integrated Intel/Realtek HD Audio with internal speaker | 32-Bit, 64-Bit | WS 3, WS 4 |
| | HP Optical Drive Internal Audio Cable (Must order an optical drive. Not supported with SoundBlaster audio cards.) | 32-Bit, 64-Bit | WS 3, WS 4 |
| | SoundBlaster® X-Fi XtremeMusic™ PCI audio card | 32-Bit | Not Supported |

| **NIC** (Network Interface Controller) | | **Windows XP** | **Red Hat Linux** |
|---|---|---|---|
| | Integrated Broadcom 5752 Ethernet LoM | 32-Bit, 64-Bit | WS 3, WS 4 |
| | Optional PCI Express Broadcom BCM5751 Gigabit Ethernet NIC | 32-Bit, 64-Bit | WS 3, WS 4 |

| **PCI Express Graphics** | | **Windows XP** | **Red Hat Linux** |
|---|---|---|---|
| | No Graphics Option | N/A | N/A |
| | NVIDIA Quadro NVS 285 (128MB) | 32-Bit, 64-Bit | WS 3, WS 4 |
| | NVIDIA Quadro FX 560 (128MB) | 32-Bit, 64-Bit | WS 3, WS 4 |
| | ATI FireGL V3300 (128MB) | 32-Bit, 64-Bit | WS 3, WS 4 |
| | NVIDIA Quadro FX 1500 (256MB) | 32-Bit, 64-Bit | WS 3, WS 4 |
| | NVIDIA Quadro FX 3500 (256MB) | 32-Bit, 64-Bit | WS 3, WS 4 |
| | ATI FireGL V7200 (256MB) | 32-Bit, 64-Bit | WS 3, WS 4 |
| | NVIDIA Quadro FX 4500 (512MB) | 32-Bit, 64-Bit | WS 3, WS 4 |
| | NVIDIA Quadro FX 5500 (1GB) | 32-Bit, 64-Bit | WS 3, WS 4 |
| | NVIDIA Quadro G-Sync Card (can only be ordered with the FX4500 graphics card.) | 32-Bit, 64-Bit | WS 3, WS 4 |

| **Miscellaneous** | | **Windows XP** | **Red Hat Linux** |
|---|---|---|---|
| | IEEE 1394b FireWire 800 3-Port PCI Card (1-port 1394a & 2-ports 1394b) | 32-Bit, 64-Bit | Not Supported |
| | Chassis Intrusion Switch | N/A | N/A |
| | HP Energy Star Enabled Configuration | 32-Bit | Not Supported |
| | HP Workstation Mouse Pad | N/A | N/A |

| **Software** | | **Windows XP** | **Red Hat Linux** |
|---|---|---|---|
| | Optional Symantec Norton AntiVirus 2004 (optional) | 32-Bit | Not supported |
| | CA eTrust 64-Bit Anti-Virus Software (available in the U.S. only) | 32-Bit | Not supported |
| | Optional Microsoft Office Basic Edition 2003 | 32-Bit | Not supported |
| | Optional Microsoft Office Personal Edition 2003 | 32-Bit | Not supported |
| | Optional Microsoft Office Professional Edition 2003 | 32-Bit, 64-Bit* | Not supported |
| | Microsoft Office Small Business Edition 2003 | 32-Bit | Not supported |
| | HP Performance Tuning Framework | 32-Bit, 64-Bit | Not supported |
| | HP Client Manager Software v6.0 | 32-Bit, 64-Bit | Not supported |
| | Optional HP Protect Tools Security Solutions (available January 2007) | 32-Bit, 64-Bit | Not supported |

**NOTE:** *Region specific, model DS700AV#ABA only.

*Standard Features - Specs*

| | |
|---|---|
| **Operating System** (choice) | Genuine Windows XP Professional SP2 |
| | Genuine Windows XP Professional x64 Edition |
| | Red Hat Enterprise Linux WS 4 (64-Bit version). 32-Bit version included with recovery media or as an after market option. |
| | Preloaded: Red Hat Enterprise Linux WS 4 (Update 4 or later) (32- or 64-bit version)<br>HP Linux Installer Kit (see http://www.hp.com/workstations/software/linux):<br>Red Hat Enterprise Linux WS 4 (Update 4 or later) (32- or 64-bit version)<br>Red Hat Enterprise Linux WS 3 (Update 8) (32 or 64 bit version)<br>For detailed OS/hardware support information for Linux, see:<br>http://www.hp.com/support/linux_hardware_matrix |
| **Form Factor** | Minitower |
| **Color** | Carbonite/Alloy metallic |
| **System Board Form Factor** | E- ATX (12" x 13") |
| **Processor** | 1 or 2 Dual-Core Intel® Xeon® Processor 5100 Sequence or Quad-Core Intel Xeon Processor 5300 Sequence with Intel® 64 Architecture |
| **CPU FSB** | 1066/1333 MHz |
| **Standard L2 Cache** | 4 MB L2 shared cache (non ECC) for Dual-Core / 8 MB (2 X 4 MB shared) total L2 cache (non ECC) for Quad-Core) |
| **Chipset** | Intel 5000X |
| **Memory Expansion Slots** | 8 DIMMs |
| **Memory Type Supported** | DDR2 registered ECC FB-DIMMs |
| **Memory Speed Supported** | 667 MHz |
| **Maximum Memory** | 32 GB (8 FB-DIMM slots with 4 GB DIMMS) |
| **Network Controller** | Broadcom 5752 Gigabit Ethernet LAN on Motherboard |
| **Audio** | Integrated Intel/Realtek HD digital audio with S/PDIF 6-channel pass-through, stereo microphone, and Yamaha XG Lite Softsynth support |
| **PCI Slots** | • 1 half-length PCI slot<br>• 6 full-length slots with a mechanical card guide support for a PCI card with extender bracket.<br>• 3 PCI-X slots (one 133 MHz, two 100 MHz slots)<br>• 1 PCI Express x16 graphics<br>• 1 PCI Express x16 mechanical (x4 electrical)<br>• 1 PCI Express x8 mechanical (x4 electrical) |
| **Bays** | Total Bays = 8 |
| **Internal Bays** | • 5 internal 3.5" bays (4 with acoustic dampening rail assemblies) |
| **External Bays** | 3 external 5.25" bays* *Third external 5.25" bay is not full-depth, bottom bay is limited to 200mm device depth. |
| **Front I/O** | 2 USB 2.0, Headphone, Microphone, and 1 IEEE 1394a |
| **Rear I/O** | 2 IEEE-1394b, 5 USB 2.0, 1 standard serial port, 1 parallel port, PS/2 keyboard and mouse, 1 RJ-45 to integrated Gigabit LAN, Audio In, Audio Out, Microphone In |
| **Integrated USB** | 1 USB 2.0 header (internal) |
| **Choice of PS/2 or USB Keyboard** | 1 |
| **Choice of PS/2 or USB Mouse** | 1 |
| **Chassis Dimensions** (H x W x D) | 17.9 x 8.3 x 20.7 inches; 45.4 x 21.0 x 52.5 cm |
| **System Weight** | Minimum config - 40 lb (19.5 kg)<br>Standard config - 46 lb (21 kg)<br>Maximum config - 62 lb (28 kg) |

*Standard Features - Specs*

| | | |
|---|---|---|
| **Temperature** | Operating | 40° to 95° F (5° to 35° C) |
| | Non-operating | -40° to 140° F (-40° to 60° C) |
| **Humidity** | Operating | 8% to 85% |
| | Non-operating | 8% to 90% |
| **Maximum Altitude** (nonpressurized) | Operating | 10,000 feet; 3,000 m |
| | Non-operating | 30,000 feet; 9,100 m |
| **Power Supply** | 800W wide-ranging, active Power Factor Correction | |
| **Interfaces Supported** | 6-channel SATA 3.0Gb/s Interface (6 Serial-ATA connectors on the motherboard, 4-channel SAS interface (4 SAS connectors each), 1 EIDE interface (1 EIDE connector) supported for optical drives, IEEE 1394, USB 2.0 | |
| **Hard Drive Controller Supported** | SATA or SAS controllers | |

| | | |
|---|---|---|
| **Processors** | **2nd Quad-Core Intel Xeon processor 5300 Series with Intel® 64 Architecture, and 8 MB of L2 cache (2x4 MB shared)** | |
| | Quad-Core Intel® Xeon® Processor 5310/ 1.60 GHz,1066 MHz FSB | RQ538AA |
| | Quad -Core Intel® Xeon® Processor 5320/ 1.86 GHz,1066 MHz FSB | RM054AA |
| | Quad -Core Intel® Xeon® Processor 5335/ 2.00 GHz,1333 MHz FSB * | RQ539AA |
| | Quad -Core Intel® Xeon® Processor 5345/ 2.33 GHz,1333 MHz FSB | RQ540AA |
| | Quad -Core Intel® Xeon® Processor 5355/ 2.66 GHz,1333 MHz FSB * | RQ541AA |
| | ***NOTE:** Quad-Core Intel Xeon Processor 5335 expected available January 2006 | |
| | **2nd Dual-Core Intel Xeon processor 5100 Series with Intel® 64 Architecture, and 4 MB of Shared L2 cache** | **Part Number** |
| | Intel Xeon 5110/ 1.60 GHz, 4MB L2, 1066 MHz FSB* | EY012AA |
| | Intel Xeon 5120/ 1.86 GHz, 4MB L2, 1066 MHz FSB * | EY013AA |
| | Intel Xeon 5130/ 2.00 GHz, 4MB L2, 1333 MHz FSB * | EY014AA |
| | Intel Xeon 5140/ 2.33 GHz, 4MB L2, 1333 MHz FSB * | EY015AA |
| | Intel Xeon 5150/ 2.66 GHz, 4MB L2, 1333 MHz FSB * | EY016AA |
| | Intel Xeon 5160/ 3 GHz, 4MB L2, 1333 MHz FSB * | EY017AA |
| | **NOTE**:* Upgrade from Intel Xeon processor 5000 series not supported. Quad-Core Intel Xeon Processor 5335 and 5355 expected available January 2006, Intel processor numbers are not a measurement of higher performance. Processor numbers differentiate features within each processor family, not across different processor families. See http://www.intel.com/products/processor_number/ for details. Intel® 64 Architecture requires a computer system with a processor, chipset, BIOS, operating system, device drivers, and applications enabled for Intel® 64 Architecture. 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. Quad-Core and Dual-Core are new technologies designed to improve performance of multithreaded software products and hardware-aware multitasking operating systems and may require appropriate operating system software for full benefits; check with software provider to determine suitability; Not all customers or software applications will necessarily benefit from use of these technologies. | |

| | | | | |
|---|---|---|---|---|
| **PCI Express Graphics** | **Multi display solutions** | **Windows XP** | **Red Hat Linux** | **Part Number** |
| | NVIDIA Quadro NVS 285 (128 MB) | 32-Bit, 64-Bit | WS 3, WS 4 | RD069AA |
| | NVIDIA Quadro FX 560 (128 MB) | 32-Bit, 64-Bit | WS 3, WS 4 | ES354AA |
| | ATI FireGL V3300 (128 MB) | 32-Bit, 64-Bit | WS 3, WS 4 | ES353AA |
| | NVIDIA Quadro NVS 440 (256 MB) | 32-Bit, 64-Bit | WS 3, WS 4 | PT453A |
| | NVIDIA Quadro FX 1500 (256 MB) | 32-Bit, 64-Bit | WS 3, WS 4 | ES355AA |
| | NVIDIA Quadro FX 3500 (256 MB) | 32-Bit, 64-Bit | WS 3, WS 4 | ES357AA |
| | ATI FireGL V7200 (256 MB) | 32-Bit, 64-Bit | WS 3, WS 4 | ES356AA |
| | NVIDIA Quadro FX 4500 (512 MB) | 32-Bit, 64-Bit | WS 3, WS 4 | EA762AA |
| | G-Sync card (available when ordering the FX 4500 only) | 32-Bit, 64-Bit | WS 3, WS 4 | ED087AA |

*After-Market Options*

| Hard Drives | SATA Hard Drives | Windows XP | Red Hat Linux | Part Number |
|---|---|---|---|---|
| | 80 GB 7200 rpm SATA 3.0Gb/s drive | 32-Bit, 64-Bit | WS 3, WS 4 | PY276AA |
| | 160 GB 7200 rpm SATA 3.0Gb/s NCQ drive | 32-Bit, 64-Bit | WS 3, WS 4 | PV944A |
| | 250 GB 7200 rpm SATA 3.0Gb/s NCQ drive | 32-Bit, 64-Bit | WS 3, WS 4 | EA788AA |
| | 500 GB 7200 rpm SATA 3.0Gb/s NCQ drive | 32-Bit, 64-Bit | WS 3, WS 4 | PV943A |
| | 750 GB 7200 rpm SATA 3.0Gb/s NCQ drive | 32-Bit, 64-Bit | WS 3, WS 4 | RH201AA |
| | 80 GB 10k rpm SATA NCQ drive | 32-Bit, 64-Bit | WS 3, WS 4 | EM172AA |
| | 160 GB 10k rpm SATA NCQ drive | 32-Bit, 64-Bit | WS 3, WS 4 | EW222AA |
| | **SAS Hard Drives** | | | |
| | 146 GB 10K rpm SAS 3.0Gb/s drive | 32-Bit, 64-Bit | WS 3, WS 4 | EM173AA |
| | 300 GB 10K rpm SAS 3.0Gb/s drive | 32-Bit, 64-Bit | WS 3, WS 4 | RH937AA |
| | 73 GB 15K rpm SAS 3.0Gb/s drive | 32-Bit, 64-Bit | WS 3, WS 4 | EA329AA |
| | 146 GB 15K rpm SAS 3.0Gb/s drive | 32-Bit, 64-Bit | WS 3, WS 4 | EA330AA |

| Controllers | | PCIe | PCI-X | Windows XP | Red Hat Linux | Part Number |
|---|---|---|---|---|---|---|
| | LSI MegaRAID SAS 8344ELP 8-port, PCI Express SAS RAID Adapter | X | | 32-Bit, 64-Bit | | EX830AA |

| 1394 PCI Cards | | PCI | PCI-X | Windows XP | Red Hat Linux | Part Number |
|---|---|---|---|---|---|---|
| | IEEE 1394b FireWire 800 3-Port PCI Card<br>(2 Ports 1394b & 1 Port 1394a) | X | | 32-Bit, 64-Bit | Not supported | EA327AA |

| Input/Output Devices | Keyboards | Windows XP | Red Hat Linux | Part Number |
|---|---|---|---|---|
| | HP PS/2 Standard Keyboard (Carbonite/Silver) | 32-Bit, 64-Bit | WS 3, WS 4 | DT527A |
| | HP USB Standard Keyboard (Carbonite/Silver) | 32-Bit, 64-Bit | WS 3, WS 4 | DT528A |
| | HP USB Smartcard Keyboard - available Q3 | 32-Bit, 64-Bit | Not supported | ED707AA |
| | **Pointing Devices** | | | |
| | HP PS/2 2-Button Scroll Mouse (Carbonite) | 32-Bit, 64-Bit | WS 3, WS 4 | DD440B |
| | HP USB 2-Button Optical Scroll Mouse (Carbonite/Silver) | 32-Bit, 64-Bit | WS 3, WS 4 | DC172B |
| | HP USB Optical 3-Button Mouse | 32-Bit, 64-Bit | WS 3, WS 4 | DY651A |
| | HP USB Optical 3-Button 2.9M OEM Mouse | 32-Bit, 64-Bit | WS 3, WS 4 | ET424AA |
| | USB Spaceball 5000 | 32-Bit, 64-Bit | Not supported | DV675A |
| | USB SpaceMouse | 32-Bit, 64-Bit | Not supported | DZ203A |
| | USB SpacePilot | 32-Bit, 64-Bit | Not supported | EF390AA |

| Networking | NICs | PCI | PCI-X | Windows XP | Red Hat Linux | Part Number |
|---|---|---|---|---|---|---|
| | Intel Pro/1000 GT Gigabit Ethernet Controller (PCI) | X | | 32-Bit, 64-Bit | WS 3, WS 4 | AG393AA |
| | Broadcom BCM5751 NetXtreme Gigabit Ethernet Controller (PCIe) | | X | 32-Bit, 64-Bit | WS 3, WS 4 | EA833AA |

*After-Market Options*

| | | | | |
|---|---|---|---|---|
| **Memory modules** | **667 MHz** | **Windows XP** | **Red Hat Linux** | **Part Number** |
| | 512 MB PC2-5300F ECC Registered DDR2 667 MHz FB-DIMM | 32-Bit, 64-Bit | WS 3, WS 4 | EM159AA |
| | 1 GB PC2-5300F ECC Registered DDR2 667 MHz FB-DIMM | 32-Bit, 64-Bit | WS 3, WS 4 | EM160AA |
| | 2 GB PC2-5300F ECC Registered DDR2 667 MHz FB-DIMM | 32-Bit, 64-Bit | WS 3, WS 4 | EM161AA |

| | | |
|---|---|---|
| **Monitors** (Supported by all Operating Systems available from HP) | **TFT display** | **Part Number** |
| | HP LP3065 (30-inch) Flat Panel Monitor TFT | EZ320A4 |
| | HP LP2465 (24 -inch) Flat Panel Monitor TFT | EF224A4 |
| | HP L2065 (20.1-inch) Flat Panel Monitor TFT | EF227A4 |
| | HP L1955 (19.1-inch) Flat Panel Monitor TFT | PD974A5 |

| | | | | |
|---|---|---|---|---|
| **Optical drives** | **DVD-ROM Drive** | **Windows XP** | **Red Hat Linux** | **Part Number** |
| | HP 16X DVD-ROM Drive | 32-Bit, 64-Bit | WS 3, WS 4 | AA620B |
| | **CD-ROM Drive** | | | |
| | HP 48X Max CD-ROM Drive (only available as first optical drive) | 32-Bit, 64-Bit | WS 3, WS 4 | DC143B |
| | **Combo Drive** | | | |
| | HP 48X CD-RW/DVD-ROM Combo Drive | 32-Bit, 64-Bit | WS 3, WS 4 | DE206B |
| | **DVD+/-RW Drive** | | | |
| | HP 16X DVD+/-RW DL LightScribe* (Windows XP only) | 32-Bit | WS 3, WS 4 | DZ555B |

**NOTE:*** LightScribe software supported with Windows XP only. 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

| | | | | |
|---|---|---|---|---|
| **Removable Storage** | | **Windows XP** | **Red Hat Linux** | **Part Number** |
| | HP 512 MB USB 2.0 Drive Key | 32-Bit, 64-Bit | WS 3, WS 4 | ED516AA |
| | HP 1 GB USB 2.0 Drive Key | 32-Bit, 64-Bit | WS 3, WS 4 | AG382AA |
| | 1.44 MB Internal Floppy Drive | 32-Bit | | DY670A |
| | HP 16-In-1 Media Card Reader with PCI Card - available Q3 | 32-Bit, 64-Bit | Not supported | EM718AA |
| | StorCase DX115 SATA Removable Enclosure (1 additional HD in a 5.25 inch bay) | N/A | N/A | EA332AA |
| | StorCase DX115 SAS Removable Enclosure | N/A | N/A | EA333AA |
| | StorCase DX115 SATA/SAS HDD Carrier Tray | N/A | N/A | RA697AA |

| | | | | |
|---|---|---|---|---|
| **Audio** | | **Windows XP** | **Red Hat Linux** | **Part Number** |
| | HP Satellite Stereo Speakers | | | ZD929AA |
| | HP USB Powered Speakers | | | RD628AA |
| | SoundBlaster X-Fi XtremeMusic Audio Card | 32-Bit | Not supported | EA326AA |

*After-Market Options*

| Brackets/Rack Kits | Part Number |
|---|---|
| HP xw8/9 Bulk 10 Pack PCI Hold Down Kit | EN764AA |
| xw8400 Slide Rack Kit IT/Broadcast | DY664A |
| HP Internal USB Port Kit | EM165AA |
| PCI Front and Rear Fan Kit | EM163AA |
| HP SAS Back Panel Connector | EM164AA |

| Security features | Part Number |
|---|---|
| HP Business PC Security Lock Kit | PV606AA |
| Kensington Security Cable & Lock | PC766A |

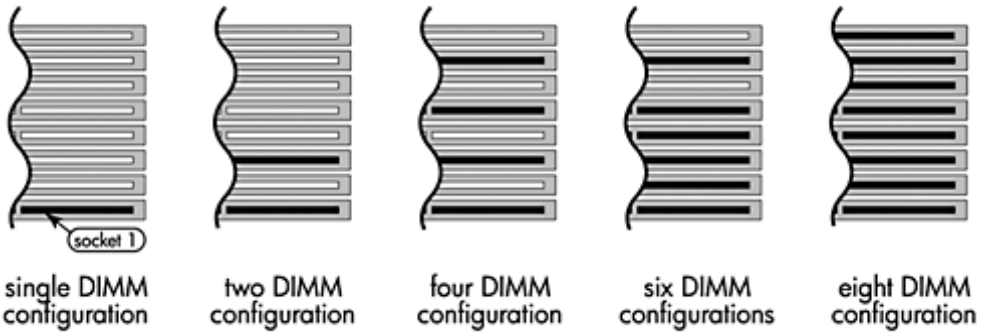
| Operating Systems | Part Number |
|---|---|
| Red Hat Enterprise Linux Workstation 4 (64-Bit preload) | EA700AA |
| Red Hat Linux WS 4, Update 4, (32- & 64-bit preload) | RL296AA |
| Red Hat Linux WS 3, Update 8, 64-bit | RL294AA |
| Red Hat Linux WS 3, Update 8, 32-bit | RL295AA |

| Software | Windows XP | Red Hat Linux | Part Number |
|---|---|---|---|
| HP Remote SW for HP 1yr Update Subscription | 32-Bit | Not supported | PN680A |
| HP Remote SW Receiver 1y Update Subscription | 32-Bit | Not supported | PN682A |
| HP Remote Graphics SW V3 for HP Systems LTU | 32-Bit | Not supported | PY682AA |
| HP Remote Graphics SW V3 Receiver LTU | 32-Bit | Not supported | PY684AA |
| HP Remote Graphics SW V3 CD-ROM Media | 32-Bit | Not supported | PY685AA |
| HP ProtectTools Quantity 1 Software (available beginning January 2007) | 32-Bit | Not supported | EM530AA |
| HP ProtectTools Quantity 25 Software (available beginning January 2007) | 32-Bit | Not supported | EM531AA |
| HP ProtectTools Quantity 500 Software (available beginning January 2007) | 32-Bit | Not supported | EM532AA |

**Intel 5000X Chipset**

**DDR2 ECC REGISTERED FB-DIMM MEMORY**

Use only fully-buffered, PC2-5300F DIMMS (FB-DIMMs). Match DIMMs by size and type. With the exception of the single-DIMM configuration, all memory should be added in like pairs. Use HP memory only. Best memory performance may be attained with 4 DIMM configurations.




If using only one DIMM, install in socket 1 (bottom DIMM slot when rear inputs/outputs of motherboard are facing left). If using 2 DIMMs, install in sockets 1 & 3. If using 4 DIMMs, install them in 1, 3, 5 and 7. If using 6 DIMMs, install in sockets 1 through 5 and 7. If using 8 DIMMs, install in all sockets.

**MAXIMUM MEMORY**

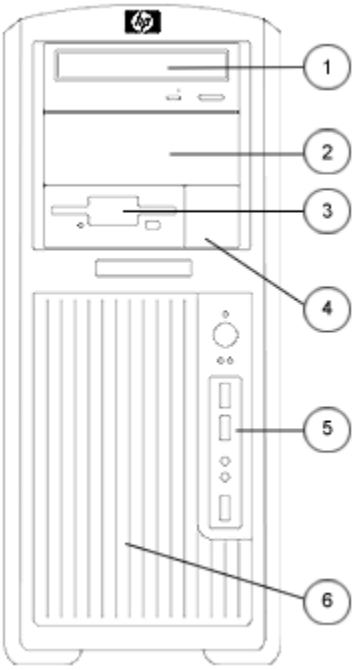
Supports up to 32 GB of DDR2 Fully Buffered DIMMs (a maximum of 16 GB available at launch).

**POSSIBLE MEMORY CONFIGURATIONS**

Not all memory configurations possible are represented below.

| DIMM Size | Slot | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
| **256 MB** | 256 MB | | | | | | | |
| **512 MB** | 512 MB | | | | | | | |
| **512 MB** | 256 MB | | 256 MB | | | | | |
| **1 GB** | 1 GB | | | | | | | |
| **1 GB** | 512 MB | | 512 MB | | | | | |
| **1 GB** | 256 MB | | 256 MB | | 256 MB | | 256 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** | 512 MB | 512 MB | 512 MB | 512 MB | 512 MB | 512 MB | 512 MB | 512 MB |
| **6 GB** | 1 GB | 1 GB | 1 GB | 1 GB | 1 GB | | 1 GB | |
| **8 GB** | 2 GB | | 2 GB | | 2 GB | | 2 GB | |
| **8 GB** | 1 GB | 1 GB | 1 GB | 1 GB | 1 GB | 1 GB | 1 GB | 1 GB |
| **16 GB** | 2 GB | 2 GB | 2 GB | 2 GB | 2 GB | 2 GB | 2 GB | 2 GB |

**Tower configuration**




| | Quantity Supported | Position Supported | Controller |
|---|---|---|---|
| **Convertible Minitower** | | | |
| Optional Diskette Drive | 1 | 3 | IDE |
| 5.25" Storage Drive Bays | 3 | 1, 2, 3 | IDE - 5.25" bays can be converted for optional SATA/SAS drives with StorCase conversion kit |
| 3.5" Storage Drive Bays with acoustic dampening rail assemblies | 4 | 5 (4 standard drive bays native) 1, 2, 3 (with StorCase conversion) | SATA or SAS |
| 3.5" Storage Drive Bay | 1 | 6 (5th drive is supported here, tools required for attach, no acoustic dampening) | SATA or SAS |

SATA and SAS may be only mixed in a Windows configuration. Here are the rules for mixing hard drives:

1. The boot/data drive must be SATA to load before any SAS drive.
2. Any size or speeds may be chosen for drives 1-3.
3. However, hard drive 4 must be the same size/speed as hard drive 3
4. Hard drive 5 must be the same as hard drive

| | |
|---|---|
| 4. | In non-mixed Microsoft Windows and Linux systems, rules 2 & 3 apply.<br><br>Configure-to-order RAID configs must all have the same size/speed hard drives.<br><br>Up to 4 channels of SAS/SATA can be supported natively.<br><br>Using external enclosures, an additional 6 channels of SATA 3.0Gb/s can be supported. |

**NOTE:*** Factory Integrated RAID 0 Configuration (Striped Array) and RAID 1 Configuration (Mirrored Array) requires 2 hard drives with identical speeds, capacity and interface. 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.

| System Board | |
|---|---|
| **Processor Architecture** | Quad-Core Intel® Xeon® Processor 5300 sequence or Dual-Core Intel® Xeon® Processor 5100 sequence |
| **Chipset** | Intel® 5000X |
| **Super I/O Controller** | SMSC SCH5307 |
| **System Board Form Factor** | SSI-EEB (E-ATX 12" x 13") |
| **Processor Socket** | Dual LGA 771 |
| **DIMM Connectors** (FBD DDR2) | 8 |
| **PCI Connectors** (5.0V) | 1 full length 33 MHz 32-Bit |
| **PCI-X Connectors** | 2 full length 100 MHz 64-Bit<br>1 full length 133 MHz 64-Bit |
| **PCI Express Connectors** | 1 PCI Express x16 graphics slot<br>1 PCI Express x16 mechanical (x4 electrical)<br>1 PCI Express x8 mechanical (x4 electrical) |
| **PCI Card Guide** | Optional, tool-free support for all full-length cards with PCI extender |
| **Flash ROM** | Yes |
| **Integrated Audio** | Realtek ALC262 High-Definition |
| **CD-ROM IN** (audio) | No |
| **AUX IN** (audio) | Yes |
| **Clear CMOS Button** | Yes |
| **CPU Fan Headers** | 2 |
| **Chassis Fan Headers** | 2 |
| **Chassis Speaker Header** | Yes |
| **CMOS Battery Holder - Lithium** | Yes |
| **Hood Lock Header** | Yes |
| **Hood Sensor Header** | Yes, as part of the front control panel header, connected by cable-to-cable. |
| **Multibay Header** | No |
| **Integrated Gigabit Ethernet** | Broadcom BCM5752 |
| **Wake on LAN** | Yes |
| **Integrated Trusted Platform Module** | TPM 1.2 expected availability for systems sold at end of 2006/ early 2007 |
| **ASF 1.0 & 2.0** (Alert Standard Format) | Yes |
| **Integrated SATA RAID** | • RAID 0, 1, 10, 5<br>• Supports one RAID array with 2-6 drives<br>• RAID 0 configuration - striped array<br>• RAID 0 configuration - data array<br>• RAID 1 configuration - mirrored array<br>• RAID 10 configuration - stripe of mirrors<br>• RAID 5 configuration - parity striping<br><br>**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. |
| **Integrated SAS RAID** | • RAID 0, 1, 10<br>• Support one RAID array with 2-4 drives<br>• Supports two RAID arrays with 2 drives each<br>• RAID 0 Configuration - Striped Array<br>• RAID 1 Configuration - Mirrored Array<br>• RAID 10 Configuration - Stripe of Mirrors<br>• External RAID arrays possible<br><br>**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. |
| **SAS/SATA Connectors** | 6 SATA only connectors<br>4 SAS connectors |
| **IEEE 1394 Connectors** | 2 IEEE 1394b rear connector, 1 IEEE 1394a header for front connector (Not supported in Linux) |
| **USB 2.0 Connectors** | 8 total: 5 rear, 2 on header for front connectors, 1 internal |
| **Power Supply Headers** | Yes |
| **Power Switch, Power LED & Hard Drive LED Header** | Yes (2x12 connector, 2x2 aux connector, 2x4 CPU connector) |
| **Password Clear Header** | Yes |

| **Cooling** | |
|---|---|
| Cooling Solutions Supported | Yes |
| Power Supply Fan | 92 mm x 32 mm |
| Memory Fan | 80 mm x 25 mm |
| Processor Fan-Heatsink | 80 mm x 15 mm |
| Chassis Fan (rear) | One 120 mm x 25 mm |
| Optional Front PCI fan | 80 mm x 25 mm - not required for most workstation compute environments |
| Optional Rear PCI fan | 70 mm x 15 mm - not required for most workstation compute environments |

| **Power Supply** | | |
|---|---|---|
| **Power Supply** | 800 watt custom power supply -<br>(Wide Ranging, Active PFC) | |
| **Operating Voltage Range** | 90 - 269 VAC | |
| **Rated Voltage Range** | 100 - 240 VAC | 100 - 240 VAC |
| **Rated Line Frequency** | 50/60Hz | 50/60 Hz |
| **Operating Line Frequency Range** | 47 - 66 Hz | 47 - 66 Hz |
| **Rated Input Current** | 13.2A @ 100-120VAC<br>6.6 A @ 200-240VAC | 13.2A @ 100-120VAC<br>6.6 A @ 200-240VAC |
| **Heat Dissipation** (Configuration and software dependent) | Typical 1950 btu/hr (491 kg-cal/hr)<br>Maximum 3793 btu/hr (956 kg-cal/hr) | |
| **Power Supply Fan** | 92x32 mm variable speed | |
| **Energy Star Compliant** | YES | |
| **Blue Angel Compliant** (<5W in S5 - Power Off) | N/A | |

*Technical Specifications*

| | |
|---|---|
| **FEMP Standby Power Compliant @115V** (<2W in S5 - Power Off, with Wake on LAN disabled) | NO |
| **Power Consumption in ES Mode - Suspend to RAM** (S3) (Instantly Available PC) | < 10 W |

| ROM Features | Description |
|---|---|
| **Instantly Available PC** | Allows for very low power consumption with quick resume time |
| **ROM Based F10 Setup and Power-on Self Test** | Review and customize BIOS settings |
| **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 |
| **ROM Revision Levels** | Identifies system BIOS revision level and reports in ROM-based F10 setup. 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** | Allows management SW to read the revision level of the system board<br>Revision level is digitally encoded into the hardware and cannot be modified |
| **Auto Setup when new hardware installed** | System automatically detects addition of new hardware |
| **Serial, Parallel, USB, Audio, Network, Enable/Disable Port Control** | Enable or disables serial, parallel, USB, audio, and network ports |
| **Removable Media Write/ Boot Control** | Prevents ability to boot from removable media on supported devices (and can disable writes to media) |
| **Power-on Password** | Prevents an unauthorized person from booting up the workstation |
| **Setup Password** | Prevents an unauthorized person from changing the workstation configuration |
| **Replicated Setup** | Saves BIOS settings to diskette or USB disk-on-key in human readable file. Repset.exe utility can then replicate these settings on machines being deployed without entering ROM-based F10 setup |
| **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:<br>● **NORMAL** - normal temperature ranges<br>● **ALERTED** - excessive temperatures are detected. Raises a flag so action can be taken to avoid shutdown or provide for a smoother system shutdown<br>● **SHUTDOWN** - excessive temperatures are encountered. Automatically shuts down the computer without warning before hardware component damage occurs |
| **Remote ROM Flash** | Provides secure, fail-safe ROM image management from a central network console |
| **Remote Wakeup/Shutdown** | ● System administrators can power on, restart, and power off a client computer from a remote location.<br>● Enables cost-effective power consumption when the administrator needs to distribute software, perform security management, or update the ROM |

*Technical Specifications*

| | |
|---|---|
| **ACPI** (Advanced Configuration and Power Interface) | • Allows the system to enter and wake from a low power mode<br>• 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<br>Supports ACPI 2.0 for full compatibility with 64-Bit operating system |
| **Keyboard-less Operation** | The system can be operated without a keyboard |
| **SMBIOS** | System Management BIOS 2.5, previously known as DMI BIOS, for system management information |
| **Localized ROM Setup** | Common BIOS image supports configuration (Setup) in 12 languages, with local keyboard mappings |
| **Asset Tag** | Allows user or MIS to set unique tag string in ROM |
| **Ownership Tag** | Allows user or MIS to set unique tag string in ROM |
| **Memory Scrubbing** | Allows memory controller to transparently correct transient ECC errors in the background |
| **Memory Remapping** | Allows system memory lost to PCI devices to be reclaimed above 4 GB, for use with operating systems that support more than 4 GB (Microsoft Windows XP 64-Bit edition, Linux) |
| **Per-slot Control** | Allows individual slot configuration (option ROM., latency) |
| **Adaptive Cooling** | Fan control parameters are set according to detected hardware configuration for optimal acoustics |
| **Pre-boot Diagnostics** | Early (pre-video) critical errors are reported via beeps and blinks on the power LED |

| **Industry Standard** | **Revision Supported by the BIOS** |
|---|---|
| **ACPI** | Advanced Configuration and Power Management Interface, Version 2.0c |
| **ASF** | Alert Standard Format Specification, Version 2.0 |
| **ATA** (IDE) | AT Attachment 6 with Packet Interface (ATA/ATAPI-6), Revision 3b |
| **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 v0.4 |
| **CD Boot** | "El Torito" Bootable CD-ROM Format Specification Version 1.0 |
| **EDD** | • Enhanced Disk Drive Specification Version 1.1<br>• BIOS Enhanced Disk Drive Specification Version 3.0 |
| **PCI** | • PCI Local Bus Specification, Revision 2.3<br>• PCI Power Management Specification, Revision 1.1 |
| **PCI Express** | PCI Express Base Specification, Revision 1.0a |
| **PMM** | POST Memory Manager Specification, Version 1.01 |
| **SATA** | • Serial ATA Specification, Revision 1.0a<br>• Serial ATA 3.0Gb/s: Extensions to Serial ATA 1.5Gb/s, Revision 1.0 |
| **SAS** | SAS specification 1.1 |
| **SMBIOS** | System Management BIOS Reference Specification, Version 2.5 |
| **SPD** | PC SDRAM Serial Presence Detect (SPD) Specification, Revision 1.2B |
| **USB 1.1** | Universal Serial Bus Revision 1.1 Specification |
| **USB 2.0** | Universal Serial Bus Revision 2.0 Specification |

| **Other Deployment & Management Features** | |
|---|---|
| **HP Client Management Solutions** (Windows XP only) | HP Client Management Solutions help simplify management of Workstations and significantly reduce total ownership costs. These solutions share a common design and are highly integrated.<br><br>HP Client Manager Software is included free with all HP business PCs and Workstations. It enables central tracking, monitoring, and management of the hardware aspects of HP client systems:<br><br>• Get valuable hardware information such as CPU, memory, video, and security settings<br>• Monitor system health to fix problems before they occur<br>• Install drivers and BIOS updates without visiting each PC<br>• |

| | |
|---|---|
| | • Remotely configure BIOS and security settings<br>• Automate processes to quickly resolve hardware problems<br><br>Additional solutions (fee-based) are available to address Workstation management challenges through the entire IT lifecycle including:<br><br>• Inventory assessment<br>• Software license compliance<br>• Personality migration<br>• Software image deployment<br>• Software distribution<br>• Asset management<br>• Client backup and recovery<br>• Problem resolution<br><br>Visit http://www.hp.com/go/clientmanager for more information, to download HP Client Manager Software. |
| **HP ProtectTools** (Windows XP only) available beginning January 2007 | HP ProtectTools Security Manager can be configured to prevent unauthorized access using Smart Cards, TPM Embedded security chips, USB tokens and other security technologies. HP ProtectTools Security Manager is completely customizable, which gives customers the flexibility to choose the level of security that best meets their needs.<br><br>• Smart Card security for HP ProtectTools<br>  ○ Initialization and configuration of the Smart Card<br>  ○ Manage Smart Card accounts and security settings<br>• Embedded Security for HP ProtectTools<br>  ○ TPM Embedded Security Chip configuration and management<br>• Credential Manager for HP ProtectTools<br>  ○ Multifactor Windows Authentication<br>  ○ Single sign-on<br>• BIOS configuration for HP ProtectTools<br>  ○ BIOS configuration and security settings from within the HP ProtectTools Security Manager console<br><br>Visit http://h18004.www1.hp.com/products/security/ for more information on HP ProtectTools. |
| **System Software Manager** (free - Windows XP only) | A free utility that detects and updates BIOS, device drivers, and management agent versions on your networked PCs and workstations |
| **Replicated Setup** | Saves BIOS settings to diskette or USB disk-on-key in human readable file. Repset.exe utility can then replicate these settings on machines being deployed without entering ROM-based F10 setup |
| **Software Restore CD** | Restores computer to its original factory shipping image; No recovery CDs will ship with Linux - an ISO image will be available on an HD partition. |
| **Asset Tag** | • Repository for storing company-specific property asset numbers for easy tracking<br>• Initially set equal to the system serial number<br>• Stored in a protected section of non-volatile memory that can be accessed and modified with the F10 Setup program |
| **DIMM Serial Presence Detect** | Detects whether or not memory DIMMs are present and their type |
| **Additional remote management** | ACPI, WOL and DMI 2.0, PXE 2.0, WfM 2.0 supported |
| **Hard Drive Serial Number, Model, and Manufacturer** | Hard drive manufacturer, model, and serial number is stored in the hard drive firmware and reported in ROM-based F10 setup |
| **Memory Change Alert** (Requires HP Client Manager Software - Windows XP only) | Alerts management console if memory is removed or changed |

*Technical Specifications*

| | |
|---|---|
| **Ownership Tag** | A user-defined string stored in non-volatile memory that is displayed in the BIOS splash screen |
| **Protocol-level Integrity Monitoring** (CRC checking) | A feature of SATA and SAS, Cyclic Redundancy Checking provides command, data and message transfer verification and proactive notification of problems with recommendations for enhancing system performance. It detects all the following errors types:<br>• single bit errors<br>• double bit errors<br>• an odd number of errors<br>• error bursts up to 32-Bits long |
| **Drive Self Tests** (DPS) | • Drive Protection System<br>• A diagnostic hard drive self test. It scans critical physical components and every sector of the hard drive for physical faults and then reports any faults to the user.<br>• Running independently of the operating system, it can be accessed through the computer's setup procedure. It produces an evaluation on whether the hard drive is the source of the problem and needs to be replaced.<br><br>The system expands on the Self-Monitoring, Analysis, and Reporting Technology (SMART), a continuously running systems diagnostic that alerts the user to certain types of failures.<br>DPS Access through F10 Setup during Boot (F10 diagnostic access not available with SCSI drives) |
| **SMART Technology** (Self-monitoring, analysis and reporting technology - Windows XP only) | Allows hard drives to monitor their own health and to raise flags if imminent failures were predicted Predicts failures before they occur. Tracks fault prediction and failure indication parameters such as re-allocated sector count, spin retry count, calibration retry count.<br>By avoiding actual hard drive failures, SMART hard drives act as "insurance" against unplanned user downtime and potential data loss from hard drive failure.<br>SMART I - Drive Failure Prediction<br>SMART II - Off-Line Data Collection<br>SMART III - Off-Line Read Scanning with Defect Reallocation |

| **Security Features** | |
|---|---|
| **Access Panel Key Lock** (standard) | Prevents removal of the access panel and all internal components including optical and floppy drives |
| **Padlock** (optional) | Prevents entire system theft and discourages access panel removal. 7mm diameter padlock loop at rear of system. |
| **Kensington Cable Lock** (optional) | Prevents entire system theft only. 3mm x 7mm slot at rear of system. |
| **Universal chassis clamp lock** (optional) | The version without a cable discourages access panel removal and prevents theft of IO devices. The version with a cable additionally prevents entire system theft and allows multiple systems to be secured with a single cable. |

| **Serviceability Features of System** | |
|---|---|
| **Access panel** | Tool-less, one-handed |
| **Optical drives** | Tool-less |
| **Floppy drive** | Drive requires screws to attach to bracket, once attached to mounting bracket, it latches toollessly to chassis |
| **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 |
| **CPUs** | Tool-less, can be upgraded without removing any internal components |
| **Chassis fan removal** | Tool-less |

*Technical Specifications*

| | |
|---|---|
| **Power supply diagnostic LED** | Yes, dual function: AC OK & power OK |
| **Power Button** | Yes, ACPI multi-function |
| **Power LED** | Yes, dual color LED indicates normal operation and faults. |
| **Hard drive activity LED** | Yes |
| **Internal speaker** | Yes, used for pre-boot diagnostic beep codes |
| **Dual Color Power and HD LED on Front of Computer** (Indicates Normal Operations and Fault Conditions) | green – normal<br>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 |
| **OS CD** (Restore OS CD) | Restores computer to its original factory shipping Operating System |
| **Restore CD** | Restores the computer to its original factory shipping image |
| **Flash ROM** | Yes |
| **3.3V Aux Power LED on System PCA** | Yes |
| **Dual Function 5V Aux Power LED (ON)/PS_ON LED (OFF) on System PCA** | Yes |
| **Diagnostic Power Switch LED on board** | Yes |
| **Clear Password Jumper** | Yes |
| **Clear CMOS Button** | Yes |
| **CMOS Battery Holder for easy Replacement** | Yes |
| **Processor ZIF Socket for easy Upgrade** | Yes |
| **DIMM Connectors for easy Upgrade** | Yes |
| **NIC LEDs** (integrated) (Green & Amber) | Used to determine NIC status |
| **ASF 1.0 support** (Alert Standard Format) | Industry-standard specification for network alerting in operating system-absent environments |
| **Dual function front power switch** | Causes a fail-safe power off when held for 4 seconds |

*Technical Specifications*

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|---|---|
| **Service and Support** | On-site Warranty and Service (Note 1): This three-year, limited warranty and service offering delivers three years of on-site, next business-day (Note 2) service for parts and labor and includes free telephone support (Note 3) 8am - 5pm. Global coverage (Note 2) ensures that any product purchased in one country and transferred to another, non-restricted country will remain fully covered under the original warranty and service offering. |
| | **NOTE 1:** Terms and conditions may vary by country. Certain restrictions and exclusions apply. |
| | **NOTE 2:** On-site service may be provided pursuant to a service contract between HP and an authorized HP third-party provider, and is not available in certain countries. Global service response times are based on commercially reasonable best effort and may vary by country. |
| | **NOTE 3**: Technical telephone support applies only to HP-configured, HP and HP-qualified, third-party hardware and software. Toll-free calling and 24 x 7 support may not be available in some countries. |

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|---|---|
| **Eco-Label Certifications & Declarations** | This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks:<br>• US Energy Star (Not in Linux)<br>• US Federal Energy Management Program (FEMP)<br>• China Energy Conservation Program<br>• IT ECO declaration<br>• Japan PC Green label* |
| | ***NOTE:** This product conforms to the examination standards (2003 version) under JEITA's 'PC Green Label System.' |

| **Energy Consumption** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Example Configuration #1** | **Processor Info** | 2x2.66GHz Intel Xeon 5100 sequence dual-core processors | | | | | |
| | **Memory Info** | 4x1GB 667MHz | | | | | |
| | **Graphics Info** | FX3500 | | | | | |
| | **Disks/Optical/Floppy** | 2x160GB SATA / 2 Optical / 1 Floppy | | | | | |
| **Energy Consumption** | | **115 VAC** | | **230 VAC** | | **100 VAC** | |
| | **LAN** | **Enabled** | **Disabled** | **Enabled** | **Disabled** | **Enabled** | **Disabled** |
| | **Windows Idle (S0)** | 203W | | 198W | | 203W | |
| | **Windows Busy Typ(S0)** | 298W | | 289W | | 299W | |
| | **Windows Busy Max (S0)** | 380W | | 368W | | 383W | |
| | **Sleep (S3)** | 5.4W | 4.0W | 5.9W | 4.7W | 5.1W | 3.9W |
| | **Off (S5)** | 2.4W | 1.3W | 3.0W | 1.8W | 2.4W | 1.2W |
| **Heat Dissipation**** | | **115 VAC** | | **230 VAC** | | **100 VAC** | |
| | **LAN** | **Enabled** | **Disabled** | **Enabled** | **Disabled** | **Enabled** | **Disabled** |
| | **Windows Idle (S0)** | 693 btu/hr | | 676 btu/hr | | 693 btu/hr | |
| | **Windows Busy Typ(S0)** | 1017 btu/hr | | 986 btu/hr | | 1023 btu/hr | |
| | **Windows Busy Max (S0)** | 1299 btu/hr | | 1258 btu/hr | | 1307 btu/hr | |
| | **Sleep (S3)** | 18.4 btu/hr | 13.7 btu/hr | 20.1 btu/hr | 16.1 btu/hr | 17.4 btu/hr | 13.3 btu/hr |
| | **Off (S5)** | 8.2 btu/hr | 4.4 btu/hr | 10.2 btu/hr | 6.1 btu/hr | 8.2 btu/hr | 4.1 btu/hr |

*Technical Specifications*

| Energy Consumption | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Example Configuration #2** | **Processor Info** | 2x3.73GHz Intel Xeon 5000 sequence dual-core processors | | | | | | |
| | **Memory Info** | 8x1GB 667MHz | | | | | | |
| | **Graphics Info** | FX3500 | | | | | | |
| | **Disks/Optical/Floppy** | 2x160GB SATA / 2 Optical / 1 Floppy | | | | | | |
| **Energy Consumption** | | **115 VAC** | | **230 VAC** | | **100 VAC** | | |
| | **LAN** | **Enabled** | **Disabled** | **Enabled** | **Disabled** | **Enabled** | **Disabled** | |
| | **Windows Idle (S0)** | 320W | | 314W | | 327W | | |
| | **Windows Busy Typ(S0)** | 482W | | 477W | | 491W | | |
| | **Windows Busy Max (S0)** | 605W | | 594W | | 611W | | |
| | **Sleep (S3)** | 7.4W | 5.7W | 8.1W | 6.8W | 6.9W | 6.0W | |
| | **Off (S5)** | 2.4W | 1.3W | 3.0W | 1.8W | 2.4W | 1.2W | |
| **Heat Dissipation**** | | **115 VAC** | | **230 VAC** | | **100 VAC** | | |
| | **LAN** | **Enabled** | **Disabled** | **Enabled** | **Disabled** | **Enabled** | **Disabled** | |
| | **Windows Idle (S0)** | 1092 btu/hr | | 1072 btu/hr | | 1116 btu/hr | | |
| | **Windows Busy Typ(S0)** | 1643 btu/hr | | 1628 btu/hr | | 1677 btu/hr | | |
| | **Windows Busy Max (S0)** | 2065 btu/hr | | 2027 btu/hr | | 2084 btu/hr | | |
| | **Sleep (S3)** | 25.3 btu/hr | 19.5 btu/hr | 27.6 btu/hr | 23.2 btu/hr | 23.5 btu/hr | 20.5 btu/hr | |
| | **Off (S5)** | 8.2 btu/hr | 4.4 btu/hr | 10.2 btu/hr | 6.1 btu/hr | 8.2 btu/hr | 4.1 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** (High and entry level configurations) | | | |
|---|---|---|---|
| **System Configuration** (Entry-level) | The entry-level configuration used for the Declared Noise Emissions for the Convertible Mini tower Desktop model is based on a "Typically Configured Desktop" | | |
| | **Processor Info**<br>**Disks/Optical/Floppy** | 2x 3.00 GHz Woodcrest Intel Xeon 5130 Sequence<br>1x 80 GB SATA / 1 DVD-ROM/ 1 Floppy | |
| **Declared Noise Emissions** (in accordance with ISO 7779 and ISO 9296) | | **Sound Power** (LWad, bels) | **Deskside Sound Pressure** (LpAm, decibels) |
| | **Idle** | 4.3 Bels | 26 dB |
| | **SATA Hard drive Operating** (random reads - 30.3 reads/sec) | 4.4 Bels | 26 dB |
| | **Floppy Drive Operating** (continuous copy) | 5.1 Bels | 35 dB |
| | **DVD-ROM Operating** (sequential reads) | 5.1 Bels | 35 dB |
| | | | |

*Technical Specifications*

| | | | |
|---|---|---|---|
| **System Configuration** (High-end) | The high-end configuration used for the Declared Noise Emissions for the Convertible Mini tower Desktop model is based on a "Typically Configured Desktop" | | |
| | **Processor Info**<br>**Graphics Info**<br>**Disks/Optical/Floppy** | 2x 3.00 GHz Woodcrest Intel Xeon 5160 Sequence<br>Quadro FX 3500 with active heatsink<br>1x 73 GB 15K rpm SAS / 1 DVD-ROM / 1 Floppy | |
| **Declared Noise Emissions** (in accordance with ISO 7779 and ISO 9296) | | **Sound Power** (LWad, bels) | **Deskside Sound Pressure** (LpAm, decibels) |
| | **Idle** | 4.6 Bels | 27 dB |
| | **SAS Hard drive Operating** (random reads - 80 reads/sec) | 5.0 Bels | 32 dB |
| | **Floppy Drive Operating** (continuous copy) | 5.2 Bels | 35 dB |
| | **DVD-ROM Operating** (sequential reads) | 5.2 Bels | 35 dB |
| | | | |

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| **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:<br>● Intel LGA775 processor sockets<br>● 8 USB ports<br>● 1 PCI slot, 3 PCI-X slots and 3 PCI Express slots<br>● 8 expansion bays<br>● 8 memory slots |

| | |
|---|---|
| **Batteries** | This product complies with ISO standards:<br>● EU Directive 91/ 157/ EEC<br>● EU Directive 93/ 86/ EEC<br>● EU Directive 98/ 101/ EEC<br>Batteries used in the product do not contain:<br>● Mercury greater the 5ppm by weight<br>● Cadmium greater than 10ppm by weight<br>● Lead greater than 4000ppm by weight.<br>Battery size: CR2032 (coin cell)<br>Battery type: Lithium |

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|---|---|---|---|
| **Additional Information** | ● This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2002/95/EC.<br>● This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive - 2002/96/EC.<br>● Plastics parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.<br>● This product contains 0% recycled materials (by wt.)<br>● 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 |

*Technical Specifications*

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|---|---|
| **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):<br>• Asbestos<br>• Certain Azo Colorants<br>• Certain Brominated Flame Retardants - may not be used as flame retardants in plastics<br>• Cadmium<br>• Chlorinated Hydrocarbons<br>• Chlorinated Paraffins<br>• Formaldehyde<br>• Halogenated Diphenyl Methanes<br>• Lead carbonates and sulfates<br>• Lead and Lead compounds<br>• Mercuric Oxide Batteries<br>• Nickel - finishes must not be used on the external surface designed to be frequently handled or carried by the user.<br>• Ozone Depleting Substances<br>• Polybrominated Biphenyls (PBBs)<br>• Polybrominated Diphenyl Ethers (PBBEs)<br>• Polybrominated Biphenyl Oxides (PBBOs)<br>• Polychlorinated Biphenyl (PCB)<br>• Polychlorinated Terphenyls (PCT)<br>• Polyvinyl Chloride (PVC) - except for wires and cables, and certain retail packaging has been voluntarily removed from most applications.<br>• Radioactive Substances<br>• Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO) |

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| **Packaging** | HP follows these guidelines to decrease the environmental impact of product packaging:<br>• Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials.<br>• Eliminate the use of ozone-depleting substances (ODS) in packaging materials.<br>• Design packaging materials for ease of disassembly.<br>• Maximize the use of post-consumer recycled content materials in packaging materials.<br>• Use readily recyclable packaging materials such as paper and corrugated materials.<br>• Reduce size and weight of packages to improve transportation fuel efficiency.<br>• Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards. |

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| **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. |

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| **Hewlett-Packard Corporate Environmental Information** | For more information about HP's commitment to the environment:<br>[link to new HP white paper now in progress]<br>Global Citizenship Report<br>http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html<br>Eco-label certifications<br>http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html<br>ISO 14001 certificates:<br>http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html |

*Technical Specifications - Audio*

| | | |
|---|---|---|
| **Integrated Intel/Realtek HDALC262 Audio** | **Type** | Integrated |
| | **High Definition Codec** | Yes |
| | **SPDIF** | No |
| | **External audio jacks** | One front stereo analog microphone-in<br>One front stereo headphone-out<br>One rear line-in<br>One rear line-out<br>One rear stereo analog microphone-in |
| | **Internal audio connectors** | AUX-IN line-level analog input |
| | **Retasking** | **NOTE:** All external audio ports are retaskable as Line-In, Line-Out, Microphone-In, or Headphone-Out |
| | **Sampling** | 44.1kHz/48 kHz/96kHz/192kHz (output only) |
| | **Wavetable syntheses** (software) | Yes - Uses OS soft wavetable |
| | **Digital audio** | Yes |
| | **Analog audio** | Yes |
| | **Number of channels on Line-Out** (mono/stereo) | Two independent stereo outputs (Left & Right channels) |
| | **Internal audio speaker power rating** | 1.5 W |
| | **Internal speaker** | Yes |
| | **Microphone features** | Stereo Microphone supporting:<br>Acoustic echo cancellation<br>Noise suppression<br>Beam forming |

| | | |
|---|---|---|
| **Opt. Sound Blaster X-Fi XtremeMusic (PCI)** (Windows XP Only) | **Audio Quality** | Total Harmonic Distortion + Noise at 1kHz (20kHz Low-pass filter) = 0.004% |
| | **Signal to Noise Ratio** (SNR) | Signal-to-Noise Ratio (20kHz Low-pass filter, A-Weighted)<br>• Stereo Output: 109dB<br>• Front and Rear Channels: 109dB<br>• Center, Subwoofer and Side Channels: 109dB |
| | **Sound Conversion** | 24-bit Analog-to-Digital conversion of analog inputs at 96kHz sample rate<br>24-bit Digital-to-Analog conversion of digital sources at 96kHz to analog 7.1 speaker output<br>24-bit Digital-to-Analog conversion of stereo digital sources at 192kHz to stereo output |
| | **Recording/Sampling Rate** | 44.1, 48 and 96kHz |
| | **ASIO 2.0 support** | 16-bit/44.1kHz, 16-bit/48kHz, 24-bit/44.1kHz 24-bit/48kHz and 24-bit/96kHz with direct monitoring |
| | **Enhanced SoundFont support** | up to 24-bit resolution<br>24-bit/96kHz |
| | **DACs** | 24-bit/192kHz |
| | **Voice Support** | 128 voices |

*Technical Specifications - Audio*

| | | |
|---|---|---|
| **Max. Channels in 3D Positional Audio** | 7.1 | |
| **EAX® ADVANCED HD™ 5.0 support** | Yes including EAX® MacroFX™, EAX® PurePath™ and Environment FlexiFX™ | |
| **Connectors** | 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) | |
| **Dimensions** | 7.25 x 5 x 0.9 inches; 18.42 x 12.7 x 2.29 cm | |
| **Additional product features** | **Movies** | THX Certification<br>Dolby Digital EX 6.1 Playback<br>DTS-ES 6.1 Playback |
| | **Music** | X-Fi 24-bit Crystalizer<br>CMSS-3D<br>SuperRip |
| | **Audio Creation** | Pristine audio playback quality with a near transparent SRC engine<br>Up to eight 24 bit hardware effects<br>ASIO recording with latency as low as one millisecond<br>24-bit SoundFont® sampling<br>3D MIDI |
| | **Gaming** | EAX ADVANCED HD 5.0 |
| | **Software Bundle** | Doom 3 Sound Blaster EAX patch<br>Entertainment Mode<br>Audio Creation Mode<br>Game Mode<br>Mode Switcher<br>Audio Console<br>Creative MediaSource<br>Creative MediaSource DVD-Audio Player<br>DTS Neo:6 Settings<br>Karaoke Player<br>Entertainment Center<br>Smart Recorder<br>SoundFont Bank Manager<br>Speaker Connection Wizard<br>THX Setup Console<br>Vienna SoundFont Studio<br>Volume Panel<br>WaveStudio<br>Console Launcher<br>Creative Media Toolbox<br>Creative Diagnostics |
| **Minimum System Requirements** | **System RAM** | 256 MB |
| | **Hard Disk** | 600MB free space<br>Available PCI 2.1 slot for the audio card<br>CD-ROM/CD-RW or CD/DVD-ROM required for software installation |
| | **Operating System** | Microsoft Windows XP Service Pack 2 (SP2) |

*Technical Specifications - Communications*

| | | |
|---|---|---|
| **Broadcom BCM5752 NetXtreme Gigabit Ethernet LOM** (PCIe) | **Connector** | RJ-45 |
| | **Controller** | Broadcom 5752 PCI-E LAN Controller |
| | **Memory** | Integrated 64KB receive buffer and 8KB transmit buffer |
| | **Data rates supported** | 10/100/1000 Mbps |
| | **Compliance** | IEEE 802.3, 802.3AB and 802.3u compliant, 802.3x flow control |
| | **Bus architecture** | PCIe 1.0a |
| | **Data path width** | X1 |
| | **Data path speed** | 2.5Gbit per sec per direction transfer rate |
| | **Data transfer mode** | Bus-master DMA |
| | **Hardware certifications** | |
| | **Power requirement** | 1.5 watts @ +3.3V AUX supply |
| | **Boot ROM support** | Yes |
| | **Network transfer rate** | 10BASE-T (half-duplex) 10 Mbps |
| | | 10BASE-T (full-duplex) 20 Mbps |
| | | 100BASE-TX (half-duplex) 100 Mbps |
| | | 100BASE-TX (full-duplex) 200 Mbps |
| | | 1000BASE-T, 1000 Mbps |
| | **Operating system driver support** | Microsoft Windows XP Professional, Microsoft Windows XP Professional x64 Edition, Red Hat Enterprise Linux 3 |
| | **Management capabilities** | WOL, PXE |
| | **Alerting** | ASF 2.0 |

| | | |
|---|---|---|
| **Intel Pro/1000 GT Gigagit NIC** (PCIe) | **Connector** | RJ-45 |
| | **Controller** | Intel 82541PI Gigabit Controller |
| | **Memory** | Integrated 64 KB |
| | **Data rates supported** | 10/100/1000 Mbps |
| | **Compliance** | IEEE 802.3, 802.3AB and 802.3u compliant, 802.3x flow control |
| | **Bus architecture** | PCI 2.3 |
| | **Data path width** | 32-Bit PCI |
| | **Data path speed** | 32 bit 33/66 MHz - 266 Mb/s full duplex |
| | **Data transfer mode** | Bus-master DMA |
| | **Hardware certifications** | FCC class , BSMI B for Taiwan, VCCI B for Japan |
| | **Power requirement** | 800 mA @ +5 VDC |
| | **IEEE support** | 802.2 and 802.3ab |
| | **Network transfer rate** | 10BASE-T (half-duplex) 10 Mbps |
| | | 10BASE-T (full-duplex) 20 Mbps |
| | | 100BASE-TX (half-duplex) 100 Mbps |
| | | 1000BASE-T, 1000 Mbps |
| | **Environmental** | **Operating temperature** 32° to 131° F (0° to 55° C) |
| | | **Operating humidity** 85% at 131° F (55° C) |
| | **Dimensions** | 4.4 x 2.2 x 0.08 inches; 11.2 x 5.5 x .2 cm |
| | **Operating system driver support** | Microsoft Windows XP, Red Hat Enterprise Linux WS 3, Red Hat Enterprise Linux WS 4 |

*Technical Specifications - Communications*

| | | |
|---|---|---|
| | **Management capabilities** | ACPI, Wake on LAN, Preboot Execution Environment, WfM Baseline v2.0, DMI 2.0 support, Windows Management Instrumentation, SNMP-manageable Offline Diagnostics, Intel Boot Agent |
| | **Kit contents** | IEEE 802.1Q Virtual Local Area Network (VLANs), IEEE 802.3x Flow Control, Transmission Control Protocol (TCP), Checksum Offload, IEEE 802.1p, Intel Priority Packet II. |

| | | |
|---|---|---|
| **Broadcom BCM5751 NetXtreme Gigabit Ethernet Controller** (PCIe) | **Connector** | RJ-45 |
| | **Controller** | Broadcom 5751 PCI-E 1.0a LAN Controller |
| | **Memory** | Integrated 96Kb frame buffer memory |
| | **Data rates supported** | 10/100/1000 Mbps |
| | **Compliance** | IEEE 802.3, 802.3AB and 802.3u compliant, 802.3x flow control |
| | **Bus architecture** | PCI-E 1.0a |
| | **Data path width** | X1 |
| | **Data path speed** | 2.5Gbit per sec per direction transfer rate |
| | **Data transfer mode** | Bus-master DMA |
| | **Hardware certifications** | 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 |
| | **Power requirement** | 3.1 watts @ +3.3V AUX supply |
| | **Boot ROM support** | Yes |
| | **Network transfer rate** | 10BASE-T (half-duplex) 10 Mbps<br>10BASE-T (full-duplex) 20 Mbps<br>100BASE-TX (half-duplex) 100 Mbps<br>100BASE-TX (full-duplex) 200 Mbps<br>1000BASE-T, 1000 Mbps |
| | **Environmental** | **Operating temperature** 32° to 131° F (0° to 55° C)<br>**Operating humidity** 85% at 131° F (55° C) |
| | **Dimensions** | 4.4 x 2.2 x 0.08 inches; 11.2 x 5.5 x 0.2 cm |
| | **Operating system driver support** | Microsoft Windows 2000 and XP, Red Hat Linux 7.2, 7.3 and Red Hat Enterprise Linux 3 |
| | **Management capabilities** | WOL, PXE , Remote cable management |
| | **Alerting** | ASF 2.0 |
| | **Kit contents** | Broadcom 5751, CD, Broadcom 5751 Netxtreme Gigabit PCIe NIC, drivers, quick install guide, product warranty statement |

| | | | |
|---|---|---|---|
| **LSI SAS3041E Serial Attach SCSI** (SAS) **Host Bus Adapter** (HBA) | **PCI Bus** | PCI-Express x4 lanes | |
| | **PCI Modes** | Bus Master DMA | |
| | **PCI data burst transfer rate** | 1.0 GBps ( half duplex ) 2.0 GBps ( full duplex ) | |
| | **SAS Bandwidths** | **Half Duplex**<br>Single lane – 300 MBps<br>Wide Port (2 lanes) – 600 MBps<br>Wide Port (4 lanes) – 1200 MBps | **Full Duplex**<br>Single SAS Lane – 600 MBps<br>Wide Port (2 lanes) – 1200 MBps<br>Wide Port (4 lanes) – 2400 MBps |
| | **PCI Card Type** | 3.3 volt add-in card | |
| | **PCI Voltage** | 12 V ± 10% | |
| | **PCI Form Factor** | 6.6" x 2.731" (Low-profile) | |
| | **PCI Power** | 7.5 Watts | |
| | **Bracket** | Full height and Low-profile | |
| | **Certification Level** | PCI-Express 1.0a | |
| | **IO Bus** | Four 3Gbps SAS / 1.5Gps SATA ports | |
| | **SAS Processor** | LSISAS1064E | |
| | **Internal Connectors** | Four- SATA x1 connectors | |
| | **External Connectors** | None | |
| | **Max. Number of SCSI Devices** | 128 | |
| | **LED Indicators** | On-board activity and fault LEDs | |
| | **Integrated Mirroring** | Integrated Mirroring option available | |
| | **Environments** | Operating | Storage |
| | **Temperature** | 32° to 140° F (0° to 60° C) | -49° to +221° F (-45° to +105° C) |
| | **Relative Humidity** | 5% to 90% non-condensing | 5% to 90% non-condensing |
| | **MTBF** | >200,000 hours | |
| | **Compliances** | 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 | |
| | **Operating system support** | Microsoft Windows XP Professional, XP Professional x64<br>Red Hat Linux 7.2, 7.3, WS3 and WS4 | |
| | **Kit contents** | Controller card, driver CD, LED cables, user documentation and warranty card. | |

*Technical Specifications - Controllers*

| | | | |
|---|---|---|---|
| **Adaptec SCSI RAID 2120S Card** | **Dimensions** (H x D) | 2.5 x 6.6 inches; 6.4 x 16.8 cm Low profile card | |
| | **RAID level** | 0, 1, 10, 5, 50, JBOD | |
| | **Data Transfer Rate** | Up to 320 MB/s | |
| | **Cache Memory** | 64 MB (onboard) | |
| | **Device Support** | Up to 15 SCSI devices | |
| | **Bus Type** | 64-bit/66 MHz PCI | |
| | | (Also support 32-bit/33 MHz PCI) | |
| | **Internal Connectors** | One 68-pin high-density | |
| | **External Connectors** | One 68-pin VHDCI | |
| | **System Requirements** | Intel PC or equivalent with available PCI slot | |
| | **Operating Temperature** | 32° to 131° F (0° to 55° C) | |
| | **Power Requirements** | 4 amps @ +5V | |
| | **Operating System Support** | Windows 2000 Professional, Windows XP Professional, Windows XP Professional x64 Edition | |
| | **Other** | Optimized disk utilization | |
| | | Online RAID Level Migration | |
| | | Online capacity expansion | |
| | | Immediate RAID availability (background initialization) | |
| | | S.M.A.R.T. support | |
| | **Kit Contents** | Controller card, driver CD, LED cables, user documentation and warranty card. | |
| **LSI SAS 8344ELP 3Gb/s RAID Controller** | **PCI Bus** | PCI-Express x4 lanes | |
| | **PCI Modes** | Bus Master DMA | |
| | **RAID Levels** | 0, 1, 5, 10 and 50 | |
| | **PCI data burst transfer rate** | 1.0 GBps ( half duplex ) 2.0 GBps ( full duplex ) | |
| | **SAS Bandwidths** | **Half Duplex**<br>Single lane - 300 MBps<br>Wide Port (2 lanes) - 600 MBps<br>Wide Port (4 lanes) - 1200 MBps | **Full Duplex**<br>Single SAS Lane - 600 MBps<br>Wide Port (2 lanes) -1200 MBps<br>Wide Port (4 lanes) - 2400 MBps |
| | **PCI Card Type** | 3.3 volt add-in card | |
| | **PCI Voltage** | 12 V ± 10% | |
| | **PCI Form Factor** | 6.6" x 2.731" (Low-profile) | |
| | **PCI Power** | 7.5 Watts | |
| | **Bracket** | Full height and Low-profile | |
| | **Certification Level** | PCI-Express 1.0a | |
| | **IO Bus** | Eight 3Gbps SAS/SATA ports | |
| | **SAS Processor** | Intel IOP333 I/O Processor | |
| | **Internal Connectors** | One SAS SFF8087 x4 internal connector | |
| | **External Connectors** | One SAS SFF8470 x4 external connector | |
| | **Max. Number of SAS Devices** | 32 | |
| | **LED Indicators** | On-board activity and fault LEDs | |
| | **Integrated Mirroring** | Integrated Mirroring option available | |
| | **Environments** | Operating | Storage |
| | **Temperature** | 0 to 60 C | -45 to +105 C |
| | **Relative Humidity** | 5 to 90% non-condensing | 5 to 90% non-condensing |

*Technical Specifications - Controllers*

| | |
|---|---|
| **MTBF** | >200,000 hours |
| **Compliances** | 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 |
| **Operating system support** | Microsoft® Windows® XP Professional, XP Professional x64<br>Red Hat Linux WS3 and WS4 |
| **Kit contents** | Controller card, driver CD, LED cables, user documentation and warranty card. |

*Technical Specifications - Hard Drives*

| | | | | |
|---|---|---|---|---|
| **Serial ATA Hard Drives** | **750 GB** (7,200 rpm) | **Capacity** | 750,156,374,016 bytes | |
| | | **Height** | 1 inches; 2.54 cm | |
| | | **Width** | Media diameter: 3.5 inches; 8.89 cm<br>Physical size: 4 inches; 10.2 cm | |
| | | **Interface** | Serial ATA (3.0 Gb/s), Native Command Queuing enabled | |
| | | **Synchronous Transfer Rate** (Maximum) | Up to 3.0 Gb/s | |
| | | **Cache** | 16 MB | |
| | | **Seek Time** (typical reads, includes controller overhead, including settling) | **Single Track** | 0.8 ms |
| | | | **Average** | 14.0 ms |
| | | | **Full-Stroke** | 20 ms |
| | | **Rotational Speed** | 7,200 rpm | |
| | | **Logical Blocks** | 1,465,149,168 | |
| | | **Operating Temperature** | 41° to 131°F (5° to 55°C) | |
| | **500 GB** (7,200 rpm) | **Capacity** | 500,107,862,016 bytes | |
| | | **Height** | 1 inches; 2.54 cm | |
| | | **Width** | Media diameter: 3.5 inches; 8.89 cm<br>Physical size: 4 inches; 10.2 cm | |
| | | **Interface** | Serial ATA (3.0 Gb/s), Native Command Queuing enabled | |
| | | **Synchronous Transfer Rate** (Maximum) | Up to 3.0 Gb/s | |
| | | **Cache** | 16 MB | |
| | | **Seek Time** (typical reads, includes controller overhead, including settling) | **Single Track** | 1.3 ms |
| | | | **Average** | 20.0 ms |
| | | | **Full-Stroke** | 30 ms |
| | | **Rotational Speed** | 7,200 rpm | |
| | | **Logical Blocks** | 976,773,168 | |
| | | **Operating Temperature** | 41° to 131°F (5° to 55°C) | |
| | **250 GB** (7,200 rpm) | **Capacity** | 250,059,350,016 bytes | |
| | | **Height** | 1 inches; 2.54 cm | |
| | | **Width** | Media diameter: 3.5 inches; 8.89 cm<br>Physical size: 4 inches; 10.2 cm | |
| | | **Interface** | Serial ATA (3.0 Gb/s)<br>Native Command Queuing enabled (Model EA788AA only) | |
| | | **Synchronous Transfer Rate** (Maximum) | Up to 3.0 Gb/s | |
| | | **Cache** | With NCQ (Model EA788AA):16 MB<br>Without NCQ (Model PY278AA): 8MB | |
| | | **Seek Time** (typical reads, includes controller overhead, including settling) | **Single Track** | 1.0 ms |
| | | | **Average** | 18.5 ms |
| | | | **Full-Stroke** | 18 ms |
| | | **Rotational Speed** | 7,200 rpm | |
| | | **Logical Blocks** | 488,397,168 | |

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

| | | | |
|---|---|---|---|
| **160 GB** (7,200 rpm) | **Capacity** | 160,041,885,696 bytes | |
| | **Height** | 1 inches; 2.54 cm | |
| | **Width** | Media diameter: 3.5 inches; 8.89 cm<br>Physical size: 4 inches; 10.2 cm | |
| | **Interface** | Serial ATA (3.0 Gb/s) | |
| | **Synchronous Transfer Rate** (Maximum) | Serial ATA (3.0 Gb/s), Native Command Queuing enabled | |
| | **Cache** | 8 MB | |
| | **Seek Time** (typical reads, includes controller overhead, including settling) | **Single Track** | 0.9 ms |
| | | **Average** | 9.3 ms |
| | | **Full-Stroke** | 18 ms |
| | **Rotational Speed** | 7,200 rpm | |
| | **Logical Blocks** | 312,581,808 | |
| | **Operating Temperature** | 41° to 131°F (5° to 55°C) | |

| | | | |
|---|---|---|---|
| **80 GB** (7,200 rpm) | **Capacity** | 80,026,361,856 bytes | |
| | **Height** | 1 inches; 2.54 cm | |
| | **Width** | Media diameter: 3.5 inches; 8.89 cm<br>Physical size: 4 inches; 10.2 cm | |
| | **Interface** | Serial ATA (3.0 Gb/s) | |
| | **Synchronous Transfer Rate** (Maximum) | Up to 3 Gb/s | |
| | **Cache** | 8 MB | |
| | **Seek Time** (typical reads, includes controller overhead, including settling) | **Single Track** | 2 ms |
| | | **Average** | 9.3 ms |
| | | **Full-Stroke** | 21 ms |
| | **Rotational Speed** | 7,200 rpm | |
| | **Logical Blocks** | 156,301,488 | |
| | **Operating Temperature** | 41° to 131°F (5° to 55°C) | |

*Technical Specifications - Hard Drives*

| | | | | |
|---|---|---|---|---|
| | **160 GB** (10k rpm) | **Capacity** | 160,041,885,696 bytes | |
| | | **Height** | 1 inches; 2.54 cm | |
| | | **Width** | Media diameter: 3.5 inches; 8.89 cm<br>Physical size: 4 inches; 10.2 cm | |
| | | **Interface** | Serial ATA (1.5 Gb/s), Native Command Queuing enabled | |
| | | **Synchronous Transfer Rate** (Maximum) | Up to 1.5 Gb/s | |
| | | **Cache** | 16 Mbytes | |
| | | **Seek Time** (typical reads, includes controller overhead, including settling) | **Single Track** | 0.3 ms |
| | | | **Average** | 4.6 ms |
| | | | **Full-Stroke** | 10.2 ms |
| | | **Rotational Speed** | 10,000 rpm | |
| | | **Logical Blocks** | 312,581,808 | |
| | | **Operating Temperature** | 41° to 131°F (5° to 55°C) | |
| | **80 GB** (10k rpm) | **Capacity** | 80,026,361,856 bytes | |
| | | **Height** | 1 inches; 2.54 cm | |
| | | **Width** | Media diameter: 3.5 inches; 8.89 cm<br>Physical size: 4 inches; 10.2 cm | |
| | | **Interface** | Serial ATA (1.5 Gb/s), Native Command Queuing enabled | |
| | | **Synchronous Transfer Rate** (Maximum) | Up to 1.5 Gb/s | |
| | | **Cache** | 16 Mbytes | |
| | | **Seek Time** (typical reads, includes controller overhead, including settling) | **Single Track** | 0.3 ms |
| | | | **Average** | 4.6 ms |
| | | | **Full-Stroke** | 10.2 ms |
| | | **Rotational Speed** | 10,000 rpm | |
| | | **Logical Blocks** | 156,301,488 | |
| | | **Operating Temperature** | 41° to 131°F (5° to 55°C) | |
| **Serial Attached SCSI (SAS) Hard Drives** | **300 GB** (15K rpm) | **Capacity** | 300,000,000,000 bytes | |
| | | **Height** | 1.0 in (25.4mm) | |
| | | **Width** | 4.0 in (101.6mm) | |
| | | **Interface** | SAS | |
| | | **Synchronous Transfer Rate** (Maximum) | 3.0 Gb/s | |
| | | **Buffer** | 16 MB | |
| | | **Seek Time** (typical reads, includes controller overhead, including settling) | **Single Track** | 0.2 ms |
| | | | **Average** | 3.5 ms |
| | | | **Full-Stroke** | 6.7 ms |
| | | **Rotational Speed** | 15,000 rpm | |
| | | **Logical Blocks** | 585,937,500 - 512 byte blocks | |
| | | **Operating Temperature** | 50° to 95° F (10° to 35° C) | |

| | | | |
|---|---|---|---|
| **146 GB** (10K rpm) | **Capacity** | 146,815,737,856 bytes | |
| | **Height** | 1.0 in (25.4mm) | |
| | **Width** | 4.0 in (101.6mm) | |
| | **Interface** | SAS | |
| | **Synchronous Transfer Rate** (Maximum) | 3.0 Gb/s | |
| | **Buffer** | 8 MB | |
| | **Seek Time** (typical reads, includes controller overhead, including settling) | **Single Track** | 0.3 msec |
| | | **Average** | <4.5 msec |
| | | **Full-Stroke** | <11.0 msec |
| | **Rotational Speed** | 10,000 rpm | |
| | **Logical Blocks** | 286,749,488 - 512 byte blocks | |
| | **Operating Temperature** | 50° to 95° F (10° to 35° C) | |
| **73 GB** (15K rpm) | **Capacity** | 73,407,865,856 bytes | |
| | **Height** | 1.0 in (2.54 cm) | |
| | **Width** | 4.0 in (101.6mm) | |
| | **Interface** | SAS | |
| | **Synchronous Transfer Rate** (Maximum) | 3.0 Gb/s | |
| | **Buffer** | 8 MB | |
| | **Seek Time** (typical reads, includes controller overhead, including settling) | **Single Track** | 0.27 ms |
| | | **Average** | 3.5 ms |
| | | **Full-Stroke** | 7.4 ms |
| | **Rotational Speed** | 15,000 rpm | |
| | **Logical Blocks** | 143,374,738 - 512 byte blocks | |
| | **Operating Temperature** | 50° to 95° F (10° to 35° C) | |
| **146 GB** (15K rpm) | **Capacity** | 146,815,737,856 bytes | |
| | **Height** | 1.0 in (25.4mm) | |
| | **Width** | 4.0 in (101.6mm) | |
| | **Interface** | SAS | |
| | **Synchronous Transfer Rate** (Maximum) | 3.0 Gb/s | |
| | **Buffer** | 8 MB | |
| | **Seek Time** (typical reads, includes controller overhead, including settling) | **Single Track** | 0.27 ms |
| | | **Average** | 3.5 ms |
| | | **Full-Stroke** | 7.4 ms |
| | **Rotational Speed** | 15,000 rpm | |
| | **Logical Blocks** | 286,749,488 - 512 byte blocks | |
| | **Operating Temperature** | 50° to 95° F (10° to 35° C) | |

*Technical Specifications - Removable Storage*

| | | | |
|---|---|---|---|
| **HP USB 2.0 Drive Key** | **Dimensions** (HxWxD) | | 0.9 x 0.7 x 3.9 inches; 2.3 x 1.8 x 9.8 cm |
| | **Weight** | | 0.05 lb (0.02 kg) |
| | **USB Specification** | | 2.0 |
| | **Transfer Rate** | | Read-1023 KB/Sec; Write-850 KB/Sec |
| | **Storage Media** | | Solid state flash memory, no moving parts |
| | **Power Supply** | | USB Bus-powered, no external power required |
| | **Capacity** | | 512 MB or 1 GB |
| **HP StorCase DX115 SATA and SAS Removable Enclosures** (Part EA332AA for SATA drives, Part EA333AA for SAS drives) | **Physical characteristics** | **Dimensions of carrier** (H x W x D) | 1.07 x 4.34 x 7.54 inches; 27.2 x 110.2 x 191.5 mm |
| | | **Weight of carrier** | 1 lbs (0.45 kg) |
| | | **Dimensions of receiving frame** (H x W x D) | 1.62 x 5.75 x 7.88 inches; 41.1 x 146.1 x 200.2 mm |
| | | **Weight of receiving frame** | N/A |
| | | **Dimensions of receiving frame – including front bezel** (H x W x D) | 1.62 x 5.81 x 8.08 inches; 41.1 x 147.6 x 205.2 mm |
| | | **Weight of receiving frame – including front bezel** | 2 lbs (0.91 kg) [1] |
| | | **Features** | Allows you to mount a low-profile (up to 1 inch high) 3.5 inch form factor drive into any half-height, 5.25 inch peripheral bay<br>Supports Serial Attached SCSI (SAS) or Serial ATA 3 Gb/s drives<br>• Drive carrier key lock<br>• Drive spin/power up/down button<br>• Power, spin, and fan failure indicator<br>• Drive activity indicator<br>• Soft Start circuitry & anti-static device protection<br>• Cable-less drive connector<br>• 50K mating connector<br>• Cooling fan |
| | **Electrical** | **Input** | +5V 9mA / +12V 20 µA |
| | **Chassis reliability/ maintainability** | **MTBF** (at 30° F) | 600,000 hours |
| | | **MTTR** | 5 minutes |
| | **Environmental** | **Operating ambient temperature** | 32° to 122° F (0° to 50° C) |
| | | **Storage ambient temperature** | -40° to 158° F (-40° to 70° C) |
| | | **Operating relative humidity** [2] | 5% to 95%<br>1000 to 10,000 feet; 305 to 3048 m |
| | | **Storage relative humidity** [2] | 50% to 95%<br>-1000 to 40,000 feet; -305 to 12,192 ft) |
| | | **Operating altitude** | -1000 to 10,000 feet; -305 to 3048 m |
| | | **Storage altitude** | -1000 to 40,000 feet; -305 to 12,195 m |

| | |
|---|---|
| **Operating shock** [3] | 60g |
| **Storage shock** [3] | 30 |

**NOTES**:
[1] With carrier removed
[2] Non-condensing with maximum gradient of 10% per hour
[3] Half-sine wave shock pulses at 2ms

*Technical Specifications - Input/Output Devices*

| | | |
|---|---|---|
| **HP IEEE 1394a FireWire 400 4-Port PCI Card** (Windows XP Only) | **Device Interface Protocol** | IEEE-1394a |
| | **Data Rate** | 400 Mbps |
| | **Devices Supported** | IEEE-1394 compliant devices |
| | **Bus Interface** | PCI |
| | **Physical** | PCI card with brackets for low profile and full height PCI slots. |
| | **Environmental** | **Operating temperature** 50° to 131° F (10° to 55° C) |
| | | **Non-operating temperature** -22° to 140° F (-30° to 60° C) |
| | | **Relative humidity** 20% to 80% |
| | **Ports** | Two IEEE1394 6-Pin Connector (Rear) |
| | **Minimum System Requirements** | Microsoft Windows XP Professional, Windows XP Home, not supported on Linux |
| | | Pentium II 266 or faster |
| | | 128-MB RAM |
| | | 1-GB Hard Drive |
| | | CD-ROM drive |
| | | Built in sound system |
| | | Available PCI slot |
| | **Regulatory Agency Approval** | FCC Part 15B, cULus 60950, CE Mark EN55022B(1995)/EN55024-1998 STD, Taiwan BSMI CNS13438, Korea MIC |

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

*Technical Specifications - Input/Output Devices*

| | | | |
|---|---|---|---|
| **HP SpacePilot USB** (Windows XP only) | **Physical Characteristics** | **Dimensions** (L x W x H) | 9.3 x 5.6 x 2.0 inches; 236 x 143 x 53 mm |
| | | **Weight** | 1.875 lb (0.85 kg) |
| | | **Palmrest** | Sculpted |
| | **Mechanical** | **Buttons** | 21+ programmable speed keys<br>15 reprogrammable |
| | | **LCD Viewing Area** | (W x H) 4.0" x 1.0" (102.4 x 30.2mm) |
| | | **Active Area** | (W x H) 3.7" x 1.0" (93.4 x 26.2mm) |
| | | **Display Format** | 240 x 64 |
| | | **Motion Controller** | Six degrees of freedom motion control through the X, Y, Z axis (pitch, roll, yaw) |
| | | **Device Sensitivity** | Adjustable to preference |
| | **Connector** | USB 1.1 or 2.0 | |
| | **Operating System Supported** | Microsoft Windows XP | |
| | **Regulatory Approvals** | FCC, CE | |

| | | | |
|---|---|---|---|
| **PS/2 OR USB Standard Keyboard** | **Physical characteristics** | **Keys** | 104, 105, 106, 107, 109 layout (depending upon country) |
| | | **Dimensions** (L x W x H) | 18.0 x 6.4 x 0.98 inches; 45.8 x 16.3 x 2.5 cm |
| | | **Weight** | 2 lb (0.9 kg) minimum |
| | **Electrical** | **Operating voltage** | + 5VDC ± 5% |
| | | **Power consumption** | 50-mA maximum (with three LEDs ON) |
| | | **ESD** | CE level 4, 15-kV air discharge |
| | | **EMI - RFI** | Conforms to FCC rules for a Class B computing device |
| | | **MicrosoftPC 99 - 2001** | Functionally compliant |
| | **Mechanical** | **Languages** | 38 available |
| | | **Keycaps** | Low-profile design |
| | | **Switch actuation** | 55-g nominal peak force with tactile feedback |
| | | **Switch life** | 20 million keystrokes (using Hasco modified tester) |
| | | **Switch type** | Contamination-resistant switch membrane |
| | | **Key-leveling mechanisms** | For all double-wide and greater-length keys |
| | | **Cable length** | 6 feet; 1.8 m |
| | | **Microsoft PC 99 - 2001** | Mechanically compliant |
| | | **Acoustics** | 43-dBA maximum sound pressure level |
| | **Environmental** | **Operating temperature** | 50° to 122° F (10° to 50° C) |
| | | **Non-operating temperature** | -22° to 140° F (-30° to 60° C) |
| | | **Operating humidity** | 10% to 90% (non-condensing at ambient) |
| | | **Non-operating humidity** | 20% to 80% (non-condensing at ambient) |
| | | **Operating shock** | 40 g, six surfaces |
| | | **Non-operating shock** | 80 g, six surfaces |
| | | **Operating vibration** | 2-g peak acceleration |
| | | **Non-operating vibration** | 4-g peak acceleration |

| | | | |
|---|---|---|---|
| | | **Drop** (out of box) | 26 inches; 66 cm on carpet, six-drop sequence |
| | | **Drop** (in box) | 42 inches; 107 cm on concrete, 16-drop sequence |
| | **Operating system support** | | Microsoft Windows XP Professional, Microsoft Windows XP Professional x64 Edition, Red Hat Enterprise Linux WS 3 and 4 |
| | **Approvals** | | UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC |
| | **Ergonomic compliance** | | ANSI HFS 100, ISO 9241-4, and TUVGS |
| | **Kit contents** | | Keyboard, keyboard software media, installation guide, warranty card, safety and comfort |
| **HP PS/2 Scroll Mouse** | **Scroll Wheel** | | 8 mm |
| | **Maximum Rotation Speed** | | 30 mm/s |
| | **Switch Type** | | Light force micro-switch |
| | **Switch Life** | | 1 million operations |
| | **Mechanical Life** | | Minimum 200,000 revolutions |
| | **Environmental** | **Operating temperature** | 50° to 122° F (10° to 50° C) |
| | | **Non-operating temperature** | -22° to 140° F (-30° to 60° C) |
| | | **Operating humidity** | 10% to 90% (non-condensing at ambient) |
| | | **Non-operating humidity** | 20% to 80% (non-condensing at ambient) |
| | | **Operating shock** | 40 g, 6 surfaces |
| | | **Non-operating shock** | 80 g, 6 surfaces |
| | | **Operating vibration** | 2 g peak acceleration |
| | | **Non-operating vibration** | 4 g peak acceleration |
| | **Electrical** | **Operating voltage** | 5 VDC ± 10% |
| | | **Power consumption** | 15 mA |
| | | **System consumption** | PS/2 mini-din connector |
| | | **ESD** | CE level 4, 15 kV air discharge |
| | | **EMI-RFI** | Conforms to FCC rules for a Class B computing device |
| | | **Microsoft PC99 - 2001** | Functionally compliant |
| | **Mechanical** | **Resolution** | 400 ± 20% DPI |
| | | **Tracking Speed** | 10 in/s maximum |
| | | **Acceleration** | 100 in/s |
| | | **Switch Actuation** | 85 g nominal peak force |
| | | **Switch Life** | 1,000,000 operations (using Hasco modified tester) |
| | | **Cable Length** | 2 m |
| | | **PC98-99** | Mechanically compliant |
| | **Regulatory Approvals** | | UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BCIQ, C-Tick |

*Technical Specifications - Input/Output Devices*

| | | | |
|---|---|---|---|
| **HP 2-button Optical Scroll Mouse** (USB) | **Dimensions** (H x L x W) | | 1.5 x 4.5 x 2.5 inches; 3.8 x 11.6 x 6.3 cm |
| | **Weight** | | 0.27 lb (0.12 kg) |
| | **Cable length** | | 72.8 inches; 185 cm |
| | **System requirements** | | Microsoft Windows XP Professional, Microsoft Windows XP Professional x64 Edition, Red Hat Enterprise Linux WS 3 and 4 |
| **HP Optical 3-Button Mouse** (USB) | **Dimensions/Weight** | **Height** | 1.5 inches; 3.76 cm |
| | | **Length** | 4.5 inches; 11.56 cm |
| | | **Width** | 2.4 inches; 6.19 cm |
| | | **Weight** | 3.80 oz (108 g) |
| | **Environmental** | **Operating temperature** | 32° to 104° F (0° to 40° C) |
| | | **Non-operating temperature** | -4° to 140° F (-20° to 60° C) |
| | | **Operating humidity** | 10% to 90% (non condensing at ambient) |
| | **Mechanical** | **Tracking speed** | 6 in/s Maximum |
| | | **Switch life** | 3,000,000 operations |
| | | **Switch type** | Micro-switches |
| | | **Tracking mechanism life** | 155 miles (250 km) at average speed of 10 in/s |
| | | **Cable length** | 9.5 feet; 2.9 m |
| **Spaceball 5000 USB** (Windows XP only) | **Physical characteristics** | **Dimensions** (H x W x D) | 3.0 x 6.0 x 8.4 inches; 7.6 x 15.2 x 21.3 cm |
| | | **Ball Diameter** | 2.2 inches; 5.6 cm |
| | | **Weight** | 2.1 lb (9.94 kg) |
| | | **Features** | Six degrees of freedom motion control through the X, Y, Z axis (pitch, roll, yaw) Certified for leading CAD and DCC applications |
| | **Environmental** | **Operating temperature** | 50° to 104° F (10° to 40° C) |
| | | **Non-operating temperature** | 43° to 140° F (6° to 60° C) |
| | | **Operating humidity** | 8% to 80% (non-condensing at ambient) |
| | | **Non-operating humidity** | 5% to 80% (non-condensing at ambient) |
| | **Mechanical** | **Buttons** | 12 programmable (unshifted) |
| | | **Ball Force Range** | 0.5 - 8.2N/1.8 - 29.5 oz |
| | | **Ball Torque Range** | 0.085 – 0.33 oz-in. (6.91 Nmm) |
| | | **Resolution** | 10 bits |
| | **Serial Specifications** | **Connector** | USB 1.1 or greater |
| | | **Cable Length** | 12.8 feet; 3.9 m |
| | | **Data Rate** | USB model – 16 msec |
| | | **Flow Control** | Xon/Xoff (on PS/2 model only) |
| | **Software Drivers Available** | **USB model** | Microsoft Windows XP Professional |
| | **System Requirements** | **Disk Space** | 10 MB free disk space |
| | **Regulatory Approvals** | | UL, cUL, EN 950, EN 60950, CSA, FCC, CE Mark, TUV, CISPR 22, EN 50082, IEC 1000 4-2, IEC 1000-4-3, AS/NZS, VCCI, BSMI, C-Tick |

*Technical Specifications - Input/Output Devices*

| | | | |
|---|---|---|---|
| **HP SpaceMouse Plus USB** (Windows XP only) | **Physical characteristics** | **Dimensions** (H x W x D) | 7.4 x 4.72 x 1.73 inches; 18.8 x 12.0 x 4.4 cm |
| | | **Cap Diameter** | 2 x 6.5 x 6.6 mm |
| | | **Weight** | 1.5 lb (0.68 kg) |
| | | **Features** | Six degrees of freedom motion control through the X, Y, Z axis (pitch, roll, yaw) Certified for leading CAD and DCC applications |
| | **Environmental** | **Operating temperature** | 41° to 140° F (5° to 60° C) |
| | | **Non-operating temperature** | -13° to 158° F (-25° to 70° C) |
| | | **Operating humidity** | 10 to 98 % RH (non-condensing) |
| | | **Non-operating humidity** | 10 to 98 % RH (non-condensing) |
| | **Mechanical** | **Buttons** | 11 programmable (unshifted) |
| | | **Cap Force Range** | 0.2 N – 4.5 N |
| | | **Cap Torque Range** | 4 Nmm to 100 Nmm |
| | | **Resolution** | 8 bit |
| | **USB Specifications** | **Connector** | 6.56 feet; 2 m |
| | | **Cable Length** | 6.56 ft (2 m) |
| | | **Data Rate** | 16 msec |
| | **Software Drivers Available** | Microsoft Windows XP Professional | |
| | **System Requirements** | **Disk Space** | 10 MB free disk space |
| | **Regulatory Approvals** | UL, cUL, EN 950, EN 60950, CSA, FCC, CE Mark, TUV, CISPR 22, EN 50082, IEC 1000 4-2, IEC 1000-4-3, AS/NZS, VCCI, BSMI, C-Tick | |

*Technical Specifications - Optical Devices*

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|---|---|---|---|
| **HP 48X CD-ROM Drive** | **Capacity** | 700 MB CD disc | |
| | **Dimensions** (HxWxD) | 1.63 x 5.83 x 7.27 inches; 4.13 x 14.6 x 18.5 cm | |
| | **Weight** | 1.76 lb (0.8 kg) | |
| | **Interface** | ATAPI/EIDE | |
| | **Mounting Orientation** | Horizontal or vertical | |
| | **Data Transfer Rates - Read** | Digital audio extraction (minimum) - 1,200 KB/s (8X)<br>CD read - up to 7,200 KB/s (48X) | |
| | **Media and Formats - Read** | Formats: CD-DA, CD-ROM (Mode 1 and 2), CD-XA Ready, Photo CD (Single and Multi-session), Mixed Mode (Audio and Data combined), CD-I (FMV), CD Plus, CD-Extra;<br>Media: stamped, CD-R, CD-RW | |
| | **Data Transfer Modes** | PIO Mode 4 (16.6 MB/s); Multi-word DMA mode 2 (16.6 MB/s); UltraDMA Mode 0 (16.7 MB/s); UltraDMA Mode 2 (33.3 MB/s) | |
| | **Access Times** (typical) | **Random** | < 75 ms @ 48x |
| | | **Full-Stroke** | < 150 ms |
| | **Start-up Time** (typical) | < 7 s (single session) | < 30 s (multisession) |
| | **Stop Time** (typical) | < 4 s | |
| | **Read Buffer size** | 128 KB (minimum) | |
| | **Audio Output** | **Line-Out** | 0.7 VRMS |
| | | **Signal-to-Noise Ratio** | 80 dB |
| | | **Channel Separation** | 65 dB |
| | **Configuration Jumper Block** | Master, slave, and cable select modes | |
| | **Operating Conditions** | **Temperature** | 41° to 122° F (5° to 50° C) |
| | | **Humidity** | 10% to 80% |
| | **Approvals / Environmental** | UL 1950 (US and Canada), CSA, SEMKO, TUV; CE, FDA, FCC, IC, C-TICK | |
| | **Operating Systems Supported** | Windows XP Professional, and XP Professional x64 Edition,<br>Red Hat Enterprise Linux WS 3, Red Hat Enterprise Linux WS 4 | |
| | **Supplied Software** | None | |

| | | | |
|---|---|---|---|
| **HP 16X/48X DVD-ROM Drive** | **Height** | 5.25-in, half-height, tray load | |
| | **Interface Type** | ATAPI/EIDE | |
| | **Dimensions** (W x H x D) | 5.88 x 1.71 x 7.87 [max] inches; 149.5 x 43.25 x 200.0 [max] mm (external, excluding bezel) | |
| | **Disc Formats** | DVD-ROM (single and dual layer); DVD-video; DVD-R version 1.0 and 2.0; DVD-RW version 1.0 and 1.1; DVD-R multi-border; DVD+RW; DVD+R ; CD-ROM Mode 1 and 2; CD-DA; CD-ROM XA Mode 2, Form 1 and 2; CD-extra; CD-text; CD-I Mode 2, Form 1 and 2; CD-I ready; video CD, CD-bridge; PhotoCD (single and multi-session); CD-R; CD-RW | |
| | **Disc Capacity** | **DVD-ROM** | 4.7 GB (DVD-5), 8.54 GB (DVD-9), 9.4 GB (DVD-10), 3.95 GB (DVD-R version 1.0), 4.7 GB (DVD-R version 2.0), 4.7 GB (DVD-RW version 1.0 and 1.1), 4.7 GB (DVD+RW), 4.7G (DVD+R) |
| | | **CD-ROM** | 540 MB (Mode 1, 12 cm), 640 MB (Mode 2, 12 cm), 700 MB (80 minimum CD-R and CD-RW), 180 MB (8 cm) |

*Technical Specifications - Optical Devices*

| | | |
|---|---|---|
| **Access Times** (typical reads, including settling) | **DVD-ROM Single Layer** | 120 ms |
| | **CD-ROM Mode 1** | 90 ms |
| | **Full Stroke DVD** | 240 ms (seek) |
| | **Full Stroke CD** | 160 ms (seek) |
| | **Startup Time** | < 10 seconds (typical) |
| | **Stop Time** | < 4 seconds |
| | **Data Transfer Modes** | PIO Mode 4 (16.6 MB/s); Multi-word DMA mode 2 (16.6 MB/s); UltraDMA Mode 3 (44.4 MB/s) |
| **Maximum Data Transfer Rates** | **CD-ROM Read** | 6000 KB/s (40X) Max |
| | **DVD-ROM Read** | 21,600 KB/s (16X) Max |
| | **Digital Audio Extraction** | 6000 KB/s (40X) Max |
| **Power** | **Source** | Four-pin, DC power receptacle |
| | **DC Power Requirement** | 5 VDC ± 5% – 100 mV ripple p-p |
| | | 12 VDC ± 5% – 200 mV ripple p-p |
| | **DC Current** | 5 VDC – <800 mA typical, < 1000 mA maximum |
| | | 12 VDC – < 870 mA typical, <1800 mA maximum |
| **Audio Output** | **Line-Out** | 0.7 VRMS |
| | **Signal-to-Noise Ratio** | 85 dB |
| | **Channel Separation** | 65 dB |
| **Configuration Jumper Block** | Master, slave, and cable select modes | |
| **Data Interface Connector** | 40-pin, shrouded and keyed, flat ribbon | |
| **Operating Environmental** (all conditions non-condensing) | **Temperature** (operating) | 41° to 122° F (5° to 50° C) |
| | **Relative Humidity** (operating) | 10% to 85% |
| | **Maximum Wet Bulb Temperature** (operating) | 86° F (30° C) |
| **Certifications, Approvals** | MMC II support, multi-read certification, Microsoft WHQL certification, ACA AS/NZS 3548 class B, CNS 13438, C.I.S.P.R. Pub 22, TUV or VDE EN60950, EN 55022, EN55024, EMKO EN60950, EN 60825-1, UL 60950, CSA C22.2 60950-2000, CFR 21 part 1040 class 1, CFR 47 C.I.S.P.R. Pub 22 Class B, DHHS/FDA, ANSI C63.4-1992 | |
| **Operating Systems Supported** | Microsoft Windows 2000, Windows XP Professional | |
| **Kit Contents** | 16X/48X DVD-ROM Drive, InterVideo WinDVD MPEG Movie Playback software, audio cable, and installation guide. | |

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|---|---|---|
| **HP 48X CD-RW/DVD-ROM Combo Drive** | **Form Factor** | 5.25-inch, half-height, tray-load |
| | **Mounting Orientation** | Horizontal or vertical |
| | **Interface** | ATAPI/EIDE |
| | **Dimensions** (HxWxD) | 5.77 x 1.71 x 7.87 [max] inches; 14.66 x 4.34 x 20.0 [max] cm (external, excluding bezel) |
| | **Weight** (max) | 2.6 lb (1.2 kg) |
| | **Read Only Disc** | **Data Transfer Rates - CD read -** 7200 KB/s (48X) Max |

*Technical Specifications - Optical Devices*

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|---|---|---|
| **Parameters** | **Read** | Digital audio extraction (minimum) - 1,800 KB/s (12X) |
| | | **DVD ROM read -** 21,632 KB/s (16X ) Max |
| | **Media and Formats - Read** | **CD Media**: stamped; CD-R; CD-RW (LS, HS, US) |
| | | **CD Capacities:** 180 MB (mode 2, 8 cm); 540 MB (mode 1, 12 cm); 650 MB (mode 2, 12 cm); 700 MB (Mode 2, 12 cm, 80-minute) |
| | | **CD Formats:** CD-DA, CD-ROM (Mode 1 and 2), CD-XA (Mode 2, Form 1 and 2), Photo CD (Single and Multi-session), Mixed Mode (Audio and Data combined), CD-I (Mode 2, Form 1 and 2, and CD-I Ready), CD-Extra, CD-Bridge, Video CD |
| | | **DVD Media:** stamped (single and double layer); DVD+R; DVD+RW; DVD+R DL; DVD-R; DVD-RW |
| | | **DVD Capacities:** 4.7 GB (DVD-5), 8.54 GB (DVD-9), 9.4 GB (DVD-10), 3.95 GB (DVD-R version 1.0), 4.7 GB (DVD-R version 2.0), 4.7 GB (DVD-RW version 1.0 and 1.1), 4.7 GB (DVD+RW), 4.7G (DVD+R) |
| | | **DVD Formats:** DVD-ROM (single and dual layer); DVD-video; DVD-R version 1.0 and 2.0; DVD-RW version 1.0 and 1.1; DVD-R multi-border ; DVD+R version 1.2 (including multi-session); DVD+R DL version 1.0; DVD+RW version 1.2 |
| **Writeable Disc Parameters** | **Data Transfer Rates - Write** | **CD-R write** - 2100 KB/s (14X) to 7200 KB/s (48X) |
| | | **CD-RW write** - 600 KB/s (4X) |
| | | **CD-RW write** (high speed) - 1500 KB/s (10X) to 1800 KB/s (12X) |
| | | **CD-RW write** (ultra high speed) **-** 2400 KB/s (16X) to 4800 KB/s (32X) |
| | **Media and Formats - Write** | **CD Media:** CD-R; CD-RW (LS, HS, US) |
| | | **CD Capacities:** 180 MB (mode 2, 8 cm); 540 MB (mode 1, 12 cm); 650 MB (mode 2, 12 cm); 700 MB (Mode 2, 12 cm, 80-minute) |
| | | **CD Formats:** CD-DA, CD-ROM (Mode 1 and 2), CD-XA (Mode 2, Form 1 and 2), Photo CD (Single and Multi-session), Mixed Mode (Audio and Data combined), CD-I (Mode 2, Form 1 and 2, and CD-I Ready), CD-Extra, CD-Bridge, Video CD |
| | **Write Methods** | Disc-at-once, session-at-once, track-at-once, incremental fixed and variable packet, multi-session |
| **Access Times** (typical reads, including settling) | **Random DVD** | < 140 ms |
| | **Random CD** | < 125 ms, (typical) |
| | **Full Stroke DVD** | < 250 ms |
| | **Full Stroke CD** | < 210 ms |
| | **Startup Time** (single) | < 7 seconds (typical) |

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|---|---|---|---|
| | | **Startup Time** (multi-session) | < 30 seconds (typical) |
| | | **Stop Time** (typical) | < 4 s |
| | | **Cache Buffer** | 2 MB (minimum) |
| | | **Data Transfer Modes** | ATA PIO mode 4 (16.7 MB/s); ATA Multi-word DMA mode 2 (16.7 MB/s); ATA UltraDMA Mode 3 (44 Mbytes/s) |
| | **Power** | **Source** | Four-pin, DC power receptacle |
| | | **DC Power Requirement** | 5 VDC ± 5%-100 mV ripple p-p |
| | | | 12 VDC ± 5%-200 mV ripple p-p |
| | | **DC Current** | 5 VDC (< 1000 mA typical, < 1600 mA maximum) |
| | | | 12 VDC (< 600 mA typical, < 1400 mA maximum) |
| | | **Total Drive Power** (standby mode) | < 2.5 Watt |
| | **Audio Output** | **Line-Out** | 0.7 VRMS |
| | | **Signal-to-Noise Ratio** | 74 dB |
| | | **Channel Separation** | 65 dB |
| | **Configuration Jumper Block** | Master, slave, and cable select modes | |
| | **Data Interface Connector** | 40-pin, shrouded and keyed, flat ribbon | |
| | **Operating Conditions** (all conditions non-condensing) | **Temperature** | 41° to 122° F (5° to 50° C) |
| | | **Relative humidity** | 10% to 90% |
| | | **Maximum wet bulb temperature** | 86° F (30° C) |
| | **Certifications, Approvals** | MMC-3 support, multi-read compliant, Microsoft WHQL certification, ACA AS/NZS 3548 class B, BSMI CNS 13438, CE Mark, C.I.S.P.R. Pub 22, TUV or VDE EN60950, EN 55022, EN55024, EMKO EN60950, EN 60825-1, UL 60950, CSA C22.2 60950-2000, CFR 21 part 1040 class 1, CFR 47 C.I.S.P.R. Pub 22 Class B, DHHS/FDA, ANSI C63.4-1992 (FCC Class B) | |
| | **Operating Systems Supported** | Microsoft Windows XP Professional, Microsoft Windows XP Professional x64 Edition, Red Hat WS3 and WS4 Versions | |
| | **Supplied Software** (for Windows XP) | Roxio Cineplayer Movie Playback<br>Roxio Digital Media Plus: Create or copy CDs and DVDs, including music and data CDs, and data DVDs | |

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|---|---|---|---|
| **HP 16X/48X DVD-ROM Drive** | **Height** | 5.25-in, half-height, tray load | |
| | **Interface Type** | ATAPI/EIDE | |
| | **Dimensions** (W x H x D) | 5.88 x 1.71 x 7.87 [max] inches; 149.5 x 43.25 x 200.0 [max] mm (external, excluding bezel) | |
| | **Disc Formats** | DVD-ROM (single and dual layer); DVD-video; DVD-R version 1.0 and 2.0; DVD-RW version 1.0 and 1.1; DVD-R multi-border; DVD+RW; DVD+R ; CD-ROM Mode 1 and 2; CD-DA; CD-ROM XA Mode 2, Form 1 and 2; CD-extra; CD-text; CD-I Mode 2, Form 1 and 2; CD-I ready; video CD, CD-bridge; PhotoCD (single and multi-session); CD-R; CD-RW | |
| | **Disc Capacity** | **DVD-ROM** | 4.7 GB (DVD-5), 8.54 GB (DVD-9), 9.4 GB (DVD-10), 3.95 GB (DVD-R version 1.0), 4.7 |

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|---|---|---|
| | | GB (DVD-R version 2.0), 4.7 GB (DVD-RW version 1.0 and 1.1), 4.7 GB (DVD+RW), 4.7G (DVD+R) |
| | **CD-ROM** | 540 MB (Mode 1, 12 cm), 640 MB (Mode 2, 12 cm), 700 MB (80 minimum CD-R and CD-RW), 180 MB (8 cm) |
| **Access Times** (typical reads, including settling) | **DVD-ROM Single Layer** | 120 ms |
| | **CD-ROM Mode 1** | 90 ms |
| | **Full Stroke DVD** | 240 ms (seek) |
| | **Full Stroke CD** | 160 ms (seek) |
| | **Startup Time** | < 10 seconds (typical) |
| | **Stop Time** | < 4 seconds |
| | **Data Transfer Modes** | PIO Mode 4 (16.6 MB/s); Multi-word DMA mode 2 (16.6 MB/s); UltraDMA Mode 3 (44.4 MB/s) |
| **Maximum Data Transfer Rates** | **CD-ROM Read** | 6000 KB/s (40X) Max |
| | **DVD-ROM Read** | 21,600 KB/s (16X) Max |
| | **Digital Audio Extraction** | 6000 KB/s (40X) Max |
| **Power** | **Source** | Four-pin, DC power receptacle |
| | **DC Power Requirement** | 5 VDC ± 5% – 100 mV ripple p-p |
| | | 12 VDC ± 5% – 200 mV ripple p-p |
| | **DC Current** | 5 VDC – <800 mA typical, < 1000 mA maximum |
| | | 12 VDC – < 870 mA typical, <1800 mA maximum |
| **Audio Output** | **Line-Out** | 0.7 VRMS |
| | **Signal-to-Noise Ratio** | 85 dB |
| | **Channel Separation** | 65 dB |
| **Configuration Jumper Block** | Master, slave, and cable select modes | |
| **Data Interface Connector** | 40-pin, shrouded and keyed, flat ribbon | |
| **Operating Environmental** (all conditions non-condensing) | **Temperature** (operating) | 41° to 122° F (5° to 50° C) |
| | **Relative Humidity** (operating) | 10% to 85% |
| | **Maximum Wet Bulb Temperature** (operating) | 86° F (30° C) |
| **Certifications, Approvals** | MMC II support, multi-read certification, Microsoft WHQL certification, ACA AS/NZS 3548 class B, CNS 13438, C.I.S.P.R. Pub 22, TUV or VDE EN60950, EN 55022, EN55024, EMKO EN60950, EN 60825-1, UL 60950, CSA C22.2 60950-2000, CFR 21 part 1040 class 1, CFR 47 C.I.S.P.R. Pub 22 Class B, DHHS/FDA, ANSI C63.4-1992 | |
| **Operating Systems Supported** | Microsoft Windows 2000, Windows XP Professional | |
| **Kit Contents** | 16X/48X DVD-ROM Drive, InterVideo WinDVD MPEG Movie Playback software, audio cable, and installation guide. | |

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| **NVIDIA Quadro NVS 285 128MB PCIe Dual Display** | **Form Factor** | Nvidia Quadro NVS 285 128MB PCIe Dual Display<br>Low profile, both ATX and low profile brackets included |
| | **Graphics Controller** | Integrated Quadro 285 2D graphics processor unit (GPU) |
| | **Bus Type** | PCI-Express |
| | **Memory** | 128 MB DDR2 |
| | **Connectors** | Single high-density DMS-59 Flex Connector |
| | **Dimensions** | Low-profile, 2.586 x 6.6 inches; 6.57 x 16.76 cm |
| | **Multi-monitor support** | Dual analog or digital monitors |
| | **RAMDAC** | Dual 350 MHz (integrated) |
| | **Maximum pixel clock** | 350 MHz |
| | **Overlay planes** | One 16-bit Video overlay plane |
| | **High-definition Video Processor (HDVP)** | Full screen, full frame video playback of HDTV and DVD content<br>DVD-ready motion compensation for MPEG-2<br>Independent hardware color controls for video overlay<br>Hardware color-space conversion (YUV 4:2:2 and 4:2:0)<br>IDCT motion compensation<br>5-tap horizontal by 3-tap vertical filtering<br>8:1 up/down scaling |
| | **Available graphics drivers** | Microsoft Windows 2000 and Microsoft Windows XP (Provides full native Dual View mode, Span or Big Desktop mode, and Clone mode)<br>HP qualified drivers may be preloaded or available from the HP support Web site:<br>http://www.hp.com/country/us/en/support.html?pageDisplay=drivers |
| | **Option kit Contents** | NVIDIA Quadro NVS 285 128MB PCIe Graphics Card with full height bracket attached, DMS 59 to dual DVI Y cable, DMS 59 to dual VGA Y cable, low profile bracket, Workstation Software Driver CD, Desktop Software Driver CD, documentation. |

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| **NVIDIA Quadro FX 560 PCI-Express graphics controller** | **Form Factor** | ATX |
| | **Graphics Controller** | NVIDIA NV73GL |
| | **Bus Type** | PCI Express x16 |
| | **Memory** | 128MB 600MHz GDDR3 SDRAM unified frame buffer, Z-buffer and Texture storage |
| | **Connectors** | 2 DVI-I (one dual-link) + 9-pin HDTV output |
| | **Display resolution support** | 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).<br>HD-Out component Mode: YPrPB - SMPTE 1080i, 720p, 480p, 576p or composite Mode: NTSC/PAL 480i, 576i<br>NVIEW advanced multi-display desktop and application management seamlessly integrated into Microsoft Windows |
| | **RAMDAC** | Dual 400MHz integrated |
| | **Architecture features** | 128-bit memory interface<br>128-bit IEEE floating-point precision graphics pipeline<br>128-bit color precision<br>12-bit sub-pixel precision<br>8x FSAA at 1920x1200, 4x at 2048x1536, rotated grid FSAA sampling algorithm<br>Hardware accelerated anti-aliased points and lines<br>Hardware OpenGL overlay planes<br>Hardware accelerated two-sided lighting |

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| | | Hardware accelerated clipping planes<br>3rd generation occlusion culling<br>3D volumetric texture support<br>Quad-buffered stereo |
| | **Shading architecture** | Fully programmable GPU<br>Long fragment programs (unlimited instructions)<br>Long vertex programs (unlimited instructions)<br>Looping and subroutines (up to 256 loops per vertex program)<br>Dynamic flow control<br>Conditional execution |
| | **Supported graphics APIs** | OpenGL 2.0<br>DirectX 9.0 |
| | **Available graphics drivers** | Microsoft Windows XP Professional qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/eng/software_drivers.html. |

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|---|---|---|
| **ATI FireGL V3300 graphics card** | **Form factor** | ATX |
| | **Graphics controller** | RV515 |
| | **Bus type** | PCI-Express x16 |
| | **Memory** | 128MB DDR unified frame buffer, Z-buffer and Texture storage |
| | **Connectors** | Dual DVI-I analog/digital, dual VGA analog support with DVI-to-VGA adapters. |
| | **Display resolution support** | Analog support for 2048x1536 @ 85Hz on each output connector.<br>Digital support for 1920x1200 @ 60Hz on each output connector. |
| | **RAMDAC** | Dual 10-bit per channel 400MHz |
| | **Architecture features** | • 2x/4x/6x Anti-aliasing modes; multi-sample algorithm with gamma correction, programmable sparse sample patterns, and centroid sampling<br>• 2x/4x/8x/16x Anisotropic Filtering modes; up to 128-tap texture filtering<br>• High resolution texture support (up to 4K x 4K)<br>• Hardware supported overlays, anti-aliased points and lines, 2 sided lighting, occlusion culling |
| | **Avivo video and display platform** | • 64-bit per pixel floating point HDR supported throughout the pipeline, includes support for blending and multi-sample anti-aliasing<br>• 32-bit integer HDR (10:10:10:2) format supported throughout the pipeline, includes support for blending and multi-sample anti-aliasing |
| | **Programmable video processor** | • Accelerated MPEG-2, MPEG-4, DiVX, WMV9, VC-1 and H.264 decoding and transcoding<br>• Seamless pixel shader integration with video in real-time |
| | **Display output** | • 16-bit per channel floating point HDR and 10 bit per channel DVI output<br>• Programmable piecewise linear gamma correction, color correction, and color space conversion (10-bits per color)<br>• Complete independent color controls and video overlays for each display<br>• High quality pre- and post-scaling engineers with underscan support for all outputs<br>• Content-adaptive de-flicker filtering for interlaced displays<br>• Spatial/temporal dithering enables 10-bit color quality on 8 and 6-bit displays<br>• VGA mode support on all outputs |

*Technical Specifications - Graphics*

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| | **Shading architecture** | • Supports Microsoft DirectX 9.0 Shader Model 3.0 programmable vertex and pixel shaders in hardware<br>• Full speed 128-bit floating point processing for all shader operations<br>• Dedicated branch-execution units for high performance dynamic branching and flow control<br>• Dedicated texture address units for improved efficiency<br>• Up to 128 simultaneous pixel threads<br>• Multiple Render Target (MRT) support<br>• Render to vertex buffer support |
| | **Supported graphics APIs** | OpenGL 2.0<br>DirectX 9.0 |
| | **Available graphics drivers** | Microsoft Windows XP Professional qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/eng/software_drivers.html.<br>HP-tested Windows XP and Linux |
| **NVIDIA Quadro FX 1500 PCI-Express graphics controller** | **Form Factor** | ATX |
| | **Graphics Controller** | NVIDIA NV71GL |
| | **Bus Type** | PCI Express x16 |
| | **Memory** | 256MB GDDR3 SDRAM unified frame buffer, Z-buffer and Texture storage |
| | **Connectors** | 2 dual-link DVI-I + 9-pin HDTV output |
| | **Display resolution support** | 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).<br>HD-Out component Mode: YPrPB - SMPTE 1080i, 720p, 480p, 576p or composite Mode: NTSC/PAL 480i, 576i<br>NVIEW advanced multi-display desktop and application management seamlessly integrated into Microsoft® Windows® |
| | **RAMDAC** | Dual 400MHz integrated |
| | **Architecture features** | 256-bit memory interface<br>128-bit IEEE floating-point precision graphics pipeline<br>128-bit color precision<br>12-bit sub-pixel precision<br>8x FSAA at 1920x1200, 4x at 2048x1536, rotated grid FSAA sampling algorithm<br>Hardware accelerated anti-aliased points and lines<br>Hardware OpenGL overlay planes<br>Hardware accelerated two-sided lighting<br>Hardware accelerated clipping planes<br>3rd generation occlusion culling<br>3D volumetric texture support<br>Quad-buffered stereo<br>Dual Link DVI enabling driving digital displays up to 3840x2400 (24Hz) |
| | **Shading architecture** | Fully programmable GPU<br>Long fragment programs (unlimited instructions)<br>Long vertex programs (unlimited instructions)<br>Looping and subroutines (up to 256 loops per vertex program)<br>Dynamic flow control<br>Conditional execution |
| | **Supported graphics APIs** | OpenGL 2.0<br>DirectX 9.0 |

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| | **Available graphics drivers** | Microsoft Windows XP Professional qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/eng/software_drivers.html. |
| **NVIDIA Quadro FX 3500 PCI-Express graphics controller** | **Form Factor** | ATX |
| | **Graphics Controller** | NVIDIA NV71GL-U |
| | **Bus Type** | PCI-Express x16 |
| | **Memory** | 256MB 700MHz GDDR3 SDRAM unified frame buffer, Z-buffer and Texture storage |
| | **Connectors** | 2 dual-link DVI-I + 3-pin Mini DIN stereo output |
| | **Display resolution support** | 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).<br>NVIEW advanced multi-display desktop and application management seamlessly integrated into Microsoft® Windows® |
| | **Maximum Resolution** | Dual DVI-I output - drives dual digital displays at resolutions up to 1920x1200 @ 60Hz (single-link) and 3840x2400 @ 24Hz (dual-link).<br>Internal 400MHz RAMDACs - drives dual analog displays up to 2048x1536 @ 75Hz each |
| | **RAMDAC** | Dual 400MHz integrated |
| | **Architecture Features** | 256-bit memory interface<br>128-bit IEEE floating-point precision graphics pipeline<br>128-bit color precision<br>12-bit sub-pixel precision<br>8x FSAA at 1920x1200, 4x at 2048x1536, rotated grid FSAA sampling algorithm<br>Hardware accelerated anti-aliased points and lines<br>Hardware OpenGL overlay planes<br>Hardware accelerated two-sided lighting<br>Hardware accelerated clipping planes<br>3rd generation occlusion culling<br>3D volumetric texture support<br>Quad-buffered stereo<br>Dual Link DVI enabling driving digital displays up to 3840x2400 (24Hz)<br>SLI Link |
| | **Shading Architecture** | Fully programmable GPU (OpenGL 2.0/DirectX 9.0c class)<br>Long fragment programs (unlimited instructions)<br>Long vertex programs (unlimited instructions)<br>Looping and subroutines (up to 256 loops per vertex program)<br>Dynamic flow control<br>Conditional execution |
| | **Supported Graphics APIs** | OpenGL 2.0 ICD with immediate mode support for all OGL primitive types<br>DirectX 9.0c |
| | **Available Graphics Drivers** | Microsoft Windows XP, Linux - Full Open GL implementation, complete with NVIDIA and ARB extensions.<br>HP qualified drivers may be preloaded or available from the HP support web site:<br>http://welcome.hp.com/country/us/eng/software_drivers.html. |
| **NVIDIA Quadro FX 4500, 512 MB with** | **Bus Type** | PCI Express x16 |
| | **RAMDAC** | Dual 400 MHz integrated |

*Technical Specifications - Graphics*

optional G-Sync

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|---|---|
| **Memory** | 512 MB GDDR3 SDRAM unified graphics memory |
| **Connectors** | 2 DVI-I analog/digital monitor outputs, 1 3-pin Mini DIN stereo output, DVI-I to VGA adapters included |
| **Display resolution support** | Dual integrated display controllers supporting up to 2048x1536 @ 75Hz (analog) or 3840x2400 @ 41Hz (digital) on both displays |
| **NVIDIA Quadro FX 4500 architecture** | 256-bit memory interface<br>35.2GB/sec. memory bandwidth<br>Full 128-bit floating point color precision<br>12-bit subpixel precision<br>65,536 fragment instruction<br>65,536 vertex instruction<br>3D volumetric textures<br>Single-system powerwall<br>12 pixels per clock rendering engine<br>Hardware accelerated antialiased points & lines<br>Hardware OpenGL® overlay planes<br>Hardware accelerated two-sided lighting<br>Hardware accelerated clipping planes<br>Hardware two-sided lighting<br>3rd-generation occlusion culling<br>OpenGL quad-buffered stereo<br>Hardware-Accelerated Pixel Read-Back |
| **Shading Architecture** | 16 textures per pixel in fragment programs<br>Window ID clipping functionality<br>Hardware accelerated line stippling<br>Fully programmable GPU (OpenGL2.0/DirectX 9.0c class)<br>Long fragment programs (up to 65,536 instructions)<br>Long vertex programs (up to 65,536 instructions)<br>Looping and subroutines (up to 256 loops per vertex program)<br>Dynamic flow control<br>Conditional execution |
| **High Level Shader Languages** | Optimized compiler for Cg and Microsoft® HLSL<br>OpenGL 2.0 and DirectX 9.0c support<br>Open source compiler |
| **High-Resolution Antialiasing** | 12-bit subpixel sampling precision enhances AA quality<br>Rotated-grid full-scene antialiasing (RG FSAA)<br>16x FSAA dramatically reduces visual aliasing artifacts or "jaggies" at resolution up to 1920x1200 |
| **Display Resolution Support** | Dual Dual Link DVI-I output-drives digital displays at resolutions up to 3840 x 2400 @ 41Hz<br>Internal 400 MHz DACs - Two analog displays up to 2048x1536 @ 75 Hz each |
| **nView Architecture** | Advanced multi-display desktop & application management seamlessly integrated into Microsoft Windows®. |
| **Optional G-Sync** | Delivers Frame lock/Genlock functionality to unprecedented levels of industrial realism, visualization and collaborative capabilities. Frame lock allows the display channels from multiple workstations to be synchronized, thus creating one large "virtual display" that can be driven by a multisystem cluster for performance scalability, while Genlock allows the graphics output to be synchronized to an external source, typically for film and broadcast video applications. The NVIDIA Quadro G-Sync requires an NVIDIA Quadro FX 4500 graphics controller and an available expansion slot. |

*Technical Specifications - Graphics*

| | | |
|---|---|---|
| | **Supported Graphics APIs** | OpenGL 2.0 ICD with immediate mode support for all OGL primitive types<br>DirectX 9.0c |
| | **Available Graphics drivers** | Microsoft Windows XP, Linux - Full Open GL implementation, complete with NVIDIA and ARB extensions.<br>HP qualified drivers may be preloaded or available from the HP support web site:<br>http://welcome.hp.com/country/us/eng/software_drivers.html |
| **ATI FireGL V7200 graphics card** | **Form factor** | ATX |
| | **Graphics controller** | R520 |
| | **Bus type** | PCI-Express x16 |
| | **Memory** | 256MB GDDR3 graphics memory with unified frame buffer, Z-buffer and Texture storage and a 512-bit Ring-Bus memory controller |
| | **Connectors** | Dual DVI-I analog/digital, dual VGA analog support with DVI-to-VGA adapters. The DVI-I digital connectors are Dual Link capable. Stereoscopic 3D output connector with quad buffer support, HD Component Video (YPrPb) output with optional adapter. |
| | **Maximum Resolution** | Analog support for 2048x1536 @ 85Hz on each output connector.<br>Digital support for 1920x1200 @ 60Hz on each output connector.<br>Dual Link digital support for 2560x1600 @ 60Hz. Ideal for 30-inch widescreen displays.<br>**NOTE:** Stereo supported on single display only. |
| | **RAMDAC** | Dual 10-bit per channel 400MHz |
| | **Ring Bus memory controller** | • 512-bit internal ring bus for highly efficient memory reads<br>• Programmable intelligent arbitration logic |
| | **Image quality features** | • 2x/4x/6x Anti-aliasing modes; multi-sample algorithm with gamma correction, programmable sparse sample patterns, and centroid sampling<br>• 2x/4x/8x/16x Anisotropic Filtering modes; up to 128-tap texture filtering<br>• High resolution texture support (up to 4K x 4K)<br>• Hardware supported overlays, anti-aliased points and lines, 2 sided lighting, occlusion culling |
| | **Avivo video and display platform** | • 64-bit per pixel floating point HDR supported throughout the pipeline, includes support for blending and multi-sample anti-aliasing<br>• 32-bit integer HDR (10:10:10:2) format supported throughout the pipeline, includes support for blending and multi-sample anti-aliasing |
| | **Programmable video processor** | • Accelerated MPEG-2, MPEG-4, DiVX, WMV9, VC-1 and H.264 decoding and transcoding<br>• Seamless pixel shader integration with video in real-tim |
| | **Display output** | • 16-bit per channel floating point HDR and 10 bit per channel DVI output<br>• Programmable piecewise linear gamma correction, color correction, and color space conversion (10-bits per color)<br>• Complete independent color controls and video overlays for each display<br>• High quality pre- and post-scaling engineers with underscan support for all outputs<br>• Content-adaptive de-flicker filtering for interlaced displays<br>• Xilleon TV encoder for high quality analog support<br>• Spatial/temporal dithering enables 10-bit color quality on 8 and 6-bit displays |

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| | **Shading architecture** | • VGA mode support on all outputs<br>• Supports Microsoft DirectX 9.0 Shader Model 3.0 programmable vertex and pixel shaders in hardware<br>• Full speed 128-bit floating point processing for all shader operations<br>• Dedicated branch-execution units for high performance dynamic branching and flow control<br>• Dedicated texture address units for improved efficiency<br>• Up to 512 simultaneous pixel threads<br>• Multiple Render Target (MRT) support<br>• Render to vertex buffer support |
| | **Supported graphics APIs** | OpenGL 2.0<br>DirectX 9.0 |
| | **Available graphics drivers** | Microsoft Windows XP Professional qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/eng/software_drivers.html.<br>HP-tested Windows XP and Linux |
| **NVIDIA Quadro FX 5500 PCIe Graphics Board** | **Graphics Controller** | NVIDIA Quadro FX 5500 Workstation GPU |
| | **Bus Type** | PCI Express x16 |
| | **RAMDAC** | Dual 400 MHz integrated |
| | **Memory** | 1 GB GDDR2 SDRAM unified graphics memory |
| | **Connectors** | 2 Dual-link DVI-I, 1 Stereo |
| | **Multi-monitor Support** | Yes |
| | **NVIDIA Quadro FX 4500 architecture** | 256-bit memory interface<br>33.6 GB/sec. memory bandwidth<br>Full 128-bit floating point color precision<br>12-bit subpixel precision<br>Unlimited fragment instruction<br>Unlimited vertex instruction<br>3D volumetric textures support<br>Single-system powerwall<br>12 pixels per clock rendering engine<br>Hardware accelerated antialiased points & lines<br>Hardware OpenGL® overlay planes<br>Hardware accelerated two-sided lighting<br>Hardware accelerated clipping planes<br>3rd-generation occlusion culling<br>OpenGL quad-buffered stereo<br>Hardware-Accelerated Line Strippling<br>16 textures per pixel in fragment programs<br>Window ID clipping functionality |
| | **Shading Architecture** | Fully programmable GPU (OpenGL2.0/DirectX 9.0c class)<br>Long fragment programs (unlimited instructions)<br>Long vertex programs (unlimited instructions)<br>Looping and subroutines (up to 256 loops per vertex program)<br>Dynamic flow control<br>Conditional execution |
| | **High Level Shader Languages** | Optimized compiler for Cg and Microsoft® HLSL<br>OpenGL 2.0 and DirectX 9.0c support<br>Open source compiler |

*Technical Specifications - Graphics*

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|---|---|
| **High-Resolution Antialiasing** | 12-bit subpixel sampling precision enhances AA quality<br>Rotated Grid Full Scene Antialiasing (RG FSAA)<br>16x FSAA dramatically reduces visual aliasing artifacts or "jaggies" at resolution up to 1920x1200 |
| **Display Resolution Support** | 2 Dual-Link DVI-I output-drives digital displays at resolutions up to 3840 x 2400 @ 24Hz<br>Internal 400 MHz DACs - Two analog displays up to 2048x1536 @ 75 Hz each |
| **nView Architecture** | Advanced multi-display desktop & application management seamlessly integrated into Microsoft® Windows®. |
| **Supported Graphics APIs** | OpenGL 2.0<br>DirectX 9.0c |
| **3D Primitive Perf** | Geometry (Triangles per Second) 225 Million<br>Fill Rate (Texels per Second) 15.6 Billion |
| **Available Graphics drivers** | Microsoft Windows XP Professional,<br>Windows XP Professional x64 Edition,<br>Linux® - Full Open GL implementation, complete with NVIDIA and ARB extensions.<br>HP qualified drivers may be preloaded or available from the HP support web site:<br>http://welcome.hp.com/country/us/eng/software_drivers.html |

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|---|---|---|---|
| **HP L1955 Flat Panel Monitor** | **Panel** | **Type** | Active matrix, thin film transistor (TFT) |
| | | **Viewable Image Area** (diagonal) | 19 inches; 48.25 cm maximum viewable |
| | | **Screen Opening** (WxH) | 14.9 x 12.0 inches; 38.0 x 30.5 cm |
| | | **Viewing Angle** (typical) | 176 degrees horizontal/176 degrees vertical (10:1 minimum contrast ratio) |
| | | **Brightness** (typical) | Up to 250 nits (cd/$m^2$) |
| | | **Contrast Ratio** (typical) | Up to 1000:1 (typical) |
| | | **Response Rate** (typical) | <16 ms (typical rise + fall) |
| | | **Pixel Pitch** | 0.294 mm |
| | | **Color Depth Support** | 16.7 million colors |
| | **Video/Other Inputs** | **Plug and Play** | Yes (supports VESA DDC2B; PC2001 compliant) |
| | | **Self Powered USB 2.0 Hub** | One upstream, four downstream ports (cable included) |
| | | **Input Signal** | Two connectors: one 15-pin mini D-sub analog VGA; and one DVI-I (VGA analog or digital) |
| | | **Input Impedance** | 75 ohms ± 2% |
| | | **Sync Input** | Separate sync (HSYNC/VSYNC); composite sync, Sync on Green (activated through on-screen display) |
| | | **Video Cable** | VGA to VGA, DVI-D to DVI-D, and DVI-I to VGA |
| | | **Video Cable Length** | 78 inches; 2.0 m |
| | **Signal Interface/ Performance** | **Horizontal Frequency** | 30 to 82 kHz |
| | | **Vertical Frequency** | 56 to 75 Hz |
| | | **Native Resolution** | 1280 x 1024 @ 75 Hz analog |
| | | | 1280 x 1024 @ 60 Hz digital |
| | | **Maximum Resolution** (Analog) | 1280 x 1024 @ 75 Hz analog |
| | | **Maximum Resolution** (Digital) | 1280 x 1024 @ 75 Hz digital |
| | | **Preset VESA Graphic Modes** (non-interlaced) | 640 x 480 @ 60 Hz, 72 Hz, 75 Hz<br>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 |
| | | **Preset MAC Mode** | 832 x 624 @ 75 Hz |
| | | | 1152 x 870 @75 Hz |
| | | **Preset VGA Mode** | 640 x 480 @ 60 Hz, 72 Hz |
| | | **Preset SUN Mode** | 1152 x 900 @ 76 Hz |
| | | **Fail Safe Mode** | Yes (limits out of range signal messages) |
| | | **Maximum Pixel Clock Speed** | 140 MHz |
| | | **User Programmable Modes** | Yes, 15 |
| | | **Anti-Glare** | Yes |

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| | **Anti-Static** | | Yes |
| | **AssetControl** | | Yes (accessible on HP Compaq Business Desktops featuring Intelligent Manageability) |
| | **Default Color Temperature** | | Yes (6500k, 9300k, SRGB, Custom User) |
| **On Screen Display** (OSD) **Controls** | **Buttons or Switches** | | Power on/off; 3-button OSD; second level OSD buttons include dual-input switch, dedicated auto adjust switch |
| | **Languages** | | English, Spanish, French, German, Italian, Japanese, Simplified Chinese |
| | **User Controls** | | Size and Positioning |
| | | | Contrast |
| | | | Brightness |
| | | | Clock, Clock Phase |
| | | | Selectable Color Temperature |
| | | | Serial Number |
| | | | Mode Displayed |
| | | | Sleep Timer |
| | | | Input Selection |
| | | | Factory Reset |
| | | | Individual Color Contrast |
| | | | Full-screen Resolution |
| **Power** | **Power Supply** | | Auto-ranging, 90 to 265 VAC; internal power supply |
| | **Input Power** | | 100 ~ 240 VAC |
| | **Nominal Current** | | 1.5 A maximum |
| | **Frequency** | | 50 ~ 60 Hz |
| | **Average** | | 33 watts when displaying standard office software |
| | **Typical Power Consumption** | | < 40 watts |
| | **Maximum** | | < 60 watts |
| | **Power Saving** | | < 2 watts |
| | **Off Mode** | | 0 watts (when master power switch is in the off position) |
| | **Power Cable Length** | | 70 inches; 1.8 m; non-captive |
| **Mechanical** | **Dimensions** (H x W x D) | **Unpacked with stand** | 16.8 (minimum) to 22.3 (maximum) x 15.9 x 8.3 inches; 42.7 (minimum) to 56.6 (maximum) x 40.4 x 21.1 cm |
| | | **Base Area** (Footprint D x W) | 8.3 x 12.2 in<br>21.1 x 30.9 cm |
| | | **Panel only** (without stand) (H x W x D) | 13.2 x 15.9 x 3.1 in<br>33.5 x 40.4 x 7.9 cm |
| | **Weight** | **Unpacked with stand** | 16.5 lb (7.5 kg) |
| | | **Unpacked without stand** | 10.5 lb (4.75 kg) |
| | | **Packaged** | 23.5 lb (10.7 kg) |

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| | **Bezel Width** | 13 mm left and right, 14 mm top, and 15 mm bottom |
| | **Tilt Range** | -5° to +35° |
| | **Swivel Range** | ± 50° horizontal swivel |
| | **Height Adjustable** | Yes (5.1 in/13 cm adjustment range) |
| | **Pivot Rotation** | Yes, 90 ° |
| | **Base** | Ships detached and is removable after installation |
| **Environmental** | **Temperature – Operating** | 41° to 95° F (5° to 35° C) |
| | **Temperature – Non-operating** | -4° to 140° F (-20° to 60° C) |
| | **Humidity – Operating** | 20% to 80% |
| | **Humidity – Non-operating** | 5% to 95% |
| | **Altitude – Operating** | 0 to 13,000 feet; 0 to 4,000 m |
| | **Altitude – Non-operating** | 0 to 40,000 feet; 0 to 12,192 m |
| **Options** | **Desktop Access Center** | Features integrated microphone/headset jacks, dual function headset for phone/PC support, a MultiBay slot for adding an optical drive (sold separately), and four USB ports for easy integration of third-party digital solutions. Sold separately; part number DK985A. For more information, refer to the HP Desktop Access Center QuickSpecs. |
| | **HP Flat Panel Speaker Bar** | Powered directly by the monitor, seamlessly attaches to the monitor's bezel to bring full multimedia support to select HP flat panel monitors. Features dual speakers with full sound range and external jack for headphones. Sold separately, part number PF804AA. For more information, refer to the HP Flat Panel Speaker Bar QuickSpecs. |
| **Other** | **Accessories Included** | VGA to VGA cable, DVI-D to DVI-D cable, DVI-I to VGA cable, USB cable, user CD-ROM with Pivot Pro software |
| | **Software** | 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. |
| | **Software** | HP Display LiteSaver feature lets you schedule Sleep mode at preset times to help protect the display against image retention, drastically lower power consumption and energy costs, and extend the lifespan of the monitor. |
| | **User Guide Languages** | English |

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| | | **Warranty Languages** | English |
| | | **Color** | Carbonite, two-tone carbonite and silver (EMEA only) |
| | | **VESA Mounting** | Yes (swing arm/wall mount not included); base must be removed for mounting options) |
| | | **VESA External Mounting** | Yes (standard 4 hole pattern, 100 mm) |
| | | **Kensington Lock-ready** | Yes |
| | **Certification and Compliance** | | 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 |
| | **Compatibility** | | VESA Video Signal Standard (VSIS) Compliant video cards have been tested and proven compatible for use with the HP L1955 Flat Panel Monitor. Recommended for use with HP products. |
| | **Service and Warranty** | | Limited three-year parts and repair labor, service provider labor, and on-site service. Next Business Day advanced exchange direct replacement service available during warranty period. Certain restrictions and exclusions apply. For details, contact HP Customer Support. |
| **HP Flat Panel Monitor LP2065** | **Panel** | **Type** | 20-inch Active Matrix TFT (thin film transistor) |
| | | **Viewable Image Area** (diagonal) | 20.1 inches; 51 cm |
| | | **Screen Opening** (W x H) | 16.2 x 12.17 inches; 41.1 x 30.9 cm |
| | | **Viewing Angle** (typical)* | Up to 178° horizontal/178° vertical (10:1 minimum contrast ratio) |
| | | **Brightness** (typical* | Up to 300 nits (cd/m2) |
| | | **Contrast Ratio** (typical)* | Up to 800:1 |
| | | **Response Rate** (typical)* | 8 ms (gray to gray), 16 ms (rise + fall) |
| | | **Pixel Pitch** | 0.255 mm |
| | | **Color Depth Support** | 16.7 million colors |
| | | **Backlight Lamp Life** (to half brightness) | 45K hours |
| | **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, Dutch, and Japanese |
| | | **User Controls** | 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 |
| | **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) |

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| | **Vertical Frequency** | | 48 to 85 Hz (VGA input); 30 to 92 KHz (DVI input for modes with pixel clock less than 157 MHz) |
| | **Native Resolution** | | 1600 x 1200 @ 60 Hz (recommended) |
| | **Preset VESA Graphic Modes** (non-interlaced) | | 1600 x 1200 @ 60 Hz, 75 Hz (VGA input)<br>1280 x 1024 @ 60 Hz, 75 Hz, 85 Hz<br>1280 x 960 @ 60 Hz<br>1152 x 900 @ 66 Hz<br>1024 x 768 @ 60 Hz, 75 Hz, 85 Hz<br>800 x 600 @ 60 Hz, 85 Hz<br>640 x 480 @ 60 Hz, 75 Hz, 85 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, 10 |
| | **Anti-Glare** | | Yes |
| | **Anti-Static** | | Yes |
| | **Default Color Temperature** | | 6500 K |
| **Video Input** | **Plug and Play** | | Yes |
| | **Input Signal** | | 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 |
| | **Self Powered USB 2.0 Hub** | | One upstream, four downstream ports (cable included) |
| | **Input Signal** | | Two DVI-I connectors (dual VGA analog or dual digital input possible) |
| | **Input Impedance** | | 75 ohms ± 10% |
| | **Sync Input** | | Separate sync (HSYNC/VSYNC); composite sync, Sync on Green |
| | **Video Cable** | | Two VGA to DVI-I; two DVI-D to DVI-I |
| | **Video Cable Length** | | 5.9 feet; 1.8 m |
| **Power** | **Input Power** | | Auto-Ranging, 90 to 132 VAC and 195 to 265 VAC; internal power supply, 50 Hz/60 Hz |
| | **Frequency** | | 47.5 to 63 Hz |
| | **Typical Power Consumption** | | 55 watts (without USB ports); 70 watts (USB ports fully loaded) |
| | **Maximum** | | < 75 W |
| | **Power Saving** | | < 2 watts |
| | **Power Cable Length** | | 5.9 feet; 1.8 m |
| **Mechanical** | **Dimensions** (H x W x D) | **Unpacked with stand** | 16.7 to 21.8 x 17.4 x 8.67 in<br>42.5 to 55.5 x 44.3 x 22.0 cm |
| | | **Unpacked w/o stand** (head only) | 13.58 x 17.4 x 3.42 in<br>34.5 x 44.3 x 8.7 cm |

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| | | **Packaged** | 11.77 x 22.2 x 16.77 in<br>29.9 x 56.4 x 42.6 cm |
| | **Weight** | **Unpacked** | With stand: 20.28 lb (9.2 kg);<br>Without stand: 12.35 lb (5.6 kg) |
| | | **Packaged** | 26.3 lb (11.95 kg) |
| | **Tilt Range** | -5° to + 25° vertical tilt | |
| | **Swivel Range** | -45° to + 45° | |
| | **Height Adjustable** | Yes, range 5.1 inches; 13.0 cm | |
| | **Pivot Rotation** | Yes | |
| | **Base** | Detachable, ships attached | |
| **Environmental** | **Temperature – Operating** | 46° to 95° F (10° to 35° C) | |
| | **Temperature – Non-operating** | 6° to 140° F (-10° to 60° C) | |
| | **Humidity – Operating** | 20% to 80% non-condensing | |
| | **Humidity – Non-operating** | 5% to 85% | |
| | **Altitude – Operating** | +12,000 feet; +3,657.6 m | |
| | **Altitude – Non-operating** | +40,000 feet; +12,192 m | |
| **Options** | **HP Silver Flat Panel Speaker Bar - Part number: EE418AA** | 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. | |
| **Other** | **Accessories Included** | VGA to DVI-I cable **–** connects the graphic card's VGA connector to the monitor's input #1 or 2 (DVI-I analog) connector.<br>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. | |
| | **User Guide Languages** | English, B. Portuguese, French, LA Spanish, Korean, S. Chinese, T. Chinese, Bahasa, Japanese, Danish, Finnish, German, Norwegian, Spanish, Swedish, Greek, Polish, Russian, Slovenian, Turkish | |
| | **Software** | HP Display Assistant Utility makes it possible to adjust displays settings through the PC using two-way communication via DDCI.<br>HP Display Lite Saver allows ability to power up and down display at predetermined hours of the day to safe power and backlight life.<br>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 | |

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| | | | 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. |
| | | **User Guide Languages** | English |
| | | **Warranty Languages** | English |
| | | **Color** | Carbonite/Silver |
| | | **VESA External Mounting** | Yes (Standard 4 hole pattern, 100 mm) |
| | | **Kensington Lock-Ready** | Yes |
| | **Certification and Compliance** | | Canadian Requirements/CSA, CE Marking, CISPR Requirements, , Energy Star Compliant, 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 98, Microsoft Windows 2000, and Microsoft Windows XP) |
| | **Compatibility** | | Compatible with platforms using the VESA standard video modes. Recommended for use with HP products. |
| | **Service and Warranty** | | 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. |

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| **HP Flat Panel Monitor LP2465** | **Panel** | **Type** | 24-inch Active Matrix TFT (thin film transistor) |
| | | **Viewable Image Area** (diagonal) | 24 inches; 60.96 cm |
| | | **Screen Opening** (W x H) | 20.47 x 12.83 inches; 52.0 x 32.6 cm |
| | | **Viewing Angle** (typical)* | 178° H/ 178° V (10:1 minimum contrast ratio) |
| | | **Brightness** (typical)* | 500 nits (cd/$m^2$) |
| | | **Contrast Ratio** (typical)* | 1000:1 |
| | | **Response Rate** (typical)* | 8 ms (typical gray to gray) |
| | | **Pixel Pitch** | 0.270 mm |
| | | **Color Depth Support** | 16.7 million colors |
| | | **Backlight Lamp Life** (to half brightness) | 50K hours |
| | | *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 |

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| | **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<br>1600 x 1200 @ 60 Hz, 75 Hz<br>1280 x 1024 @ 60 Hz, 75 Hz, 85 Hz<br>1280 x 960 @ 60 Hz<br>1152 x 900 @ 66 Hz<br>1024 x 768 @ 60 Hz, 75 Hz, 85 Hz<br>800 x 600 @ 60 Hz, 75 Hz<br>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 | |
| **Video/Other Inputs** | **Plug and Play** | Yes | |
| | **Self Powered USB 2.0 Hub** | One upstream, four downstream ports (located on side of monitor, cable included) | |
| | **Input Signal** | Two DVI-I (VGA analog and digital) inputs | |
| | **Input Impedance** | 75 ohms ± 10% | |
| | **Sync Input** | Separate sync (HSYNC/VSYNC); composite sync, Sync on Green | |
| | **Video Cable** | VGA to DVI-I; DVI-D to DVI-D | |
| | **Video Cable Length** | 5.9 feet; 1.8 m | |
| **Power** | **Input Power** | Auto-Ranging, 90 to 132 VAC and 195 to 265 VAC; internal power supply, 50 Hz/60 Hz | |
| | **Frequency** | 47.5 to 63 Hz | |
| | **Typical Power Consumption** | 75 watts | |
| | **Maximum** | < 110 watts | |
| | **Power Saving** | < 2 watts | |
| | **Power Cable Length** | 6.2 feet; 1.9 m | |
| **Mechanical** | **Dimensions** (H x W x D) | **Unpacked w/ stand** | 14.6 (min) to 19.7 (max) x 22 x 9.1 in |

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|---|---|---|---|
| | | | 37.1 (min) to 50.1 (max) x 55.4 x 23.2 cm |
| | | **Unpacked w/o stand** (head only) | 14.4 x 22 x 3.7 in<br>36.6 x 55.84 x 9.2 cm |
| | | **Packaged** | 11.7 x 22.1 x 25.6 in<br>29.8 x 56.0 x 65.1 cm |
| | **Weight** | **Unpacked** | 23.6 lbs (10.7 kg ) |
| | | **Packaged** | 23.6 lbs (10.7 kg ) |
| | **Tilt Range** | -5° to + 25° vertical | |
| | **Swivel Range** | -45° to + 45° | |
| | **Height Adjustable** | Yes, range 5.1 inches; 130 mm | |
| | **Pivot Rotation** | Yes | |
| | **Base** | Detachable, ships detached | |
| **Environmental** | **Temperature – Operating** | 46° to 95° F (10° to 35° C) | |
| | **Temperature – Non-operating** | 6° to 140° F (-10° to 60° C) | |
| | **Humidity – Operating** | 20% to 80% non-condensing | |
| | **Humidity – Non-operating** | 5% to 85% | |
| | **Altitude – Operating** | +12,000 feet; +3,657.6 m | |
| | **Altitude – Non-operating** | +40,000 feet; +12,192 m | |
| **Other** | **Accessories Included** | VGA to DVI-I cable **–** connects the graphic card's VGA connector to the monitor's input #2 (DVI-I analog) connector<br>DVI-D to DVI-D cable **–** connects the graphic card's DVI-D digital connector to the monitor's input #2 (DVI-I digital) connector | |
| | **Software** | 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.<br>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.<br>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. | |

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| | **User Guide Languages** | English, B. Portuguese, French, LA Spanish, Korean, S. Chinese, T. Chinese, Bahasa, Japanese, Danish, Finnish, German, Norwegian, Spanish, Swedish, Greek, Polish, Russian, Slovenian, Turkish |
| | **Warranty Languages** | English, Canadian French, LA Spanish, Brazilian Portuguese, Danish, German, Castilian Spanish, French, Italian, Dutch, Norwegian, Finnish, Swedish, Bahasa Indonesian, Korean, T. Chinese, S. Chinese |
| | **Color** | Carbonite/silver |
| | **VESA External Mounting** | Yes (Standard 4 hole pattern, 100 mm) |
| | **Kensington Lock-Ready** | Yes |
| **Options** | **HP Silver Flat Panel Speaker Bar - Part number: EE418AA** | 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. |
| **Certification and Compliance** | 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 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 (Microsoft Windows 98, Microsoft Windows 2000, and Microsoft Windows XP) | |
| **Compatibility** | Compatible with platforms using the VESA standard video modes. Recommended for use with HP products. | |
| **Service and Warranty** | 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. | |

*Technical Specifications - Monitors*

| | | | |
|---|---|---|---|
| **HP LP3065 Flat Panel Monitor** | **Panel** | **Type** | 30.0-inch Wide Format Active Matrix TFT (thin film transistor) |
| | | **Viewable Image Area** (diagonal) | 29.77 in (75.623 cm) |
| | | **Screen Opening** (W x H) | 25.3 x 15.8 in (64.3 x 40.3 cm) |
| | | **Viewing Angle** (typical)* | Up to 178° H/ 178° V (10:1 minimum contrast ratio) |
| | | **Brightness** (typical)* | 300 nits (cd/m2) |
| | | **Contrast Ratio** (typical)* | 1000:1 |
| | | **Response Rate** (typical)* | 12 ms (8 ms average gray to gray) |
| | | **Pixel Pitch** | 0.250 mm |
| | | **Color Depth Support** | 16.7 million colors |
| | | **Backlight Lamp Life** (to half brightness) | 40K hours |
| | | **Color Gamut** | 92% of NTSC |
| | **On Screen Display** (OSD) **Controls** | **Buttons or Switches** | Input select, brightness up, brightness down, power |
| | | **User Controls** | Brightness, input selection |
| | **Signal Interface/ Performance** | **Horizontal Frequency** | 100 KHz |
| | | **Vertical Frequency** | 60 Hz |
| | | **Native Resolution** | 2560 x 1600 @ 60 Hz (native aspect ratio of 16:10) |
| | | **Pixel Clock Speed** | 275 MHz |
| | | **Anti-Glare** | Yes |
| | | **Anti-Static** | Yes |
| | | **Default Color Temperature** | 6500 K |
| | **Video/Other Inputs** | **Plug and Play** | Yes |
| | | **Self Powered USB 2.0 Hub** | One upstream, four downstream ports (located on side of monitor, cable included) |
| | | **Input Signal** | 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.) |
| | | **Video Cable** | Two dual-link DVI cables |
| | | **Video Cable Length** | 5.9 ft (1.8 m) |
| | **Power** | **Input Power** | Auto-Ranging, 100 to 240 VAC; internal power supply, 50 Hz/60 Hz |
| | | **Typical Power Consumption** | 118 watts |
| | | **Maximum** | < 176 watts |
| | | **Power Saving** | < 2 watts |
| | | **Power Cable Length** | 5.9 ft (1.8 m) |
| | **Mechanical** | **Dimensions** (H x W x D) | **Unpacked w/ stand** 19.3 to 23.2 x 27.2 x |

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| | | | 9.5in (49.0 to 59.0 x 69.2 x 24.0 cm) |
| | | **Unpacked w/o stand** (head only) | 17.9 x 27.2 x 3.3 in (45.5 x 69.2 x 8.4 cm) |
| | | **Packaged** | 22.4 x 31.1 x 14.9 in (56.8 x 79.0 x 37.8 cm) |
| | **Weight** | **Unpacked** | 30.6 lbs (13.9 kg) |
| | **Tilt Range** | -5° to + 30° vertical | |
| | **Swivel Range** | -45° to + 45° | |
| | **Height Adjustable** | Yes, range 5.1 in (100 mm) | |
| | **Pivot Rotation** | No | |
| | **Base** | Detachable, ships detached | |
| **Environmental** | **Temperature – Operating** | 46° to 95° F (10° to 35° C) | |
| | **Temperature – Non-operating** | 6° to 140° F (-10° to 60° C) | |
| | **Humidity – Operating** | 20% to 80% non-condensing | |
| | **Humidity – Non-operating** | 5% to 85% | |
| | **Altitude – Operating** | +12,000 ft | |
| | **Altitude – Non-operating** | +40,000 ft | |

**Environmental Data**

**Eco-Label Certifications and Declarations**

This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks:

- US Energy Star
- US Federal Energy Management Program (FEMP)
- IT Eco Declaration
- TCO 03
- Taiwan Green Mark
- CECP
- Korea Eco-label
- EPEAT - Silver

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| **Energy Consumption** (in accordance with US Energy Star test method) | 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 |
| **Normal Operation** | 102.8 watts | 101.7 watts | 100.4watts |
| **Sleep**[1] | 2 watts | 2 watts | 2 watts |
| **Off** | 0.05 watts | 0.06 watts | 0.25 watts |
| **Heat Dissipation**[2] | 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 |
| **Normal Operation** | 350.8 BTU/hr | 347.0 BTU/hr | 342.6 BTU/hr |
| **Sleep** | 6.8 BTU/hr | 6.8 BTU/hr | 6.8 BTU/hr |
| **Off** | 0.2 BTU/hr | 0.2 BTU/hr | 0.9 BTU/hr |

**NOTES**
[1]This sleep status ignore the input sync signal check cycle when metering the model in sleep mode.
[2]Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.

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|---|---|
| **Longevity and Upgrading** | Upgradeability features contained in the product include:<br>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.<br><br>This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive, 2002/96/EC.<br><br>This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).<br><br>This product is in compliance with the IEEE 1680 (EPEAT) standard at the SILVER level, see www.epeat.net.<br><br>Plastics parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.<br><br>Display meets the requirement for low frequency electromagnetic fields per MPR-II, TCO, and prEN50279 A/B/C.<br><br>This product contains 0% recycled materials (by wt.)<br><br>This product is 97.6% recycleable when properly disposed of at end of life.<br><br>Packaging Materials<br><br>• Corrugated Paper 2.19 kg<br>• PE-LD Bags 0.09 kg<br>• 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):

- 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 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

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|---|---|---|
| | | recycled, recovered or disposed of in a responsible manner. |
| | **Hewlett-Packard Corporate Environmental Information** | For more information about HP's commitment to the environment:<br>Global Citizenship Report<br>http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html<br>Eco-label certifications<br>http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html<br>ISO 14001 certificates:<br>http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html |
| **Other** | **Accessories Included** | 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 |
| | **Software** | 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. |
| | **User Guide Languages** | English, B. Portuguese, French, LA Spanish, Korean, S. Chinese, T. Chinese, Bahasa, Japanese, Danish, Finnish, German, Norwegian, Spanish, Swedish, Greek, Polish, Russian, Slovenian, Turkish |
| | **Warranty Languages** | English, Canadian French, LA Spanish, Brazilian Portuguese, Danish, German, Castilian Spanish, French, Italian, Dutch, Norwegian, Finnish, Swedish, Bahasa Indonesian, Korean, T. Chinese, S. Chinese |
| | **Color** | Carbonite |
| | **VESA External Mounting** | Yes (Standard 4 hole pattern, 100 mm) |
| | **Kensington Lock-Ready** | Yes |
| **Options** | **HP Flat Panel Speaker Bar - Part number: EE418AA** | 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. |
| **Certification and Compliance** | 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 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. | |

*Technical Specifications - Monitors*

| | |
|---|---|
| **Compatibility** | Compatible with platforms using the VESA standard video modes. Recommended for use with HP products. |
| **Service and Warranty** | 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. |



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.