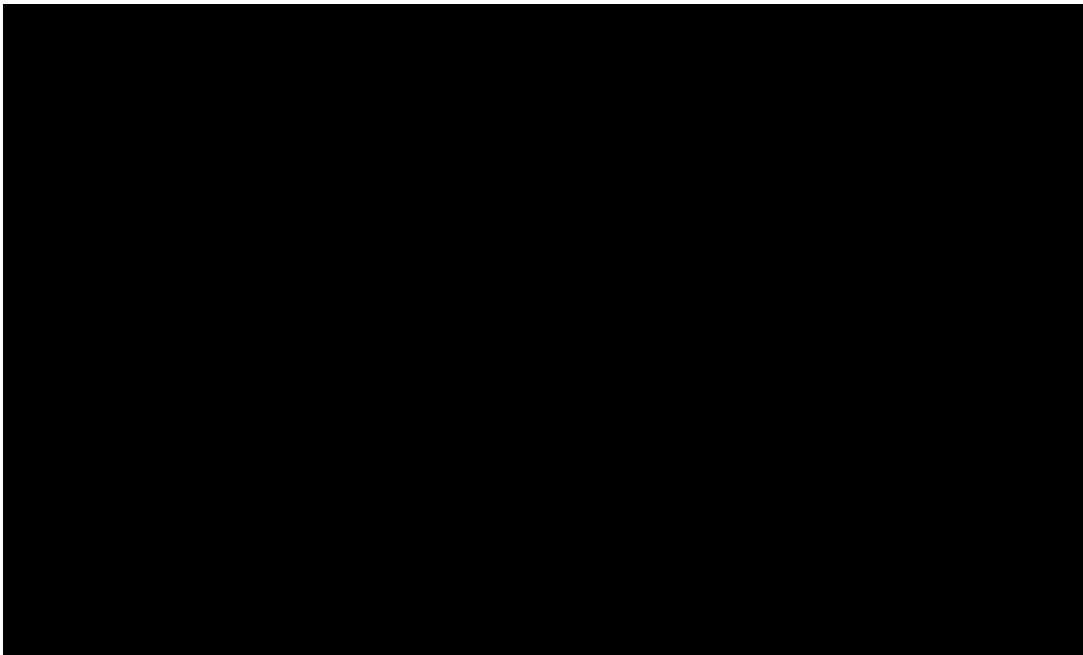


Overview

HP recommends Windows Vista[®] Business

1/2



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

1/2 1/2

Overview

At A Glance

- Choice of Operating Systems:
 - Microsoft Vista Business 32 or 64
 - Microsoft Windows Vista Business 32-bit downgrade to Microsoft Windows XP Professional
 - Microsoft Windows Vista Business 64-bit downgrade to Microsoft Windows XP Professional x64
 - Preloaded: Red Hat Enterprise Linux WS 4 (64-bit version)
 - HP Linux Installer Kit (see <http://www.hp.com/workstations/software/linux>)
 - Red Flag Linux v5 *
 - For detailed OS/hardware support information for Linux, see: http://www.hp.com/support/linux_hardware_matrix
- Intel Core i7 Extreme processor with Intel 64 Architecture
 - Quad-Core
 - 1333 MHz Front Side Bus
 - 8 MB L2 cache (2x4 MB shared)
 - Virtualization Technology on most processors
- Intel Core i7 Quad-Core processor with Intel 64 Architecture
 - Quad-Core
 - 1066 MHz Front Side Bus
 - 8 MB L2 cache (2x4 MB shared)
 - Virtualization Technology available with most processor options.
- Intel Core i7 Duo processor with Intel 64 Architecture
 - Dual-Core
 - 800 or 1333 MHz Front Side Bus
 - 2 or 4 MB shared L2 cache
 - Virtualization Technology
- Intel Pentium D Dual-Core Processor with Intel 64 Architecture
 - Dual-core
 - 800 MHz Front Side Bus
 - 1 MB dedicated L2 cache
- Intel X38 Express chipset
- Integrated HP Gbit LAN by Broadcom
- 1333, 1066 or 800 MHz processor front side bus support
- Convertible and tool-less minitower chassis
- 4 PCI Express / 3 PCI slots
- Dual channel ECC DDR2 memory at 667 or 800 MHz
- Six channel SATA Controller with RAID** (Factory integrated RAID is Microsoft Windows only)
- Realtek integrated high definition audio with internal speaker
- Pre-loaded Manageability tools (Microsoft Windows only)
- ENERGY STAR 4.0 Compliance with energy-saving features available on selected configurations (Not supported by Linux)
- Protected by HP Services, including a 3 years parts, 3 years labor, and 3 years onsite service (3/3/3) standard warranty. Terms and conditions vary by country. Certain restrictions and exclusions apply.

* Red Flag Linux available in China only

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

Standard Features - Specs

Processor and Speed ^{1/2}

One of the following

All processors feature Intel[®] 64 Architecture

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

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

Intel processor numbers are not a measurement of higher performance. Processor numbers differentiate features within each processor family, not across different processor families. See http://www.intel.com/products/processor_number/ 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.

Operating System ^{1/2}

One of the following

Microsoft Vista[®] Business 32 or 64

Microsoft Windows Vista 32-bit downgrade to Microsoft Windows XP Professional

Microsoft Windows Vista 64-bit downgrade to Microsoft Windows XP Professional x64 Edition

Preloaded:

Red Hat Enterprise Linux WS 4 (64-bit version)

Or

Red Flag v5 (PRC only)

HP Linux Installer Kit (see <http://www.hp.com/workstations/software/linux>)

Red Hat Enterprise Linux WS 4 & 5 Desktop (4.5/5.0 or later - 32- or 64-bit version)

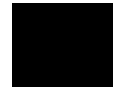
For detailed OS/hardware support information for Linux, see:

http://www.hp.com/support/linux_hardware_matrix

Standard Features - Specs

| 1-3 Hard Disk Drives ^{1/2} | ^{1/2} | Windows Vista ¹ | Windows XP | Red Hat Linux |
|--|---|----------------------------|----------------|------------------|
| Up to 3 of the following SATA drives, or 3 of the following SAS drives | SATA Hard Drives | | | |
| | 80 GB 7200 rpm SATA 3.0 Gb/s NCQ | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 4 & 5 Desktop |
| | 160 GB 7200 rpm SATA 3.0 Gb/s NCQ | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 4 & 5 Desktop |
| | 250 GB 7200 rpm SATA 3.0Gb/s NCQ | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 4 & 5 Desktop |
| | 500 GB 7200 rpm SATA 3.0Gb/s NCQ | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 4 & 5 Desktop |
| | 1 TB 7200 rpm SATA 3.0 Gb/s NCQ | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 4 & 5 Desktop |
| | 80 GB 10K rpm SATA NCQ | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 4 & 5 Desktop |
| | 160 GB 10K rpm SATA NCQ | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 4 & 5 Desktop |
| | Serial Attached SCSI (SAS) Hard Drives (SAS controller required) | | | |
| | 73 GB 15K rpm SAS 3.0 Gb/s | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 4 & 5 Desktop |
| | 146 GB 15K rpm SAS 3.0 Gb/s | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 4 & 5 Desktop |
| | 300 GB 15K rpm SAS 3.0 Gb/s | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 4 & 5 Desktop |
| | | | | |

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



Standard Features - Specs

| Factory Integrated RAID ^{1/2} (on motherboard for SATA drives) | | Windows Vista ¹ | Windows XP | Red Hat Linux |
|---|--|----------------------------|----------------|---------------|
| | RAID 0 Configuration - Striped Array (SATA or SAS) | 32-Bit, 64-Bit | 32-Bit, 64-Bit | Not supported |
| All drives must be identical in type and capacity | RAID 0 Data Configuration - | 32-Bit, 64-Bit | 32-Bit, 64-Bit | Not supported |
| | RAID 1 Configuration - Mirrored Array (SATA or SAS, 2 drive max.) | 32-Bit, 64-Bit | 32-Bit, 64-Bit | Not supported |
| All RAID arrays must be less than 2 TB | RAID 5 Configuration - Parity Array (available CQ1 2008): If SAS, 8 port controller required. | 32-Bit, 64-Bit | 32-Bit, 64-Bit | Not supported |
| | RAID 10 Configuration - Striped/Mirrored Array (available CQ1 2008): 4 HD drives required | 32-Bit, 64-Bit | 32-Bit, 64-Bit | Not supported |
| NOTE: Requires identical hard drives (speeds, capacity, interface). (HW RAID functionality not supported by Linux) | | | | |





| Drive controllers | ^{1/2} | Windows Vista ¹ | Windows XP | Red Hat Linux |
|---|--|----------------------------|----------------|------------------|
| | Integrated 6-channel SATA 3.0 Gb/s controller with RAID* 0, 1, 5, 10 and NCQ | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 4 & 5 Desktop |
| | Optional 4-port SAS LSI 3041E 3.0 Gb/s RAID* Card** | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 4 & 5 Desktop |
| NOTE: | | | | |
| * Hardware RAID is not supported on Linux systems. The Linux kernel, with built-in software RAID, provides excellent functionality and performance. It is a good alternative to hardware-based RAID. Please visit http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00060684/c00060684.pdf for RAID capabilities with Linux. | | | | |
| ** Not supported when HD drive 1 is SATA | | | | |

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

Standard Features - Specs








| | | | |
|---|----------------|----------------|------------------|
| HP 4 GB (4 x 1 GB) PC2-6400E DDR2-800 ECC | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 4 & 5 Desktop |
| HP 8 GB (4 x 2 GB) PC2-6400E DDR2-800 ECC | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 4 & 5 Desktop |

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




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

* Not supported as a 2nd drive option.

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

| Input Devices | | Windows Vista ¹ | Windows XP | Red Hat Enterprise Linux |
|---------------|--|---|---|---|
| |  Keyboard  One of the following |  |  |  |
| | PS/2 Standard Keyboard | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 4 & 5 Desktop |
| | USB Standard Keyboard | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 4 & 5 Desktop |
| |  Mouse  One of the following | | | |
| | PS/2 2-Button Scroll Mouse (optical) | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 4 & 5 Desktop |
| | USB 2-Button Scroll Mouse (optical) | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 4 & 5 Desktop |
| | USB 3-Button Mouse (optical) | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 4 & 5 Desktop |

Standard Features - Specs

| | | | | |
|------------------------------------|---|----------------------------------|-------------------|--|
| Audio |  | Windows Vista¹ | Windows XP | Red Hat Linux |
| | Integrated High Definition audio with internal speaker | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 4 & 5 Desktop |
| | Sound Blaster X-Fi XtremeMusic Audio Card | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 4 & 5 Desktop (configure-to-order expected availability in March 2008) |
| NIC (Network Interface Controller) |  | Windows Vista¹ | Windows XP | Red Hat Enterprise Linux |
| | Integrated PCIe Broadcom 5755 Netxtreme Gigabit Ethernet NIC | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 4 & 5 Desktop |
| PCI Express Graphics |  | Windows Vista¹ | Windows XP | Red Hat Linux |
| | Professional 2D | | | |
| | NVIDIA Quadro NVS 290 PCIe (256 MB) - 1 or 2 of these cards are supported - 2nd card must be NVS 290 or NVS 440 | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 4 & 5 Desktop |
| | NVIDIA Quadro NVS 440 PCIe (256 MB) - 1 or 2 of these cards are supported - 2nd card must be NVS 290 or NVS 440 | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 4 & 5 Desktop |
| | Entry 3D | | | |
| | NVIDIA Quadro FX 370 PCIe (256 MB) - 1 or 2 of these cards are supported - 2nd card must match first | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 4 & 5 Desktop |
| | NVIDIA Quadro FX 570 PCIe (256 MB) - 1 or 2 of these cards are supported - 2nd card must match first | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 4 & 5 Desktop |
| | Mid-range 3D | | | |
| | NVIDIA Quadro FX 1700 PCIe (512 MB) - 1 or 2 of these cards are supported - 2nd card must match first | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 4 & 5 Desktop |
| | ATI FireGL V5600 PCIe (512 MB) - 1 or 2 of these cards are supported - 2nd card must match first | 32-Bit, 64-Bit | 32-Bit, 64-Bit | Not supported |
| | High-end 3D | | | |
| | NVIDIA Quadro FX 3500 PCIe (256 MB) - 1 or 2 of these cards are supported - 2nd card must match first | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 4 & 5 Desktop |
| | NVIDIA Quadro FX 4600 PCIe (768 MB)** - 1 or 2 of these cards are supported - 2nd card must match first | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 4 & 5 Desktop |

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

Standard Features - Specs

| Miscellaneous | 1/2 | Windows Vista ¹ | Windows XP | Red Hat Linux |
|--|-----|----------------------------|----------------|------------------|
| Solenoid lock and hood sensor | | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 4 & 5 Desktop |
| Configure minitower in desktop orientation | | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 4 & 5 Desktop |
| HP IEEE 1394a 3-Port PCI Card | | 32-Bit, 64-Bit | 32-Bit, 64-Bit | Not Supported |

| Software | 1/2 | Windows Vista ¹ | Windows XP | Red Hat Linux |
|---|-----|----------------------------|----------------|------------------|
| OS options | | 1/2 | 1/2 | 1/2 |
| Microsoft Windows Vista Business 64 | | 64-Bit | N/A | N/A |
| OR Microsoft Windows Vista Business 32 | | 32-Bit | N/A | N/A |
| OR Microsoft Windows Vista Business 64 downgrade to Microsoft Windows XP Professional x64 Edition | | 64-Bit | 64-Bit | N/A |
| OR Microsoft Windows XP Professional SP2 | | N/A | 32-bit | |
| OR Microsoft Windows XP Professional x64 Edition | | N/A | N/A | N/A |
| OR Red Flag Linux v5 (China Only) | | N/A | N/A | |
| OR Red Hat Linux WS 4 & 5 Desktop (32 & 64-bit) | | N/A | N/A | WS 4 & 5 Desktop |
| Standard | | | | |
| Alert Standard Format specification | | N/A | N/A | N/A |
| Standard | 1/2 | 1/2 | 1/2 | 1/2 |
| Alert Standard Format specification | | 32-Bit, 64-Bit | 32-Bit, 64-Bit | N/A |
| HP Performance Tuning Framework | | 32-Bit, 64-Bit | 32-Bit, 64-Bit | N/A |
| HP Backup and Recovery | | 32-Bit, 64-Bit | 32-Bit, 64-Bit | N/A |
| PDF Complete | | 32-Bit, 64-Bit | 32-Bit, 64-Bit | N/A |
| Optional | | | | |
| PDF Complete | | 32-Bit | 32-Bit, 64-Bit | N/A |
| Optional | 1/2 | 1/2 | 1/2 | 1/2 |
| Microsoft Office 2007 Small Business Edition | | 32-Bit | 32-Bit, 64-Bit | N/A |
| HP ProtectTools Security | | 32-Bit | 32-Bit, 64-Bit | N/A |
| Symantec AntiVirus for Vista | | 32-Bit, 64-Bit | N/A | N/A |
| Symantec AntiVirus for XP | | N/A | 32-Bit, 64-Bit | N/A |

Standard Features - Specs


| | | |
|--|--|------------------------------|
| Form Factor | Minitower | |
| Color | Carbonite/Alloy metallic | |
| Convertibility | Yes. 5.25" drives rotate for Minitower or Desktop orientation. | |
| Expansion Slots (see system board section for more details) | <ul style="list-style-type: none"> • 3 PCI slots (full-height, full-length) • 1 PCI Express x8 slot (x4 functionality) • 1 PCI Express x1 slot (half length) • 2 PCI Express x16 Gen2 slots (one dedicated for graphics) | |
| Expansion Bays (see storage section for more details) | <ul style="list-style-type: none"> • 2 internal 3.5" bays • 1 external 3.5" bay, 3 external 5.25" bays* <p>NOTE: Third external 5.25" bay is not full depth in side orientation.</p> | |
| Front I/O | 2 USB 2.0, 1 IEEE 1394 (requires optional PCI card to function), 1 audio out, and 1 microphone. <p>NOTE: Although HP Personal Workstations can be ordered with the HP Installer Kit for Linux and an IEEE 1394 card, HP cannot provide customer support for this configuration. Please refer to the Linux Hardware Support Matrix (http://www.hp.com/support/linux_hardware_matrix) for details, and to the Linux User Manual (http://www.hp.com/support/linux_user_manual) for tips on user-enablement of the IEEE 1394 Card.</p> | |
| Internal I/O | 1 USB 2.0 Type A Receptacle, 2 USB 2.0 headers | |
| Rear I/O | 7 USB 2.0, 1 serial, 1 optional serial port, parallel port, 2 PS/2, RJ-45 (NIC), 1 External SATA, 1 audio line in, 1 audio line out, 1 microphone in; audio ports can be retasked to function as line in, line out, microphone, or headphone. | |
| Interfaces Supported | 1 SATA 3 Gb/s interface (5 internal, 1 external SATA connectors) | |
| On-board RAID Support | SATA only | |
| Chassis Dimensions (W x D x H) | Standard minitower orientation: 6.6 x 17.9 x 17.7 inches; 16.8 x 45.6 x 45.0 cm Converted desktop orientation: 17.7 x 17.9 x 6.6 inches; 16.8 x 45.0 x 45.6 cm | |
| Weight | Exact weights depend upon configuration Minimum: 29.9 lbs (13.6 kg) Standard: 33.3 lbs (15.1 kg) Maximum: 43.3 lbs (19.6 kg) | |
| 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 (non-pressurized) | Operating | 10,000 feet; 3,000 m |
| | Non-operating | 30,000 feet; 9,100 m |
| Power Supply | 475 watts wide-ranging, active Power Factor Correction, 80 PLUS Efficient | |


After-Market Options

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




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



After-Market Options



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

| Controllers |  | Windows Vista ¹ | Windows XP | Red Hat Linux | Part Number |
|--|---|----------------------------|----------------|---------------------|-------------|
| SCSI Controllers | | | | | |
| LSI 3041E 4-Port SAS 3 Gb/s controller, supports RAID 0, 1 1E and 10E | | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 4 & 5 Desktop | EH417AA |
| NOTE: Hardware RAID is not supported on Linux systems. The Linux kernel, with built-in software RAID, provides excellent functionality and performance. It is a good alternative to hardware-based RAID. Please visit http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00060684/c00060684.pdf for RAID capabilities with Linux. | | | | | |

After-Market Options

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

| Networking |  | Windows Vista ¹ | Windows XP | Red Hat Linux | Part Number |
|---|---|----------------------------|----------------|------------------|-------------|
| NICs | | | | | |
|  | | | | | |
| Intel Pro 1000 PT Gigabit PCI Express Network Interface Card (NIC) | | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 4 & 5 Desktop | EH352AA |
| Broadcom NetXtreme Gigabit Ethernet PCIe NIC | | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 4 & 5 Desktop | EA833AA |

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

After-Market Options

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

| Multimedia | 1/2 | Windows Vista ¹ | Windows XP | Red Hat Linux | Part Number |
|------------|---|----------------------------|----------------|----------------|-------------|
| | Adaptec Fireconnect 2100 Firewire (1394a) PCI Card (Windows only) | 32-Bit, 64-Bit | 32-Bit, 64-Bit | Not supported | PA997A |
| | HP FireWire 800 IEEE 1394b PCI Card | Not supported | 32-Bit, 64-Bit | Not supported* | EA327AA |

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

| Audio | 1/2 | Windows Vista ¹ | Windows XP | Red Hat Linux | Part Number |
|-------|---|----------------------------|----------------|---|-------------|
| | SoundBlaster X-Fi XtremeGamer Audio Card (Windows only) | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 4 & 5 Desktop (AMO expected availability in December 2007) | GE257AA |
| | HP USB Powered Speakers | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 4 & 5 Desktop | RD628AA |

| Removable Storage Devices | 1/2 | Windows Vista ¹ | Windows XP | Red Hat Linux | Part Number |
|---------------------------|---|----------------------------|----------------|--------------------|-------------|
| | FDD Floppy drive | | | | |
| | 1.44 MB Diskette Drive (1 only) | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 4 & 5 Desktop | DY670A |
| | Optical drives | | | | |
| | SATA 16X DVD-ROM* | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 4 & 5 Desktop | EW268AA |
| | SATA 48X CD-RW/DVD-ROM Combo Drive | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 4 & 5 Desktop | EW267AA |
| | SATA 16X DVD +/-RW, Supermulti with Lightscribe** | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 4 & 5 Desktop** | EW269AA |
| | Other storage options | | | | |
| | HP 16-In-1 Media Card Reader with PCI Card | 32-Bit, 64-Bit | 32-Bit, 64-Bit | Not supported | EM718AA |

After-Market Options

* Cannot be 2nd drive.

** LightScribe creates a grayscale image similar to black and white photography. LightScribe media required and sold separately. Double-layer discs can store more data than single layer discs. However, double-layer discs burned with this drive may not be compatible with many existing single-layer DVD drives and players. LightScribe software works with Microsoft Windows XP and Vista only.)





| Security | 1/2 | Part Number |
|----------------------------------|-----|-------------|
| HP Solenoid Hood Lock/Sensor Kit | | DE618A |
| Kensington Security Cable & Lock | | PC766A |

| Racking Options | 1/2 | Part Number |
|--|-----|-------------|
| HP xw4000 Depth Adjustable Fixed Rail Rack Kit | | EK729AA |

| Other Devices | 1/2 | Part Number |
|--|-----|-------------|
| Agere 2006 PCI hi-speed modem (32- and 64-Bit) | | EK694AA |
| Modem RJ11 Adapter Kit | | DC131C |
| 2nd serial port adapter | | PA716A |
| Front Card Guide and Fan Guide Kit | | DY648A |
| HP Optical Bay HDD Mounting Bracket | | DY659A |
| HP Power Cord Kit | | DM293A |
| HP Internal USB Port Kit | | EM165AA |

| Software | 1/2 | Windows Vista ¹ | Windows XP | Red Hat Linux | Part Number |
|--|-----|----------------------------|------------|---------------|-------------|
| HP RGS PC 3-year Software Assurance | | TBD | TBD | TBD | GN039AA |
| HP RGS V5 PC Edition | | TBD | TBD | TBD | GN038AA |
| HP RGS V5 Receiver Site License | | TBD | TBD | TBD | GN034AA |
| HP RGS V5 Workstation Edition | | TBD | TBD | TBD | GN035AA |
| HP RGS Workstation 3-year Software Assurance | | TBD | TBD | TBD | GN036AA |

$$\mathbb{I}_{\mathbb{C}}^{1/2}$$
$$\begin{array}{c} \mathbb{I}_2 \\ \mathbb{I}_2^{1/2} \end{array}$$

|  | Quantity Supported | Position Supported | Controller |
|--|---|---|---|
| Convertible Minitower |  |  |  |
| Optional Diskette Drive | 1 | 4 | Diskette |
| Optical Disk Drives | 2 | 1, 2 | SATA |
| Hard Disk Drives | 2 standard (2 additional in Optical Bays via adapter) (4 SATA, 4 SAS) | 5, 6 (and 2 or 3, for 3rd or 4th drives using optical bays, adapter kit(s) required) | SATA (and/or optional SAS) Factory Integrated RAID* 0, 1, 5, 10 (Levels 5, 10 available in CQ1 2008) User configurable SATA RAID 0, 1, 5, 10 standard |

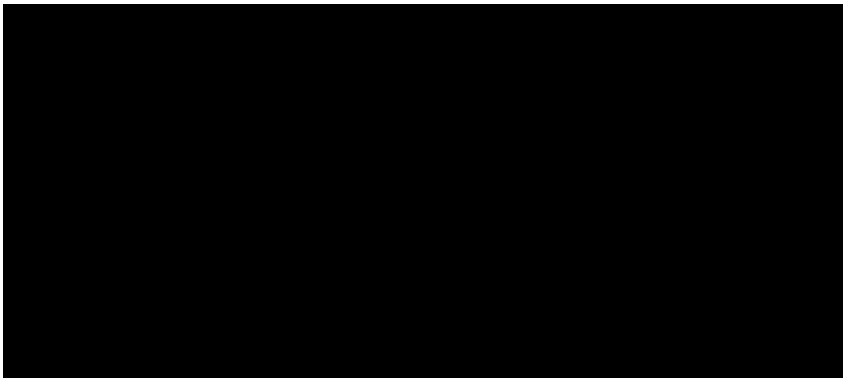
* **NOTE:** Hardware RAID is not supported on Linux systems. The Linux kernel, with built-in software RAID, provides excellent, functionality and performance. It is a good alternative to hardware-based RAID. Please visit <http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00060684/c00060684.pdf>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

Memory

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

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

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



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

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

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

Technical Specifications

| | |
|---|---|
| System Board | 1/2 |
| Processor Socket | Single LGA775 |
| CPU Bus Speed Supported | 800, 1066 and 1333 MHz FSB |
| Chipset | Intel X38 Express North Bridge/ICH9R South Bridge |
| Super I/O Controller | SMSC SCH5327 |
| System Board Form Factor | ATX 9.6 x 12 inches (243.84 x 304.8 mm) |
| Memory Expansion Slots | 4 DDR2 memory slots |
| Memory Type Supported | 1.8V DDR2 (ECC memory modules) |
| Memory Speed Supported | DDR2 SDRAM PC2-5300E (667 MHz) unbuffered ECC or DDR2 SDRAM PC2-6400E (800 MHz) unbuffered ECC |
| Maximum Memory | 8 GB (4 DIMM slots) NOTE: * Maximum memory capacities assume 64-bit operating systems, such as genuine Windows Vista Business 64, XP Professional x64 Edition, Red Hat Linux 64-bit. Genuine Windows Vista Business 32 and XP Professional (32-bit) support up to 4 GB. 32-bit Linux supports up to 8 GB. |
| Memory Protection | ECC available on data, parity on address and command |
| Memory Modes | Dual channel |
| PCI Express Connectors (Gen2 Rev 0.7 connectors) | 2 PCI Express x16 Gen2 Rev 0.7 (75W + 75W) 1 PCI Express x8' (x4 electrical) 1 PCI Express x1 |
| PCI Connectors (5.0V) | 2 full length, 1 half-length 33 MHz 32-Bit |
| Serial Attached SCSI) Supported | (Hardware RAID is not supported on Linux systems. The Linux kernel, with built-in software RAID, provides excellent functionality and performance. It is a good alternative to hardware-based RAID. Please visit http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00060684/c00060684.pdf for RAID capabilities with Linux.) |
| SATA Interface Supported | 1 SATA 3.0 Gb/s interface (5 SATA connectors); gen2 |
| Integrated SATA RAID | <ul style="list-style-type: none"> RAID 0, 1, 5*, or 10* on a single array, up to 4 hard drives depending on the RAID level supported (RAID 5 and 10 won't be available as a factory-configurable option until Q1 2008) Support for 1 or 2 RAID arrays on 4-ports for RAID 0 or 1 RAID 1 spare and auto-rebuild Matrix RAID support AHCI support for NCQ drives 3.0 Gb/s drive support 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. |
| External SATA (eSATA) | 1 dedicated rear eSATA, 1.5 Gbps |
| Network Controller | Integrated Broadcom 5755 Gigabit Ethernet LOM |
| USB 2.0 Connectors | Front: 2 Rear: 7 Internal: 3 (one Female Type A and one dual channel 2x5 pin header) |
| IDE connector | No |
| Floppy connector | Yes |

Technical Specifications

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

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

Technical Specifications

| | |
|---|-----|
| FEMP Standby Power Compliant @115V (<2W in S5 - Power Off) | Yes |
| Power Consumption in ES Mode - Suspend to RAM (S3) (Instantly Available PC) | <5W |

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

| BIOS Features | |
|--|---|
| PCI 3.0 Support | Full BIOS support for PCI Express through industry standard interfaces. |
| ASF 2.0 Compliant | Allows workstation status to be monitored on a remote console. |
| WMI Support | WMI is Microsoft's implementation of Web-Based Enterprise Management (WBEM) for Windows. WMI is fully compliant with the Distributed Management Task Force (DMTF) Common Information Model (CIM) and WBEM specifications. |
| BIOS Boot Spec 1.01 + | Provides more control over how and from what devices the workstation will boot. |
| BIOS Power on | Users can define a specific date and time for the system to power on. |
| Instantly Available PC (Suspend to RAM - ACPI sleep state S3) | Allows for very low power consumption with quick resume time |
| ROM Based Computer Setup Utility (F10) | Review and customize system configuration settings controlled by the BIOS. |
| Remote System Installation via F12 (PXE) (Remote Boot from Server) | Allows a new or existing system to boot over the network and download software, including the operating system |
| System/Emergency ROM Flash Recovery with Video | Recovers corrupted system BIOS |
| Serial, USB, Audio, Network, Enable/Disable Port Control | Enable or disables serial, USB, audio, and network ports |
| Removable Media Write Control/ Boot Control | User can prevent the workstation from writing to or booting from removable media |
| Power-On Password | Prevents an unauthorized person from booting up the computer |
| Setup Password | Prevents an unauthorized person from changing the system configuration |
| Replicated Setup | Saves BIOS settings to diskette or USB flash device in human readable file. Repset.exe utility can then replicate these settings on machines being deployed without entering Computer Setup Utility (F10) |
| Memory Change Alert (Requires HP Client Manager Software) | Alerts management console if memory is removed or changed |

Technical Specifications

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

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

Technical Specifications

| | |
|---------|--|
| SMBIOS | System Management BIOS Reference Specification, Version 2.5 |
| SPD | PC SDRAM Serial Presence Detect (SPD) Specification, Revision 1.2B |
| TPM | Trusted Computing Group TPM Specification Version 1.2 |
| UHCI | Universal Host Controller Interface Design Guide, Revision 1.1 |
| USB 1.1 | Universal Serial Bus Revision 1.1 Specification |
| USB 2.0 | Universal Serial Bus Revision 2.0 Specification |

Serviceability Features of System

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

Technical Specifications

| System Software Updating | |
|--|---|
| Product Change Notification | <ul style="list-style-type: none"> • Program to proactively communicate Product Change Notifications (PCNs) and Customer Advisories by email to customers, based on a user-defined profile. • PCNs provide advance notification of hardware and software changes to be implemented in the factory providing time to plan for transition. • Customer Advisories provide concise, effective problem resolution, greatly reducing the need to call technical support. |
| Remote ROM Flash | Provides secure, fail-safe ROM image management from a central network console |
| Remote Wakeup/ Remote Shutdown | <ul style="list-style-type: none"> • System administrators can power on, restart, and power off a client computer from a remote location. • Enables cost-effective power consumption when the administrator needs to distribute software, perform security management, or update the ROM. |
| ROM Based Setup (F10) and Start-up Diagnostics | Yes |
| Support Software CD & WWW | Yes |

Other deployment & management features

| | |
|--------------------------------|---|
| HP Client Management Solutions | Visit http://www.hp.com/go/easydeploy |
|--------------------------------|---|

Security Features

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

Other Features

| | |
|---------------------|---|
| ACPI-Ready Hardware | <p>Advanced Configuration and Power Management Interface (ACPI).</p> <ul style="list-style-type: none"> • Allows the system to wake from a low power mode. • 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 |
|---------------------|---|

Technical Specifications

| | |
|---------------------|---|
| Insight Diagnostics | <p>HP Insight Diagnostics Offline Edition</p> <p>The diagnostics utility enables you to perform testing and to view critical computer hardware and software configuration information from various sources. This utility enables you to:</p> <ul style="list-style-type: none"> • Run diagnostics • View the hardware configuration of the system <p>Key features and benefits</p> <p>HP Insight Diagnostics simplifies the process of effectively identifying, diagnosing, and isolating the hardware issues. In addition to robust management tools, service tools can be invaluable in quickly resolving system problems. To streamline the service process and resolve problems quickly, it is necessary to have the right information available at the time that a service call is placed. The primary information requirement, which is also the one that provides the greatest insight into potential system issues, is the configuration of the system. Insight Diagnostics helps provide higher system availability. Typical uses of the Insight Diagnostics are:</p> <ul style="list-style-type: none"> • Testing and diagnosing apparent hardware failures • Documenting system configurations for upgrade planning, standardization, inventory tracking, disaster recovery, and maintenance • Sending configuration information to another location for more in-depth analysis |
|---------------------|---|

| | |
|---------------------|--|
| Service and Support | <p>On-site Warranty and Service (Note 1): One and three-years, limited warranty and service offering delivers 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</p> <p>Note 1: Terms and conditions may vary by country. Certain restrictions and exclusions apply.</p> <p>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.</p> <p>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.</p> |
|---------------------|--|

| | |
|---|--|
| Eco-Label Certifications & Declarations | <p>This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks:</p> <ul style="list-style-type: none"> • US Energy Star (energy-saving features available on selected configurations -Windows only) • US Federal Energy Management Program (FEMP) • China Energy Conservation Program • IT ECO declaration • Japan PC Green label* <p>*NOTE: This product conforms to the examination standards (2003 version) under JEITA's 'PC Green Label System.'</p> |
|---|--|

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

Technical Specifications

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

Energy Consumption

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

Heat Dissipation**

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

| | | |
|-------------------------------------|----------------------|------------------------------------|
| Example Configuration #2 | Processor Info | 1xCORE 2 Extreme QX6850 (2.93GHz) |
| | Memory Info | 2x1GB 800MHz |
| | Graphics Info | FX1700 |
| | Disks/Optical/Floppy | 2x73 GB SAS / 2 Optical / 1 Floppy |

Energy Consumption

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

Technical Specifications

Heat Dissipation**

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

Example Configuration #3

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

Energy Consumption

| | 115 VAC | 230 VAC | 100 VAC |
|---|---------|---------|---------|
| On-Idle (ENERGY STAR ^{1/2} Idle (S0)) | 76.3W | 75.3W | 76.6W |
| ENERGY STAR ^{1/2} P _{TEC} (Total Energy Consumption) Windows running Linpack and Viewperf | 162.3W | 159.6W | 163.2W |
| ENERGY STAR ^{1/2} "Sleep" (S3) | 3.7W | 4.1W | 3.8W |
| ENERGY STAR ^{1/2} "Standby" (Off) (S5) | 1.5W | 1.8W | 1.5W |

Heat Dissipation**

| | 115 VAC | 230 VAC | 100 VAC |
|---|-------------|-------------|-------------|
| On-Idle (ENERGY STAR ^{1/2} Idle (S0)) | 260 btu/hr | 257 btu/hr | 261 btu/hr |
| ENERGY STAR ^{1/2} P _{TEC} (Total Energy Consumption) Windows running Linpack and Viewperf | 554 btu/hr | 545 btu/hr | 557 btu/hr |
| ENERGY STAR ^{1/2} "Sleep" (S3) | 12.6 btu/hr | 14.0 btu/hr | 13.0 btu/hr |
| ENERGY STAR ^{1/2} "Standby" (Off) (S5) | 5.12 btu/hr | 6.14 btu/hr | 5.12 btu/hr |

NOTES:

* Energy Star low energy mode

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

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

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:

Technical Specifications

| | | | |
|------------------------|--|--|--|
| | <ul style="list-style-type: none">● Intel LGA775 processor socket● 12 USB ports<ul style="list-style-type: none">○ 7 rear○ 3 internal - 1 Type A○ 2 front● 3 PCI slots● 4 PCI Express slots<ul style="list-style-type: none">○ 1 PCI Express 1¹/₂ slot○ 2 Gen2 PCI Express 1¹/₆ slots○ 1 PCI Express 3³/₄ slot● 5 storage bays● 4 memory slots | | |
| Batteries | <p>This product complies with ISO standards:</p> <ul style="list-style-type: none">● EU Directive 91/ 157/ EEC● EU Directive 93/ 86/ EEC● EU Directive 98/ 101/ EEC <p>Batteries used in the product do not contain:</p> <ul style="list-style-type: none">● Mercury greater the 5ppm by weight● Cadmium greater than 10ppm by weight● Lead greater than 4000ppm by weight. <p>Battery size: CR2032 (coin cell)</p> <p>Battery type: Lithium</p> | | |
| Additional Information | <ul style="list-style-type: none">● This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2002/95/EC.● This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive 1¹/₂ 2002/96/EC.● Plastics parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.● This product contains 0% recycled materials (by wt.)● This product is >90% recycle-able when properly disposed of at end of life. | | |
| | Packaging Materials | 1 ¹ / ₂ | 1 ¹ / ₂ |
| | 1 ¹ / ₂ External | Cardboard carton and insert | 2.70 kg |
| | 1 ¹ / ₂ Internal | LDPE Foam | 0.35 kg |
| Material Usage | <p>This product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html):</p> <ul style="list-style-type: none">● Asbestos● Certain Azo Colorants● Certain Brominated Flame Retardants 1¹/₂ 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 | | |

Technical Specifications

| | |
|--|---|
| | <ul style="list-style-type: none"> • Nickel - finishes must not be used on the external surface designed to be frequently handled or carried by the user. • Ozone Depleting Substances • Polybrominated Biphenyls (PBBs) • Polybrominated Diphenyl Ethers (PBDEs) • Polybrominated Biphenyl Oxides (PBBOs) • Polychlorinated Biphenyl (PCB) • Polychlorinated Terphenyls (PCT) • Polyvinyl Chloride (PVC) except for wires and cables, and certain retail packaging has been voluntarily removed from most applications. • Radioactive Substances • Tributyl Tinches; TBT), Triphenyl Tinches; TPT), Tributyl Tin Oxide (TBTO) |
| Packaging | <p>HP follows these guidelines to decrease the environmental impact of product packaging:</p> <ul style="list-style-type: none"> • 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 | <p>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.</p> |
| Hewlett-Packard Corporate Environmental Information | <p>For more information about HP's commitment to the environment: [link to new HP white paper now in progress] Global Citizenship Report http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html Eco-label certifications http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html ISO 14001 certificates: http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html</p> |

Technical Specifications - Audio

| | | |
|---|--------------------------------------|---|
| High Definition Integrated Type Realtek ALC262 Audio | High Definition Codec | Integrated |
| | SPDIF | Yes |
| | External audio jacks | No |
| | | One front stereo analog microphone-in |
| | | One front stereo headphone-out |
| | | One rear line-in |
| | | One rear line-out |
| | | One rear stereo analog microphone-in |
| | Internal audio connectors | AUX-IN line-level analog input |
| | Retasking | NOTE: *Rear audio port are re-taskable as Line-In, Line-Out, Microphone-In, or Headphone-Out with Optional driver, available only through download from HP support website and not supported by default. External Speakers need to be powered externally. |
| | Sampling | 44.1kHz/48 kHz/96kHz/192kHz (output only) |
| | Wavetable Syntheses (software) | Yes - Uses OS soft wavetable |
| | Internal audio speaker power rating | 1.5 W |
| Sound Blaster X-Fi XtremeMusic (PCI) | Internal Speaker | Yes |
| | Microphone features | Stereo Microphone supporting: Acoustic echo cancellation Noise suppression Beam forming |
| | 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) <ul style="list-style-type: none">• Stereo Output: 109dB• Front and Rear Channels: 109dB• Center, Subwoofer and Side Channels: 109dB |
| | Sound Conversion | 24-bit Analog-to-Digital conversion of analog inputs at 96kHz sample rate 24-bit Digital-to-Analog conversion of digital sources at 96kHz to analog 7.1 speaker output 24-bit Digital-to-Analog conversion of stereo digital sources at 192kHz to stereo output |
| | 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 24-bit/96kHz |
| | DACs | 24-bit/192kHz |
| | Voice Support | 128 voices |
| | Max. Channels in 3D Positional Audio | 7.1 |

Technical Specifications - Audio

| | | |
|-----------------------------|---|--|
| EAX ADVANCED HD 5.0 support | Yes including EAX1, MacroFX1, EAX2, PurePath, and Environment FlexiFX1/2 | |
| 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" x5" x .9" | |
| Additional product features | Movies | THX Certification Dolby Digital EX 6.1 Playback DTS-ES 6.1 Playback |
| | Music | X-Fi 24-bit Crystalizer CMSS-3D SuperRip |
| | Audio Creation | Pristine audio playback quality with a near transparent SRC engine Up to eight 24 bit hardware effects ASIO recording with latency as low as one millisecond 24-bit SoundFont sampling 3D MIDI |
| | Gaming | EAX ADVANCED HD 5.0 |
| | Software Bundle | Doom 3 Sound Blaster EAX patch Entertainment Mode Audio Creation Mode Game Mode Mode Switcher Audio Console Creative MediaSource Creative MediaSource DVD-Audio Player DTS Neo:6 Settings Karaoke Player Entertainment Center Smart Recorder SoundFont Bank Manager Speaker Connection Wizard THX Setup Console Vienna SoundFont Studio Volume Panel WaveStudio Console Launcher Creative Media Toolbox Creative Diagnostics |
| Minimum system | System RAM | 256MB |

Technical Specifications - Audio

| | | |
|--------------|------------------|--|
| requirements | Hard disk | 600MB free space Available PCI 2.1 slot for the audio card CD-ROM/CD-RW or CD/DVD-ROM required for software installation |
| | Operating System | Microsoft Windows XP Service Pack 2 (SP2) |

Technical Specifications - Communications

| | | |
|---|---------------------------------|---|
| Integrated PCI Express Broadcom BCM5755 NetXtreme Gigabit Ethernet Network Controller LoM | Connector | RJ-45 |
| | Controller | Broadcom 5755 PCI-E LAN Controller |
| | Memory | Integrated 48KB 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 | UL |
| | 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 (full-duplex) 2000 Mbps |
| | Operating system driver support | Microsoft Windows Vista Business 32 and 64, Microsoft Windows XP Professional, Microsoft Windows XP Professional x64 Edition, Red Hat Enterprise Linux WS 4 & 5 Desktop |
| | Management capabilities | WOL, PXE |
| | Alerting | ASF 2.0 |
| <hr/> | | |
| Intel Pro 1000 PT PCI Express Gigabit NIC (Part# EH352AA) | Connector | RJ-45 |
| | Controller | Intel 82572EI Gigabit Ethernet Controller |
| | Memory | Integrated Dual 48K configurable transmit receive FIFO Buffers |
| | Data rates supported | 10/100/1000 Mbps |
| | Compliance | IEEE 802.1P, 802.1Q, 802.2, 802.3, 802.3AB and 802.3u compliant, 802.3x flow control |
| | Bus architecture | PCIe 1.0a |
| | Data path width | X1, 250MB/s, Bi-directional interface |
| | Data transfer mode | Bus-master DMA |
| | Hardware certifications | FCC, B, CE, TUV- cTUVus Mark Canada and United States, TUV- GS Mark for European Union |
| | Power requirement | Aux 3.3V, 3.0 Watts in 1000base-T and 2.0 Watts in 100Base-T |
| | 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 | |

Technical Specifications - Communications

| | | |
|---------------------------------|-----------------------|---|
| Environmental | Operating temperature | 32° to 131°F (0° to 55°C) |
| | Operating humidity | 85% at 131°F (55°C) |
| Dimensions | | 6.4 x 2.6 x 0.8 inches; 16.3 x 6.6 x 1.9 cm) |
| Operating system driver support | | Microsoft Windows Vista Business 32 and 64, Microsoft Windows XP Professional, Red Hat Enterprise Linux WS 4 and 5 Desktop |
| Management capabilities | | ASF, WOL , PXE, DMI, WFM 2.0. |
| Kit contents | | Intel Pro 1000 PT PCI Express Gigabit NIC, CD containing Intel PROset II NIC drivers, quick install guide, product warranty statement |

| | | |
|---|-------------------------|--|
| Broadcom BCM5751 NetXtreme Gigabit Ethernet Controller (PCIe) (Part# EA833AA) | 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 | 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 | 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 |
| | | 10BASE-T (full-duplex) 20 Mbps |
| | | 100BASE-TX (half-duplex) 100 Mbps |
| | | 100BASE-TX (full-duplex) 200 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 Vista Business 32 and 64, Microsoft Windows XP, Red Hat Enterprise Linux 4 and 5 Desktop |
| Management capabilities | | WOL, PXE , Remote cable management |
| Alerting | | ASF 2.0 |
| Kit contents | | Broadcom 5751, CD, Broadcom NetXtreme Gigabit Ethernet PCI NIC, drivers, quick install guide, product warranty statement |

| | | |
|---|-------------------|--|
| Agere Systems PCI International Softmodem | Data Transmission | Technology speeds: 56,000 Kbps maximum downstream data, controllerless NOTE: 56 Kbps technology refers to download speeds only and requires compatible modems at server sites. Other conditions may limit modem speed. FCC limitations allow a maximum of 53 Kbps during download transmissions. |
|---|-------------------|--|

Technical Specifications - Communications

| | |
|--|--|
| Data Speeds | (Upload only) 33,600/31,200/28,800/26,400/21,600/19,200/16,800/14,400/12,000/ 9,600/7,200/4,800/2,400/1,200/300 |
| Data Standards | ITU-T V.90, ITU-T, ITU-T V.34, V.44, V.42, V.42bis21, V.32bis, Bell 212A, and Bell 103 |
| Fax Speeds | 14,400/12,000/9,600/7,200/4,800/2,400/1,200/300 b/s |
| Fax Mode Capabilities | ITU-T T.31 class 1 FAX, V. 17, V.29, V.27ter, and V.21 Channel 2 |
| Error Correction and Data Compression | V.44, 42bis, V.42 and MNP2-5 |
| Power Management | ACPI; PPML 1.1 and wake support with PME and Vaux; meets PCI 2.3 requirements and PC 2001 requirements |
| Upgradeability | Driver upgradeable for future enhancements |
| Video | ITU-T V.80 video ready interface |
| Other | TIA/EIA 602 standard AT command set Integrated DTE interface with speeds of up to 115.2 Kbps, parallel 16550a UART-compatible interface Optional ring wakeup signal |
| Operating Temperature | 32°F to 158°F (0°C to 70°C) |
| Operating Humidity | 20% to 90%, non-condensing |
| Operating System Support | Microsoft Windows XP Professional, Microsoft Windows XP Professional x64 Edition |
| OS Driver Support | Microsoft Windows XP Professional, Microsoft Windows XP Professional x64 Edition |
| Power | Requires a 3.3-V auxiliary power rail on PCI bus Uses only one PCI load (i.e., one grant/request pair), one shared IRQ, one electrical load |
| Chipset | Agere Systems SV92PL - Integrated PCI interface with 5-V tolerant buffers and CardBus support |
| Dimensions (L X H) | Complies with PCI low profile specifications-6.7 x 2.3 inches; 17.0 x 5.8 cm and supports high- and low-profile brackets |
| Connection | Single RJ-11 connector |
| Other Features | Digital line protection, call progress monitoring via on-board piezo device, support for high profile and low profile brackets, PnP ID support |
| Safety | UL recognized to UL 1950, 3rd edition (U.S. and Canada); IEC 950 (TUV, NEMKO, DEMKO, SEMKO); CE Mark, EC 950 (TUV, NEMKO, DEMKO, SEMKO, CE mark |
| EMC | FCC Part 15, IC ES003, EN 55022, 3rd edition, EN 55024, annex A, EN 61000-4-6, EN 61000-4-8 |
| Telecom | FCC Part 68, IC-CS-03 (Canada); Worldwide PTT approvals Not available in Korea or the Republic of South Africa. |
| Health | Bare PCB material compliant to 94V-0 or better (marked as such) |
| Other | PC 2001 compliant, PCI version 2.3, WHQL approved; ACPI compliant |
| Kit Contents | DC132D : Agere Systems PCI International Softmodem with full-height bracket attached, additional low-profile bracket, RJ11 modem cable, driver and documentation CD. |

Technical Specifications - Communications

NOTE: RJ11 modem adapter is not included.

DC131C #xxx: RJ11 modem adapter kit for use with DC132D

#ACP: Austria, #ABW: Belgium (Dutch/Flemish), #AKN: Bosnia, Herzegovna, Croatia, Slovenia, Yugoslavia (Slovenian), #AKB: Czech Republic (Czech) & Slovakia, #ABF: France, #ABD: Germany, #AB7:

Technical Specifications - Controllers

| | | | |
|--|------------------------------|--|---------------------------------|
| LSI SAS3041E Serial Attach SCSI (SAS) Host Bus Adapter (HBA) (Part# EH417AA) | 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 | Full Duplex |
| | | Single lane 1.200 MBps | Single SAS Lane 1.600 MBps |
| | | Wide Port (2 lanes) 1.600 MBps | Wide Port (2 lanes) 1.200 MBps |
| | | Wide Port (4 lanes) 1.200 MBps | Wide Port (4 lanes) 1.2400 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/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 Vista Business 32 and 64, Microsoft Windows XP Professional, Microsoft Windows XP Professional x64,Red Hat Enterprise Linux WS 4 and 5 Desktop | |
| | Kit contents | Controller card, driver CD, LED cables, user documentation and warranty card. | |

Technical Specifications - Hard Drives

| | | | | |
|---|-------------------------------------|---|--|---------|
| SATA hard drives | 160 GB (10k rpm) | Capacity | 160,041,885,696 bytes | |
| | | Height | 1 inches; 2.54 cm or less | |
| | | Width | Media diameter: 3.0 inches; 7.62 cm | |
| | | $\frac{1}{2}$ | Physical size: 4 inches; 10.2 cm | |
| | | Interface | Serial ATA (1.5 Gb/s), Native Command Queuing enabled | |
| | | Synchronous Transfer Rate (Maximum) | Up to 150 MB/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 $\frac{1}{2}$ to 131 $\frac{1}{2}$ (5 to 55 $\frac{1}{2}$) | |
| | | $\frac{1}{2}$ | $\frac{1}{2}$ | |
| | 80 GB (10k rpm) | Capacity | 80,026,361,856 bytes | |
| Height | | 1 inches; 2.54 cm or less | | |
| Width | | Media diameter: 3.0 inches; 7.62 cm | | |
| | | Physical size: 4 inches; 10.2 cm | | |
| Interface | | Serial ATA (1.5 Gb/s), Native Command Queuing enabled | | |
| Synchronous Transfer Rate (Maximum) | | Up to 150 MB/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 $\frac{1}{2}$ to 131 $\frac{1}{2}$ (5 to 55 $\frac{1}{2}$) | | |
| $\frac{1}{2}$ | | $\frac{1}{2}$ | | |
| $\frac{1}{2}$ 80 GB (7,200 rpm) | Capacity | 80,026,361,856 bytes | | |
| | Height | 1 inches; 2.54 cm or less | | |
| | Width | Media diameter: 3.5 inches; 8.89 cm | | |
| | $\frac{1}{2}$ | Physical size: 4 inches; 10.2 cm | | |
| | Interface | Serial ATA (3.0 Gb/s) Native Command Queuing available only in Configure-To-Order drive, not when ordered as an After Market Option). | | |
| | Synchronous Transfer Rate (Maximum) | Up to 300 MB/s | | |
| | Cache | 8 MB | | |

Technical Specifications - Hard Drives

| | | | | |
|-----|-----------------------|---|---|--------|
| 1/2 | 160 GB (7,200 rpm) | Seek Time (typical reads, includes controller overhead, including settling) | Single Track | 0.9 ms |
| | | | Average | 11 ms |
| | | | Full-Stroke | 118 ms |
| | | Rotational Speed | 7,200 rpm | |
| | | Logical Blocks | 156,301,488 | |
| | | Operating Temperature | 41°F to 131°F (5°C to 55°C) | |
| | | Capacity | 160,041,885,696 bytes | |
| | | Height | 1 inches; 2.54 cm or less | |
| | | Width | Media diameter: 3.5 inches; 8.89 cm | |
| | | Interface | Serial ATA (3.0 Gb/s), Native Command Queuing enabled | |
| 1/2 | 250 GB (7,200 rpm) | Synchronous Transfer Rate (Maximum) | Up to 300 MB/s | |
| | | Cache | 8 MB | |
| | | Seek Time (typical reads, includes controller overhead, including settling) | Single Track | 2 ms |
| | | | Average | 11 ms |
| | | | Full-Stroke | 21 ms |
| | | Rotational Speed | 7,200 rpm | |
| | | Logical Blocks | 312,581,808 | |
| | | Operating Temperature | 41°F to 131°F (5°C to 55°C) | |
| | | Capacity | 250,059,350,016 bytes | |
| | | Height | 1 inches; 2.54 cm or less | |
| 1/2 | 500 GB (7,200 rpm) | Width | Media diameter: 3.5 inches; 8.89 cm | |
| | | Interface | Serial ATA (3.0 Gb/s), Native Command Queuing enabled | |
| | | Synchronous Transfer Rate (Maximum) | Up to 300 MB/s | |
| | | Cache | 8 MB | |
| | | Seek Time (typical reads, includes controller overhead, including settling) | Single Track | 2 ms |
| | | | Average | 11 ms |
| | | | Full-Stroke | 21 ms |
| | | Rotational Speed | 7,200 rpm | |
| | | Logical Blocks | 488,397,168 | |
| | | Operating Temperature | 41°F to 131°F (5°C to 55°C) | |
| 1/2 | | Capacity | 500,107,862,016 bytes | |
| | | Height | 1 inches; 2.54 cm or less | |
| | | Width | Media diameter: 3.5 inches; 8.89 cm | |
| | | Interface | Physical size: 4 inches; 10.2 cm | |

Technical Specifications - Hard Drives

| | | | | |
|--|--|---|---|-------|
| | | Interface | Serial ATA (3.0 Gb/s), Native Command Queuing enabled | |
| | | Synchronous Transfer Rate (Maximum) | Up to 300 MB/s | |
| | | Cache | 8 MB | |
| | | Seek Time (typical reads, includes controller overhead, including settling) | Single Track | 2 ms |
| | | | Average | 11 ms |
| | | | Full-Stroke | 21 ms |
| | | Rotational Speed | 7,200 rpm | |
| | | Logical Blocks | 976,773,168 | |
| | | Operating Temperature | 41° to 131°F (5° to 55°C) | |

| | | | | |
|------------------------|-----------------------|---|---|---------|
| Serial ATA Hard Drives | 1 TB (7,200 rpm) | Capacity | 1,000,204,886,016 bytes | |
| | | Height | 1 inches; 2.54 cm or less | |
| | | Width | Media diameter: 3.5 inches; 8.89 cm | |
| | | 1/2 | Physical size: 4 inches; 10.2 cm | |
| | | Interface | Serial ATA (1.5 Gb/s), Native Command Queuing enabled | |
| | | Synchronous Transfer Rate (Maximum) | Up to 300 MB | |
| | | Cache | 16 Mbytes | |
| | | Seek Time (typical reads, includes controller overhead, including settling) | Single Track | 2.0 ms |
| | | | Average | 14.5 ms |
| | | | Full-Stroke | 33 ms |
| | Rotational Speed | 7,200 rpm | | |
| | Logical Blocks | 1,953,525,168 | | |
| | 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) | Up to 300 MB | |
| | | Cache | 16 MB | |
| | | Seek Time (typical reads, includes controller overhead, including settling) | Single Track | 0.2 ms |
| | | | Average | 3.5 ms |
| | | | Full-Stroke | 7.0 ms |
| | | Rotational Speed | 15,000 rpm | |
| | Logical Blocks | 585,937,500 - 512 byte blocks | | |
| | Operating Temperature | 50° to 95°F (10° to 35°C) | | |
| | 1/2 | 1/2 | | |

Technical Specifications - Hard Drives

| | | | |
|---------------------|---|-------------------------------|--------|
| 73 GB (15k rpm) | Capacity | 73,407,865,856 bytes | |
| | Height | 1.0 in (25.4mm) | |
| | Width | 4.0 in (101.6mm) | |
| | Interface | SAS | |
| | Synchronous Transfer Rate (Maximum) | Up to 300 MB | |
| | Cache | 16 MB | |
| | Seek Time (typical reads, includes controller overhead, including settling) | Single Track | 0.2 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) | Up to 300 MB | |
| | Cache | 16 MB | |
| | Seek Time (typical reads, includes controller overhead, including settling) | Single Track | 0.2 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 - Peripherals

| | | |
|---|-----------------------------|--|
| HP IEEE 1394a FireWire 4-Port PCI Card (Part# PA997A) | 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°F to 131°F (10°C to 55°C) |
| | | Non-operating temperature -22°F to 140°F (-30°C to 60°C) |
| | | Relative humidity 20% to 80% |
| | Ports | Two IEEE1394 6-Pin Connector (Rear) |
| | Connectors | One 10-Pinches; 9 Contacts) Custom Connector (Internal) |
| | Minimum System Requirements | Microsoft Windows Vista Business 32 and 64, Microsoft Windows XP Professional, Windows XP Home, not supported on Linux |
| | | Pentium II 266 or above |
| | | 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) (Part# EA327AA) | 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°F to 131°F (10°C to 55°C) |
| | | Non-operating temperature -22°F to 140°F (-30°C 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 |

Technical Specifications - Peripherals

Regulatory Agency Approval

FCC Part 15B, cULus 60950, CE Mark EN55022B(1995)/EN55024-1998
STD, Taiwan BSMI CNS13438, Korea MIC

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 lbs (0.9 kg) minimum

Electrical

Operating voltage

+ 5VDC ~~15%~~

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

Mechanical

Microsoft PC 99 ~~2001~~

Functionally compliant

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 ft (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 in (66 cm) on carpet, six-drop sequence

Drop (in box)

42 in (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 4 and 5 Desktop

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

Technical Specifications - Peripherals

| | | | |
|---|----------------------------|---|---|
| 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, Red Hat Enterprise Linux WS 4 & 5 Desktop | |
| HP Optical 3-Button Mouse (USB) | Dimensions/Weight | Height | 1.5 inches; 3.6 cm |
| | | Length | 4.5 inches; 11.56 cm |
| | | Width | 2.2 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 | 6 feet; 1.8 m |
| HP SpaceExplorer USB 3D Physical Characteristics Input Device | Mechanical | Dimensions (L x W x H) | 7.6 x 5.4 x 2.3 in (194 x 139 x 58mm) |
| | | Weight | 1.36 lbs (0.62 kg) |
| | | Palmrest | Sculpted |
| | | Buttons | 15 reprogrammable speed keys |
| | | Motion Controller | Six degrees of freedom motion control through the X, Y, Z axis (pitch, roll, yaw) |
| | Operating System Supported | Device Sensitivity | Adjustable to preference |
| | | | Microsoft Windows Vista Business 32 and 64, Microsoft Windows XP Professional or XP x64, not supported in Linux |
| | Regulatory Approvals | FCC, CE | |

Technical Specifications - Peripherals

| | | | |
|--|----------------------------|--|---|
| HP SpacePilot (USB 1.1/2.0 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 |
| | | Buttons | 21+ programmable speed keys |
| | |  2 | 15 reprogrammable |
| | Mechanical | LCD Viewing Area (W x H) | 4.0 x 1.0 inches; 102.4 x 30.2mm |
| | | Active Area (W x H) | 3.7 x 1.0 inches; 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 |
| | System Requirements | USB 1.1 or 2.0 | |
| | Operating System Supported | Microsoft Windows Vista Business 32 and 64, Microsoft Windows XP, not supported in Linux | |
| | Regulatory Approvals | FCC, CE | |

Technical Specifications - Optical Devices

| | | | |
|--|---|---|--------------------------|
| HP 16X Max SATA DVD-ROM Drive | Form Factor | 5.25-inch, half-height, tray-load | |
| | Orientation | Either horizontal or vertical | |
| | Interface type | SATA/ATAPI | |
| | Disc capacity | Single layer: Up to 4.7 GB (6 times capacity of CD-ROM) Double layer: Up to 8.5 GB (12 times capacity of CD-ROM) | |
| | Dimensions (W x H x D) | 5.9 x 1.7 x 8.0 in (15.0 x 4.4 x 20.3 cm) | |
| | Weight (max) | 2.6 lb (1.2 kg) | |
| | Read speeds | DVD+R/-R/+RW/-RW/+R DL /-R DL | Up to 8X |
| | | DVD-ROM | Up to 16X |
| | | DVD-RAM | Up to 4X |
| | | CD-ROM, CD-R | Up to 48X |
| | | CD-RW | Up to 32X |
| | Removable Storage - Media Compatibility - DVD-ROM | | |
| | Media | Read | Write |
| | CD-ROM | Yes | No |
| | CD-R | Yes | No |
| | CD-RW | Yes | No |
| | DVD-ROM | Yes | No |
| | DVD-ROM DL | Yes | No |
| | DVD-RAM | Yes | No |
| DVD+R | Yes | No | |
| DVD+R DL | Yes | No | |
| DVD+RW | Yes | No | |
| DVD-R | Yes | No | |
| DVD-RW | Yes | No | |
| DVD-R DL | Yes | No | |
| Access times (typical reads, including setting) | Random | DVD: < 140 ms (typical), CD: < 125 ms (typical) | |
| | Full Stroke | DVD: < 250 ms (seek), CD: < 210 ms (seek) | |
| | 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 (44.4 MB/s -default) | |
| | Power | Source | SATA DC power receptacle |
| | DC Power Requirement | 5 VDC 15%-100 mV ripple p-p 12 VDC 15%-200 mV ripple p-p | |
| | DC Current | 5 VDC - <1000 mA typical, < 1600 mA maximum | |
| | | 12 VDC - < 600 mA typical, < 1400 mA maximum | |

Technical Specifications - Optical Devices

| | | |
|---|--|-----------------------------|
| Environmental (all conditions non-condensing) | Temperature (operating) | 41°F to 122°F (5°C to 50°C) |
| | Relative Humidity (operating) | 10% to 90% |
| | Maximum Wet Bulb Temperature (operating) | 86°F (30°C) |
| Operating Systems Supported | Windows Vista Business 32 and 64*, Windows XP Professional or Red Hat Enterprise Linux WS 4 & 5 Desktop, No driver is required for this device. Native support is provided by the operating system. | |
| | *NOTE: Certain Windows Vista product features require advanced or additional hardware. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit http://www.windowsvista.com/upgradeadvisor . For Windows Vista system requirements, visit http://www.windowsvista.com/systemrequirements . | |
| Option kit contents | HP 16X Max SATA DVD-ROM Drive, Intervideo WinDVD and installation guide. | |

| | | | |
|---------------------------------------|--|---|---|
| HP 48X SATA CD-RW/DVD-ROM Combo Drive | Form Factor | 5.25-inch, half-height, tray-load | |
| | Orientation | Either horizontal or vertical | |
| | Interface type | SATA/ATAPI | |
| | Disc capacity | Single layer: Up to 4.7 GB (6 times capacity of CD-ROM) Double layer: Up to 8.5 GB (12 times capacity of CD-ROM) | |
| | Dimensions (W x H x D) | 5.9 x 1.7 x 8.0 in (15.0 x 4.4 x 20.3 cm) | |
| | Weight (max) | 2.6 lb (1.2 kg) | |
| | Write speed | CD-R | Up to 48X |
| | | CD-RW | Up to 32X |
| | Read speeds | DVD +R/-R/ +RW/-RW/ +R DL /-R DL | Up to 8X |
| | | DVD-ROM | Up to 16X |
| | | CD-ROM, CD-R | Up to 48X |
| | | CD-RW | Up to 32X |
| | Buffer Size | 1.5MB (Min) | 1/2 |
| | Access times (typical reads, including setting) | Random | DVD: < 140 ms (typical), CD: < 125 ms (typical) |
| | | Full Stroke | DVD: < 250 ms (seek), CD: < 210 ms (seek) |
| | Power | Source | SATA DC power receptacle |
| | | DC Power Requirement | 5 VDC 15%-100 mV ripple p-p 12 VDC 15%-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 |
| | | | |

Technical Specifications - Optical Devices

| | | |
|---|---|-----------------------------|
| Environmental (all conditions non-condensing) | Temperature (operating) | 41°F to 122°F (5°C to 50°C) |
| | Relative Humidity (operating) | 10% to 90% |
| | Maximum Wet Bulb Temperature (operating) | 86°F (30°C) |
| Operating Systems Supported | Windows Vista Business 64*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32*, Red Hat Linux WS 4, 32/64-bit OS. No driver is required for this device. Native support is provided by the operating system. | |
| | <p>* Certain Windows Vista product features require advanced or additional hardware. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit http://www.windowsvista.com/upgradeadvisor. For Windows Vista system requirements, visit http://www.windowsvista.com/systemrequirements.</p> | |
| Option kit contents | HP 48X Max SATA CD-RW/DVD-ROM Combo Drive, Roxio Easy Media Creator version 9, Intervideo WinDVD, CD-R media, high-speed CD-RW media, and installation guide. | |

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

Technical Specifications - Optical Devices

| | | |
|--|---|--|
| Power | Source | SATA DC power receptacle |
| | DC Power Requirement | 5 VDC 15%-100 mV ripple p-p 12 VDC 15%-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 |
| Environmental (all conditions non-condensing) | Temperature (operating) | 41°F to 122°F (5°C to 50°C) |
| | Relative Humidity (operating) | 10% to 90% |
| | Maximum Wet Bulb Temperature (operating) | 86°F (30°C) |
| Operating Systems Supported | Windows Vista Business 64* (64-bit expected availability in July 2007), Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32*, Red Hat Linux WS 4 & 5 Desktop (32/64-bit OS). No driver is required for this device. Native support is provided by the operating system. | |
| Option kit contents | HP 16X DVD+-RW SuperMulti LightScribe drive, LightScribe software, Roxio Easy Media Creator version 9, Intervideo WinDVD Software, installation guide, and DVD+R media. Software is Microsoft Windows only. | |

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



Technical Specifications - Graphics

| | | |
|--|--|--|
| NVIDIA Quadro NVS 440, 256 MB Quad Head (Part# PT453AA) | Form Factor | ATX |
| | Graphics Controller | 2 nv43 2D graphics processor units (GPUs) |
| | VGA controller | Integrated into the Quadro GPU |
| | Bus Type | PCI-E x16 |
| | RAMDAC | Dual 350 MHz |
| | Memory | 256 MB DDR frame buffer and Texture storage (128MB per GPU) |
| | Connector | Two DMS-59 |
| | Controller clock speed | 250 MHz |
| | Color planes | 32-bit color buffer |
| | Overlay planes | 1 16-bit Video overlay plane |
| | Maximum pixel clock | 350 MHz |
| | Multi-Monitor Support | Up to 4 analog or digital monitors |
| | Single DVI Support | Yes |
| | Dual DVI Support | Yes |
| | High-definition Video Processor (HDVP) | 32-Bit color 2048 x 1536 @ 60 Hz maximum resolution 2D rendering engine optimized for 32-, 24-, 16-, 15-, and 8-bpp modes |
| | High-definition Video Processor (HDVP) | Full-screen, full-frame video playback of HDTV and DVD content DVD-ready motion compensation for MPEG-2 Independent hardware color controls for video overlay Hardware color-space conversion (YUV 4:2:2 and 4:2:0) IDCT motion compensation 5-tap horizontal by 3-tap vertical filtering 8:1 up/down scaling |
| | Available graphics drivers | Microsoft Windows XP (Provides full native Dual View mode, Span or Big Desktop mode, and Clone mode) HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/eng/software_drivers.html . |

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



Technical Specifications - Graphics

| | | |
|--|---|--|
| NVIDIA Quadro NVS 290, 256 MB Dual Head | Form Factor | Low Profile |
| | Bus Type | PCIe x16 |
| | Memory | 256 MB 400MHz DDR2 SDRAM unified frame buffer, Z-buffer and Texture storage |
| | Connector | DMS-59, includes DMS-59 to Dual DVI-I cable. DMS-59 to Dual VGA cable available as an option. |
| | 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). NVIEW advanced multi-display desktop and application management seamlessly integrated into Microsoft Windows [®] 1/2 |
| | RAMDAC | Integrated dual 400MHz |
| | Color planes | 32-bit color buffer |
| | Overlay planes | Hardware supported |
| | nView Architecture | Advanced multi-display desktop & application management seamlessly integrated into Microsoft Windows [®] 1/2 |
| | Multi-Monitor Support | Dual monitor support |
| | DVI Support | DMS-59 (to dual DVI-SL) |
| | High-definition Video Processor (HDVP) | Full-screen, full-frame video playback of HDTV and DVD content DVD-ready motion compensation for MPEG-2 Independent hardware color controls for video overlay Hardware color-space conversion (YUV 4:2:2 and 4:2:0) IDCT motion compensation 5-tap horizontal by 3-tap vertical filtering 8:1 up/down scaling |
| | Supported Graphics APIs | OpenGL 2.1 & DX10 Support; Shader Model 4.0 |
| | Available graphics drivers | Microsoft Windows Vista Business 32 and 64, Microsoft Windows XP (Provides full native Dual View mode, Span or Big Desktop mode, and Clone mode), Linux - Full Open GL implementation, complete with NVIDIA and ARB extensions. HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/eng/software_drivers.html . |

Technical Specifications - Graphics

| | | |
|--|----------------------------|---|
| NVIDIA Quadro FX 370 PCI-Express graphics controller | Form Factor | ATX |
| | Bus Type | PCI-Express x16 |
| | Memory | 256MB 400MHz DDR2 SDRAM unified frame buffer, Z-buffer and Texture storage |
| | Connectors | DVI-I (dual-link) and DVI-I (single-link) |
| | 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). NVIEW advanced multi-display desktop and application management seamlessly integrated into Microsoft Windows 7 |
| | RAMDAC | Integrated dual 400MHz |
| | Architecture Features | High Resolution Anti-Aliasing PureVideo 2 engine supports AES 128-bit decryption GPU Computing (HW/SW including CUDA SDK 3D Textures LightSpeed Memory Architecture II 128-bit color precision Hardware accelerated anti-aliased points and lines Hardware OpenGL overlay planes H/W accelerated pixel readback 3rd generation occlusion culling AA on scan-out |
| | Power consumption | <50 W |
| | Shading Architecture | Fully programmable GPU (OpenGL 2.1/DirectX 10 class) Vertex/Pixel Shader 4.0 Shading Support (HLSL, GLSL, CgFX) |
| | Supported Graphics APIs | OpenGL 2.1 & SM4.0 and DirectX10 Support |
| Available graphics drivers | | Microsoft Windows Vista 32 and 64, Microsoft Windows XP, Linux - Full Open GL implementation, complete with NVIDIA and ARB extensions. HP qualified drivers may be preloaded or available from the HP support web site: http://welcome.hp.com/country/us/eng/software_drivers.html . |

Technical Specifications - Graphics

| | | |
|--|----------------------------|--|
| NVIDIA Quadro FX 570 PCI-Express graphics controller | Form Factor | ATX |
| | Bus Type | PCI-Express x16 |
| | Memory | 256MB 400MHz DDR2 SDRAM unified frame buffer, Z-buffer and Texture storage |
| | Connectors | DVI-I (dual-link) and DVI-I (single-link) |
| | 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). NVIEW advanced multi-display desktop and application management seamlessly integrated into Microsoft Windows 7 |
| | RAMDAC | Integrated dual 400MHz |
| | Architecture Features | High Resolution Anti-Aliasing PureVideo 2 engine supports AES 128-bit decryption GPU Computing (HW/SW including CUDA SDK 3D Textures LightSpeed Memory Architecture II 128-bit color precision Hardware accelerated anti-aliased points and lines Hardware OpenGL overlay planes H/W accelerrated pixel readback 3rd generation occlusion culling AA on scan-out |
| | Power consumption | <60 W |
| | Shading Architecture | Fully programmable GPU (OpenGL 2.1/DirectX 10 class) Vertex/Pixel Shader 4.0 Shading Support (HLSL, GLSL, CgFX) |
| | Supported Graphics APIs | OpenGL 2.1 & SM4.0 and DirectX10 Support |
| Available graphics drivers | | Microsoft Windows Vista 32 and 64, Microsoft Windows XP, Linux - Full Open GL implementation, complete with NVIDIA and ARB extensions. HP qualified drivers may be preloaded or available from the HP support web site: http://welcome.hp.com/country/us/eng/software_drivers.html . |

Technical Specifications - Graphics

| | | |
|---------------------------------|----------------------------|--|
| NVIDIA Quadro FX 1700 | Form Factor | ATX |
| PCI-Express graphics controller | Bus Type | PCI-Express x16 |
| | Memory | 512 MB 4000MHz DDR2 SDRAM unified frame buffer, Z-buffer and Texture storage |
| | Connectors | DVI-I (dual-link) and DVI-I (dual-link) |
| | 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). NVIEW advanced multi-display desktop and application management seamlessly integrated into Microsoft Windows 7 |
| | RAMDAC | Integrated dual 400MHz |
| | Architecture Features | High Resolution Anti-Aliasing PureVideo 2 engine supports AES 128-bit decryption GPU Computing (HW/SW including CUDA SDK 3D Textures LightSpeed Memory Architecture II 128-bit color precision Hardware accelerated anti-aliased points and lines Hardware OpenGL overlay planes H/W accelerrated pixel readback 3rd generation occlusion culling AA on scan-out |
| | Power consumption | < 75 W |
| | Shading Architecture | Fully programmable GPU (OpenGL 2.1/DirectX 10 class) Vertex/Pixel Shader 4.0 Shading Support (HLSL, GLSL, CgFX) |
| | Supported Graphics APIs | OpenGL 2.1 & SM4.0 and DirectX10 Support |
| | Available graphics drivers | Microsoft Windows Vista 32 and 64, Microsoft Windows XP, Linux - Full Open GL implementation, complete with NVIDIA and ARB extensions. HP qualified drivers may be preloaded or available from the HP support web site: http://welcome.hp.com/country/us/eng/software_drivers.html . |

Technical Specifications - Graphics

| | | |
|--|----------------------------|---|
| ATI FireGL V5600 PCI-Express graphics controller | Form Factor | ATX |
| | Graphics Controller | R520 |
| | Bus Type | PCI Express x16 |
| | Memory | 512 MB f unified frame buffer, Z-buffer and Texture storage and a 128-bit Ring-Bus memory controller |
| | Connectors | Two dual-link DVI connectors with analog/digital outputs |
| | Maximum Resolution | Dual Link digital support for 3840 x 2400 @ 60Hz. Ideal for 30-inch widescreen displays. |
| | RAMDAC | Dual 10-bit per channel 400MHz |
| | Ring Bus memory controller | <ul style="list-style-type: none">512-bit internal ring bus for highly efficient memory reads |
| | Display output | Programmable intelligent arbitration logic <ul style="list-style-type: none">Up to 16-bit per RGB color component High Dynamic Range output (HDR) |
| | Shading Architecture | Programmable piecewise linear gamma correction, color correction, and color space conversion (10-bits per color) <ul style="list-style-type: none">Supports Full Shader Model 4.0 |
| 1/2 | Supported Graphics APIs | 120 shader processing unit DirectX 10 and OpenGL 2.1 advanced |
| | Available graphics drivers | Microsoft Windows XP Professional qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/eng/software_drivers.html . HP-tested Windows XP and Linux |
| 1/2 | Available Graphics Drivers | Microsoft Windows Vista 32 and 64, Microsoft Windows XP, Linux - Full Open GL implementation, complete with NVIDIA and ARB extensions. HP qualified drivers may be preloaded or available from the HP support web site: http://welcome.hp.com/country/us/eng/software_drivers.html . |
| 1/2 | Option kit Contents | PCA with ATX bracket, DVI to VGA converters, CD and manual |

Technical Specifications - Graphics

| | | |
|------------------------------------|----------------------------|--|
| NVIDIA Quadro FX 3500, Form Factor | | ATX |
| 256 MB | Bus Type | PCI-Express x16 |
| (Part# ES357AA) | Memory | 256 MB 700 MHz 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). NVIEW advanced multi-display desktop and application management seamlessly integrated into Microsoft Windows |
| | RAMDAC | Dual 400 MHz integrated |
| | Architecture Features | 256-bit memory interface 128-bit IEEE floating-point precision graphics pipeline 128-bit color precision 12-bit sub-pixel precision 8x FSAA at 1920x1200, 4x at 2048x1536, rotated grid FSAA sampling algorithm Hardware accelerated antialiased points and lines Hardware OpenGL overlay planes Hardware accelerated two-sided lighting Hardware accelerated clipping planes 3rd generation occlusion culling 3D volumetric texture support Quad-buffered stereo Dual Link DVI enabling driving digital displays up to 3840x2400 (24Hz) SLI Link |
| | Shading Architecture | Fully programmable GPU Long fragment programs (up to 65,536 instructions) Long vertex programs (up to 65,536 instructions) Looping and subroutines (up to 256 loops per vertex program) Dynamic flow control Conditional execution |
| | Supported Graphics APIs | OpenGL 2.0 DirectX 9.0 |
| | Available Graphics Drivers | Microsoft Windows Vista Business 32 and 64, Microsoft Windows XP Professional; Linux - Full Open GL implementation, complete with NVIDIA and ARB extensions. Qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/eng/software_drivers.html . |
| | Maximum Resolution | Dual DVI-I output drives dual digital displays at resolutions up to 1920x1200 @ 60Hz (single-link) and 3840x2400 @ 24Hz (dual-link). Internal 400MHz RAMDACs drives dual analog displays up to 2048x1536 @ 75Hz each |

| | | |
|-----------------------|---------------------|---------------------------------------|
| NVIDIA Quadro FX 4600 | Graphics controller | NVIDIA Quadro FX 4600 Workstation GPU |
| (768 MB) | Bus Type | PCI Express x16 |
| | RAMDAC | Dual 400 MHz integrated |

Technical Specifications - Graphics

| | |
|---|--|
| Memory | 768 MB GDDR3 SDRAM unified graphics memory |
| Connectors | 2 Dual-Link DVI-I analog/digital monitor outputs, 1 3-pin Mini DIN stereo output, DVI-I to VGA adapters included |
| Multi-monitor Support | Dual integrated display controllers supporting up to 2048x1536 @ 75Hz (analog) or 3840x2400 @ 41Hz (digital) on both displays |
| NVIDIA Quadro FX 4600 Architecture | 384-bit memory interface 67.2 GB/sec. memory bandwidth Full 128-bit floating point color precision 12-bit subpixel precision 65,536 fragment instruction 65,536 vertex instruction 3D volumetric textures Single-system powerwall Hardware accelerated antialiased points & lines Hardware OpenGL overlay planes Hardware accelerated two-sided lighting Hardware accelerated clipping planes Hardware two-sided lighting 3rd-generation occlusion culling OpenGL quad-buffered stereo Hardware-Accelerated Pixel Read-Back |
| Shading Architecture | 16 textures per pixel in fragment programs Window ID clipping functionality Hardware accelerated line stippling Fully programmable GPU (OpenGL2.0/DirectX 9.0c class) Long fragment programs (up to 65,536 instructions) Long vertex programs (up to 65,536 instructions) Looping and subroutines (up to 256 loops per vertex program) Dynamic flow control Conditional execution |
| High-level Shader Languages | Optimized compiler for Cg and Microsoft HLSL OpenGL 2.0 and DirectX 9.0c support Open source compiler |
| High-resolution Antialiasing | 12-bit subpixel sampling precision enhances AA quality Rotated-grid full-scene antialiasing (RG FSAA) 16x FSAA dramatically reduces visual aliasing artifacts or "jaggies" at resolution up to 1920x1200 |
| Display Resolution Support | Dual Dual Link DVI-I output-drives digital displays at resolutions up to 3840 x 2400 @ 41Hz Internal 400 MHz DACs - Two analog displays up to 2048x1536 @ 75 Hz each |
| nView Architecture | Advanced multi-display desktop & application management seamlessly integrated into Microsoft Windows |
| Supported Graphics APIs | OpenGL 2.0 ICD with immediate mode support for all OGL primitive types, DirectX 10 compatible |

Technical Specifications - Graphics

Available Graphics drivers

Microsoft Windows XP Professional, Linux - Full Open GL implementation,
complete with NVIDIA and ARB extensions.

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

http://welcome.hp.com/country/us/eng/software_drivers.html

Technical Specifications - Monitors

| | | | |
|------------------------------|-------------------------------|---|---|
| HP L1965 19-inch LCD 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) | 178 degrees horizontal/178 degrees vertical (10:1 minimum contrast ratio) |
| | | Brightness (typical) | 300 nits (cd/m2) |
| | | Contrast Ratio (typical) | 1000:1 (typical) |
| | | Response Rate (typical) | 6 ms (typical gray to gray)** |
| | | Pixel Pitch | 0.294 mm |
| | | Backlight Lamp Life (to half brightness) | 50K hours |
| | | * NOTE: All performance specifications represent the typical specifications provided by HP's component manufacturers; actual performance may vary either higher or lower. | |
| | | **NOTE: 20 ms rise and fall | |
| | | | |
| | | | |
| Video/Other Inputs | Signal Interface/ Performance | Plug and Play | Yes (supports VESA DDC2B and DDC/CI; PC2001 compliant) |
| | | Self Powered USB 2.0 Hub | One upstream, four downstream ports (cable included) |
| | | Input Signal | Two DVI-I connectors (VGA analog or digital) |
| | | Input Impedance | 75 ohms 12% |
| | | Sync Input | Separate sync (HSYNC/VSYNC); composite sync, Sync on Green (activated through on-screen display) |
| | | Video Cable | One DVI-D to DVI-D, and 1 DVI-I to VGA cables |
| | | Video Cable Length | 71 in (1.8 m) |
| | | Horizontal Frequency | 24 to 83 kHz |
| | | Vertical Frequency | 48 to 76 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 analog |
| | | Preset VESA Graphic Modes (non-interlaced) | 640 x 480 @ 60 Hz, 72 Hz, 75 Hz 720 x 400 @ 70 Hz 800 x 600 @ 60 Hz, 72 Hz, 75 Hz 1024 x 768 @ 60 Hz, 70 Hz, 75 Hz 1280 x 1024 @ 60 Hz, 75 Hz |
| | | 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 |

Technical Specifications - Monitors

| | | | | |
|-----|-----|--|--|---|
| | | Fail Safe Mode | Yes (limits out of range signal messages) | |
| | | Maximum Pixel Clock Speed | 140 MHz | |
| | | User Programmable Modes | Yes, 15 | |
| | | Anti-Glare | Yes | |
| | | 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) Buttons or Switches Controls | Power on/off; 3-button OSD; second level OSD buttons include dual-input switch, dedicated auto adjust switch | |
| 1/2 | 1/2 | Languages | English, Spanish, French, German, Netherlands, 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 | |
| | | 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 | |
| | | Typical Power Consumption | < 35 watts | |
| | | Maximum | < 55 watts | |
| | | Power Saving | < 2 watts | |
| | | Off Mode | 0 watts (when master power switch is in the off position) | |
| | | Power Cable Length | 74.8 in (1.9 m); non-captive | |
| | | Mechanical | | |
| | | Dimensions (H x W x D) | Unpacked with stand | 14.85 min to 18.79 max x 15.9 x 8.78 inches (37.72 min to 47.72 max x 40.39 x 22.29 cm) |
| | | | Base Area (Footprint D x W) | 8.78 x 11.88 inches (22.29 x 30.18 cm) |
| | | | Panel only (without stand) (H x W x D) | 12.96 x 15.9 x 2.4 inches (32.91 x 40.39 x 6.1 cm) |

Technical Specifications - Monitors

| | | | |
|--------------------|---|--|--------------------|
| Environmental | Weight | Unpacked with stand | 15.6 lbs (7.06 kg) |
| | | Unpacked without stand | 9.26 lbs (4.19 kg) |
| | | Packaged | 20.5 lbs (9.27 kg) |
| | Bezel Width | 12.5 mm left and right, 12.75 mm top and bottom | |
| | Tilt Range | -4 degrees to +30 degrees | |
| | Swivel Range | 145 degrees horizontal swivel | |
| | Height Adjustable | Yes (4 in/100mm adjustment range) | |
| | Pivot Rotation | Yes, 90 degrees | |
| | Base | Ships attached and is removable | |
| | Temperature 1/2 Operating | 41 °F 95 °F (5 °C 35 °C) | |
| | Temperature 1/2 Non-operating | -4 °F 140 °F (-20 °C 60 °C) | |
| | Humidity 1/2 Operating | 20% to 80% | |
| | Humidity 1/2 Non-operating | 5% to 95% | |
| Environmental Data | Altitude 1/2 Operating | 0 to 12,000 ft (0 to 3,658 m) | |
| | Altitude 1/2 Non-operating | 0 to 40,000 ft (0 to 12,192 m) | |
| | 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
- CEC

| 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 | 35.7 watts | 35.6 watts | 35.1 watts |
| Sleep | 1.08 watts | 1.14watts | 1.23 watts |
| Off | 0.93 watts | 0.94 watts | 0.92 watts |
| Heat Dissipation* | 100 VAC, 50 Hz | 115 VAC, 60 Hz | 230 VAC, 50 Hz |
| Normal Operation | 121.7 BTU/hr | 121.4 BTU/hr | 119.7 BTU/hr |
| Sleep | 3.68 BTU/hr | 3.89 BTU/hr | 4.19 BTU/hr |
| Off | 3.17 BTU/hr | 3.21 BTU/hr | 3.14 BTU/hr |

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

| | |
|-------------------------|---|
| Longevity and Upgrading | Upgradeability features contained in the product include: One upstream and four downstream USB ports |
| Ergonomics | The monitor meets the ergonomic requirement of EN-ISO 13406-2 for flat panel displays. |
| Additional Information | This product is in compliance with the Restrictions of Hazardous Substances (RoHS) Directive, 2002/95/EC. |

Technical Specifications - Monitors

This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive, 2002/96/EC.

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

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

This product contains 100% recycled materials (by wt.)

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

Packaging Materials

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

Material Usage

This product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at

http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html):

- 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

Technical Specifications - Monitors

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|----------------|--|--|
| | Packaging | <ul style="list-style-type: none">• Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO) <p>HP follows these guidelines to decrease the environmental impact of product packaging:</p> <ul style="list-style-type: none">• 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 | <p>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.</p> |
| | Hewlett-Packard Corporate Environmental Information | <p>For more information about HP's commitment to the environment:</p> <p>Global Citizenship Report http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html</p> <p>Eco-label certifications http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html</p> <p>ISO 14001 certificates: http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html</p> |
| Options | HP Silver Flat Panel Speaker Bar | <p>Powered directly by the monitor or PC, seamlessly attaches to the monitor's bezel to bring full multimedia support to select HP flat panel monitors. Features include dual speakers with full sound range and external jack for headphones. Sold separately, part number EE418AA. For more information, refer to the HP Flat Panel Speaker Bar QuickSpecs.</p> |
| Other | Accessories Included | <p>One DVI-D to DVI-D cable, one DVI-I to VGA cable, one USB cable, and CD-ROM with Pivot Pro software, HP Display Assistant software, and HP Display LiteSaver software.</p> |
| | Software | <p>Pivot Pro software from Portrait Displays, Inc. interacts with your PC's native graphics driver to enable seamless portrait screen redraws with a simple mouse-click or</p> |

Technical Specifications - Monitors

| | |
|------------------------------|---|
| | <p>keyboard command. Pivot Pro supports 90-degree portrait and landscape views. Language support is available in English, Japanese, French, German, Spanish, Italian, and Traditional and Simplified Chinese.</p> <p>HP Display Assistant is a software utility that allows monitor adjustment, color calibration, and security/asset management using the Display Data Channel Command Interface (DDC/CI) protocol of the connected desktop PC.</p> <p>HP Display LiteSaver feature allows you to schedule Sleep mode at preset times to help protect the monitor against image retention, drastically lower power consumption and energy costs, and extend the lifespan of the monitor.</p> |
| User Guide Languages | English, Bahasa, B. Portuguese, French, LA Spanish, Korean, Simplified Chinese, Traditional Chinese, Japanese, Danish, Dutch, Finnish, German, Italian, Norwegian, Swedish, Greek, Polish, Russian, Slovenian, Turkish |
| 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 12 Certification |
| Compatibility | VESA Video Signal Standard (VSIS) Compliant video cards have been tested and proven compatible for use with the HP LP1965 Flat Panel Monitor. Recommended for use with HP products. |
| 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. |

| | | |
|-------------------------------------|--------------------------------|--|
| HP LP2065 20-inch LCD Panel Monitor | Type | 20-inch Active Matrix TFT (thin film transistor) |
| | Viewable Image Area (diagonal) | 20.1 in (51 cm) |
| | Screen Opening (W x H) | 16.2 x 12.17 inches; 41.1 x 30.9 cm |

Technical Specifications - Monitors

| | | |
|-------------------------------------|---|--|
| On Screen Display (OSD) Controls | 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 |
| | Backlight Lamp Life (to half brightness) | 45K hours |
| | 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 | |
| Video Input | 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 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) 1280 x 1024 @ 60 Hz, 75 Hz, 85 Hz 1280 x 960 @ 60 Hz 1152 x 900 @ 66 Hz 1024 x 768 @ 60 Hz, 75 Hz, 85 Hz 800 x 600 @ 60 Hz, 85 Hz 640 x 480 @ 60 Hz, 75 Hz, 85 Hz |
| | 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 |
| | Plug and Play | Yes |

Technical Specifications - Monitors

| | | | |
|---------------|---|--|---|
| Power | 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 100 % | |
| | 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 ft (1.8 m) | |
| | 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 | |
| Mechanical | Power Cable Length | 5.9 ft (1.8 m) | |
| | Dimensions (H x W x D) | Unpacked with stand | 16.7 to 21.8 x 17.4 x 8.67 inches; 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 inches; 34.5 x 44.3 x 8.7 cm |
| | | Packaged | 11.77 x 22.2 x 16.77 inches; 29.9 x 56.4 x 42.6 cm |
| | Weight | Unpacked | With stand: 20.28 lb (9.2 kg); Without stand: 12.35 lb (5.6 kg) |
| | | Packaged | 26.3 lb (11.95 kg) |
| | Tilt Range | 10 ° + 25 ° vertical tilt | |
| | Swivel Range | 45 ° + 45 ° | |
| | Height Adjustable | Yes, range 5.1 in (13.0 cm) | |
| | Pivot Rotation | Yes | |
| Environmental | Base | Detachable, ships attached | |
| | Temperature 10 Operating | 46 ° to 95 °F (10 ° to 35 °C) | |
| | Temperature 10 Non-operating | 61 ° to 140 °F (-10 ° to 60 °C) | |
| | Humidity 10 Operating | 20% to 80% non-condensing | |

Technical Specifications - Monitors

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|------------------------------|--|---|--|
| 1/2 | Options | Humidity Non-operating | 5% to 85% |
| | | Altitude Operating | + 12,000 ft (+ 3,657.6 m) |
| | | Altitude Non-operating | + 40,000 ft (+ 12,192 m) |
| | Other | 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. |
| | | Accessories Included | VGA to DVI-I cable 1/2 connects the graphic card's VGA connector to the monitor's input #1 or 2 (DVI-I analog) connector. |
| | | | DVI-D to DVI-I cable 1/2 connects the graphic card's DVI-D digital connector to the monitor's input #1 or #2 (DVI-I digital) connector. |
| | | | User Guide Languages |
| | | Software | HP Display Assistant Utility makes it possible to adjust displays settings through the PC using two-way communication via DDCI. |
| | | 1/2 | HP Display Lite Saver allows ability to power up and down display at predetermined hours of the day to save power and backlight life. |
| | | 1/2 | 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. |
| | | User Guide Languages | English |
| | | Warranty Languages | English |
| | | Color | Carbonite/Silver |
| Certification and Compliance | VESA External Mounting | Yes (Standard 4 hole pattern, 100 mm) | |
| | Kensington Lock-Ready | Yes | |
| | Canadian Requirements/CSA, CE Marking, CISPR Requirements, Energy FCC Approval, ISO 13406-2 Pixel Defect Guidelines, Mexican NOM Approval,, MPR-II Compliant, PC2001 Compliant, PC99 Certified, TCO 03 (emissions, ergonomics, environment), TUV-Ergo, UL Listed, VCCI Approvals, Microsoft Windows Certification (Microsoft Windows XP) | | |

Technical Specifications - Monitors

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|----------------------|---|
| 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. |

| | | | |
|--|----------------------------------|--|--|
| HP LP2465 24-inch Widescreen LCD Monitor | 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°/ 178° (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 |
| | | 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 |
| | | User Controls | Brightness, contrast, positioning, color temperature, individual color control, serial number display, full screen resolutions, clock, clock phase, input selection (includes separate direct access key for dedicated swap between inputs 1 and 2), factory reset |
| Signal Interface/ Performance | | Horizontal Frequency | 30 to 94 kHz (VGA input); 30 to 92 KHz (DVI input) (for modes with pixel clock less than 157 MHz) |
| | | Vertical Frequency | 48 to 85 Hz (VGA and DVI input) |
| | | Native Resolution | 1920 x 1200 @ 60 Hz (recommended) (native aspect ratio of 16:10) |
| | | Preset VESA Graphic Modes (non-interlaced) | 1920 x 1200 @ 60 Hz |
| | | | 1600 x 1200 @ 60 Hz, 75 Hz 1280 x 1024 @ 60 Hz, 75 Hz, 85 Hz 1280 x 960 @ 60 Hz 1152 x 900 @ 66 Hz 1024 x 768 @ 60 Hz, 75 Hz, 85 Hz 800 x 600 @ 60 Hz, 75 Hz 640 x 480 @ 60 Hz, 75 Hz |

Technical Specifications - Monitors

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|--|--------------------|---------------------------|--|
| | | 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 |
| | | 1/2 | 1/2 |
| | | Plug and Play | Yes |
| | Video/Other Inputs | 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 ft (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 ft (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 (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 (36.6 x 55.84 x 9.2 cm) |
| | | | Packaged 11.7 x 22.1 x 25.6 in (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 | -51/2° + 251/2° vertical |
| | | Swivel Range | -451/2° + 451/2° |
| | | Height Adjustable | Yes, range 5.1 in (130 mm) |
| | | Pivot Rotation | Yes |
| | | Base | Detachable, ships detached |

Technical Specifications - Monitors

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|-----|---------------|-------------------------------|--|
| 1/2 | Environmental | Temperature 1/2 Operating | 4610 951/2 (1010 351/2) |
| | | Temperature 1/2 Non-operating | 610 1401/2 (-1010 601/2) |
| | | Humidity 1/2 Operating | 20% to 80% non-condensing |
| | | Humidity 1/2 Non-operating | 5% to 85% |
| | | Altitude 1/2 Operating | + 12,000 ft (+ 3,657.6 m) |
| | | Altitude 1/2 Non-operating | + 40,000 ft (+ 12,192 m) |
| | Other | Accessories Included | VGA to DVI-I cable 1/2 connects the graphic card's VGA connector to the monitor's input #2 (DVI-I analog) connector DVI-D to DVI-D cable 1/2 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. |
| | | 1/2 | 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. |
| | | 1/2 | 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 |
| | Options | Color | Carbonite/silver |
| | | VESA External Mounting | Yes (Standard 4 hole pattern, 100 mm) |
| | | Kensington Lock-Ready | Yes |
| | | HP Silver Flat Panel | Powered directly by the monitor or PC, the |

Technical Specifications - Monitors

| | | |
|-------------------------------------|---|---|
| | Speaker Bar - Part number: EE418AA | 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, 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. | |

| | | | |
|---|---|---|--|
| HP LP3065 30-inch Widescreen LCD 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 |
| | | 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/ | Horizontal Frequency | 100 KHz |
| | | | |

Technical Specifications - Monitors

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|---------------|--------------------|-------------------------------|---|---|
| 1/2 | Performance | 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 | |
| | | 1/2 | 1/2 | |
| | 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.) | |
| | Power | Video Cable | Two dual-link DVI cables | |
| | | Video Cable Length | 5.9 ft (1.8 m) | |
| | | 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 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 | -51/2° + 301/2° vertical | |
| | | Swivel Range | -451/2° + 451/2° | |
| | | Height Adjustable | Yes, range 5.1 in (100 mm) | |
| Environmental | | Pivot Rotation | No | |
| | | Base | Detachable, ships detached | |
| | | Temperature 1/2 Operating | 461/2° to 951/2° (101/2° to 351/2°) | |
| | | Temperature 1/2 Non-operating | 61/2° to 1401/2° (-101/2° to 601/2°) | |

Technical Specifications - Monitors

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|---|--------------------|---|---|---|---|
| 1/2 | Environmental Data | Humidity 1/2 Operating | 20% to 80% non-condensing | | |
| | | Humidity 1/2 Non-operating | 5% to 85% | | |
| | | Altitude 1/2 Operating | + 12,000 ft | | |
| | | Altitude 1/2 Non-operating | + 40,000 ft | | |
| | | 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: <ul style="list-style-type: none">● US Energy Star● US Federal Energy Management Program (FEMP)● IT Eco Declaration● TCO 03● Taiwan Green Mark● CECP● Korea Eco-label● EPEAT - Silver | | |
| | | 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. | | | | | |
| Longevity and Upgrading | | Upgradeability features contained in the product include: One upstream and four downstream USB ports | | | |
| Ergonomics | | The monitor meets the ergonomic requirement of EN-ISO 13406-2 for flat panel displays. | | | |
| Additional Information | | This product is in compliance with the Restrictions of Hazardous Substances (RoHS) Directive, 2002/95/EC. | | | |

Technical Specifications - Monitors

This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive, 2002/96/EC.

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

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

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

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

This product contains 0% recycled materials (by wt.)

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

Packaging Materials

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

RoHS Compliance

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

Material Usage

This product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at

http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html):

- Asbestos
- Certain Azo Colorants
- Certain Brominated Flame Retardants - may

Technical Specifications - Monitors

- 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 recycled, recovered or disposed of in a responsible manner.

Technical Specifications - Monitors

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|-------------------------------------|---|---|
| Other | Hewlett-Packard Corporate Environmental Information | For more information about HP's commitment to the environment: Global Citizenship Report http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html Eco-label certifications http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html ISO 14001 certificates: http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html |
| | 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 |
| Options | Color | Carbonite |
| | VESA External Mounting | Yes (Standard 4 hole pattern, 100 mm) |
| | Kensington Lock-Ready | Yes |
| | 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, 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. | |
| Compatibility | Compatible with platforms using the VESA standard video modes. Recommended for use with HP products. | |

Technical Specifications - Monitors

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.

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

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