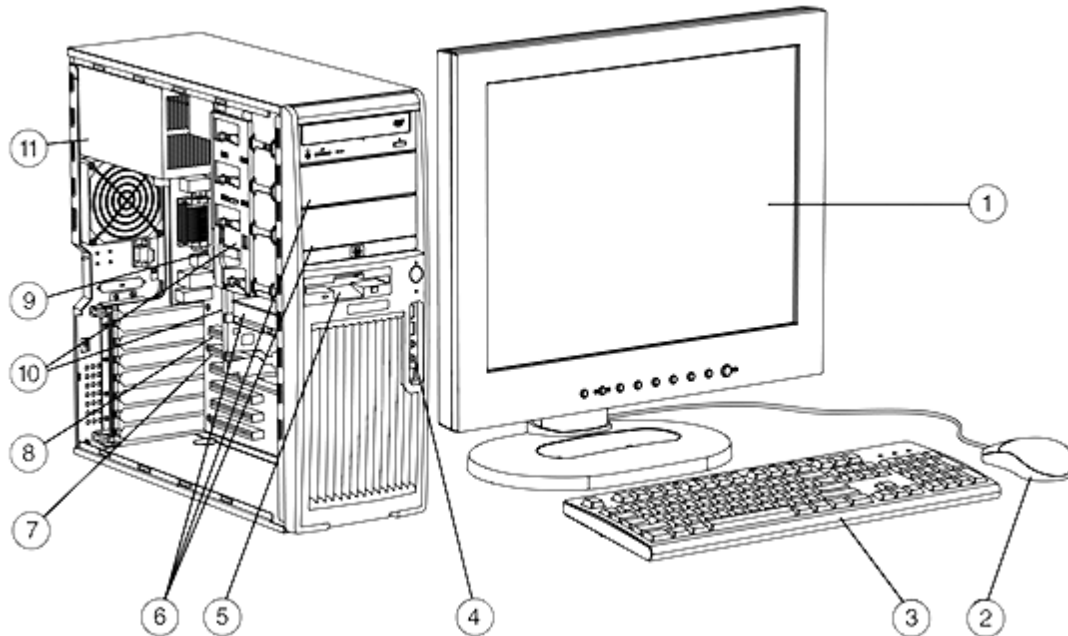


### Overview

**HP recommends Windows  
Vista™ Business**



1. Monitor (sold separately)
2. 2-Button Scroll Mouse
3. Standard 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 x16 slot (with x4 functionality)
8. 1 PCI Express x16 Graphics slot
9. Rear IO: 5 USB 2.0, 1 standard serial port, 1 optional serial port, 1 parallel port, PS/2 keyboard, PS/2 mouse, RJ-45, audio in, audio out, mic in
10. 1 USB 2.0 internal port
11. Intel® Core™ 2 Duo processor or Intel Pentium® D processor; both processors are EM64T capable
12. 460 watt (continuous) power supply

### At A Glance

### Overview

- 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
  - Microsoft Windows XP Professional (32-Bit)
  - Microsoft Windows XP Professional x64 Edition
  - Preloaded: Red Hat Enterprise Linux® WS 4 (Update 4 or later) (32- or 64-bit version)
  - HP Linux Installer Kit (see <http://www.hp.com/workstations/software/linux>)
  - Red Hat Enterprise Linux WS 4 (Update 4 or later) (32- or 64-bit version)
  - Red Hat Enterprise Linux WS 3 (Update 8) (32 or 64 bit version)
  - For detailed OS/hardware support information for Linux, see: [http://www.hp.com/support/linux\\_hardware\\_matrix](http://www.hp.com/support/linux_hardware_matrix)
- Intel Core™ 2 Extreme QX6700 processor with Intel® 64 Architecture
  - Quad-Core
  - 1066 MHz Front Side Bus
  - 8 MB L2 cache (2x4 MB shared)
  - Virtualization Technology
- Intel Core™ 2 Duo processor with Intel® 64 Architecture
  - Dual-Core
  - 800 or 1066 MHz Front Side Bus
  - 2 MB or 4 MB shared L2 cache
  - Virtualization Technology
- Intel® Pentium® D Processor with Intel® 64 Architecture
  - Dual-core
  - 4 MB dedicated L2 cache (2 MB per core)
- Intel 975X chipset
- Integrated HP Gbit LAN by Broadcom
- Convertible and tool-less minitower chassis
- 3 PCI Express slots/3 PCI slots
- Dual channel DDR2 memory at 667 MHz
- Four channel SATA Controller with RAID\*\* (Factory integrated RAID is Microsoft Windows only)
- 80 PLUS Power supply option and ENERGY STAR 4.0 configuration options available
- SATA optical drives option
- Realtek integrated high definition audio with internal speaker
- Pre-loaded Manageability tools (Microsoft Windows only)
- Protected by HP Services, including a 3-3-3 standard warranty. Terms and conditions vary by country. Certain restrictions and exclusions apply.

\* Not all Windows Vista features are available for use on all Windows Vista Capable PCs. All Windows Vista Capable PCs will run the core experiences of Windows Vista, such as innovations in organizing and finding information, security, and reliability. Some features available in premium editions of Windows Vista -- like the new Windows Aero™ user interface -- require advanced or additional hardware. Check <http://www.windowsvista.com/getready> for details.

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

### Standard Features - Custom Components

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

One of the following

Intel Core 2 Extreme QX6700 processor / 2.66 GHz, 4 MB x 2, 1066 FSB, Dual-Core, Intel Virtualization Technology

Intel Core 2 Duo E6700 Processor/ 2.67 GHz, 4 MB L2, 1066 MHz FSB, Dual-Core, Intel Virtualization Technology

Intel Core 2 Duo E6600 Processor/ 2.40 GHz, 4 MB L2, 1066 MHz FSB, Dual-Core, Intel Virtualization Technology

Intel Core 2 Duo E6420 Processor/ 2.13 GHz, 4 MB L2, 1066 MHz FSB, Dual-Core, Intel Virtualization Technology

Intel Core 2 Duo E6400 Processor/ 2.13 GHz, 2 MB L2, 1066 MHz FSB, Dual-Core, Intel Virtualization Technology

Intel Core 2 Duo E6320 Processor/ 1.86 GHz, 4 MB L2, 1066 MHz FSB, Dual-Core, Intel Virtualization Technology

Intel Core 2 Duo E6300 Processor/ 1.86 GHz, 2 MB L2, 1066 MHz FSB, Dual-Core, Intel Virtualization Technology

Intel Core 2 Duo E4300 Processor/ 1.80 GHz, 2 MB L2, 800 MHz FSB, Dual-Core

Intel Core 2 Duo E2160 Processor/ 1.80 GHz, 1 MB L2, 800 MHz FSB, Dual-Core

#### NOTE:

Intel processor numbers are not a measurement of higher performance. Processor numbers differentiate features within each processor family, not across different processor families. See [http://www.intel.com/products/processor\\_number/](http://www.intel.com/products/processor_number/) for details. Intel® 64 Architecture requires a computer system with a processor, chipset, BIOS, operating system, device drivers, and applications enabled for Intel® 64 Architecture. Processor will not operate (including 32-bit operation) without an Intel® 64 Architecture-enabled BIOS. Performance will vary depending on your hardware and software configurations. See <http://www.intel.com/technology/64bitextensions> for more information including details on which processors support Intel® 64 Architecture or consult with your system vendor for more information. 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. Virtualization technology-enabled BIOS and VMM applications are currently in development.

#### Operating System –

One of the following

Microsoft Vista™ Business 32 or 64

Genuine Windows XP Professional SP2 (32-Bit)

Genuine Windows XP Professional x64 Edition (64-Bit)

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 (Update 4 or later) (32- or 64-bit version)

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

Red Hat Enterprise Linux WS 4 (Update 4 or later) (32- or 64-bit version)

Red Hat Enterprise Linux WS 3 (Update 8) (32 or 64 bit version)

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

[http://www.hp.com/support/linux\\_hardware\\_matrix](http://www.hp.com/support/linux_hardware_matrix)

### Standard Features - Custom Components

| Energy conservation  | Windows Vista  | Windows XP     | Red Hat Linux |
|--|----------------|----------------|---------------|
| ENERGY STAR 4.0 configurations (includes 80 PLUS power supply) | 32-Bit         | 32-Bit         | Not supported |
| 80 PLUS power supply option only                               | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |

| 1-3 Hard Disk Drives –<br>Up to 3 of the following<br>SATA drives, or 3 of the<br>following SAS drives | Windows Vista  | Windows XP     | Red Hat Linux |
|--|----------------|----------------|---------------|
| <b>SATA Hard Drives</b>  |                |                |               |
| 80 GB 7200 rpm SATA 3.0Gb/s drive  | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |
| 160 GB 7200 rpm SATA 3.0Gb/s NCQ   | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |
| 250 GB 7200 rpm SATA 3.0Gb/s NCQ   | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |
| 500 GB 7200 rpm SATA 3.0Gb/s NCQ   | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |
| 750 GB 7200 rpm SATA 3.0Gb/s NCQ   | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |
| 80 GB 10K rpm SATA 1.5Gb/s NCQ   | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |
| 160 GB 10K rpm SATA 1.5Gb/s NCQ  | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |
| <b>Serial Attached SCSI (SAS) Hard Drives (SAS controller required)</b>                                |                |                |               |
| 146 GB 10K rpm SAS 3.0Gb/s   | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |
| 300 GB 10K rpm SAS 3.0Gb/s   | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |
| 73 GB 15K rpm SAS 3.0Gb/s  | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |
| 146 GB 15K rpm SAS 3.0Gb/s   | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |
| 300 GB 15K rpm SAS 3.0Gb/s   | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |

| 4th Hard Disk Drive –<br>One of the following (not<br>supported with 2nd<br>optical drive) | Windows Vista  | Windows XP     | Red Hat Linux |
|--|----------------|----------------|---------------|
| <b>SATA 3Gb/s Hard Drives</b>  |                |                |               |
| 160 GB 7200 rpm SATA 3.0Gb/s NCQ drive   | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |
| 500 GB 7200 rpm SATA 3.0Gb/s NCQ drive   | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |
| 750 GB 7200 rpm SATA 3.0Gb/s NCQ   | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |
| <b>Serial Attached SCSI (SAS) Drives (SAS controller required)</b>                         |                |                |               |
| 300 GB 10K rpm SAS 3.0Gb/s   | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |
| 300 GB 15K rpm SAS 3.0Gb/s drive   | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |

### Standard Features - Custom Components

| Factory Integrated RAID   | Windows Vista  | Windows XP     | Red Hat Linux |
|---|----------------|----------------|---------------|
| <b>RAID</b><br>(on motherboard for SATA drives. All drives must be identical in type and capacity)  | 32-Bit, 64-Bit | 32-Bit, 64-Bit | Not supported |
| RAID 0 Configuration - Striped Array (SATA or SAS)<br>(HD drive 3 cannot be 500 GB SATA. Not supported with 750 GB SATA)  | 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 |
| RAID 5 Configuration - Parity Array (SAS available now, SATA available later in 2007):<br>Only 80 GB or 160 GB HD drives allowed in SATA configuration. If SAS, 8 port controller required. | Not supported  | 32-Bit, 64-Bit | Not supported |
| RAID 10 Configuration - Striped/Mirrored Array (SAS available now, SATA available later in 2007):<br>4 HD drives required)  | Not supported  | 32-Bit, 64-Bit | Not supported |
| <b>NOTE:</b> Requires identical hard drives (speeds, capacity, interface). (HW RAID functionality not supported by Linux)   |                |                |               |

| Drive controllers  | Windows Vista   | Windows XP     | Red Hat Linux  |
|--|---|----------------|--|
| Integrated 4-channel SATA 3.0 Gb/s controller with RAID* 0, 1, 10, 5 and NCQ | 32-Bit, 64-Bit, RAID supported but not factory integrated | 32-Bit, 64-Bit | WS 3 & WS 4 (HW RAID functionality not supported by Linux) |
| Optional 4-port SAS LSI 3041E 3.0Gb RAID* Card**                             | 32-Bit, 64-Bit, RAID supported but not factory integrated | 32-Bit, 64-Bit | WS 3 & WS 4 (HW RAID functionality not supported by Linux) |
| LSI 8344ELP 8-port SAS HW RAID* Card***                                      | Not supported   | 32-Bit, 64-Bit |  |

\*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

\*\*\* Supported only with RAID5. Not supported when HD drive 1 is SATA

### Standard Features - Custom Components

| Memory –<br>One of the following |  | Windows Vista  | Windows XP     | Red Hat Linux |
|----------------------------------|--|----------------|----------------|---------------|
|                                  | <b>PC2-5300E ECC Unbuffered RAM DIMMs</b>                  |                |                |               |
|                                  | HP 512 MB (2 x 256 MB) PC2-5300E DDR2-667 ECC              | 32-Bit         | 32-Bit, 64-Bit | WS 3, WS 4    |
|                                  | HP 1 GB (2 x 512 MB) PC2-5300E DDR2-667 ECC                | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |
|                                  | HP 1.5 GB (2 x 256 MB + 2 x 512 MB) PC2-5300E DDR2-667 ECC | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |
|                                  | HP 2 GB (4 x 512 MB) PC2-5300E DDR2-667 ECC                | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |
|                                  | HP 2 GB (2 x 1 GB) PC2-5300E DDR2-667 ECC                  | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |
|                                  | HP 3 GB (2 x 512 + 2 x 1 GB) PC2-5300E DDR2-667 ECC        | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |
|                                  | HP 4 GB (2 x 2 GB) PC2-5300E DDR2-667 ECC                  | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |
|                                  | HP 4 GB (4 x 1 GB) PC2-5300E DDR2-667 ECC                  | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |
|                                  | HP 6 GB (2 x 1 GB + 2 x 2 GB) PC2-5300E DDR2-667 ECC       | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |
|                                  | HP 8 GB (4 x 2 GB) PC2-5300E DDR2-667 ECC                  | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |
|                                  | <b>PC2-5300U Non-ECC Unbuffered RAM DIMMs</b>              |                |                |               |
|                                  | HP 256 MB (1 x 256 MB) PC2-5300U DDR2-667 non-ECC          | Not supported  | 32-Bit, 64-Bit | Not supported |
|                                  | HP 512 MB (2 x 256 MB) PC2-5300U DDR2-667 non-ECC          | 32-Bit         | 32-Bit, 64-Bit | WS 3, WS 4    |
|                                  | HP 1 GB (2 x 512 MB) PC2-5300U DDR2-667 non-ECC            | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |
|                                  | HP 2 GB (4 x 512 MB) PC2-5300U DDR2-667 non-ECC            | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |

**NOTE:** Do not mix ECC and non-ECC memory. The system will not boot if ECC and non-ECC DIMMs are mixed. Only unbuffered DDR2 DIMMs are supported. All DIMMs must be either x8 or x16 width.

### Standard Features - Custom Components

| Removable Storage                            | Windows Vista   | Windows XP     | Red Hat Linux |
|--|---|----------------|---------------|
| No Floppy Drive option                       | N/A   | N/A            | N/A           |
| 1.44 MB Diskette Drive*                      | TBD   | 32-Bit, 64-Bit | WS 3, WS 4    |
| 16X DVD-ROM with +R Read                     | 32-Bit, 64-Bit  | 32-Bit, 64-Bit | WS 3, WS 4    |
| 48X CD-RW/DVD-ROM Combo                      | 32-Bit, 64-Bit  | 32-Bit, 64-Bit | WS 3, WS 4    |
| SATA 48X CD-RW/DVD-ROM Combo Drive           | 32-Bit, 64-Bit<br>(expected availability in July 2007)        | 32-Bit, 64-Bit | WS 3, WS 4    |
| 16X DVD+/-RW, DL LightScribe**               | 32-Bit, 64-Bit  | 32-Bit, 64-Bit | WS 3, WS 4    |
| SATA SuperMulti DVD+/-RW LightScribe Drive** | 32-Bit, 64-Bit<br>(64-bit expected availability in July 2007) | 32-Bit, 64-Bit | WS 3, WS 4    |

\* 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. LightScribe software works with Microsoft Windows XP and Vista only.

| Input Devices                           | Windows Vista  | Windows XP     | Red Hat Linux |
|---|----------------|----------------|---------------|
| <b>Keyboard*</b> – One of the following |                |                |               |
| No Keyboard option                      | N/A            | N/A            | N/A           |
| PS/2 Standard Keyboard                  | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |
| USB Standard Keyboard                   | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |
| <b>Mouse</b> – One of the following     |                |                |               |
| No Mouse option                         | N/A            | N/A            | N/A           |
| PS/2 2-Button Scroll Mouse              | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |
| USB 2-Button Optical Scroll Mouse       | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |
| USB 3-Button Optical Mouse              | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |

\* Mixing USB and PS/2 not supported in Linux - Both Mouse and Keyboard must be either PS/2 or USB.

| Audio  | Windows Vista  | Windows XP     | Red Hat Linux |
|--|----------------|----------------|---------------|
| Integrated High Definition audio with internal speaker | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |
| Sound Blaster X-Fi XtremeMusic Audio Card              | Not supported  | 32-Bit         | Not Supported |

| NIC (Network Interface Controller)                           | Windows Vista  | Windows XP     | Red Hat Linux |
|--|----------------|----------------|---------------|
| Integrated PCIe Broadcom 5755 Netxtreme Gigabit Ethernet NIC | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |

### Standard Features - Custom Components

| PCI Express Graphics –<br>Up to two of the<br>following* |                                       | Windows Vista  | Windows XP     | Red Hat Linux |
|--|---------------------------------------|----------------|----------------|---------------|
|  | HP No Graphics option                 | N/A            | N/A            | N/A           |
|  | <b>Professional 2D</b>                |                |                |               |
|  | NVIDIA Quadro NVS 285 PCIe (128 MB)*  | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |
|  | NVIDIA Quadro NVS 440 PCIe (256 MB)*  | 32-Bit, 64-Bit | 32-Bit, 64-Bit | Not supported |
|  | <b>Entry 3D</b>                       |                |                |               |
|  | NVIDIA Quadro FX 560 PCIe (128 MB)    | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |
|  | <b>Mid-range 3D</b>                   |                |                |               |
|  | NVIDIA Quadro FX 1500 PCIe (256 MB)*  | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |
|  | ATI FireGL V3350 PCIe (256 MB)        | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |
|  | <b>High-end 3D</b>                    |                |                |               |
|  | NVIDIA Quadro FX 3500 PCIe (256 MB)   | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |
|  | ATI FireGL V7200 PCIe (256 MB)        | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |
|  | NVIDIA Quadro FX 4500 PCIe (512 MB)   | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    |
|  | NVIDIA Quadro FX 4600 PCIe (768 MB)** | Not supported  | 32-Bit, 64-Bit | WS 3, WS 4    |

\* Two NVIDIA Quadro NVS 285 PCIe cards may be used together on Red Hat or Windows XP 32-bit or 64-bit. Two NVIDIA Quadro FX 1500 PCIe cards may be used together on Windows XP 32-bit and x64. One NVIDIA Quadro NVS 440 PCIe and NVIDIA Quadro NVS 285 PCIe may be used together on Windows XP 32-bit.

\*\* This card consumes 1 PCIE slot and 1 PCI slot reducing the maximum number of PCI cards in a system

| Miscellaneous |  | Windows Vista  | Windows XP     | Red Hat Linux |
|---------------|--|----------------|----------------|---------------|
|               | Solenoid lock and hood sensor              | TBD            | 32-Bit, 64-Bit | WS 3, WS 4    |
|               | Configure minitower in desktop orientation | N/A            | 32-Bit, 64-Bit | WS 3, WS 4    |
|               | HP IEEE 1394a 3-Port PCI Card              | 32-Bit, 64-Bit | 32-Bit, 64-Bit |               |

| Software |  | Windows Vista | Windows XP | Red Hat Linux |
|----------|--|---------------|------------|---------------|
|          | Microsoft Vista™ Business 64   | 64-Bit        | N/A        | N/A           |
|          | Microsoft Vista™ Business 32   | 32-Bit        | N/A        | N/A           |
|          | OR Genuine Windows XP Professional   | N/A           | 32-Bit     | N/A           |
|          | OR genuine Windows XP Professional x64 Edition   | N/A           | 64-Bit     | 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 Vista™ Business 32 downgrade to Microsoft Windows XP Professional SP2         | 32-bit        | 32-bit     | 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 Vista™ Business 32 downgrade to Microsoft Windows XP Professional SP2         | 32-bit        | 32-bit     | N/A           |

### Standard Features - Custom Components

|   |                                |                |               |
|---|--------------------------------|----------------|---------------|
| Alert Standard Format specification                   | TBD                            | 32-Bit, 64-Bit | N/A           |
| Symantec AntiVirus 10 (optional preinstall)           | 32-Bit, 64-Bit                 | 32-Bit, 64-Bit | N/A           |
| HP Performance Tuning Framework                       | 32-Bit, 64-Bit                 | 32-Bit, 64-Bit | N/A           |
| Optional HP ProtectTools Security                     | 32-Bit, 64-Bit                 | 32-Bit         |               |
| HP Backup and Recovery                                | 32-Bit, 64-Bit                 | 32-Bit, 64-Bit | N/A           |
| HP Client Manager Software v6.2 (optional download)   | 32-Bit, 64-Bit                 | 32-Bit, 64-Bit | N/A           |
| PDF Complete  | 32-Bit, 64-Bit                 | 32-Bit, 64-Bit | N/A           |
| Optional Microsoft Office 2007 Trial Edition          | 32-Bit (English language only) | 32-Bit         | N/A           |
| Optional Microsoft Office 2007 Small Business Edition | 32-Bit (English language only) | 32-Bit         | N/A           |
| Intervideo WinDVD with DVD player                     | 32-Bit, 64-Bit                 | 32-Bit, 64-Bit |               |
| Roxio Easy Media Creator                              | 32-Bit, 64-Bit                 | 32-Bit, 64-Bit | Not supported |

### Standard Features - Specs

|   |  |                              |
|---|--|------------------------------|
| <b>Form Factor</b>  | Minitower  |                              |
| <b>Color</b>  | Carbonite/Alloy metallic   |                              |
| <b>Convertibility</b>   | Yes. 5.25" drives rotate for Minitower or Desktop orientation.   |                              |
| <b>Expansion Slots</b> (see mainboard section for more details) | <ul style="list-style-type: none"> <li>• 3 PCI slots (full-height, full-length)</li> <li>• 1 PCI Express x16 slot (x4 functionality)</li> <li>• 1 PCI Express x1 slot</li> <li>• 1 PCI Express x16 graphics slot</li> </ul>  |                              |
| <b>Expansion Bays</b> (see storage section for more details)    | <ul style="list-style-type: none"> <li>• 2 internal 3.5" bays</li> <li>• 1 external 3.5" bay, 3 external 5.25" bays*</li> </ul> <p><b>NOTE:</b> Third external 5.25" bay is not full depth in side orientation.</p>  |                              |
| <b>Front I/O</b>  | 2 USB 2.0, 1 IEEE 1394 (requires optional PCI card to function), 1 audio out, and 1 microphone.<br><br><p><b>NOTE:</b> Although HP Personal Workstations can be ordered with the HP Installer Kit for Linux and an IEEE 1394 card, HP cannot provide customer support for this configuration. Please refer to the Linux Hardware Support Matrix (<a href="http://www.hp.com/support/linux_hardware_matrix">http://www.hp.com/support/linux_hardware_matrix</a>) for details, and to the Linux User Manual (<a href="http://www.hp.com/support/linux_user_manual">http://www.hp.com/support/linux_user_manual</a>) for tips on user-enablement of the IEEE 1394 Card.</p> |                              |
| <b>Internal I/O</b>   | 1 USB 2.0 header   |                              |
| <b>Rear I/O</b>   | 5 USB 2.0, 1 serial, 1 optional serial port, parallel port, 2 PS/2, RJ-45 (NIC), 1 audio in, 1 audio out, 1 microphone inches; audio/microphone ports can be made to function autosensing and interchangeably retaskable by downloading a driver)  |                              |
| <b>USB Keyboard</b>   | Optional   |                              |
| <b>USB Mouse</b>  | Optional   |                              |
| <b>PS/2 Keyboard</b>  | 1  |                              |
| <b>PS/2 Mouse</b>   | 1  |                              |
| <b>Interfaces Supported</b>                                     | 1 SATA 3 Gb/s interface (4 SATA connectors), 1 EIDE interface for optical drives   |                              |
| <b>Hard Drive Controller (PCI) Supported</b>                    | Optional Ultra320 or Ultra320 RAID (Hardware RAID is not supported on Linux systems. The Linux kernel, with built-in software RAID, provides excellent functionality and performance. It is a good alternative to hardware-based RAID. Please visit <a href="http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00060684/c00060684.pdf">http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00060684/c00060684.pdf</a> for RAID capabilities with Linux.)   |                              |
| <b>On-board RAID Support</b>                                    | Yes  |                              |
| <b>Chassis Dimensions (H x W x D)</b>                           | 17.7 x 6.6 x 17.9 inches; 45.0 x 16.8 x 45.6 cm<br>6.6 x 17.7 x 17.9 inches; 16.8 x 45.0 x 45.6 cm   |                              |
| <b>Weight</b>   | From 35.0 lb (15.88 kg), depending on configuration  |                              |
| <b>Shipping Weight</b>  | From 44.0 lb (19.96 kg), depending on configuration  |                              |
| <b>Temperature</b>  | Operating  | 40° to 95°F (5° to 35°C)     |
|   | Non-operating  | -40° to 140°F (-40° to 60°C) |
| <b>Humidity</b>   | Operating  | 8% to 85%                    |
|   | Non-operating  | 8% to 90%                    |
| <b>Maximum Altitude (non-pressurized)</b>                       | Operating  | 10,000 feet; 3,000 m         |
|   | Non-operating  | 30,000 feet; 9,100 m         |
| <b>Power Supply</b>   | 460 watts wide-ranging, active Power Factor Correction   |                              |

### After-Market Options

| PCI-Express Graphics                           | Windows Vista  | Windows XP     | Red Hat Linux | Part Number |
|--|----------------|----------------|---------------|-------------|
| <b>Professional 2D Multi Display Solutions</b> |                |                |               |             |
| NVIDIA Quadro NVS 285 PCIe                     | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    | EE061AA     |
| NVIDIA Quadro NVS 440 PCIe (256 MB)            | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    | PT453A      |
| <b>Entry 3D</b>                                |                |                |               |             |
| NVIDIA Quadro FX 560 PCIe (128 MB)             | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    | ES354AA     |
| <b>Mid-range 3D</b>                            |                |                |               |             |
| NVIDIA Quadro FX 1500 PCIe (256 MB)            | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    | ES355AA     |
| ATI FireGL V3350 PCIe (256 MB)                 | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    | RV705AA     |
| <b>High-end 3D</b>                             |                |                |               |             |
| NVIDIA Quadro FX 3500 PCIe (256 MB)            | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    | ES357AA     |
| ATI FireGL V7200 PCIe (256 MB)                 | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    | ES356AA     |
| NVIDIA Quadro FX 4600 PCIe (768 MB)**          | Not supported  | 32-Bit, 64-Bit | WS 3, WS 4    | RV706AA     |

| Hard Drives                         | Windows Vista     | Windows XP        | Red Hat Linux        | Part Number        |
|-------------------------------------|-------------------|-------------------|----------------------|--------------------|
| <b>SATA Hard Drives</b>             |                   |                   |                      |                    |
| HP 80 GB 10K rpm SATA 1.5Gb/s       | 32-Bit, 64-Bit    | 32-Bit, 64-Bit    | WS 3, WS 4           | EM172AA            |
| HP 160 GB 10K rpm SATA 1.5Gb/s      | 32-Bit, 64-Bit    | 32-Bit, 64-Bit    | WS 3, WS 4           | EW222AA            |
| HP 80 GB 7200 rpm SATA 3.0Gb/s      | 32-Bit, 64-Bit    | 32-Bit, 64-Bit    | WS 3, WS 4           | PY276AA            |
| HP 160 GB 7200 rpm SATA 3.0Gb/s NCQ | 32-Bit, 64-Bit    | 32-Bit, 64-Bit    | WS 3, WS 4           | PV944A             |
| HP 250 GB 7200 rpm SATA 3.0Gb/s NCQ | 32-Bit, 64-Bit    | 32-Bit, 64-Bit    | WS 3, WS 4           | EA788AA            |
| HP 500 GB 7200 rpm SATA 3.0Gb/s NCQ | 32-Bit, 64-Bit    | 32-Bit, 64-Bit    | WS 3, WS 4           | PV943A             |
| HP 750 GB 7200 rpm SATA 3.0Gb/s NCQ | 32-Bit, 64-Bit    | 32-Bit, 64-Bit    | WS 3, WS 4           | RH201AA            |
| <b>SAS Hard Drives</b>              |                   |                   |                      |                    |
|                                     | <b>Windows XP</b> | <b>Windows XP</b> | <b>Red Hat Linux</b> | <b>Part Number</b> |
| 146 GB 10K rpm SAS 3.0Gb/s          | 32-Bit, 64-Bit    | 32-Bit, 64-Bit    | WS 3, WS 4           | EM173AA            |
| 73 GB 15K rpm SAS 3.0Gb/s           | 32-Bit, 64-Bit    | 32-Bit, 64-Bit    | WS 3, WS 4           | EA329AA            |
| 146 GB 15K rpm SAS 3.0Gb/s          | 32-Bit, 64-Bit    | 32-Bit, 64-Bit    | WS 3, WS 4           | EA330AA            |
| 300 GB 10K rpm SAS 3.0Gb/s          | 32-Bit, 64-Bit    | 32-Bit, 64-Bit    | WS 3, WS 4           | RH937AA            |
| 300 GB 15K rpm SAS 3.0Gb/s          | 32-Bit, 64-Bit    | 32-Bit, 64-Bit    | WS 3, WS 4           | EM174AA            |

### After-Market Options

| Controllers  | Windows Vista  | Windows XP    | Red Hat Linux  | Part Number |
|--|----------------|---------------|----------------|-------------|
| <b>SCSI Controllers</b>  |                |               |                |             |
| LSI 3041E 4-Port SAS 3 Gb/s host adapter, supports RAID 0, 1 1E and 10E  | 32-Bit, 64-Bit | 32-Bit/64-Bit | Not supported* | EH417AA     |
| LSI 8344ELP 8-port SAS HW RAID Card  | Not supported  | 32-Bit/64-Bit | Not supported* | EX830AA     |
| <p>* Hardware RAID is not supported on Linux systems. The Linux kernel, with built-in software RAID, provides excellent functionality and performance. It is a good alternative to hardware-based RAID. Please visit <a href="http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00060684/c00060684.pdf">http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00060684/c00060684.pdf</a> for RAID capabilities with Linux.</p> |                |               |                |             |

| Removable storage devices                       | Windows Vista  | Windows XP     | Red Hat Linux | Part Number |
|---|----------------|----------------|---------------|-------------|
| 512 MB USB 2.0 Drive Key II                     | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    | ED516AA     |
| 1 GB USB 2.0 Drive Key II                       | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    | AG382AA     |
| 1.44 MB Internal Floppy Drive                   | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    | DY670A      |
| HP 16-In-1 Media Card Reader with PCI Card      | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    | EM718AA     |
| HP StorageWorks DAT 40 USB external tape drive  | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    | DW023A      |
| HP StorageWorks DAT 40 USB internal tape drive  | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    | DW022A      |
| HP StorageWorks DAT 72 USB external tape drive  | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    | DW027A      |
| HP StorageWorks DAT 72 USB internal tape drive  | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    | DW026A      |
| HP StorageWorks DAT 160 USB external tape drive | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    | Q1581A      |
| HP StorageWorks DAT 160 USB internal tape drive | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    | Q1580A      |

### After-Market Options

| Input Devices                                 | Windows Vista  | Windows XP     | Red Hat Linux | Part Number |
|---|----------------|----------------|---------------|-------------|
| <b>Keyboards</b>                              |                |                |               |             |
| HP PS/2 Standard Keyboard                     | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    | DT527A      |
| HP USB Standard Keyboard                      | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    | DT528A      |
| HP USB Smart Card Keyboard (Carbonite/Silver) | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    | ED707AA     |
| <b>Pointing Devices</b>                       |                |                |               |             |
| HP PS/2 2-Button Scroll Mouse (mechanical)    | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    | DD440B      |
| HP USB 2-Button Scroll Mouse (optical)        | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    | DC172B      |
| HP USB 3-button mouse (optical)               | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    | DY651A      |
| HP USB SpacePilot USB 3D Input Device         | TBD            | 32-Bit, 64-Bit | Not Supported | EF390AA     |
| HP USB SpaceExplorer USB 3D Input Device      | 32-Bit, 64-Bit | 32-Bit, 64-Bit | Not Supported | RY429AA     |

| Networking                                       | Windows Vista  | Windows XP     | Red Hat Linux | Part Number |
|--|----------------|----------------|---------------|-------------|
| <b>NICs</b>                                      |                |                |               |             |
| Intel Pro 1000 PT Gigabit PCI Express NIC        | 32-Bit, 64-Bit | 32-Bit         | WS 3, WS 4    | EH352AA     |
| Broadcom NetXtreme Gigabit Ethernet PCIe Adapter | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4    | EA833AA     |

| Memory (Unbuffered DIMMs)   |  | Windows XP     | Red Hat Linux  | Part Number |         |
|---|--|----------------|----------------|-------------|---------|
| <b>PC2-5300 DDR2-667 DIMMs (ECC Unbuffered)</b>   |  |                |                |             |         |
| Configurations less than 512 MB are not supported on either Microsoft Vista 32 or 64, configurations less than 1 GB are not supported on Microsoft Vista 64 | 256 MB (1 x 256 MB) PC2-5300E DDR2-667 ECC     | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4  | PV939A  |
|   | 512 MB (1 x 512 MB) PC2-5300E DDR2-667 ECC     | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4  | PV940A  |
|   | 1 GB (1 x 1 GB) PC2-5300E DDR2-667 ECC         | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4  | PV941A  |
|   | 2 GB (1 x 2 GB) PC2-5300E DDR2-667 ECC         | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4  | PV942A  |
| <b>PC2-5300 DDR2-667 Memory (non-ECC Unbuffered)</b>  |  |                |                |             |         |
|   | 256 MB (1 x 256 MB) PC2-5300U DDR2-667 non-ECC | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4  | PX974AA |
|   | 512 MB (1 x 512 MB) PC2-5300U DDR2-667 non-ECC | 32-Bit, 64-Bit | 32-Bit, 64-Bit | WS 3, WS 4  | PX975AA |

### After-Market Options

| Monitors | TFTs                                      | Part Number |
|----------|---|-------------|
|          | HP LP3065 24-inch Flat Panel Monitor TFT  | EZ320AA     |
|          | HP LP2465 24-inch Flat Panel Monitor TFT  | EF224AA     |
|          | HP L2065 20.1-inch Flat Panel Monitor TFT | EF227AA     |
|          | HP L1965 19.1-inch Flat Panel Monitor TFT | RA373AA     |

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

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

| Audio   | Windows Vista | Windows XP     | Red Hat Linux  | Part Number |
|---|---------------|----------------|----------------|-------------|
| SoundBlaster X-Fi XtremeMusic Audio Card (Windows only) | Not supported | 32-Bit, 64-Bit | 32-Bit, 64-Bit | EA326AA     |
| HP Satellite Speakers                                   | ZD929AA       | 32-Bit, 64-Bit | 32-Bit, 64-Bit | ZD929AA     |
| HP USB Powered Speakers                                 | RD628AA       | 32-Bit, 64-Bit | 32-Bit, 64-Bit | RD628AA     |

| Optical Drives  | Windows Vista  | Windows XP      | Red Hat Linux | Part Number |
|---|--|-----------------|---------------|-------------|
| <b>DVD-ROM Drive</b>  |  |                 |               |             |
| 16X DVD-ROM w/ +R read  | 32-Bit, 64-Bit   | 32-Bit, 64-Bit  | WS 3, WS 4    | AA620B      |
| <b>Combo Drive</b>  |  |                 |               |             |
| 48X DVD-ROM/CD-RW Combo (Roxio & WinDVD on Microsoft Windows) | 32-Bit, 64-Bit   | 32-Bit, 64-Bit  | WS 3, WS 4    | DE206B      |
| SATA 48X CD-RW/DVD-ROM Combo Drive                            | 32-Bit, 64-Bit (64-bit expected availability in July 2007) | 32-Bit, 64-Bit  | WS 3, WS 4    | EW267AA     |
| <b>DVD+/-RW Drive</b>   |  |                 |               |             |
| 16X DVD+/-RW DL LightScribe *                                 | 32-Bit, 64-Bit   | 32-Bit, 64-Bit* | WS3, WS 4**   | DZ555B      |
| SATA SuperMulti DVD+/-RW LightScribe*                         | 32-Bit, 64-Bit (64-bit expected availability in July 2007) | 32-Bit, 64-Bit  | WS 3, WS 4**  | EW269AA     |

### After-Market Options

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

\*\* LightScribe software works with Microsoft Windows XP and Vista only.)

| Security                              | Part Number |
|---------------------------------------|-------------|
| HP Solenoid Hood Lock/Sensor Kit      | DE618A      |
| HP Business PC Security Lock Kit      | PV606AA     |
| HP 2006 Business PC Security Lock Kit | EV265AA     |
| Kensington Security Cable & Lock      | PC766A      |

| Racking Options                               | Part Number |
|---|-------------|
| HP xw400 Depth Adjustable Fixed Rail Rack Kit | EK729AA     |

| Other Devices                                  | 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 3-Port Internal SCSI Cable                  | DY661A      |
| HP Power Cord Kit                              | DM293A      |
| HP Internal USB Port Kit                       | EM165AA     |

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

| Software                                      | Windows Vista  | Windows XP | Red Hat Linux | Part Number |
|---|----------------|------------|---------------|-------------|
| HP Remote Graphics SW V3 for HP Systems LTU   | Future support | 32-Bit     | Not supported | PY682AA     |
| HP Remote Graphics SW V3 Receiver LTU         | Future support | 32-Bit     | Not supported | PY684AA     |
| HP Remote Graphics SW V3 CD-ROM Media         | Future support | 32-Bit     | Not supported | PY685AA     |
| HP Remote SW for HP 1yr Update Subscription   | Future support | 32-Bit     | Not supported | PN680A      |
| HP Remote SW Receiver 1yr Update Subscription | Future support | 32-Bit     | Not supported | PN682A      |

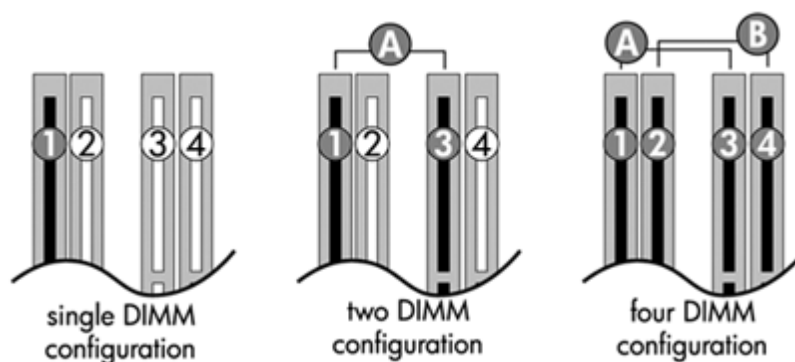
### Memory

#### Intel 975X Express chipset

#### PC2-5300E DDR2-667 or PC2-5300U DDR2-667DIMMS

Only unbuffered DDR2 DIMMs (ECC unbuffered or non-ECC) 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 975X chipset supports both PC2-5300 DDR2-667 non-ECC and ECC unbuffered 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 ECC Unbuffered or 2 GB DDR2-667 non-ECC SDRAM

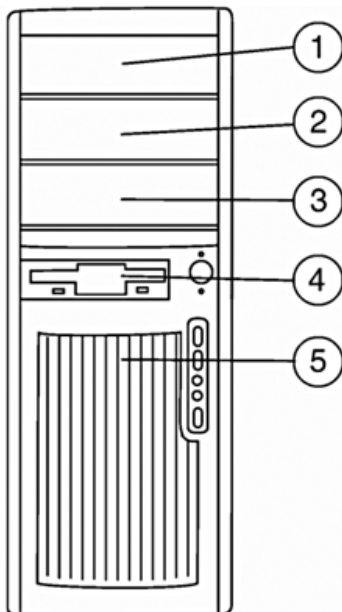
#### POSSIBLE MEMORY CONFIGURATIONS

Not all memory configurations possible are represented below.

| DIMM Size  | Slot   |        |        |        |
|--|--------|--------|--------|--------|
|  | 1      | 2      | 3      | 4      |
| 256 MB<br>(single channel performance configuration) | 256 MB |        |        |        |
| 512 MB   | 256 MB |        | 256 MB |        |
| 1 GB   | 512 MB |        | 512 MB |        |
| 1.5 GB   | 256 MB | 512 MB | 256 MB | 512 MB |
| 2 GB   | 1 GB   |        | 1 GB   |        |
| 2 GB   | 512 MB | 512 MB | 512 MB | 512 MB |
| 4 GB   | 1 GB   | 1GB    | 1 GB   | 1GB    |
| 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   |

### Storage Specifications

Tower configuration



|                              | Quantity Supported  | Position Supported  | Controller  |
|------------------------------|---|---|---|
| <b>Convertible Minitower</b> |   |   |   |
| Optional Diskette Drive      | 1   | 4   | Diskette  |
| Optical Disk Drives          | 2   | 1, 2  | IDE or SATA<br>(for SATA optical drives)  |
| Hard Disk Drives             | 2 standard (2 additional in<br>Optical Bays via adapter)<br>(4 SATA, 4 SAS) | 5, 6<br>(and 2 or 3, for 3rd or 4th<br>drives using optical bays,<br>adapter kit(s) required) | SATA (and/or optional SAS)<br>Factory Integrated RAID* 0, 1,<br>5, 10 (Levels 5, 10 available<br>in 2007)<br>User configurable SATA RAID<br>0, 1, 10 standard |

\* 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.

### Technical Specifications

|                                       |   |
|---------------------------------------|---|
| <b>System Board</b>                   |   |
| Processor                             | One dual-Core Intel Pentium D processor with Hyper-Threading Technology or one Dual-Core Intel® Core™ 2 Duo E6x00 or Dual-Core Intel Core 2 Extreme series processor, or one Quad-Core Intel Core 2 Extreme QX6700  |
| Processor Socket                      | Single LGA771   |
| CPU Bus Speed Supported               | 800 and 1066 MHz FSB  |
| Standard L2 Cache                     | 2 or 4 MB L2 cache, depending on specific processor and number of cores   |
| Chipset                               | Intel 975X North Bridge/ICH7R South Bridge  |
| Super I/O Controller                  | SMSC SCH5317  |
| 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 and non-ECC) memory modules, up to quad ranked   |
| Memory Speed Supported                | DDR2 SDRAM PC2-5300 (667 MHz) ECC<br>DDR2 SDRAM PC2-5300 (667 MHz) non-ECC  |
| Maximum Memory                        | 8 GB (4 DIMM slots)<br><br>* Maximum memory capacities assume 64-bit operating systems, such as genuine Windows® XP Professional x64 Edition. Genuine Windows XP Professional (32-bit) supports up to 4 GB. 32-bit Linux supports up to 8 GB.   |
| Memory Protection                     | ECC memory only - ECC available on data, parity on address and command  |
| Memory Modes                          | Dual channel  |
| DIMM Connectors (DDR2, 1.8V)          | 4<br>ECC support  |
| PCI Express Connectors (v1.0a)        | 1 PCI Express x16<br>1 PCI Express x16 (x4 bandwidth)<br>1 PCI Express x1   |
| PCI Connectors (5.0V)                 | 3 full length 33 MHz 32-Bit   |
| Interfaces Supported                  | 1 SATA 3.0Gb/s interface (4 SATA connectors); 1 PATA interface (2 PATA connectors) for optical drives   |
| Hard Drive Controller (PCI) Supported | Optional Serial Attached SCSI with RAID (Hardware RAID is not supported on Linux systems. The Linux kernel, with built-in software RAID, provides excellent functionality and performance. It is a good alternative to hardware-based RAID. Please visit <a href="http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00060684/c00060684.pdf">http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00060684/c00060684.pdf</a> for RAID capabilities with Linux.)   |
| Integrated SATA RAID                  | <ul style="list-style-type: none"> <li>RAID 0, 1, 5*, or 10* on a single array, up to 4 hard drives (*available 2007)</li> <li>Support for 1 or 2 RAID arrays on 4-ports for RAID 0 or 1</li> <li>RAID 1 spare and auto-rebuild</li> <li>Matrix RAID support</li> <li>AHCI support for NCQ drives</li> <li>3.0Gb/s drive support</li> </ul> <p><b>NOTE:</b> Hardware RAID is not supported on Linux systems. The Linux kernel, with built-in software RAID, provides excellent functionality and performance. It is a good alternative to hardware-based RAID. Please visit <a href="http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00060684/c00060684.pdf">http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00060684/c00060684.pdf</a> for RAID capabilities with Linux.</p> |

### Technical Specifications

|   |  |
|---|--|
| Network Controller                              | Integrated Broadcom 5755 Gigabit Ethernet LoM  |
| IEEE 1394a Connectors                           | 1 optional connector   |
| USB 2.0 Connectors                              | Front: 2<br>Rear: 5<br>Internal: 1   |
| Wake-On-Lan®                                    | Yes  |
| HD Integrated Audio                             | Integrated high definition digital audio with S/PDIF 6-channel pass-through, stereo microphone, and Yamaha XG Lite Softsynth support<br><br><b>NOTE:</b> If using RHEL WS 3, the audio drivers are not included as part of the standard RHEL WS 3 operating system. Use the ALSA audio drivers included on the HP Driver CD or from the HP support website. See <a href="http://www.hp.com/support/linux_hardware_matrix">http://www.hp.com/support/linux_hardware_matrix</a> and <a href="http://www.hp.com/support/linux_user_manual">http://www.hp.com/support/linux_user_manual</a> for details. |
| CD-ROM INCHES; Audio)                           | No   |
| AUX INCHES; Audio)                              | Yes  |
| Flash ROM                                       | Yes  |
| Clear CMOS Button                               | Yes  |
| CPU Fan Header                                  | Yes  |
| Chassis Fan Header                              | Yes  |
| Front Control Panel/Speaker Header              | Yes  |
| CMOS Battery Holder - Lithium                   | Yes  |
| Hood Lock Header                                | Yes  |
| Hood Sensor Header                              | Yes  |
| Multibay Header                                 | No   |
| Integrated Trusted Platform Module              | TPM 1.2  |
| ASF 2.0 (Alert Standard Format)                 | Yes  |
| Power Supply Headers                            | Yes  |
| Power Switch, Power LED & Hard Drive LED Header | Yes  |
| Password Clear Header                           | Yes  |

| Cooling                |             |
|------------------------|-------------|
| Chassis Fan            | 92 mm       |
| Convertibility         | 70 or 80 mm |
| Processor Heatsink Fan | 92 mm       |

### Technical Specifications

|   |  |                             |
|---|--|-----------------------------|
| <b>80 PLUS Power Supply Option</b>  | 460 watt custom power supply -<br>(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   | 7.4 A @ 100-240VAC   | 7.4 A @ 118 VAC             |
| Heat Dissipation<br>(Configuration and software dependent)                  | Typical  | 1121 btu/hr (283 kg-cal/hr) |
|   | Maximum  | 2415 btu/hr (609 kg-cal/hr) |
| Power Supply Fan  | 92x25 mm variable speed                                      |                             |
| Blue Angel Compliant (<5w in S5 - Power Off)                                | N/A  |                             |
| FEMP Standby Power Compliant @ 115V (<2W in S5 - Power Off)                 | YES  |                             |
| Power Consumption in ES Mode - Suspend to RAM (S3) (Instantly Available PC) | < 7 W  |                             |

|   |  |                             |
|---|--|-----------------------------|
| <b>Power Supply</b>   | 475 watt custom power supply -<br>(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 @ 100-127VAC<br>6 A @ 200-240VAC                        | 10 A @ 118 VAC              |
| Heat Dissipation<br>(Configuration and software dependent)                  | Typical  | 1013 btu/hr (255 kg-cal/hr) |
|   | Maximum  | 2027 btu/hr (511 kg-cal/hr) |
| Power Supply Fan  | 92x25 mm variable speed                                      |                             |
| Blue Angel Compliant (<5w in S5 - Power Off)                                | N/A  |                             |
| FEMP Standby Power Compliant @ 115V (<2W in S5 - Power Off)                 | YES  |                             |
| Power Consumption in ES Mode - Suspend to RAM (S3) (Instantly Available PC) | < 7 W  |                             |

|                     |   |
|---------------------|---|
| <b>ROM Features</b> |   |
| 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.          |

### Technical Specifications

|  |   |
|--|---|
| 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, Parallel, USB, Audio, Network, Enable/Disable Port Control | Enable or disables serial, parallel, USB, audio, and network ports  |
| Removable Media Write Control/ Boot Control                        | User can prevent the workstation from writing to or booting from removable media  |
| Power-On Password  | Prevents an unauthorized person from booting up the computer  |
| Setup Password   | Prevents an unauthorized person from changing the system configuration  |
| Replicated Setup   | Saves BIOS settings to diskette or USB flash device in human readable file. Repset.exe utility can then replicate these settings on machines being deployed without entering Computer Setup Utility (F10)   |
| Memory Change Alert (Requires HP Client Manager Software)          | Alerts management console if memory is removed or changed   |
| Thermal Alert (Requires HP Client Manager Software)                | Monitors the temperature state within the chassis. Three modes: <ul style="list-style-type: none"> <li>• NORMAL - normal temperature ranges</li> <li>• ALERTED - excessive temperatures are detected. Raises a flag so action can be taken to avoid shutdown or provide for a smoother system shutdown</li> <li>• SHUTDOWN - excessive temperatures are encountered. Automatically shuts down the computer without warning before hardware component damage occurs</li> </ul> |
| Remote ROM Flash   | Provides secure, fail-safe ROM image management from a central network console  |
| Remote Wakeup  | <ul style="list-style-type: none"> <li>• System administrators can power on, restart, and power off a client computer from a remote location.</li> </ul>  |
| ACPI (Advanced Configuration and Power Management Interface)       | <ul style="list-style-type: none"> <li>• Allows the system to enter and resume from low power modes (sleep states)</li> <li>• Controls system power consumption, making it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system</li> <li>• Supports ACPI 2.0 for full compatibility with 64-bit operating systems</li> </ul>   |
| SMBIOS   | System Management BIOS 2.4, 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  |

### Technical Specifications

|  |   |
|--|---|
| System board revision level                    | <ul style="list-style-type: none"> <li>Allows management SW to read revision level of the system board</li> <li>Revision level is digitally encoded into the HW and cannot be modified</li> </ul>   |
| Ownership Tag                                  | A user-defined string stored in non-volatile memory that is displayed in the BIOS splash screen   |
| Remote ROM Flash                               | Provides secure, fail-safe ROM image management from a central network console  |
| Remote Wakeup/<br>Remote Shutdown              | <ul style="list-style-type: none"> <li>System administrators can power on, restart, and power off a client computer from a remote location.</li> <li>Enables cost-effective power consumption when the administrator needs to distribute software, perform security management, or update the ROM.</li> </ul> |
| ROM Based Setup (F10) and Start-up Diagnostics | Yes   |

| Industry Standard    | Revision Supported by the BIOS  |
|----------------------|---|
| ACPI                 | Advanced Configuration and Power Management Interface, Version 2.0  |
| ASF                  | Alert Standard Format Specification, Version 2.0  |
| ATA (IDE)            | ATA Attachment 6 with Packet Interface (ATA/ATAPI-6), Revision 3b   |
| ATAPI                | ATAPI Removable Media Device BIOS Specification Version 1.0   |
| BBS                  | BIOS Boot Specification v1.01   |
| BIOS 32-bit Services | Standard BIOS 32-bit Service Directory Proposal   |
| CD Boot              | "El Torrito" Bootable CD-ROM Format Specification Version 1.0   |
| EDD                  | <ul style="list-style-type: none"> <li>Enhanced Disk Drive Specification Version 1.1</li> <li>BIOS Enhanced Disk Drive Specification Version 3.0</li> </ul>   |
| EHCI                 | Enhanced Host Controller Interface for Universal Serial Bus, Revision 1.0   |
| PCI                  | <ul style="list-style-type: none"> <li>PCI Local Bus Specification, Revision 2.3</li> <li>PCI Power Management Specification, Revision 1.1</li> <li>PCI Firmware Specification, Revision 3.0, Draft .7</li> </ul> |
| PCI Express          | PCI Express Base Specification, Revision 1.0a   |
| PMM                  | POST Memory Manager Specification, Version 1.01   |
| SATA                 | <ul style="list-style-type: none"> <li>Serial ATA Specification, Revision 1.0a</li> <li>Serial ATA 3 Gb/s: Extensions to Serial ATA 1.5 Gb/s, Revision 1.0</li> </ul>   |
| SMBIOS               | System Management BIOS Reference Specification, Version 2.4   |
| 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   |

### Other deployment & management features

|                                |   |
|--------------------------------|---|
| HP Client Management Solutions | <p>HP Client Management Solutions help simplify management of Workstations and significantly reduce total ownership costs. HP has two distinct client management product lines.</p> <p>The first client management product line consists of HP OpenView Configuration Management Solutions and HP OpenView Client Configuration Manager.</p> <p>The second client management product line is comprised of the HP Client Premium Suite, HP Client Foundation Suite, and HP Client Manager</p> <p>To learn more about all of these solutions, visit <a href="http://www.hp.com/go/easydeploy">http://www.hp.com/go/easydeploy</a></p> |
|--------------------------------|---|

### Technical Specifications

|   |  |
|---|--|
| HP Client Manager   | <p>HP Client Manager is available for free for use with all HP business PCs, Notebooks, and Workstations. It enables central tracking, monitoring, and management of the hardware aspects of HP client systems:</p> <ul style="list-style-type: none"> <li>• Get valuable hardware inventory information such as CPU, memory, video, and security settings</li> <li>• Monitor system health to fix problems before they occur</li> <li>• Install drivers and BIOS updates without visiting each PC</li> <li>• Remotely configure BIOS and security settings</li> <li>• Automate processes to quickly resolve hardware problems</li> </ul> <p>Additional Altiris solutions (fee-based) are available to address Workstation management challenges through the entire IT lifecycle including:</p> <ul style="list-style-type: none"> <li>• Inventory assessment</li> <li>• Software license compliance</li> <li>• Personality migration</li> <li>• Software image deployment</li> <li>• Software distribution</li> <li>• Asset management</li> <li>• Problem resolution</li> </ul> <p>Visit <a href="http://www.hp.com/go/clientmanager">http://www.hp.com/go/clientmanager</a> for more information, to download HP Client Manager, and to evaluate the Altiris solutions</p> |
| System Software Manager (free, Windows only)                    | A free utility that detects and updates BIOS, device drivers, and management agent versions on your networked PCs and workstations   |
| HP Backup and Recovery Manager (included with PC, Windows only) | <p>HP Backup and Recovery Manager saves your computer's software image on Recovery Discs (CDs or DVDs). You have the flexibility to save both the original factory software image that came with your HP computer and your software image that includes your customizations and data. These Recovery Discs enable full recovery of your computer should a critical hardware failure occur. Since HP now provides this simple tool to create your own Recovery Discs, HP commercial PCs that include HP Backup and Recovery Manager will not include factory restore CDs. HP Backup &amp; Recovery Manager is preloaded on new HP commercial desktops, workstations, notebooks, and tablet PCs introduced starting March 2006*. For product availability, visit <a href="http://www.hp.com/go/easydeploy">http://www.hp.com/go/easydeploy</a>.</p> <p>*Up to 8 GB of the hard drive is reserved for the system recovery software.</p>   |
| Replicated Setup  | Saves BIOS settings to diskette or USB disk-on-key in human readable file. Repset.exe utility can then replicate these settings on machines being deployed without entering ROM-based F10 setup  |
| Software Restore CD   | Restores computer to its original factory shipping image   |
| Asset Tag   | <ul style="list-style-type: none"> <li>• Repository for storing company-specific property asset numbers for easy tracking</li> <li>• Initially set equal to the system serial number</li> <li>• Stored in a protected section of non-volatile memory that can be accessed and modified with the F10 Setup program</li> </ul>   |
| DIMM Serial Presence Detect                                     | Detects whether or not memory DIMMs are present and their type   |
| Hard drive serial number, model, and manufacturer               | Hard drive manufacturer, model, and serial number is stored in the hard drive firmware and reported in ROM-based F10 setup   |
| Memory Change Alert (Requires HP Client Manager)                | Alerts management console if memory is removed or changed  |
| Ownership Tag   | A user-defined string stored in non-volatile memory that is displayed in the BIOS splash screen  |

### Technical Specifications

|   |   |
|---|---|
| Ultra ATA Integrity Monitoring (CRC Checking)                         | <p>A feature of SATA and SCSI, Cyclic Redundancy Checking provides data transfer verification and proactive notification of hard drive data transmission problems with recommendations for enhancing system performance. It detects all the following errors' types:</p> <ul style="list-style-type: none"> <li>• single-bit errors</li> <li>• double-bit errors</li> <li>• an odd number of errors</li> <li>• error bursts up to 32-bits long</li> </ul>   |
| Drive Self Tests (DPS)  | <ul style="list-style-type: none"> <li>• Drive Protection System (Adaptec and LSI SCSI controllers do not offer DPS)</li> <li>• A diagnostic hard drive self test. It scans critical physical components and every sector of the hard drive for physical faults and then reports any faults to the user.</li> <li>• Running independently of the operating system, it can be accessed through the computer's setup procedure. It produces an evaluation on whether the hard drive is the source of the problem and needs to be replaced.</li> </ul> <p>The system expands on the Self-Monitoring, Analysis, and Reporting Technology (SMART), a continuously running systems diagnostic that alerts the user to certain types of failures<br/>DPS Access through F10 Setup during Boot (F10 diagnostic access not available with SCSI drives)</p> |
| SMART Technology (Self-Monitoring, Analysis and Reporting Technology) | <p>Allows hard drives to monitor their own health and to raise flags if imminent failures were predicted<br/>Predicts failures before they occur. Tracks fault prediction and failure indication parameters such as re-allocated sector count, spin retry count, calibration retry count.<br/>By avoiding actual hard drive failures, SMART hard drives act as "insurance" against unplanned user downtime and potential data loss from hard drive failure.</p> <p>SMART I – Drive Failure Prediction<br/>SMART II – Off-Line Data Collection<br/>SMART III – Off-Line Read Scanning with Defect Reallocation</p>   |

| 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  |

### Technical Specifications

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

| <b>Other Features</b> |  |
|-----------------------|--|
| ACPI-Ready Hardware   | Advanced Configuration and Power Management Interface (ACPI). <ul style="list-style-type: none"> <li>• Allows the system to wake from a low power mode.</li> <li>• Controls system power consumption, making it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system</li> </ul> |

| <b>Serviceability Features of System</b>  |   |
|---|---|
| Access Panel  | Tool-less   |
| Optical Drives  | Tool-less   |
| Floppy Drive  | Tool-less   |
| Hard Drives   | Tool-less   |
| Expansion Cards   | Tool-less   |
| Green user touch points   | Yes, on tool-free internal chassis mechanisms                       |
| Color-coordinated cables and connectors   | Yes   |
| Memory  | Tool-less, can be upgraded without removing any internal components |
| System Board  | Tool-less removal   |
| Dual Color Power and HD LED on Front of Computer (Indicates Normal Operations and Fault Conditions) | green – normal<br>red – fault                                       |
| System/Emergency ROM Flash Recovery with Video  | Recovers corrupted system BIOS.                                     |
| Configuration Record SW   | Yes   |
| Over-Temp Warning on Screen (Requires IM Agents)  | Yes   |
| Restore CD set  | Restores the computer to its original factory shipping image        |
| Flash ROM   | Yes   |

### Technical Specifications

|   |  |
|---|--|
| 3.3V Aux Power LED on System PCA                                  | Yes  |
| Dual Function 5V Aux Power LED (ON)/PS_ON LED (OFF) on System PCA | Yes  |
| Diagnostic Power Switch LED on board                              | Yes  |
| Clear Password Jumper   | Yes  |
| Clear CMOS Button   | Yes  |
| CMOS Battery Holder for easy Replacement                          | Yes  |
| Processor ZIF Socket for easy Upgrade                             | Yes  |
| DIMM Connectors for easy Upgrade                                  | Yes  |
| NIC LEDs (integrated) (Green & Amber)                             | Used to determine NIC status   |
| ASF 1.0 support (Alert Standard Format)                           | Industry-standard specification for network alerting in operating system-absent environments |
| Dual Function Front Power Switch                                  | Also acts as a reset switch when held for 4 seconds  |

|                            |   |
|----------------------------|---|
| <b>Service and Support</b> | On-site Warranty and Service <sup>1</sup> : This three-year, limited warranty and service offering delivers three years of on-site, next business-day <sup>2</sup> service for parts and labor and includes free telephone support <sup>3</sup> 24 x 7. Global coverage <sup>2</sup> 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. |
|                            | <sup>1</sup> Terms and conditions may vary by country. Certain restrictions and exclusions apply.   |
|                            | <sup>2</sup> 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.  |
|                            | <sup>3</sup> Technical telephone support applies only to HP-configured, HP and HP-qualified, third-party hardware and software. Toll-free calling and 24 x 7 support may not be available in some countries.  |

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

### Technical Specifications

| Energy Consumption and Noise Emissions |  |                                     |              |             |              |             |              |
|--|--|-------------------------------------|--------------|-------------|--------------|-------------|--------------|
| <b>System Configuration</b>            | The configuration used for the Energy Consumption data for the Convertible Mini tower Desktop model is based on a "Typically Configured Desktop" |                                     |              |             |              |             |              |
| <b>Example Configuration #1</b>        | Processor Info   | 1x 3.4GHz Pentium D                 |              |             |              |             |              |
|  | Memory Info  | 2x1GB 667MHz                        |              |             |              |             |              |
|  | Graphics Info  | FX1500                              |              |             |              |             |              |
|  | Disks/Optical/Floppy   | 2x160GB SATA / 2 Optical / 1 Floppy |              |             |              |             |              |
| <b>Energy Consumption</b>              |  | 115 VAC                             |              | 230 VAC     |              | 100 VAC     |              |
|  |  | LAN Enabled                         | LAN Disabled | LAN Enabled | LAN Disabled | LAN Enabled | LAN Disabled |
|  | Windows Idle (S0)  | 132W                                |              | 128W        |              | 132W        |              |
|  | Windows Busy Typ(S0)   | 194W                                |              | 189W        |              | 195W        |              |
|  | Windows Busy Max (S0)  | 259W                                |              | 245W        |              | 261W        |              |
|  | Sleep (S3)   | 3.5W                                | 2.8W         | 4.1W        | 3.4W         | 3.4W        | 2.7W         |
|  | Off (S5)   | 2.3W                                | 1.2W         | 2.8W        | 1.8W         | 2.2W        | 1.2W         |
| <b>Heat Dissipation**</b>              |  | 115 VAC                             |              | 230 VAC     |              | 100 VAC     |              |
|  |  | LAN Enabled                         | LAN Disabled | LAN Enabled | LAN Disabled | LAN Enabled | LAN Disabled |
|  | Windows Idle (S0)  | 451 btu/hr                          |              | 437 btu/hr  |              | 451 btu/hr  |              |
|  | Windows Busy Typ(S0)   | 662 btu/hr                          |              | 645 btu/hr  |              | 666 btu/hr  |              |
|  | Windows Busy Max (S0)  | 884 btu/hr                          |              | 836 btu/hr  |              | 891 btu/hr  |              |
|  | Sleep (S3)   | 11.9 btu/hr                         | 9.56 btu/hr  | 13.9 btu/hr | 11.6 btu/hr  | 11.6 btu/hr | 9.22 btu/hr  |
|  | Off (S5)   | 7.85 btu/hr                         | 4.09 btu/hr  | 9.56 btu/hr | 6.14 btu/hr  | 7.51 btu/hr | 4.09 btu/hr  |
| <b>Example Configuration #2</b>        | Processor Info   | 1x 2.93GHz Core 2 Extreme           |              |             |              |             |              |
|  | Memory Info  | 2x1GB 667MHz                        |              |             |              |             |              |
|  | Graphics Info  | FX1500                              |              |             |              |             |              |
|  | Disks/Optical/Floppy   | 2x160GB SATA / 2 Optical / 1 Floppy |              |             |              |             |              |
| <b>Energy Consumption</b>              |  | 115 VAC                             |              | 230 VAC     |              | 100 VAC     |              |
|  |  | LAN Enabled                         | LAN Disabled | LAN Enabled | LAN Disabled | LAN Enabled | LAN Disabled |
|  | Windows Idle (S0)  | 137W                                |              | 134W        |              | 141W        |              |
|  | Windows Busy Typ(S0)   | 196W                                |              | 191W        |              | 198W        |              |
|  | Windows Busy Max (S0)  | 257W                                |              | 253W        |              | 268W        |              |
|  | Sleep (S3)   | 3.5W                                | 2.8W         | 4.1W        | 3.4W         | 3.5W        | 2.7W         |
|  | Off (S5)   | 2.3W                                | 1.2W         | 2.9W        | 1.8W         | 1.9W        | 1.2W         |

### 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)     | 468 btu/hr  |              | 457 btu/hr  |              | 481 btu/hr  |              |
| Windows Busy Typ(S0)  | 669 btu/hr  |              | 652 btu/hr  |              | 676 btu/hr  |              |
| Windows Busy Max (S0) | 877 btu/hr  |              | 863 btu/hr  |              | 915 btu/hr  |              |
| Sleep (S3)            | 11.9 btu/hr | 9.56 btu/hr  | 13.9 btu/hr | 11.6 btu/hr  | 11.6 btu/hr | 9.22 btu/hr  |
| Off (S5)              | 6.48 btu/hr | 4.09 btu/hr  | 9.89 btu/hr | 6.14 btu/hr  | 6.48 btu/hr | 4.09 btu/hr  |

\* Low energy mode

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

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

#### Declared Noise Emissions (High and entry level configurations)

**System Configuration (Entry-level)** The entry-level configuration used for the Declared Noise Emissions for the Convertible Mini tower Desktop model is based on a "Typically Configured Desktop"

| Declared Noise Emissions<br>(in accordance with ISO 7779 and ISO 9296) | Processor Info<br>Disks/Optical/Floppy                       | 1.86 GHz Conroe Intel Core 2 Duo E6300 Processor<br>1x 80 GB SATA / 1 DVD-ROM / 1 Floppy |  |
|--|--|--|--|
|  |  | Sound Power<br>(LWad, bels)  | Deskside<br>Sound Pressure<br>(LpAm, decibels) |
|  | Idle   | 4.2 Bels   | 26 dB  |
|  | SATA Hard drive Operating<br>(random reads - 30.3 reads/sec) | 4.3 Bels   | 27 dB  |
|  | Floppy Drive Operating<br>(continuous copy)                  | 5.1 Bels   | 33 dB  |
|  | DVD-ROM Operating<br>(sequential reads)                      | 5.1 Bels   | 39 dB  |

**System Configuration (High-end)** The high-end configuration used for the Declared Noise Emissions for the Convertible Mini tower Desktop model is based on a "Typically Configured Desktop"

| Declared Noise Emissions<br>(in accordance with ISO 7779 and ISO 9296) | Processor Info<br>Graphics Info<br>Disks/Optical/Floppy      | 2.66 GHz Conroe Intel Core 2 Duo E6700 Processor<br>Quadro FX 3500 with active heatsink<br>1x 73 GB 15K rpm SAS / 1 DVD-ROM / 1 Floppy |  |
|--|--|--|--|
|  |  | Sound Power<br>(LWad, bels)  | Deskside<br>Sound Pressure<br>(LpAm, decibels) |
|  | Idle   | 4.9 Bels   | 27 dB  |
|  | SATA Hard drive Operating<br>(random reads - 30.3 reads/sec) | 5.2 Bels   | 34 dB  |
|  | Floppy Drive Operating<br>(continuous copy)                  | 5.2 Bels   | 35 dB  |
|  | DVD-ROM Operating<br>(sequential reads)                      | 5.3 Bels   | 36 dB  |

### Technical Specifications

| <b>Longevity and Upgrading</b> | <p>This product is designed to be upgraded, possibly extending its useful life by several years. Spare parts are available throughout the warranty period and for up to 5 years after the end of production. Upgradeability features contained in the product include:</p> <ul style="list-style-type: none"> <li>• Intel LGA775 processor socket</li> <li>• 4 USB ports</li> <li>• 3 PCI slots and 3 PCI Express slots</li> <li>• 5 storage bays</li> <li>• 4 memory slots</li> </ul>   |         |                     |  |  |          |                             |         |          |           |         |
|--------------------------------|--|---------|---------------------|--|--|----------|-----------------------------|---------|----------|-----------|---------|
| <b>Batteries</b>               | <p>This product complies with ISO standards:</p> <ul style="list-style-type: none"> <li>• EU Directive 91/ 157/ EEC</li> <li>• EU Directive 93/ 86/ EEC</li> <li>• EU Directive 98/ 101/ EEC</li> </ul> <p>Batteries used in the product do not contain:</p> <ul style="list-style-type: none"> <li>• Mercury greater the 5ppm by weight</li> <li>• Cadmium greater than 10ppm by weight</li> <li>• Lead greater than 4000ppm by weight.</li> </ul> <p>Battery size: CR2032 (coin cell)<br/>Battery type: Lithium</p>  |         |                     |  |  |          |                             |         |          |           |         |
| <b>Additional Information</b>  | <ul style="list-style-type: none"> <li>• This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2002/95/EC.</li> <li>• This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive – 2002/96/EC.</li> <li>• Plastics parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.</li> <li>• This product contains 0% recycled materials (by wt.)</li> <li>• This product is &gt;90% recycle-able when properly disposed of at end of life.</li> </ul> <table border="1" data-bbox="349 1187 1495 1295"> <thead> <tr> <th data-bbox="349 1187 675 1222">Packaging Materials</th> <th data-bbox="680 1187 1072 1222"></th> <th data-bbox="1077 1187 1495 1222"></th> </tr> </thead> <tbody> <tr> <td data-bbox="349 1222 675 1257">External</td> <td data-bbox="680 1222 1072 1257">Cardboard carton and insert</td> <td data-bbox="1077 1222 1495 1257">2.70 kg</td> </tr> <tr> <td data-bbox="349 1257 675 1295">Internal</td> <td data-bbox="680 1257 1072 1295">LDPE Foam</td> <td data-bbox="1077 1257 1495 1295">0.35 kg</td> </tr> </tbody> </table> |         | Packaging Materials |  |  | External | Cardboard carton and insert | 2.70 kg | Internal | LDPE Foam | 0.35 kg |
| Packaging Materials            |  |         |                     |  |  |          |                             |         |          |           |         |
| External                       | Cardboard carton and insert  | 2.70 kg |                     |  |  |          |                             |         |          |           |         |
| Internal                       | LDPE Foam  | 0.35 kg |                     |  |  |          |                             |         |          |           |         |
| <b>Material Usage</b>          | <p>This product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at <a href="http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html">http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html</a>):</p> <ul style="list-style-type: none"> <li>• Asbestos</li> <li>• Certain Azo Colorants</li> <li>• Certain Brominated Flame Retardants – may not be used as flame retardants in plastics</li> <li>• Cadmium</li> <li>• Chlorinated Hydrocarbons</li> <li>• Chlorinated Paraffins</li> <li>• Formaldehyde</li> <li>• Halogenated Diphenyl Methanes</li> <li>• Lead carbonates and sulfates</li> <li>• Lead and Lead compounds</li> <li>• Mercuric Oxide Batteries</li> <li>• Nickel - finishes must not be used on the external surface designed to be frequently handled or carried by the user.</li> <li>• Ozone Depleting Substances</li> <li>• Polybrominated Biphenyls (PBBs)</li> </ul>  |         |                     |  |  |          |                             |         |          |           |         |

### Technical Specifications

|  |   |
|--|---|
|  | <ul style="list-style-type: none"> <li>• Polybrominated Diphenyl Ethers (PBBEs)</li> <li>• Polybrominated Biphenyl Oxides (PBBOs)</li> <li>• Polychlorinated Biphenyl (PCB)</li> <li>• Polychlorinated Terphenyls (PCT)</li> <li>• Polyvinyl Chloride (PVC) – except for wires and cables, and certain retail packaging has been voluntarily removed from most applications.</li> <li>• Radioactive Substances</li> <li>• Tributyl Tinches; TBT), Triphenyl Tinches; TPT), Tributyl Tin Oxide (TBTO)</li> </ul>   |
| <b>Packaging</b>   | <p>HP follows these guidelines to decrease the environmental impact of product packaging:</p> <ul style="list-style-type: none"> <li>• Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials.</li> <li>• Eliminate the use of ozone-depleting substances (ODS) in packaging materials.</li> <li>• Design packaging materials for ease of disassembly.</li> <li>• Maximize the use of post-consumer recycled content materials in packaging materials.</li> <li>• Use readily recyclable packaging materials such as paper and corrugated materials.</li> <li>• Reduce size and weight of packages to improve transportation fuel efficiency.</li> <li>• Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.</li> </ul> |
| <b>End-of-Life Management and Recycling</b>                | <p>Hewlett-Packard offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: <a href="http://www.hp.com/recycle">http://www.hp.com/recycle</a> or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.</p>  |
| <b>Hewlett-Packard Corporate Environmental Information</b> | <p>For more information about HP's commitment to the environment:<br/>         [link to new HP white paper now in progress]<br/>         Global Citizenship Report<br/> <a href="http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html">http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html</a><br/>         Eco-label certifications<br/> <a href="http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html">http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html</a><br/>         ISO 14001 certificates:<br/> <a href="http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html">http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html</a></p>              |

### Technical Specifications - Audio

|   |   |  |
|---|---|--|
| <b>Integrated Intel/Realtek HD ALC260 Audio</b> | <b>Type</b>   | Integrated   |
|   | <b>High Definition Codec</b>                        | Yes  |
|   | <b>FM Synthesis Support</b>                         | Yes  |
|   | <b>OPL3 FM Synthesis Support</b>                    | Yes  |
|   | <b>Sound Blaster Compatibility</b>                  | Yes  |
|   | <b>SPDIF 6-channel pass-through</b>                 | No   |
|   | <b>Audio Jacks</b>                                  | One Front fixed stereo analog Microphone-Inches; 20-K ohm Input Impedance)<br>One Front fixed stereo Headphone-Out (expects at least a 32ohm load)<br>One Line-In* (12-K ohm Input Impedance)*<br>One Line-Out * (less than 800 ohms Output Impedance, expects at least a 10-K ohm load)<br>One Stereo analog Microphone-In* (20-K ohm Input Impedance)<br><i>* 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.</i> |
|   | <b>Sampling</b>                                     | 44.1 kHz/48 kHz/96 kHz/192 kHz (output only)   |
|   | <b>Wavetable Syntheses (software)</b>               | Yes - GM and FM Midi Support, Direct Music and Down Loadable Soundset (4 Meg DLS Level 1 and 2 Support)  |
|   | <b>3D Positional Sound</b>                          | No   |
|   | <b>Digital Audio</b>                                | Yes  |
|   | <b>Analog Audio</b>                                 | Yes  |
|   | <b>DVD Audio</b>                                    | Yes  |
|   | <b>Number of Channels on Line-Out (mono/stereo)</b> | Stereo (Left & Right channels)   |
|   | <b>Internal Audio Speaker Power Rating</b>          | 1.5 W  |
|   | <b>Internal Speaker</b>                             | Yes  |
|   | <b>Hardware Equalizer for Internal Speaker</b>      | No   |
|   | <b>External Speaker Jack (Line-Out)</b>             | Yes  |
| <b>Sound Blaster X-Fi XtremeMusic (PCI)</b>     | <b>Audio Quality</b>                                | Total Harmonic Distortion + Noise at 1kHz (20kHz Low-pass filter) = 0.004%   |
|   | <b>Signal to Noise Ratio (SNR)</b>                  | Signal-to-Noise Ratio (20kHz Low-pass filter, A-Weighted) <ul style="list-style-type: none"> <li>• Stereo Output: 109dB</li> <li>• Front and Rear Channels: 109dB</li> <li>• Center, Subwoofer and Side Channels: 109dB</li> </ul>   |

### Technical Specifications - Audio

|   |   |   |
|---|---|---|
| <b>Sound Conversion</b>                     | 24-bit Analog-to-Digital conversion of analog inputs at 96kHz sample rate                         |   |
|   | 24-bit Digital-to-Analog conversion of digital sources at 96kHz to analog 7.1 speaker output      |   |
|   | 24-bit Digital-to-Analog conversion of stereo digital sources at 192kHz to stereo output          |   |
| <b>Recording/Sampling Rate</b>              | 44.1, 48 and 96kHz  |   |
| <b>ASIO 2.0 support</b>                     | 16-bit/44.1kHz, 16-bit/48kHz, 24-bit/44.1kHz 24-bit/48kHz and 24-bit/96kHz with direct monitoring |   |
| <b>Enhanced SoundFont support</b>           | up to 24-bit resolution   |   |
|   | 24-bit/96kHz  |   |
| <b>DACs</b>                                 | 24-bit/192kHz   |   |
| <b>Voice Support</b>                        | 128 voices  |   |
| <b>Max. Channels in 3D Positional Audio</b> | 7.1   |   |
| <b>EAX® ADVANCED HD™ 5.0 support</b>        | Yes including EAX® MacroFX™, EAX® PurePath™ and Environment FlexiFX™                              |   |
| <b>Connectors</b>                           | FlexiJack (Performing a 3-in-1 function, Digital In / Line In / Microphone) via 3.50 mm minijack  |   |
|   | Line level out (Front / Rear / Center / Subwoofer / Rear Center) via 3.50 mm minijacks            |   |
|   | AUX_IN line-level analog input via 4-pin Molex connector on card                                  |   |
|   | One AD_Link (26 pin) connector for linking to the X-Fi I/O Console (upgrade option)               |   |
| <b>Dimensions</b>                           | 7.25" x5" x .9"   |   |
| <b>Additional product features</b>          | <b>Movies</b>   | THX Certification<br>Dolby Digital EX 6.1 Playback<br>DTS-ES 6.1 Playback   |
|   | <b>Music</b>  | X-Fi 24-bit Crystalizer<br>CMSS-3D<br>SuperRip  |
|   | <b>Audio Creation</b>   | Pristine audio playback quality with a near transparent SRC engine<br>Up to eight 24 bit hardware effects<br>ASIO recording with latency as low as one millisecond<br>24-bit SoundFont® sampling<br>3D MIDI |
|   | <b>Gaming</b>   | EAX ADVANCED HD 5.0   |

### Technical Specifications - Audio

|                                    |                         |  |
|------------------------------------|-------------------------|--|
|                                    | <b>Software Bundle</b>  | Doom 3 Sound Blaster EAX patch<br>Entertainment Mode<br>Audio Creation Mode<br>Game Mode<br>Mode Switcher<br>Audio Console<br>Creative MediaSource<br>Creative MediaSource DVD-Audio Player<br>DTS Neo:6 Settings<br>Karaoke Player<br>Entertainment Center<br>Smart Recorder<br>SoundFont Bank Manager<br>Speaker Connection Wizard<br>THX Setup Console<br>Vienna SoundFont Studio<br>Volume Panel<br>WaveStudio<br>Console Launcher<br>Creative Media Toolbox<br>Creative Diagnostics |
| <b>Minimum system requirements</b> | <b>System RAM</b>       | 256MB  |
|                                    | <b>Hard disk</b>        | 600MB free space<br>Available PCI 2.1 slot for the audio card<br>CD-ROM/CD-RW or CD/DVD-ROM required for software installation   |
|                                    | <b>Operating System</b> | Microsoft Windows XP Service Pack 2 (SP2)  |

### Technical Specifications - Communications

|  |  |   |
|--|--|---|
| <b>Integrated PCI Express<br/>Broadcom BCM5755<br/>NetXtreme Gigabit<br/>Ethernet Network<br/>Controller LoM</b> | <b>Connector</b>   | RJ-45   |
|  | <b>Controller</b>  | Broadcom 5755 PCI-E LAN Controller                            |
|  | <b>Memory</b>  | Integrated 64KB receive buffer and 8KB transmit buffer        |
|  | <b>Data rates supported</b>  | 10/100/1000 Mbps  |
|  | <b>Compliance</b>  | IEEE 802.3, 802.3AB and 802.3u compliant, 802.3x flow control |
|  | <b>Bus architecture</b>  | PCI-E 1.0a  |
|  | <b>Data path width</b>   | X1  |
|  | <b>Data path speed</b>   | 2.5Gbit per sec per direction transfer rate                   |
|  | <b>Data transfer mode</b>  | Bus-master DMA  |
|  | <b>Hardware certifications</b>   |   |
|  | <b>Power requirement</b>   | 1.5 watts @ +3.3V AUX supply                                  |
|  | <b>Boot ROM support</b>  | Yes   |
|  | <b>Network transfer rate</b>   | 10BASE-T (half-duplex) 10 Mbps                                |
|  |  | 10BASE-T (full-duplex) 20 Mbps                                |
|  |  | 100BASE-TX (half-duplex) 100 Mbps                             |
|  |  | 100BASE-TX (full-duplex) 200 Mbps                             |
|  |  | 1000BASE-T, 1000 Mbps   |
| <b>Operating system driver support</b>   | Microsoft Windows Vista Business 32 and 64, Microsoft Windows XP Professional, Microsoft Windows XP Professional x64 Edition, Red Hat Enterprise Linux 3 |   |
| <b>Management capabilities</b>   | WOL, PXE   |   |
| <b>Alerting</b>  | ASF 2.0  |   |

|  |                                |  |
|--|--------------------------------|--|
| <b>Intel Pro 1000 PT PCI<br/>Express Gigabit NIC<br/>(Part# EH352AA)</b> | <b>Connector</b>               | RJ-45  |
|  | <b>Controller</b>              | Intel 82572EI Gigabit Ethernet Controller  |
|  | <b>Memory</b>                  | Integrated Dual 48K configurable transmit receive FIFO Buffers                         |
|  | <b>Data rates supported</b>    | 10/100/1000 Mbps   |
|  | <b>Compliance</b>              | IEEE 802.1P, 802.1Q, 802.2, 802.3, 802.3AB and 802.3u compliant, 802.3x flow control   |
|  | <b>Bus architecture</b>        | PCI-E 1.0a   |
|  | <b>Data path width</b>         | X1, 250MB/s, Bi-directional interface  |
|  | <b>Data transfer mode</b>      | Bus-master DMA   |
|  | <b>Hardware certifications</b> | FCC, B, CE, TUV- cTUVus Mark Canada and United States, TUV- GS Mark for European Union |
|  | <b>Power requirement</b>       | Aux 3.3V, 3.0 Watts in 1000base-T and 2.0 Watts in 100Base-T                           |
|  | <b>Boot ROM support</b>        | Yes  |
|  | <b>Network transfer rate</b>   | 10BASE-T (half-duplex) 10 Mbps   |
|  |                                | 10BASE-T (full-duplex) 20 Mbps   |
| 100BASE-TX (half-duplex) 100 Mbps  |                                |  |
| 100BASE-TX (full-duplex) 200 Mbps  |                                |  |
| 1000BASE-T, 1000 Mbps  |                                |  |

### Technical Specifications - Communications

|  |   |                             |
|--|---|-----------------------------|
| <b>Environmental</b>                   | <b>Operating temperature</b>  | 32° to 131° F (0° to 55° C) |
|  | <b>Operating humidity</b>   | 85% at 131° F (55° C)       |
| <b>Dimensions</b>                      | 6.4 x 2.6 x 0.8 inches; 16.3 x 6.6 x 1.9 cm)  |                             |
| <b>Operating system driver support</b> | Microsoft Windows Vista Business 32 and 64, Microsoft XP, Red Hat Linux 7.2, Linux 7.3 and Red Hat Enterprise Linux WS 3              |                             |
| <b>Management capabilities</b>         | ASF, WOL , PXE, DMI, WFM 2.0.   |                             |
| <b>Kit contents</b>                    | Intel Pro 1000 PT PCI Express Gigabit NIC, CD containing Intel PROset II NIC drivers, quick install guide, product warranty statement |                             |

#### Broadcom BCM5751 NetXtreme Gigabit Ethernet Controller (PCIe) (Part# EA833AA)

|  |   |
|--|---|
| <b>Connector</b>                       | RJ-45   |
| <b>Controller</b>                      | Broadcom 5751 PCI-E 1.0a LAN Controller   |
| <b>Memory</b>                          | Integrated 96Kb frame buffer memory   |
| <b>Data rates supported</b>            | 10/100/1000 Mbps  |
| <b>Compliance</b>                      | IEEE 802.3, 802.3AB and 802.3u compliant, 802.3x flow control   |
| <b>Bus architecture</b>                | PCI-E 1.0a  |
| <b>Data path width</b>                 | X1  |
| <b>Data path speed</b>                 | 2.5Gbit per sec per direction transfer rate   |
| <b>Data transfer mode</b>              | Bus-master DMA  |
| <b>Hardware certifications</b>         | FCC class B, NRTL Mark Canada and United States, C-Tick for Australia, BSMI for Taiwan, VCCI for Japan, MIC for Korea, GOST for Russia                              |
| <b>Power requirement</b>               | 3.1 watts @ +3.3V AUX supply  |
| <b>Boot ROM support</b>                | Yes   |
| <b>Network transfer rate</b>           | 10BASE-T (half-duplex) 10 Mbps<br>10BASE-T (full-duplex) 20 Mbps<br>100BASE-TX (half-duplex) 100 Mbps<br>100BASE-TX (full-duplex) 200 Mbps<br>1000BASE-T, 1000 Mbps |
| <b>Environmental</b>                   | <b>Operating temperature</b> 32° to 131° F (0° to 55° C)<br><b>Operating humidity</b> 85% at 131° F (55° C)   |
| <b>Dimensions</b>                      | 4.4 x 2.2 x 0.08 inches; 11.2 x 5.5 x .2 cm   |
| <b>Operating system driver support</b> | Microsoft Windows Vista Business 32 and 64, Microsoft Windows 2000 and XP, Red Hat Linux 7.2, 7.3 and Red Hat Enterprise Linux 3                                    |
| <b>Management capabilities</b>         | WOL, PXE , Remote cable management  |
| <b>Alerting</b>                        | ASF 2.0   |
| <b>Kit contents</b>                    | Broadcom 5751, CD, Broadcom NetXtreme Gigabit Ethernet PCI NIC, drivers, quick install guide, product warranty statement  |

#### Agere Systems PCI International

|                          |  |
|--------------------------|--|
| <b>Data Transmission</b> | Technology speeds: 56,000 Kbps maximum downstream data, controllerless |
|--------------------------|--|

### Technical Specifications - Communications

#### Softmodem

**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.

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

### Technical Specifications - Communications

#### Kit Contents

DC132D : Agere Systems PCI International Softmodem with full-height bracket attached, additional low-profile bracket, RJ11 modem cable, driver and documentation CD.

**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

|  |  |   |                                 |  |
|--|--|---|---------------------------------|--|
| <b>LSI SAS 8344ELP<br/>3Gb/s RAID Controller</b> | <b>PCI Bus</b>   | PCI-Express x4 lanes                              |                                 |  |
|  | <b>PCI Modes</b>   | Bus Master DMA                                    |                                 |  |
|  | <b>RAID Levels</b>   | 0, 1, 5, 10 and 50                                |                                 |  |
|  | <b>PCI data burst transfer rate</b>  | 1.0 GBps ( half duplex ) 2.0 GBps ( full duplex ) |                                 |  |
|  | <b>SAS Bandwidths</b>  | <b>Half Duplex</b>                                | <b>Full Duplex</b>              |  |
|  |  | Single lane - 300 MBps                            | Single SAS Lane - 600 MBps      |  |
|  |  | Wide Port (2 lanes) - 600 MBps                    | Wide Port (2 lanes) - 1200 MBps |  |
|  |  | Wide Port (4 lanes) - 1200 MBps                   | Wide Port (4 lanes) - 2400 MBps |  |
|  | <b>PCI Card Type</b>   | 3.3 volt add-in card                              |                                 |  |
|  | <b>PCI Voltage</b>   | 12 V ± 10%  |                                 |  |
|  | <b>PCI Form Factor</b>   | 6.6" x 2.731" (Low-profile)                       |                                 |  |
|  | <b>PCI Power</b>   | 7.5 Watts   |                                 |  |
|  | <b>Bracket</b>   | Full height and Low-profile                       |                                 |  |
|  | <b>Certification Level</b>   | PCI-Express 1.0a                                  |                                 |  |
|  | <b>IO Bus</b>  | Eight 3Gbps SAS/SATA ports                        |                                 |  |
|  | <b>SAS Processor</b>   | Intel IOP333 I/O Processor                        |                                 |  |
|  | <b>Internal Connectors</b>   | One SAS SFF8087 x4 internal connector             |                                 |  |
|  | <b>External Connectors</b>   | One SAS SFF8470 x4 external connector             |                                 |  |
|  | <b>Max. Number of SAS Devices</b>  | 32  |                                 |  |
|  | <b>LED Indicators</b>  | On-board activity and fault LEDs                  |                                 |  |
|  | <b>Integrated Mirroring</b>  | Integrated Mirroring option available             |                                 |  |
|  | <b>Environments</b>  | Operating   | Storage                         |  |
| <b>Temperature</b>                               | 0 to 60 C  | -45 to +105 C                                     |                                 |  |
| <b>Relative Humidity</b>                         | 5 to 90% non-condensing  | 5 to 90% non-condensing                           |                                 |  |
| <b>MTBF</b>                                      | >200,000 hours   |   |                                 |  |
| <b>Compliances</b>                               | EMC: Class B-US (CFR 47, P15B); Canada (ICES-003); Japan (V-3/02.04); Europe (EN55022/EN55024); Australia/New Zealand (AS/NZS 3548); Safety: EN60950 |   |                                 |  |
| <b>Operating system support</b>                  | Microsoft® Windows® XP Professional, XP Professional x64<br>Red Hat Linux WS3 and WS4  |   |                                 |  |
| <b>Kit contents</b>                              | Controller card, driver CD, LED cables, user documentation and warranty card.  |   |                                 |  |

\* Due to the placement of the I/O controller engine on the SAS 8344ELP, external cables from the SAS 8344ELP RAID controller to the storage enclosure may not be longer than two meters; this card also does not support the use of external fan-out cables. See [http://h20000.www2.hp.com/bizsupport/TechSupport/Document.jsp?lang=en&cc=us&objectID=c00817918&jumpid=reg\\_R1002\\_USEN](http://h20000.www2.hp.com/bizsupport/TechSupport/Document.jsp?lang=en&cc=us&objectID=c00817918&jumpid=reg_R1002_USEN) for additional information

### Technical Specifications - Controllers

|  |                                     |  |                                  |
|--|-------------------------------------|--|----------------------------------|
| <b>LSI SAS3041E Serial Attach SCSI (SAS) Host Bus Adapter (HBA)</b><br>(Part# EH417AA) | <b>PCI Bus</b>                      | PCI-Express x4 lanes   |                                  |
|  | <b>PCI Modes</b>                    | Bus Master DMA   |                                  |
|  | <b>PCI data burst transfer rate</b> | 1.0 GBps ( half duplex ) 2.0 GBps ( full duplex )  |                                  |
|  | <b>SAS Bandwidths</b>               | <b>Half Duplex</b>   | <b>Full Duplex</b>               |
|  |                                     | Single lane – 300 MBps   | Single SAS Lane – 600 MBps       |
|  |                                     | Wide Port (2 lanes) – 600 MBps   | Wide Port (2 lanes) –1200 MBps   |
|  |                                     | Wide Port (4 lanes) – 1200 MBps  | Wide Port (4 lanes) – 2400 MBps  |
|  | <b>PCI Card Type</b>                | 3.3 volt add-in card   |                                  |
|  | <b>PCI Voltage</b>                  | 12 V ± 10%   |                                  |
|  | <b>PCI Form Factor</b>              | 6.6" x 2.731" (Low-profile)  |                                  |
|  | <b>PCI Power</b>                    | 7.5 Watts  |                                  |
|  | <b>Bracket</b>                      | Full height and Low-profile  |                                  |
|  | <b>Certification Level</b>          | PCI-Express 1.0a   |                                  |
|  | <b>IO Bus</b>                       | Four 3Gbps SAS/SATA ports  |                                  |
|  | <b>SAS Processor</b>                | LSISAS1064E  |                                  |
|  | <b>Internal Connectors</b>          | Four- SATA x1 connectors   |                                  |
|  | <b>External Connectors</b>          | None   |                                  |
|  | <b>Max. Number of SCSI Devices</b>  | 128  |                                  |
|  | <b>LED Indicators</b>               | On-board activity and fault LEDs   |                                  |
|  | <b>Integrated Mirroring</b>         | Integrated Mirroring option available  |                                  |
|  | <b>Environments</b>                 | <b>Operating</b>   | <b>Storage</b>                   |
|  | <b>Temperature</b>                  | 32° to 140° F (0° to 60° C)  | -49° to 221° F (-45° to +105° C) |
|  | <b>Relative Humidity</b>            | 5% to 90% non-condensing   | 5% to 90% non-condensing         |
|  | <b>MTBF</b>                         | >200,000 hours   |                                  |
|  | <b>Compliances</b>                  | EMC: Class B-US (CFR 47, P15B); Canada (ICES-003); Japan (V-3/02.04); Europe (EN55022/EN55024); Australia/New Zealand (AS/NZS 3548); Safety: EN60950 |                                  |
|  | <b>Operating system support</b>     | Microsoft Vista Business 32 and 64, Microsoft Windows XP Professional, XP Professional x64, Red Hat Linux 7.2, 7.3, WS3 and WS4                      |                                  |
|  | <b>Kit contents</b>                 | Controller card, driver CD, LED cables, user documentation and warranty card.  |                                  |

### Technical Specifications - Hard Drives

|                                 |                            |   |   |                      |  |
|---------------------------------|----------------------------|---|---|----------------------|--|
| <b>SATA 3.0Gb/s hard drives</b> | <b>160 GB</b><br>(10k rpm) | <b>Capacity</b>   | 160,041,885,696 bytes   |                      |  |
|                                 |                            | <b>Height</b>   | 1 inches; 2.54 cm   |                      |  |
|                                 |                            | <b>Width</b>  | Media diameter: 3.0 inches; 7.62 cm<br>Physical size: 4 inches; 10.2 cm |                      |  |
|                                 |                            | <b>Interface</b>  | Serial ATA (1.5 Gb/s), Native Command Queuing enabled                   |                      |  |
|                                 |                            | <b>Synchronous Transfer Rate (Maximum)</b>  | Up to 1.5 Gb/s  |                      |  |
|                                 |                            | <b>Cache</b>  | 16 Mbytes   |                      |  |
|                                 |                            | <b>Seek Time</b><br>(typical reads, includes controller overhead, including settling) | <b>Single Track</b>   | 0.3 ms               |  |
|                                 |                            |   | <b>Average</b>  | 4.6 ms               |  |
|                                 |                            |   | <b>Full-Stroke</b>  | 10.2 ms              |  |
|                                 |                            | <b>Rotational Speed</b>   | 10,000 rpm  |                      |  |
|                                 |                            | <b>Logical Blocks</b>   | 312,581,808   |                      |  |
|                                 |                            | <b>Operating Temperature</b>  | 41° to 131° F (5° to 55° C)   |                      |  |
|                                 |                            | <b>80 GB</b><br>(10k rpm)   | <b>Capacity</b>   | 80,026,361,856 bytes |  |
|                                 |                            |   | <b>Height</b>   | 1 inches; 2.54 cm    |  |
|                                 |                            | <b>Width</b>  | Media diameter: 3.0 inches; 7.62 cm<br>Physical size: 4 inches; 10.2 cm |                      |  |
|                                 |                            | <b>Interface</b>  | Serial ATA (1.5 Gb/s), Native Command Queuing enabled                   |                      |  |
|                                 |                            | <b>Synchronous Transfer Rate (Maximum)</b>  | Up to 1.5 Gb/s  |                      |  |
|                                 |                            | <b>Cache</b>  | 16 Mbytes   |                      |  |
|                                 |                            | <b>Seek Time</b><br>(typical reads, includes controller overhead, including settling) | <b>Single Track</b>   | 0.3 ms               |  |
|                                 |                            |   | <b>Average</b>  | 4.6 ms               |  |
|                                 |                            |   | <b>Full-Stroke</b>  | 10.2 ms              |  |
|                                 |                            | <b>Rotational Speed</b>   | 10,000 rpm  |                      |  |
|                                 |                            | <b>Logical Blocks</b>   | 156,301,488   |                      |  |
|                                 |                            | <b>Operating Temperature</b>  | 41° to 131° F (5° to 55° C)   |                      |  |

### Technical Specifications - Hard Drives

|  |  |   |                       |
|--|--|---|-----------------------|
| <b>80 GB</b><br>(7,200 rpm)  | <b>Capacity</b>  | 80,026,361,856 bytes  |                       |
|  | <b>Height</b>  | 1 inches; 2.54 cm or less   |                       |
|  | <b>Width</b>   | Media diameter: 3.5 inches; 8.89 cm<br>Physical size: 4 inches; 10.2 cm |                       |
|  | <b>Interface</b>   | Serial ATA (3.0 Gb/s)   |                       |
|  | <b>Synchronous Transfer Rate (Maximum)</b>   | Up to 300 MB/s  |                       |
|  | <b>Cache</b>   | 8 MB  |                       |
|  | <b>Seek Time</b> (typical reads, includes controller overhead, including settling) | <b>Single Track</b>   | 0.9 ms                |
|  |  | <b>Average</b>  | 11.0 ms               |
|  |  | <b>Full-Stroke</b>  | 18 ms                 |
|  | <b>Rotational Speed</b>  | 7,200 rpm   |                       |
|  | <b>Logical Blocks</b>  | 156,301,488   |                       |
|  | <b>Operating Temperature</b>   | 41° to 131° F (5° to 55° C)   |                       |
|  | <b>160 GB</b><br>(7,200 rpm)   | <b>Capacity</b>   | 160,041,885,696 bytes |
| <b>Height</b>  |  | 1 inches; 2.54 cm or less   |                       |
| <b>Width</b>   |  | Media diameter: 3.5 inches; 8.89 cm<br>Physical size: 4 inches; 10.2 cm |                       |
| <b>Interface</b>   |  | Serial ATA (3.0 Gb/s), Native Command Queuing enabled                   |                       |
| <b>Synchronous Transfer Rate (Maximum)</b>   |  | Up to 300 MB/s  |                       |
| <b>Buffer</b>  |  | 8 MB  |                       |
| <b>Seek Time</b> (typical reads, includes controller overhead, including settling) |  | <b>Single Track</b>   | 0.9 ms                |
|  |  | <b>Average</b>  | 11.0 ms               |
|  |  | <b>Full-Stroke</b>  | 18 ms                 |
| <b>Rotational Speed</b>  |  | 7,200 rpm   |                       |
| <b>Logical Blocks</b>  |  | 312,581,808   |                       |
| <b>Operating Temperature</b>   |  | 41° to 131° F (5° to 55° C)   |                       |

### Technical Specifications - Hard Drives

|                              |  |   |         |
|------------------------------|--|---|---------|
| <b>250 GB</b><br>(7,200 rpm) | <b>Capacity</b>  | 250,059,350,016 bytes                                 |         |
|                              | <b>Height</b>  | 1 inches; 2.54 cm or less                             |         |
|                              | <b>Width</b>   | Media diameter: 3.5 inches; 8.89 cm                   |         |
|                              |  | Physical size: 4 inches; 10.2 cm                      |         |
|                              | <b>Interface</b>   | Serial ATA (3.0 Gb/s), Native Command Queuing enabled |         |
|                              | <b>Synchronous Transfer Rate (Maximum)</b>   | Up to 300 MB/s  |         |
|                              | <b>Buffer</b>  | 8 MB  |         |
|                              | <b>Seek Time</b> (typical reads, includes controller overhead, including settling) | <b>Single Track</b>                                   | 1.0 ms  |
|                              |  | <b>Average</b>  | 11.0 ms |
|                              |  | <b>Full-Stroke</b>                                    | 18 ms   |
|                              | <b>Rotational Speed</b>  | 7,200 rpm   |         |
|                              | <b>Logical Blocks</b>  | 488,397,168   |         |
|                              | <b>Operating Temperature</b>   | 41° to 131° F (5° to 55° C)                           |         |
| <b>500 GB</b><br>(7,200 rpm) | <b>Capacity</b>  | 500,107,862,016 bytes                                 |         |
|                              | <b>Height</b>  | 1 inches; 2.54 cm or less                             |         |
|                              | <b>Width</b>   | Media diameter: 3.5 inches; 8.89 cm                   |         |
|                              |  | Physical size: 4 inches; 10.2 cm                      |         |
|                              | <b>Interface</b>   | Serial ATA (3.0 Gb/s), Native Command Queuing enabled |         |
|                              | <b>Synchronous Transfer Rate (Maximum)</b>   | Up to 300 MB/s  |         |
|                              | <b>Buffer</b>  | 8 MB  |         |
|                              | <b>Seek Time</b> (typical reads, includes controller overhead, including settling) | <b>Single Track</b>                                   | 1.3 ms  |
|                              |  | <b>Average</b>  | 20.0 ms |
|                              |  | <b>Full-Stroke</b>                                    | 30 ms   |
|                              | <b>Rotational Speed</b>  | 7,200 rpm   |         |
|                              | <b>Logical Blocks</b>  | 976,773,168   |         |
|                              | <b>Operating Temperature</b>   | 41° to 131° F (5° to 55° C)                           |         |

### Technical Specifications - Hard Drives

|  |                               |  |   |                 |                       |
|--|-------------------------------|--|---|-----------------|-----------------------|
|  | <b>750 GB</b><br>(7,200 rpm)  | <b>Capacity</b>  | 750,156,374,016 bytes   |                 |                       |
|  |                               | <b>Height</b>  | 1 inches; 2.54 cm or less   |                 |                       |
|  |                               | <b>Width</b>   | Media diameter: 3.5 inches; 8.89 cm<br>Physical size: 4 inches; 10.2 cm |                 |                       |
|  |                               | <b>Interface</b>   | Serial ATA (3.0 Gb/s), Native Command Queuing enabled                   |                 |                       |
|  |                               | <b>Synchronous Transfer Rate (Maximum)</b>   | Up to 300 MB/s  |                 |                       |
|  |                               | <b>Buffer</b>  | 8 MB  |                 |                       |
|  |                               | <b>Seek Time</b> (typical reads, includes controller overhead, including settling) | <b>Single Track</b>   | 0.8 ms          |                       |
|  |                               |  | <b>Average</b>  | 14.0 ms         |                       |
|  |                               |  | <b>Full-Stroke</b>  | 20 ms           |                       |
|  |                               | <b>Rotational Speed</b>  | 7,200 rpm   |                 |                       |
|  |                               | <b>Logical Blocks</b>  | 1,465,149,168   |                 |                       |
|  |                               | <b>Operating Temperature</b>   | 41° to 131° F (5° to 55° C)   |                 |                       |
|  |                               |  |   |                 |                       |
|  |                               | <b>Serial Attached SCSI (SAS) Hard Drives</b>                                      | <b>300 GB</b><br>(15K rpm)  | <b>Capacity</b> | 300,000,000,000 bytes |
| <b>Height</b>  | 1.0 in (25.4mm)               |  |   |                 |                       |
| <b>Width</b>   | 4.0 in (101.6mm)              |  |   |                 |                       |
| <b>Interface</b>   | SAS                           |  |   |                 |                       |
| <b>Synchronous Transfer Rate (Maximum)</b>   | 3.0 Gb/s                      |  |   |                 |                       |
| <b>Buffer</b>  | 16 MB                         |  |   |                 |                       |
| <b>Seek Time</b> (typical reads, includes controller overhead, including settling) | <b>Single Track</b>           |  |   | 0.2 ms          |                       |
|  | <b>Average</b>                |  |   | 3.5 ms          |                       |
|  | <b>Full-Stroke</b>            |  |   | 7.0 ms          |                       |
| <b>Rotational Speed</b>  | 15,000 rpm                    |  |   |                 |                       |
| <b>Logical Blocks</b>  | 585,937,500 - 512 byte blocks |  |   |                 |                       |
| <b>Operating Temperature</b>   | 50° to 95° F (10° to 35° C)   |  |   |                 |                       |
|  |                               |  |   |                 |                       |
|  | <b>300 GB</b><br>(10K rpm)    |  |   | <b>Capacity</b> | 300,000,000,000 bytes |
|  |                               | <b>Height</b>  | 1.0 in (25.4mm)   |                 |                       |
|  |                               | <b>Width</b>   | 4.0 in (101.6mm)  |                 |                       |
|  |                               | <b>Interface</b>   | SAS   |                 |                       |
|  |                               | <b>Synchronous Transfer Rate (Maximum)</b>   | 3.0 Gb/s  |                 |                       |
|  |                               | <b>Buffer</b>  | 16 MB   |                 |                       |
|  |                               | <b>Seek Time</b> (typical reads, includes controller overhead, including settling) | <b>Single Track</b>   | 0.3 ms          |                       |
|  |                               |  | <b>Average</b>  | <4.5 ms         |                       |
|  |                               |  | <b>Full-Stroke</b>  | <11.0 ms        |                       |
|  |                               | <b>Rotational Speed</b>  | 15,000 rpm  |                 |                       |
|  |                               | <b>Logical Blocks</b>  | 585,937,500 - 512 byte blocks   |                 |                       |
|  |                               | <b>Operating Temperature</b>   | 50° to 95° F (10° to 35° C)   |                 |                       |

### Technical Specifications - Hard Drives

|  |  |                               |                       |  |
|--|--|-------------------------------|-----------------------|--|
| <b>146 GB</b><br>(10K rpm)   | <b>Capacity</b>  | 146,815,737,856 bytes         |                       |  |
|  | <b>Height</b>  | 1.0 in (25.4mm)               |                       |  |
|  | <b>Width</b>   | 4.0 in (101.6mm)              |                       |  |
|  | <b>Interface</b>   | SAS                           |                       |  |
|  | <b>Synchronous Transfer Rate (Maximum)</b>   | 3.0 Gb/s                      |                       |  |
|  | <b>Buffer</b>  | 16 MB                         |                       |  |
|  | <b>Seek Time</b> (typical reads, includes controller overhead, including settling) | <b>Single Track</b>           | 0.3 msec              |  |
|  |  | <b>Average</b>                | <4.5 msec             |  |
|  |  | <b>Full-Stroke</b>            | <11.0 msec            |  |
|  | <b>Rotational Speed</b>  | 10,000 rpm                    |                       |  |
|  | <b>Logical Blocks</b>  | 286,749,488 - 512 byte blocks |                       |  |
|  | <b>Operating Temperature</b>   | 50° to 95° F (10° to 35° C)   |                       |  |
|  | <b>73 GB</b><br>(15K rpm)  | <b>Capacity</b>               | 73,407,865,856 bytes  |  |
| <b>Height</b>  |  | 1.0 in (2.54 cm)              |                       |  |
| <b>Width</b>   |  | 4.0 in (101.6mm)              |                       |  |
| <b>Interface</b>   |  | SAS                           |                       |  |
| <b>Synchronous Transfer Rate (Maximum)</b>   |  | 3.0 Gb/s                      |                       |  |
| <b>Buffer</b>  |  | 16 MB                         |                       |  |
| <b>Seek Time</b> (typical reads, includes controller overhead, including settling) |  | <b>Single Track</b>           | 0.2 ms                |  |
|  |  | <b>Average</b>                | 3.5 ms                |  |
|  |  | <b>Full-Stroke</b>            | 7.4 ms                |  |
| <b>Rotational Speed</b>  |  | 15,000 rpm                    |                       |  |
| <b>Logical Blocks</b>  |  | 143,374,738 - 512 byte blocks |                       |  |
| <b>Operating Temperature</b>   |  | 50° to 95° F (10° to 35° C)   |                       |  |
| <b>146 GB</b><br>(15K rpm)   |  | <b>Capacity</b>               | 146,815,737,856 bytes |  |
|  | <b>Height</b>  | 1.0 in (25.4mm)               |                       |  |
|  | <b>Width</b>   | 4.0 in (101.6mm)              |                       |  |
|  | <b>Interface</b>   | SAS                           |                       |  |
|  | <b>Synchronous Transfer Rate (Maximum)</b>   | 3.0 Gb/s                      |                       |  |
|  | <b>Buffer</b>  | 16 MB                         |                       |  |
|  | <b>Seek Time</b> (typical reads, includes controller overhead, including settling) | <b>Single Track</b>           | 0.2 ms                |  |
|  |  | <b>Average</b>                | 3.5 ms                |  |
|  |  | <b>Full-Stroke</b>            | 7.4 ms                |  |
|  | <b>Rotational Speed</b>  | 15,000 rpm                    |                       |  |
|  | <b>Logical Blocks</b>  | 286,749,488 - 512 byte blocks |                       |  |
|  | <b>Operating Temperature</b>   | 50° to 95° F (10° to 35° C)   |                       |  |

## Technical Specifications - Removable Storage

|                        |                           |   |
|------------------------|---------------------------|---|
| <b>USB Disk on Key</b> | <b>Dimensions (HxWxD)</b> | 0.9 x 0.7 x 3.9 in (2.3 x 1.8 x 9.8 cm)     |
|                        | <b>Weight</b>             | 0.05 lb (0.02 kg)                           |
|                        | <b>USB Specification</b>  | 2.0   |
|                        | <b>Transfer Rate</b>      | Read—1023 KB/Sec; Write—850 KB/Sec          |
|                        | <b>Storage Media</b>      | Solid state flash memory, no moving parts   |
|                        | <b>Power Supply</b>       | USB Bus-powered, no external power required |
|                        | <b>Capacity</b>           | 512 MB or 1 GB                              |



### Technical Specifications - Peripherals

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

|                                      |                                 |                                  |   |
|--------------------------------------|---------------------------------|----------------------------------|---|
| <b>PS/2 OR USB Standard Keyboard</b> | <b>Physical characteristics</b> | <b>Keys</b>                      | 104, 105, 106, 107, 109 layout (depending upon country)   |
|                                      |                                 | <b>Dimensions (L x W x H)</b>    | 18.0 x 6.4 x 0.98 inches ; 45.8 x 16.3 x 2.5 cm   |
|                                      |                                 | <b>Weight</b>                    | 2 lbs (0.9 kg) minimum  |
|                                      | <b>Electrical</b>               | <b>Operating voltage</b>         | + 5VDC $\pm$ 5%   |
|                                      |                                 | <b>Power consumption</b>         | 50-mA maximum (with three LEDs ON)  |
|                                      |                                 | <b>ESD</b>                       | CE level 4, 15-kV air discharge   |
|                                      |                                 | <b>EMI – RFI</b>                 | Conforms to FCC rules for a Class B computing device  |
|                                      | <b>Mechanical</b>               | <b>MicrosoftPC 99 – 2001</b>     | Functionally compliant  |
|                                      |                                 | <b>Languages</b>                 | 38 available  |
|                                      |                                 | <b>Keycaps</b>                   | Low-profile design  |
|                                      |                                 | <b>Switch actuation</b>          | 55-g nominal peak force with tactile feedback   |
|                                      |                                 | <b>Switch life</b>               | 20 million keystrokes (using Hasco modified tester)   |
|                                      |                                 | <b>Switch type</b>               | Contamination-resistant switch membrane   |
|                                      |                                 | <b>Key-leveling mechanisms</b>   | For all double-wide and greater-length keys   |
|                                      |                                 | <b>Cable length</b>              | 6 ft (1.8 m)  |
|                                      |                                 | <b>Microsoft PC 99 - 2001</b>    | Mechanically compliant  |
|                                      | <b>Environmental</b>            | <b>Acoustics</b>                 | 43-dBA maximum sound pressure level   |
|                                      |                                 | <b>Operating temperature</b>     | 50° to 122° F (10° to 50° C)  |
|                                      |                                 | <b>Non-operating temperature</b> | -22° to 140° F (-30° to 60° C)  |
|                                      |                                 | <b>Operating humidity</b>        | 10% to 90% (non-condensing at ambient)  |
|                                      |                                 | <b>Non-operating humidity</b>    | 20% to 80% (non-condensing at ambient)  |
|                                      |                                 | <b>Operating shock</b>           | 40 g, six surfaces  |
|                                      |                                 | <b>Non-operating shock</b>       | 80 g, six surfaces  |
|                                      |                                 | <b>Operating vibration</b>       | 2-g peak acceleration   |
|                                      |                                 | <b>Non-operating vibration</b>   | 4-g peak acceleration   |
|                                      |                                 | <b>Drop (out of box)</b>         | 26 in (66 cm) on carpet, six-drop sequence  |
|                                      |                                 | <b>Drop (in box)</b>             | 42 in (107 cm) on concrete, 16-drop sequence  |
|                                      | <b>Operating system support</b> |                                  | Microsoft Windows Vista Business 32 or 64, Microsoft Windows XP Professional, Microsoft Windows XP Professional x64 Edition, Red Hat Enterprise Linux WS 3 and WS 4 |
|                                      | <b>Approvals</b>                |                                  | UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC   |
|                                      | <b>Ergonomic compliance</b>     |                                  | ANSI HFS 100, ISO 9241-4, and TUVGS   |
|                                      | <b>Kit contents</b>             |                                  | Keyboard, keyboard software media, installation guide, warranty card, safety and comfort  |

### Technical Specifications - Peripherals

|  |  |   |   |
|--|--|---|---|
| <b>HP USB Smart Card Keyboard</b><br>(ED707AA) | <b>Physical characteristics</b>              | <b>Keys</b>   | 104, 105, 106, 107, 109 layout (depending upon country) |
|  |  | <b>Form factor</b>                                  | USB basic Smart Card keyboard                           |
|  |  | <b>Colors</b>                                       | Carbonite/Silver  |
|  |  | <b>Dimensions (L x W x H)</b>                       | 18.2 x 6.3 x 1.3 in (46.3 x 16.1 x 3.3 cm)              |
|  | <b>Electrical</b>                            | <b>Weight</b>                                       | 2 lb (0.9 kg) minimum                                   |
|  |  | <b>Operating voltage</b>                            | + 5VDC $\pm$ 5%   |
|  |  | <b>Power consumption</b>                            | 100-mA maximum (with four LEDs ON)                      |
|  |  | <b>System interface</b>                             | USB Type A plug connector                               |
|  |  | <b>ESD</b>  | CE level 4, 15-kV air discharge                         |
|  | <b>Mechanical</b>                            | <b>EMI – RFI</b>                                    | Conforms to FCC rules for a Class B computing device    |
| <b>Microsoft PC 99 – 2001</b>                  |  | Functionally compliant                              |   |
| <b>Languages</b>                               |  | 30+ available                                       |   |
| <b>Keycaps</b>                                 |  | Low-profile design                                  |   |
| <b>Switch actuation</b>                        |  | 55-g nominal peak force with tactile feedback       |   |
| <b>Switch life</b>                             |  | 20 million keystrokes (using Hasco modified tester) |   |
| <b>Switch type</b>                             |  | Contamination-resistant switch membrane             |   |
| <b>Key-leveling mechanisms</b>                 |  | For all double-wide and greater-length keys         |   |
| <b>Cable length</b>                            |  | 6 ft (1.8 m)  |   |
| <b>Microsoft PC 99 - 2001</b>                  |  | Mechanically compliant                              |   |
| <b>Environmental</b>                           | <b>Acoustics</b>                             | 43-dBA maximum sound pressure level                 |   |
|  | <b>Operating temperature</b>                 | 50° to 122° F (10° to 50° C)                        |   |
|  | <b>Non-operating temperature</b>             | -22° to 140° F (-30° to 60° C)                      |   |
|  | <b>Operating humidity</b>                    | 10% to 90% (non-condensing at ambient)              |   |
|  | <b>Non-operating humidity</b>                | 20% to 80% (non-condensing at ambient)              |   |
|  | <b>Operating shock</b>                       | 40 g, six surfaces                                  |   |
|  | <b>Non-operating shock</b>                   | 80 g, six surfaces                                  |   |
|  | <b>Operating vibration</b>                   | 2-g peak acceleration                               |   |
|  | <b>Non-operating vibration</b>               | 4-g peak acceleration                               |   |
|  | <b>Drop (out of box)</b>                     | 26 in (66 cm) on carpet, six-drop sequence          |   |
| <b>Drop (in box)</b>                           | 42 in (107 cm) on concrete, 16-drop sequence |   |   |

### Technical Specifications - Peripherals

|                                     |  |  |   |  |
|-------------------------------------|--|--|---|--|
| <b>SMARTCARD function</b>           | <b>Support</b>   | All ISO 7816 smart cards   |   |  |
|                                     | <b>Interface</b>   | Reads from and writes to all ISO7816-1, 2, 3, 4 memory and microprocessor smart cards (T=0, T=1) |   |  |
|                                     | <b>Chipset</b>   | SCM STCII  |   |  |
|                                     | <b>Standard APIs supported</b>   | PC/SC, EMV2000, SET  |   |  |
|                                     | <b>Power</b>   | <b>USB Port</b>  | USB Port  |  |
|                                     |  |  | Short circuit detection (protects smart card and reader)  |  |
|                                     |  |  | Power supply compliant with ISO7816 and EMV (5V, 60 mA)   |  |
|                                     | <b>Power consumption</b>   |  | Supports 3-V and 5-V cards  |  |
|                                     |  |  | 250-mA maximum draw (50 mA for the keyboard with three LEDs ON and 200-mA maximum startup current using a high-current, 60-mA smart card) |  |
|                                     |  |  |   |  |
|                                     | <b>Communication</b>   | <b>From card</b>   | Programmable from 9,600 baud to 115,200 baud  |  |
|                                     |  | <b>From computer</b>   | Up to 38,400 baud   |  |
|                                     | <b>Landing mechanism</b>   | <b>Contact device</b>  | Friction contact  |  |
|                                     |  | <b>Card insertions rating</b>  | Up to 100,000 insertion cycles  |  |
|                                     |  |  |   |  |
| <b>Interface modes</b>              |  | USB communications through USB port  |   |  |
|                                     |  | SCM protocol   |   |  |
| <b>Reader performance interface</b> |  | Automatic card insertion/removal detection   |   |  |
|                                     |  | USB connection   |   |  |
| <b>Electro-magnetic standards</b>   | <b>Europe</b>  | 89/336/CEE guideline   |   |  |
|                                     | <b>USA</b>   | USAFCC part 15   |   |  |
| <b>Operating system support</b>     | Microsoft Windows Vista Business 32 or 64, Microsoft® Windows® 2000, Windows XP Home, Windows XP Professional, xpe, ce.net, Linux, XP-64 |  |   |  |
| <b>Approvals</b>                    | CE-Mark, UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BSMI, C-Tick, MIC, JITC, EMV2000, USB-IF  |  |   |  |
| <b>Ergonomic compliance</b>         | ANSI HFS 100, ISO 9241-4, TUVGS  |  |   |  |
| <b>Kit contents</b>                 | Keyboard, I/O Security and Documentation CD, , warranty card   |  |   |  |
| <b>Smart card compatibility</b>     | <b>HP</b>  | HP ProtectTools Smart Card   |   |  |
|                                     | <b>American Express</b>  | Amex Blue  |   |  |

### Technical Specifications - Peripherals

|                              |   |
|------------------------------|---|
| <b>Axalto</b> (Schlumberger) | Cryptoflex 8K<br>Cryptoflex 16K<br>Cryptoflex 32K<br>Cryptoflex 32K e-gate<br>Cyberflex Access 64K<br>Cyberflex Access 32K<br>Cyberflex 32K e-gate<br>Cyberflex 64K<br>Cyberflex Palmera<br>Payflex-S<br>Payflex 1K<br>Payflex 2K<br>Payflex 4K<br>Payflex 8K<br>Prismera<br>US DoD CAC |
| <b>Cardlogix</b>             | CLXSU004KK4<br>CLXSU008KK5  |
| <b>Safenet, Inc.</b>         | Model 300<br>Model 330  |
| <b>De La Rue</b>             | VisaCash  |
| <b>Gemplus</b>               | Gem Espresso<br>GKK32K<br>Gemclub Memo<br>GemClub Micro<br>GemXplore<br>GemSafe   |
| <b>Infineon</b>              | SLE66C322P  |
| <b>SafLink</b> (Litronic)    | Forte   |
| <b>Sharp</b>                 | Java Card   |
| <b>Oberthur</b>              | CosmopolIIC v4<br>CosmopolIIC v4.1<br>Cosmo ID-One<br>GalatIIC v2.1<br>US DoD CAC   |
| <b>Memory Cards</b>          |   |
| <b>Atmel</b>                 | AT24C01ASC<br>AT24C02SC<br>AT24C04SC<br>AT24C08SC<br>AT24C16SC<br>AT24C32SC<br>AT24C64SC<br>AT24C128SC<br>AT24C256SC<br>AT24C512SC<br>AT88SC153<br>AT88SC1608   |
| <b>Axalto</b> (Schlumberger) | PrimeFlex Store 8K<br>PrimeFlex Store 2K  |

### Technical Specifications - Peripherals

|                     |             |
|---------------------|-------------|
| <b>nfineon</b>      | SLE4406     |
|                     | SLE4406E    |
|                     | SLE4406E SE |
|                     | SLE4418     |
|                     | SLE4428     |
|                     | SLE4432     |
|                     | SLE4436E    |
|                     | SLE4442     |
|                     | SLE5536     |
|                     | <b>ISSI</b> |
| <b>ST</b>           | 14C02       |
| <b>Telefonkarte</b> | SLE4406     |
|                     | SLE4436     |
|                     | SLE5536     |
| <b>XICOR</b>        | X24026      |

|  |                               |  |  |                 |
|--|-------------------------------|--|--|-----------------|
| <b>HP 2-Button Scroll Mouse (PS/2)</b> | <b>Scroll Wheel</b>           | 8 mm   |  |                 |
|  | <b>Maximum Rotation Speed</b> | 30 mm/s  |  |                 |
|  | <b>Switch Type</b>            | Light force micro-switch                               |  |                 |
|  | <b>Switch Life</b>            | 1 million operations                                   |  |                 |
|  | <b>Mechanical Life</b>        | Minimum 200,000 revolutions                            |  |                 |
|  | <b>Environmental</b>          | <b>Operating temperature</b>                           | 50° to 122° F (10° to 50° C)                       |                 |
|  |                               | <b>Non-operating temperature</b>                       | -22° to 140° F (-30° to 60° C)                     |                 |
|  |                               | <b>Operating humidity</b>                              | 10% to 90% (non-condensing at ambient)             |                 |
|  |                               | <b>Non-operating humidity</b>                          | 20% to 80% (non-condensing at ambient)             |                 |
|  |                               | <b>Operating shock</b>                                 | 40 g, 6 surfaces                                   |                 |
|  |                               | <b>Non-operating shock</b>                             | 80 g, 6 surfaces                                   |                 |
|  |                               | <b>Operating vibration</b>                             | 2 g peak acceleration                              |                 |
|  |                               | <b>Non-operating vibration</b>                         | 4 g peak acceleration                              |                 |
|  |                               | <b>Mechanical</b>                                      | <b>Resolution</b>                                  | 400 ± 20% DPI   |
|  |                               |  | <b>Tracking speed</b>                              | 10 in/s maximum |
|  | <b>Acceleration</b>           |  | 100 in/s   |                 |
|  | <b>Switch actuation</b>       |  | 85 g nominal peak force                            |                 |
|  | <b>Switch life</b>            |  | 1,000,000 operations (using Hasco modified tester) |                 |
|  | <b>Regulatory approvals</b>   | <b>Cable length</b>                                    | 6 ft (1.8 m)                                       |                 |
| PC98-99                                |                               | Mechanically compliant                                 |  |                 |
|  |                               | UL, CSA, FCC, CE Mark, TUV, TUV GS, VCCI, BCIQ, C-Tick |  |                 |

### Technical Specifications - Peripherals

|   |                               |   |
|---|-------------------------------|---|
| <b>HP 2-button Optical Scroll Mouse (USB)</b> | <b>Dimensions (H x L x W)</b> | 1.5 x 4.5 x 2.5 inches; 3.8 x 11.6 x 6.3 cm   |
|   | <b>Weight</b>                 | 0.27 lb (0.12 kg)   |
|   | <b>Cable length</b>           | 72.8 inches; 185 cm   |
|   | <b>System requirements</b>    | Microsoft Windows Vista Business 32 or 64, Microsoft Windows XP, Red Hat Enterprise Linux WS 3, Red Hat Enterprise Linux WS 4 |

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

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

### Technical Specifications - Peripherals

|   |                                   |  |   |
|---|-----------------------------------|--|---|
| <b>HP SpaceExplorer</b><br>(USB - Windows Only) | <b>Physical Characteristics</b>   | <b>Dimensions (L x W x H)</b>  | 7.6 x 5.4 x 2.3 in (194 x 139 x 58mm)   |
|   |                                   | <b>Weight</b>  | 1.36 lbs (0.62 kg)  |
|   |                                   | <b>Palmrest</b>  | Sculpted  |
|   | <b>Mechanical</b>                 | <b>Buttons</b>   | 15 reprogrammable speed keys  |
|   |                                   | <b>Motion Controller</b>   | Six degrees of freedom motion control through the X, Y, Z axis (pitch, roll, yaw) |
|   |                                   | <b>Device Sensitivity</b>  | Adjustable to preference  |
|   | <b>System Requirements</b>        | USB 1.1 or 2.0   |   |
|   | <b>Operating System Supported</b> | Microsoft Windows Vista Business 32 and 64, Microsoft Windows XP, not supported in Linux |   |
|   | <b>Regulatory Approvals</b>       | FCC, CE  |   |

### Technical Specifications - Optical Devices

|   |  |   |   |
|---|--|---|---|
| <b>16X/40X DVD-ROM Drive with +R Read Support</b> | <b>Height</b>  | 5.25-in, half-height, tray load   |   |
|   | <b>Interface Type</b>                                      | ATAPI/EIDE  |   |
|   | <b>Dimensions (W x H x D)</b>                              | 5.88 x 1.71 x 7.87 [max] inches; 149.5 x 43.25 x 200.0 [max] mm (external, excluding bezel)   |   |
|   | <b>Disc Formats</b>  | DVD-ROM (single and dual layer); DVD-video; DVD-R version 1.0 and 2.0; DVD-RW version 1.0 and 1.1; DVD-R multi-border; DVD+RW; DVD+R ; CD-ROM Mode 1 and 2; CD-DA; CD-ROM XA Mode 2, Form 1 and 2; CD-extra; CD-text; CD-I Mode 2, Form 1 and 2; CD-I ready; video CD, CD-bridge; PhotoCD (single and multi-session); CD-R; CD-RW |   |
|   | <b>Disc Capacity</b>                                       | <b>DVD-ROM</b>  | 4.7 GB (DVD-5), 8.54 GB (DVD-9), 9.4 GB (DVD-10), 3.95 GB (DVD-R version 1.0), 4.7 GB (DVD-R version 2.0), 4.7 GB (DVD-RW version 1.0 and 1.1), 4.7 GB (DVD+RW), 4.7G (DVD+R) |
|   |  | <b>CD-ROM</b>   | 540 MB (Mode 1, 12 cm), 640 MB (Mode 2, 12 cm), 700 MB (80 minimum CD-R and CD-RW), 180 MB (8 cm)   |
|   | <b>Access Times</b><br>(typical reads, including settling) | <b>DVD-ROM Single Layer</b>   | 120 ms  |
|   |  | <b>CD-ROM Mode 1</b>  | 90 ms   |
|   |  | <b>Full Stroke DVD</b>  | 240 ms (seek)   |
|   |  | <b>Full Stroke CD</b>   | 160 ms (seek)   |
| <b>Startup Time</b>                               |  | < 10 seconds (typical)  |   |
| <b>Stop Time</b>                                  |  | < 4 seconds   |   |
| <b>Data Transfer Modes</b>                        |  | PIO Mode 4 (16.6 MB/s); Multi-word DMA mode 2 (16.6 MB/s); UltraDMA Mode 3 (44.4 MB/s)  |   |
| <b>Maximum Data Transfer Rates</b>                | <b>CD-ROM Read</b>   | 6000 KB/s (40X) Max   |   |
|   | <b>DVD-ROM Read</b>  | 21,600 KB/s (16X) Max   |   |
|   | <b>Digital Audio Extraction</b>                            | 6000 KB/s (40X) Max   |   |
| <b>Power</b>                                      | <b>Source</b>  | Four-pin, DC power receptacle   |   |
|   | <b>DC Power Requirement</b>                                | 5 VDC $\pm$ 5% – 100 mV ripple p-p<br>12 VDC $\pm$ 5% – 200 mV ripple p-p   |   |
|   | <b>DC Current</b>  | 5 VDC – <800 mA typical,<br>< 1000 mA maximum<br>12 VDC – < 870 mA typical,<br><1800 mA maximum   |   |
| <b>Audio Output</b>                               | <b>Line-Out</b>  | 0.7 VRMS  |   |
|   | <b>Signal-to-Noise Ratio</b>                               | 85 dB   |   |
|   | <b>Channel Separation</b>                                  | 65 dB   |   |
| <b>Configuration Jumper Block</b>                 | Master, slave, and cable select modes                      |   |   |
| <b>Data Interface Connector</b>                   | 40-pin, shrouded and keyed, flat ribbon                    |   |   |

### Technical Specifications - Optical Devices

|   |   |
|---|---|
| <b>Operating Environmental</b><br>(all conditions non-condensing) | <b>Temperature</b> (operating) 41° to 122° F (5° to 50° C)<br><b>Relative Humidity</b> 10% to 85% (operating)<br><b>Maximum Wet Bulb Temperature</b> 86° F (30° C) (operating)  |
| <b>Certifications, Approvals</b>                                  | MMC II support, multi-read certification, Microsoft WHQL certification, ACA AS/NZS 3548 class B, CNS 13438, C.I.S.P.R. Pub 22, TUV or VDE EN60950, EN 55022, EN55024, EMKO EN60950, EN 60825-1, UL 60950, CSA C22.2 60950-2000, CFR 21 part 1040 class 1, CFR 47 C.I.S.P.R. Pub 22 Class B, DHHS/FDA, ANSI C63.4-1992 |
| <b>Operating Systems Supported</b>                                | Microsoft Windows Vista Business 32 and 64, Windows XP Professional, and XP Professional x64 Edition, Red Hat Enterprise Linux WS 3, Red Hat Enterprise Linux WS 4  |
| <b>Kit Contents</b>   | 16X/40X DVD-ROM Drive, Intervideo WinDVD, audio cable, and installation guide   |

#### 48X Combo CD-RW/DVD-ROM

|                                  |  |
|----------------------------------|--|
| <b>Form Factor</b>               | 5.25-inch, half-height, tray-load  |
| <b>Mounting Orientation</b>      | Horizontal or vertical   |
| <b>Interface</b>                 | ATAPI/EIDE   |
| <b>Dimensions</b> (HxWxD)        | 5.77 x 1.71 x 7.87 [max] inches; 14.66 x 4.34 x 20.0 [max] cm (external, excluding bezel)  |
| <b>Weight</b> (max)              | 2.6 lb (1.2 kg)  |
| <b>Read Only Disc Parameters</b> | <b>Formats and Modes Supported</b> CD-ROM-Mode 1; CD-ROM XA-Mode 2 (forms 1 and 2); CD-Bridge; CD digital audio; CD Extra; CD-I-Mode 2 (forms 1 and 2) and CD-I-Ready; Photo CD (single and multi-session); video CD; DVD (single- and double-layer); DVD-R; DVD-RW; DVD-RW Multi-Border; DVD+R; DVD+R Multisession , and DVD+RW |
|                                  | <b>Capacity</b> 180 MB (mode 2, 8 cm); 540 MB (mode 1, 12 cm); 650 MB (mode 2, 12 cm); 700 MB (Mode 2, 12 cm); 4.7 GB (DVD-5); 8.54 GB (DVD-9); 9.4 GB (DVD-10)  |
|                                  | <b>CD-ROM, CD-R, CD-RW read</b> 7200 KB/s (48X) Max  |
|                                  | <b>DVD ROM read</b> 21,632 KB/s (16X ) Max   |

### Technical Specifications - Optical Devices

|  |  |   |                               |
|--|--|---|-------------------------------|
| <b>Writeable Disc Parameters</b>                               | <b>Disc Type</b>   | CD-R and CD-RW  |                               |
|  | <b>Write Methods</b>                                       | Disc at Once, Track at Once, Session at Once, Variable Packet, Fixed Packet   |                               |
|  | <b>Format and Modes Supported</b>                          | CD-ROM (mode 1); CD-ROM XA (mode 2, forms 1 and 2); CD digital audio, CD-I (mode 2, forms 1 and 2); video CD; CD-Bridge; Video CD |                               |
|  | <b>Capacity</b>  | 180 MB (mode 2, 8 cm); 540 MB (mode 1, 12 cm); 650 MB (mode 2, 12 cm); 700 MB (mode 2, 12 cm)                                     |                               |
|  | <b>CD-R write</b>  | 7200 KB/s (48X) Max   |                               |
|  | <b>CD-RW write</b>   | 4800 KB/s (32X) Max   |                               |
|  | <b>Access Times</b><br>(typical reads, including settling) | <b>Random DVD</b>   | < 140 ms                      |
|  |  | <b>Random CD</b>  | < 125 ms, (typical)           |
|  |  | <b>Full Stroke DVD</b>  | < 250 ms                      |
|  |  | <b>Full Stroke CD</b>   | < 210 ms                      |
| <b>Startup Time</b> (single)                                   |  | < 7 seconds (typical)   |                               |
| <b>Startup Time</b> (multi-session)                            |  | < 30 seconds (typical)  |                               |
| <b>Stop Time</b> (typical)                                     |  | < 4 s   |                               |
| <b>Cache Buffer</b>  |  | 2 MB (minimum)  |                               |
| <b>Data Transfer Modes</b>                                     |  | ATA PIO mode 4 (16.7 MB/s); ATA Multi-word DMA mode 2 (16.7 MB/s); ATA UltraDMA Mode 3 44 Mbytes/s (default)                      |                               |
| <b>Power</b>   |  | <b>Source</b>   | Four-pin, DC power receptacle |
|  | <b>DC Power Requirement</b>                                | 5 VDC $\pm$ 5%-100 mV ripple p-p  |                               |
|  |  | 12 VDC $\pm$ 5%-200 mV ripple p-p   |                               |
|  | <b>DC Current</b>  | 5 VDC (< 1000 mA typical, < 1600 mA maximum)  |                               |
|  |  | 12 VDC (< 600 mA typical, < 1400 mA maximum)  |                               |
|  | <b>Total Drive Power</b> (standby mode)                    | < 2.5 Watt  |                               |
| <b>Audio Output</b>  | <b>Line-Out</b>  | 0.7 VRMS  |                               |
|  | <b>Signal-to-Noise Ratio</b>                               | 74 dB   |                               |
|  | <b>Channel Separation</b>                                  | 65 dB   |                               |
| <b>Configuration Jumper Block</b>                              | Master, slave, and cable select modes                      |   |                               |
| <b>Data Interface Connector</b>                                | 40-pin, shrouded and keyed, flat ribbon                    |   |                               |
| <b>Operating Conditions</b><br>(all conditions non-condensing) | <b>Temperature</b>   | 41° to 122° F (5° to 50° C)   |                               |
|  | <b>Relative humidity</b>                                   | 10% to 90%  |                               |
|  | <b>Maximum wet bulb temperature</b>                        | 86° F (30° C)   |                               |

### Technical Specifications - Optical Devices

|  |   |
|--|---|
| <b>Certifications, Approvals</b>                     | MPC-3 compliant, multi-read requirements, ATA Spec X3T9.2, ATAPI Spec SFF-8020, ANSI C63.4-1992, UL 1950, ACA AS/NZS 3548, CB Bulletin No. 96A, CSA C22.2 No. 950-1995, CFR 47 C.I.S.P.R. Pub 22 Class B, DHHS/FDA, EMKO-TSE 07/94, TUV EN60950, EN60825-1, MIC, BSMI-CNS 13438, CE, Microsoft PC2001 certification, Microsoft Logo for Windows XP. |
| <b>Operating Systems Supported</b>                   | Microsoft Windows Vista Business 32 and 64, Windows XP Professional, and XP Professional x64 Edition, Red Hat Enterprise Linux WS 3, Red Hat Enterprise Linux WS 4  |
| <b>Supplied Software</b><br>(Microsoft Windows only) | 48X Combo CD-RW/DVD-ROM Drive, Intervideo WinDVD, Roxio Easy Media Creator, Dantz Retrospect Express 7.0, audio cable, and installation guide.  |

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

|   |   |   |
|---|---|---|
| <b>Form Factor</b>  | 5.25-inch, half-height, tray-load   |   |
| <b>Orientation</b>  | Either horizontal or vertical   |   |
| <b>Interface type</b>                                     | SATA/ATAPI  |   |
| <b>Disc capacity</b>                                      | Single layer: Up to 4.7 GB (6 times capacity of CD-ROM)<br>Double layer: Up to 8.5 GB (12 times capacity of CD-ROM) |   |
| <b>Dimensions (W x H x D)</b>                             | 5.9 x 1.7 x 8.0 in (15.0 x 4.4 x 20.3 cm)   |   |
| <b>Weight (max)</b>                                       | 2.6 lb (1.2 kg)   |   |
| <b>Write speed</b>  | <b>CD-R</b>   | Up to 48X   |
|   | <b>CD-RW</b>  | Up to 32X   |
| <b>Read speeds</b>  | <b>DVD+R/-R/+RW/-RW/+R DL /-R DL</b>  | Up to 8X  |
|   | <b>DVD-ROM</b>  | Up to 16X   |
|   | <b>CD-ROM, CD-R</b>   | Up to 48X   |
|   | <b>CD-RW</b>  | Up to 32X   |
| <b>Buffer Size</b>  | 1.5MB (Min)   |   |
| <b>Access times</b><br>(typical reads, including setting) | <b>Random</b>   | DVD: < 140 ms (typical), CD: < 125 ms (typical)   |
|   | <b>Full Stroke</b>  | DVD: < 250 ms (seek), CD: < 210 ms (seek)   |
| <b>Power</b>  | <b>Source</b>   | SATA DC power receptacle  |
|   | <b>DC Power Requirement</b>   | 5 VDC $\pm$ 5%-100 mV ripple p-p<br>12 VDC $\pm$ 5%-200 mV ripple p-p                       |
|   | <b>DC Current</b>   | 5 VDC - <1000 mA typical, < 1600 mA maximum<br>12 VDC - < 600 mA typical, < 1400 mA maximum |
|   | <b>Total Drive Power</b><br>(standby mode)  | < 2.5 Watt  |
| <b>Environmental</b><br>(all conditions non-condensing)   | <b>Temperature</b> (operating)  | 41° to 122° F (5° to 50° C)   |
|   | <b>Relative Humidity</b> (operating)  | 10% to 90%  |
|   | <b>Maximum Wet Bulb Temperature</b> (operating)   | 86° F (30° C)   |

### Technical Specifications - Optical Devices

|                                    |  |
|------------------------------------|--|
| <b>Operating Systems Supported</b> | Windows Vista Business 64*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32*, Red Hat Linux WS 4, 32/64-bit OS. No driver is required for this device. Native support is provided by the operating system.   |
|                                    | * Certain Windows Vista product features require advanced or additional hardware. Windows Vista Upgrade Advisor can help you determine which features of Windows Vista will run on your computer. To download the tool, visit <a href="http://www.windowsvista.com/upgradeadvisor">http://www.windowsvista.com/upgradeadvisor</a> . For Windows Vista system requirements, visit <a href="http://www.windowsvista.com/systemrequirements">http://www.windowsvista.com/systemrequirements</a> . |
| <b>Option kit contents</b>         | HP 48X Max SATA CD-RW/DVD-ROM Combo Drive, Roxio Easy Media Creator version 9, Intervideo WinDVD, CD-R media, high-speed CD-RW media, and installation guide.  |

#### 16X DVD+/-RW LightScribe drive

|   |   |                               |   |                    |   |                     |   |                  |             |                     |                |                            |   |              |           |
|---|---|-------------------------------|---|--------------------|---|---------------------|---|------------------|-------------|---------------------|----------------|----------------------------|---|--------------|-----------|
| <b>Form Factor</b>                                      | 5.25-inch, half-height, tray-load   |                               |   |                    |   |                     |   |                  |             |                     |                |                            |   |              |           |
| <b>Orientation</b>                                      | Either horizontal or vertical   |                               |   |                    |   |                     |   |                  |             |                     |                |                            |   |              |           |
| <b>Interface</b>  | ATAPI/EIDE  |                               |   |                    |   |                     |   |                  |             |                     |                |                            |   |              |           |
| <b>Disc Recording Capacity</b>                          | 8.5 GB DL or 4.7 GB standard  |                               |   |                    |   |                     |   |                  |             |                     |                |                            |   |              |           |
| <b>Dimensions (HxWxD)</b>                               | 5.9 x 1.7 x 8.0 inches; 15.0 x 4.4 x 20.3 cm  |                               |   |                    |   |                     |   |                  |             |                     |                |                            |   |              |           |
| <b>Weight (maximum)</b>                                 | 2.6 lb (1.2 kg)   |                               |   |                    |   |                     |   |                  |             |                     |                |                            |   |              |           |
| <b>Write Speed (maximum)</b>                            | <table> <tr> <td><b>DVD+R</b></td> <td>Up to 16X</td> </tr> <tr> <td><b>DVD+RW</b></td> <td>Up to 4X</td> </tr> <tr> <td><b>DVD+R DL</b></td> <td>Up to 2.4X</td> </tr> <tr> <td><b>DVD-R</b></td> <td>Up to 8X</td> </tr> <tr> <td><b>DVD-RW</b></td> <td>Up to 4X</td> </tr> <tr> <td><b>CD-R</b></td> <td>Up to 40X</td> </tr> <tr> <td><b>CD-RW</b></td> <td>Up to 24X</td> </tr> </table>  | <b>DVD+R</b>                  | Up to 16X                                       | <b>DVD+RW</b>      | Up to 4X                                  | <b>DVD+R DL</b>     | Up to 2.4X  | <b>DVD-R</b>     | Up to 8X    | <b>DVD-RW</b>       | Up to 4X       | <b>CD-R</b>                | Up to 40X   | <b>CD-RW</b> | Up to 24X |
| <b>DVD+R</b>  | Up to 16X   |                               |   |                    |   |                     |   |                  |             |                     |                |                            |   |              |           |
| <b>DVD+RW</b>   | Up to 4X  |                               |   |                    |   |                     |   |                  |             |                     |                |                            |   |              |           |
| <b>DVD+R DL</b>   | Up to 2.4X  |                               |   |                    |   |                     |   |                  |             |                     |                |                            |   |              |           |
| <b>DVD-R</b>  | Up to 8X  |                               |   |                    |   |                     |   |                  |             |                     |                |                            |   |              |           |
| <b>DVD-RW</b>   | Up to 4X  |                               |   |                    |   |                     |   |                  |             |                     |                |                            |   |              |           |
| <b>CD-R</b>   | Up to 40X   |                               |   |                    |   |                     |   |                  |             |                     |                |                            |   |              |           |
| <b>CD-RW</b>  | Up to 24X   |                               |   |                    |   |                     |   |                  |             |                     |                |                            |   |              |           |
| <b>Read Speed (maximum)</b>                             | <table> <tr> <td><b>DVD+R/-R/+RW/-RW/+R DL</b></td> <td>Up to 8X</td> </tr> <tr> <td><b>DVD-ROM</b></td> <td>Up to 16X</td> </tr> <tr> <td><b>CD-ROM, CD-R</b></td> <td>Up to 40X</td> </tr> <tr> <td><b>CD-RW</b></td> <td>Up to 32X</td> </tr> </table>   | <b>DVD+R/-R/+RW/-RW/+R DL</b> | Up to 8X  | <b>DVD-ROM</b>     | Up to 16X                                 | <b>CD-ROM, CD-R</b> | Up to 40X   | <b>CD-RW</b>     | Up to 32X   |                     |                |                            |   |              |           |
| <b>DVD+R/-R/+RW/-RW/+R DL</b>                           | Up to 8X  |                               |   |                    |   |                     |   |                  |             |                     |                |                            |   |              |           |
| <b>DVD-ROM</b>  | Up to 16X   |                               |   |                    |   |                     |   |                  |             |                     |                |                            |   |              |           |
| <b>CD-ROM, CD-R</b>                                     | Up to 40X   |                               |   |                    |   |                     |   |                  |             |                     |                |                            |   |              |           |
| <b>CD-RW</b>  | Up to 32X   |                               |   |                    |   |                     |   |                  |             |                     |                |                            |   |              |           |
| <b>Access Times (typical reads, including settling)</b> | <table> <tr> <td><b>Random</b></td> <td>DVD: &lt; 130 ms (typical), CD: &lt; 120 ms (typical)</td> </tr> <tr> <td><b>Full Stroke</b></td> <td>DVD: &lt; 240 ms (seek), CD: &lt; 200 ms (seek)</td> </tr> <tr> <td><b>Startup Time</b></td> <td>Single-session: &lt; 15 seconds (typical), Multi-session: &lt; 30 seconds (typical)</td> </tr> <tr> <td><b>Stop Time</b></td> <td>&lt; 4 seconds</td> </tr> <tr> <td><b>Cache Buffer</b></td> <td>2 MB (minimum)</td> </tr> <tr> <td><b>Data Transfer Modes</b></td> <td>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)</td> </tr> </table> | <b>Random</b>                 | DVD: < 130 ms (typical), CD: < 120 ms (typical) | <b>Full Stroke</b> | DVD: < 240 ms (seek), CD: < 200 ms (seek) | <b>Startup Time</b> | Single-session: < 15 seconds (typical), Multi-session: < 30 seconds (typical) | <b>Stop Time</b> | < 4 seconds | <b>Cache Buffer</b> | 2 MB (minimum) | <b>Data Transfer Modes</b> | ATA PIO mode 4 (16.7 MB/s); ATA Multi-word DMA mode 2 (16.7 MB/s); ATA UltraDMA Mode 3 (44.4 MB/s -default) |              |           |
| <b>Random</b>   | DVD: < 130 ms (typical), CD: < 120 ms (typical)   |                               |   |                    |   |                     |   |                  |             |                     |                |                            |   |              |           |
| <b>Full Stroke</b>                                      | DVD: < 240 ms (seek), CD: < 200 ms (seek)   |                               |   |                    |   |                     |   |                  |             |                     |                |                            |   |              |           |
| <b>Startup Time</b>                                     | Single-session: < 15 seconds (typical), Multi-session: < 30 seconds (typical)   |                               |   |                    |   |                     |   |                  |             |                     |                |                            |   |              |           |
| <b>Stop Time</b>  | < 4 seconds   |                               |   |                    |   |                     |   |                  |             |                     |                |                            |   |              |           |
| <b>Cache Buffer</b>                                     | 2 MB (minimum)  |                               |   |                    |   |                     |   |                  |             |                     |                |                            |   |              |           |
| <b>Data Transfer Modes</b>                              | ATA PIO mode 4 (16.7 MB/s); ATA Multi-word DMA mode 2 (16.7 MB/s); ATA UltraDMA Mode 3 (44.4 MB/s -default)   |                               |   |                    |   |                     |   |                  |             |                     |                |                            |   |              |           |

### Technical Specifications - Optical Devices

|  |  |  |
|--|--|--|
| <b>Power</b>   | <b>Source</b>  | Four-pin, DC power receptacle  |
|  | <b>DC Power Requirement</b>  | 5 VDC $\pm$ 5%-100 mV ripple p-p<br>12 VDC $\pm$ 5%-200 mV ripple p-p                        |
|  | <b>DC Current</b>  | 5 VDC (< 1000 mA typical, < 1600 mA maximum)<br>12 VDC (< 600 mA typical, < 1400 mA maximum) |
|  | <b>Total Drive Power (standby mode)</b>  | < 2.5 Watt   |
| <b>Audio Output</b>  | <b>Line-Out</b>  | 0.7 VRMS   |
|  | <b>Signal-to-Noise Ratio</b>   | 74 dB  |
|  | <b>Channel Separation</b>  | 65 dB  |
| <b>Operating Conditions</b><br>(all conditions non-condensing) | <b>Temperature</b>   | 41° to 122° F (5° to 50° C)  |
|  | <b>Relative humidity</b>   | 10% to 90%   |
|  | <b>Maximum wet bulb temperature</b>  | 86° F (30° C)  |
| <b>System Configuration</b>                                    | Intel Pentium III Processor or later with 128 MB of memory (required); 256 MB recommended 2-D or 3-D graphics cards on primary disk drive for operating system and application software; second disk drive for audio and video data  |  |
| <b>Operating Systems Supported</b>                             | Microsoft Vista Business 32 and 64, Windows XP Professional, and XP Professional x64 Edition<br>Red Hat Enterprise Linux WS 3 and WS 4 (lightscribe functionality excluded)  |  |
| <b>Regulatory Approvals</b>                                    | MPC-3 compliant, multi-read requirements, ATA Spec X3T9.2, ATAPI Spec T13.1153D, ANSI C63.4-1992, UL 1950, ACA AS/NZS 3548, CB Bulletin No. 96A, CSA C22.2 No. 950-1995, CFR 47 C.I.S.P.R. Pub 22 Class B, DHHS/FDA, EMKO-TSE 07/94, TUV EN60950, EN60825-1, MIC, BSMI-CNS 13438, CE, Microsoft PC2001 certification, Microsoft Logo for Windows XP. |  |
| <b>Option Kit contents</b>                                     | 16X DVD+/-RW LightScribe drive, Intervideo WinDVD, Roxio Easy Media Creator, installation guide, and DVD+R media.  |  |
| <b>HP 16X Max SATA DVD+/-RW LightScribe Drive</b>              | <b>Form Factor</b>   | 5.25-inch, half-height, tray-load  |
|  | <b>Orientation</b>   | Either horizontal or vertical  |
|  | <b>Interface type</b>  | SATA/ATAPI   |
|  | <b>Disc capacity</b>   | 8.5 GB DL or 4.7 GB standard   |
|  | <b>Dimensions (W x H x D)</b>  | 5.9 x 1.7 x 8.0 in (15.0 x 4.4 x 20.3 cm)  |
|  | <b>Weight (max)</b>  | 2.6 lb (1.2 kg)  |

### Technical Specifications - Optical Devices

|   |   |  |   |
|---|---|--|---|
| <b>Write speed</b>  | <b>DVD+R</b>  | Up to 16X  |   |
|   | <b>DVD+RW</b>   | Up to 8X   |   |
|   | <b>DVD+R DL</b>   | Up to 8X   |   |
|   | <b>DVD-R DL</b>   | Up to 4X   |   |
|   | <b>DVD-R</b>  | Up to 16X  |   |
|   | <b>DVD-RW</b>   | Up to 6X   |   |
|   | <b>DVD-RAM</b>  | Up to 12X  |   |
|   | <b>CD-R</b>   | Up to 48X  |   |
|   | <b>CD-RW</b>  | Up to 32X  |   |
|   | <b>Read speeds</b>                                      | <b>DVD-RAM</b>   | Up to 12X                                       |
| <b>DVD+RW, DVD-RW, DVD+R DL, DVD-R DL</b>                 |   | Up to 8X   |   |
| <b>DVD-ROM, DVD+R, DVD-R</b>                              |   | Up to 16X  |   |
| <b>CD-ROM, CD-R</b>                                       |   | Up to 48X  |   |
| <b>CD-RW</b>  |   | Up to 32X  |   |
| <b>Access times</b><br>(typical reads, including setting) |   | <b>Random</b>  | DVD: < 130 ms (typical), CD: < 120 ms (typical) |
|   | <b>Full Stroke</b>                                      | DVD: < 240 ms (seek), CD: < 200 ms (seek)  |   |
| <b>Power</b>  | <b>Source</b>   | SATA DC power receptacle   |   |
|   | <b>DC Power Requirement</b>                             | 5 VDC $\pm$ 5%-100 mV ripple p-p<br>12 VDC $\pm$ 5%-200 mV ripple p-p  |   |
|   | <b>DC Current</b>                                       | 5 VDC - <1000 mA typical, < 1600 mA maximum<br>12 VDC - < 600 mA typical, < 1400 mA maximum  |   |
|   |   | <b>Total Drive Power</b><br>(standby mode)   | < 2.5 Watt                                      |
|   | <b>Environmental</b><br>(all conditions non-condensing) | <b>Temperature</b> (operating)   | 41° to 122° F (5° to 50° C)                     |
| <b>Relative Humidity</b> (operating)                      |   | 10% to 90%   |   |
| <b>Maximum Wet Bulb Temperature</b> (operating)           |   | 86° F (30° C)  |   |
| <b>Operating Systems Supported</b>                        |   | Windows Vista Business 64* (64-bit expected availability in July 2007), Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32*, Red Hat Linux WS 4, 32/64-bit OS. No driver is required for this device. Native support is provided by the operating system. |   |

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

## *Technical Specifications - Optical Devices*

**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.

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### Technical Specifications - Graphics

|   |   |  |
|---|---|--|
| <b>NVIDIA Quadro NVS 285, 128 MB Dual Head</b><br>(Part# RD069AA) | <b>Form Factor</b>                            | Low profile, both ATX and low profile brackets included  |
|   | <b>Graphics Controller</b>                    | Integrated Quadro 285 2D graphics processor unit (GPU)   |
|   | <b>Bus Type</b>                               | PCIe   |
|   | <b>RAMDAC</b>                                 | Dual 350 MHz (integrated)  |
|   | <b>Memory</b>                                 | 128 MB DDR (64 MB local frame buffer plus 64 MB of shared system memory via TurboCache technology)<br><b>NOTE:</b> The graphics card uses part of the total system memory (RAM) for graphics performance. System memory dedicated to graphics performance is not available for other use by other programs.  |
|   | <b>Connectors</b>                             | DVI DMS-59 to dual DVI Y-cable and DMS-59 to dual-VGA Y-cable  |
|   | <b>Dimensions</b>                             | Low-profile, 2.586 x 6.6 inches; 6.57 x 16.76 cm   |
|   | <b>Controller clock speed</b>                 | 250 MHz  |
|   | <b>Color depth</b>                            | 32 bits/pixel max  |
|   | <b>Overlay planes</b>                         | One 16-bit Video overlay plane   |
|   | <b>Maximum pixel clock</b>                    | 350 MHz  |
|   | <b>Multi-monitor support</b>                  | Dual analog or digital monitors  |
|   | <b>Single DVI Support</b>                     | Yes  |
|   | <b>Dual DVI Support</b>                       | Yes  |
|   | <b>High-definition Video Processor (HDVP)</b> | Full screen, full frame video playback of HDTV and DVD content<br>DVD-ready motion compensation for MPEG-2<br>Independent hardware color controls for video overlay<br>Hardware color-space conversion (YUV 4:2:2 and 4:2:0)<br>IDCT motion compensation<br>5-tap horizontal by 3-tap vertical filtering<br>8:1 up/down scaling  |
|   | <b>Available graphics drivers</b>             | Microsoft Windows Vista Business 32 and 64, Microsoft Windows XP (Provides full native Dual View mode, Span or Big Desktop mode, and Clone mode), Graphics drivers for Red Hat Enterprise Linux WS 3, and Red Hat Enterprise Linux WS 4<br>HP qualified drivers may be preloaded or available from the HP support Web site:<br><a href="http://www.hp.com/country/us/en/support.html?pageDisplay=drivers">http://www.hp.com/country/us/en/support.html?pageDisplay=drivers</a> |

### Technical Specifications - Graphics

| Analog Resolution  | Maximum Colors Supported | Maximum Refresh Rate |
|--------------------|--------------------------|----------------------|
| 640 x 480          | 16.7 M                   | 240 Hz               |
| 800 x 600          | 16.7 M                   | 240 Hz               |
| 1024 x 768         | 16.7 M                   | 240 Hz               |
| 1152 x 864         | 16.7 M                   | 170 Hz               |
| 1280x1024          | 16.7 M                   | 150 Hz               |
| 1600 x 1200        | 16.7 M                   | 100 Hz               |
| 1920 x 1080        | 16.7 M                   | 85 Hz                |
| 1920 x 1200        | 16.7 M                   | 85 Hz                |
| 1920 x 1440        | 16.7 M                   | 75 Hz                |
| 2048 x 1536        | 16.7 M                   | 60 Hz                |
| Digital Resolution | Maximum Colors Supported | Maximum Refresh Rate |
| 640 x 480          | 16.7 M                   | 75 Hz                |
| 800 x 600          | 16.7 M                   | 75 Hz                |
| 1024 x 768         | 16.7 M                   | 75 Hz                |
| 1152 x 864         | 16.7 M                   | 60 Hz                |
| 1280 x 1024        | 16.7 M                   | 60 Hz                |
| 1600 x 1200        | 16.7 M                   | 60 Hz                |
| 1900 x 1200        | 16.7 M                   | 60 Hz                |

**NVIDIA Quadro NVS 440, 256 MB Quad Head**  
(Part# PT453AA)

|   |   |
|---|---|
| <b>Form Factor</b>                            | ATX   |
| <b>Graphics Controller</b>                    | 2 nv43 2D graphics processor units (GPUs)   |
| <b>VGA controller</b>                         | Integrated into the Quadro GPU  |
| <b>Bus Type</b>                               | PCI-E x16   |
| <b>RAMDAC</b>                                 | Dual 350 MHz  |
| <b>Memory</b>                                 | 256 MB DDR frame buffer and Texture storage (128MB per GPU)   |
| <b>Connector</b>                              | Two DMS-59  |
| <b>Controller clock speed</b>                 | 250 MHz   |
| <b>Color planes</b>                           | 32-bit color buffer   |
| <b>Overlay planes</b>                         | 1 16-bit Video overlay plane  |
| <b>Maximum pixel clock</b>                    | 350 MHz   |
| <b>Multi-Monitor Support</b>                  | Up to 4 analog or digital monitors  |
| <b>Single DVI Support</b>                     | Yes   |
| <b>Dual DVI Support</b>                       | Yes   |
| <b>High-definition Video Processor (HDVP)</b> | 32-Bit color<br>2048 x 1536 @ 60 Hz maximum resolution<br>2D rendering engine optimized for 32-, 24-, 16-, 15-, and 8-bpp modes   |
| <b>High-definition Video Processor (HDVP)</b> | Full-screen, full-frame video playback of HDTV and DVD content<br>DVD-ready motion compensation for MPEG-2<br>Independent hardware color controls for video overlay<br>Hardware color-space conversion (YUV 4:2:2 and 4:2:0)<br>IDCT motion compensation<br>5-tap horizontal by 3-tap vertical filtering<br>8:1 up/down scaling |

### Technical Specifications - Graphics

**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](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.

|   |                                   |  |
|---|-----------------------------------|--|
| <b>NVIDIA Quadro FX 560, 128 MB (Part# ES354AA)</b> | <b>Form Factor</b>                | ATX  |
|   | <b>Graphics Controller</b>        | NVIDIA NV73GL  |
|   | <b>Bus Type</b>                   | PCI-Express x16  |
|   | <b>Memory</b>                     | 128 MB 600 MHz GDDR3 SDRAM unified frame buffer, Z-buffer and Texture storage  |
|   | <b>Connectors</b>                 | 2 DVI-I + 9-pin HDTV output  |
|   | <b>Display resolution support</b> | Dual integrated analog display controllers supporting up to two analog displays at 2048x1536 @ 85Hz on both displays or dual digital displays at 1920x1200 (single-link) and 3840x2400 (dual-link).<br>NVIEW advanced multi-display desktop and application management seamlessly integrated into Microsoft Windows  |
|   | <b>RAMDAC</b>                     | Dual 400 MHz integrated  |
|   | <b>Architecture features</b>      | 128-bit memory interface<br>128-bit IEEE floating-point precision graphics pipeline<br>128-bit color precision<br>12-bit sub-pixel precision<br>8x FSAA at 1920x1200, 4x at 2048x1536, rotated grid FSAA sampling algorithm<br>Hardware accelerated antialiased points and lines<br>Hardware OpenGL overlay planes<br>Hardware accelerated two-sided lighting<br>Hardware accelerated clipping planes<br>3rd generation occlusion culling<br>3D volumetric texture support<br>Quad-buffered stereo<br>Single Link DVI enabling driving digital displays up to 1920x1200 (60Hz) |
|   | <b>Shading architecture</b>       | Fully programmable GPU<br>Long fragment programs (up to 65,536 instructions)<br>Long vertex programs (up to 65,536 instructions)<br>Looping and subroutines (up to 256 loops per vertex program)<br>Dynamic flow control<br>Conditional execution  |
|   | <b>Supported graphics APIs</b>    | OpenGL 2.0<br>DirectX 9.0  |
|   | <b>Available graphics drivers</b> | Microsoft Windows Vista Business 32 and 64, Microsoft Windows XP Professional, Linux - Full Open GL implementation, complete with NVIDIA and ARB extensions. Qualified drivers may be preloaded or available from the HP support Web site:<br><a href="http://welcome.hp.com/country/us/eng/software_drivers.html">http://welcome.hp.com/country/us/eng/software_drivers.html</a> .  |

### Technical Specifications - Graphics

**Maximum Resolution** Dual DVI-I output - drives dual digital displays at resolutions up to 1920x1200 @ 60Hz.  
Internal 400MHz RAMDACs - drives dual analog displays up to 2048x1536 @ 75Hz each

**NVIDIA Quadro FX 1500, 256 MB**  
(Part# ES355AA)

**Form Factor** ATX

**Bus Type** PCI Express x16

**Memory** 256 MB 625 MHz GDDR3 SDRAM unified frame buffer, Z-buffer and Texture storage

**Connectors** 2 dual-link DVI-I + 9-pin HDTV output

**Display resolution support** Dual integrated analog display controllers supporting up to two analog displays at 2048x1536 @ 85Hz on both displays or dual digital displays at 1920x1200 (single-link) and 3840x2400 (dual-link).  
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 FSAAs at 1920x1200, 4x at 2048x1536, rotated grid FSAAs sampling algorithm  
Hardware accelerated antialiased points and lines  
Hardware OpenGL overlay planes  
Hardware accelerated two-sided lighting  
Hardware accelerated clipping planes  
3rd generation occlusion culling  
3D volumetric texture support  
Quad-buffered stereo  
Dual Link DVI enabling driving digital displays up to 3840x2400 (24Hz)

**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](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 400 MHz RAMDACs – drives dual analog displays up to 2048x1536 @ 75Hz each

**ATI FireGL V7200, 256** Form factor ATX



### Technical Specifications - Graphics

|                              |   |   |
|------------------------------|---|---|
| <b>MB</b><br>(Part# ES356AA) | <b>Bus type</b>                         | PCI-Express x16   |
|                              | <b>RAMDAC</b>                           | Dual 10-bit per channel 400 MHz   |
|                              | <b>Memory</b>                           | 256 MB GDDR3 graphics memory with unified frame buffer, Z-buffer and Texture storage and a 512-bit Ring-Bus memory controller   |
|                              | <b>Connectors</b>                       | Dual DVI-I analog/digital, dual VGA analog support with DVI-to-VGA adapters. The DVI-I digital connectors are Dual Link capable. Stereoscopic 3D output connector with quad buffer support, HD Component Video (YPrPb) output with optional adapter.  |
|                              | <b>Display resolution support</b>       | Analog support for 2048x1536 @ 85Hz on each output connector. Digital support for 1920 x1200 @ 60Hz on each output connector. Dual Link digital support for 2560 x 1600 @ 60Hz. Ideal for 30-inch widescreen displays.<br><b>NOTE:</b> Stereo supported on single display only.   |
|                              |   | <b>Additional product features</b>  |
|                              | <b>Ring Bus memory controller</b>       | <ul style="list-style-type: none"><li>• 512-bit internal ring bus for highly efficient memory reads</li><li>• Programmable intelligent arbitration logic</li></ul>  |
|                              | <b>Image quality features</b>           | <ul style="list-style-type: none"><li>• 2x/4x/6x Anti-aliasing modes; multi-sample algorithm with gamma correction, programmable sparse sample patterns, and centroid sampling</li><li>• 2x/4x/8x/16x Anisotropic Filtering modes; up to 128-tap texture filtering</li><li>• High resolution texture support (up to 4K x 4K)</li><li>• Hardware supported overlays, antialiased points and lines, 2 sided lighting, occlusion culling</li></ul>   |
|                              | <b>Avivo video and display platform</b> | <ul style="list-style-type: none"><li>• 64-Bit per pixel floating point HDR supported throughout the pipeline, includes support for blending and multi-sample anti-aliasing</li><li>• 32-Bit integer HDR (10:10:10:2) format supported throughout the pipeline, includes support for blending and multi-sample anti-aliasing</li></ul>  |
|                              | <b>Programmable video processor</b>     | <ul style="list-style-type: none"><li>• Accelerated MPEG-2, MPEG-4, DivX, WMV9, VC-1 and H.264 decoding and transcoding</li><li>• Seamless pixel shader integration with video in real-time</li></ul>   |
|                              | <b>Display output</b>                   | <ul style="list-style-type: none"><li>• 16-bit per channel floating point HDR and 10 bit per channel DVI output</li><li>• Programmable piecewise linear gamma correction, color correction, and color space conversion (10-bits per color)</li><li>• Complete independent color controls and video overlays for each display</li><li>• High quality pre- and post-scaling engines with underscan support for all outputs</li><li>• Content-adaptive de-flicker filtering for interlaced displays</li><li>• Xilleon TV encoder for high quality analog support</li><li>• Spatial/temporal dithering enables 10-bit color quality on 8 and 6-bit displays</li><li>• VGA mode support on all outputs</li></ul> |

### Technical Specifications - Graphics

**Shader Engine**

- Supports Microsoft DirectX 9.0 Shader Model 3.0 programmable vertex and pixel shaders in hardware
- Full speed 128-bit floating point processing for all shader operations
- Dedicated branch-execution units for high performance dynamic branching and flow control
- Dedicated texture address units for improved efficiency
- Up to 512 simultaneous pixel threads
- Multiple Render Target (MRT) support
- Render to vertex buffer support

**Supported graphics APIs**

OpenGL 2.0, Microsoft DirectX 9.0

**Available graphics drivers**

HP-tested Windows XP  
Microsoft Windows Vista Business 32 and 64,  
HP-tested Linux  
HP qualified drivers may be preloaded or available from the HP support web site:

[http://h20000.www2.hp.com/bizsupport/TechSupport/Product.jsp?prodTypeId=12454&prodCatId=296719&locale=en\\_US&taskId=135](http://h20000.www2.hp.com/bizsupport/TechSupport/Product.jsp?prodTypeId=12454&prodCatId=296719&locale=en_US&taskId=135)

**ATI FireGL™ V3350**  
(Part# RV705AA)**Form Factor**

ATX

**Graphics Controller**

RV515

**Bus Type**

PCI-Express x16

**Memory**

256 MB DDR unified frame buffer, Z-buffer and Texture storage

**Connectors**

Dual DVI-I analog/digital, dual VGA analog support with DVI-to-VGA adapters.

**Display resolution support**

Analog support for 2048x1536 @ 85Hz on each output connector.  
Digital support for 1920x1200 @ 60Hz on each output connector.

**RAMDAC**

Dual 10-bit per channel 400MHz

**Image quality features**

2x/4x/6x Anti-aliasing modes; multi-sample algorithm with gamma correction, programmable sparse sample patterns, and centroid sampling  
2x/4x/8x/16x Anisotropic Filtering modes; up to 128-tap texture filtering  
High resolution texture support (up to 4K x 4K)  
Hardware supported overlays, anti-aliased points and lines, 2 sided lighting, occlusion culling

### Technical Specifications - Graphics

|   |  |
|---|--|
| <b>Architecture Features</b>            | 256-bit memory interface<br>128-bit IEEE floating-point precision graphics pipeline<br>128-bit color precision<br>12-bit sub-pixel precision<br>8x FSAA at 1920x1200, 4x at 2048x1536, rotated grid FSAA sampling algorithm<br>Hardware accelerated antialiased points and lines<br>Hardware OpenGL overlay planes<br>Hardware accelerated two-sided lighting<br>Hardware accelerated clipping planes<br>3rd generation occlusion culling<br>3D volumetric texture support<br>Quad-buffered stereo<br>Dual Link DVI enabling driving digital displays up to 3840x2400 (24Hz)<br>SLI Link |
| <b>Avivo video and display platform</b> | 64-bit per pixel floating point HDR supported throughout the pipeline, includes support for blending and multi-sample anti-aliasing<br>32-bit integer HDR (10:10:10:2) format supported throughout the pipeline, includes support for blending and multi-sample anti-aliasing  |
| <b>Programmable video processor</b>     | Accelerated MPEG-2, MPEG-4, DivX, WMV9, VC-1 and H.264 decoding and transcoding<br>Seamless pixel shader integration with video in real-time   |
| <b>Display output</b>                   | 16-bit per channel floating point HDR and 10 bit per channel DVI output<br>Programmable piecewise linear gamma correction, color correction, and color space conversion (10-bits per color)<br>Complete independent color controls and video overlays for each display<br>High quality pre- and post-scaling engines with underscan support for all outputs<br>Content-adaptive de-flicker filtering for interlaced displays<br>Spatial/temporal dithering enables 10-bit color quality on 8 and 6-bit displays<br>VGA mode support on all outputs                                       |
| <b>Shading architecture</b>             | Supports Microsoft DirectX 9.0 Shader Model 3.0 programmable vertex and pixel shaders in hardware<br>Full speed 128-bit floating point processing for all shader operations<br>Dedicated branch-execution units for high performance dynamic branching and flow control<br>Dedicated texture address units for improved efficiency<br>Up to 128 simultaneous pixel threads<br>Multiple Render Target (MRT) support<br>Render to vertex buffer support  |
| <b>Supported graphics APIs</b>          | OpenGL 2.0<br>DirectX 9.0  |
| <b>Available graphics drivers</b>       | Microsoft Windows Vista Business 32 and 64, Microsoft Windows XP Professional qualified drivers may be preloaded or available from the HP support Web site:<br><a href="http://welcome.hp.com/country/us/eng/software_drivers.html">http://welcome.hp.com/country/us/eng/software_drivers.html</a><br>HP-tested Windows XP and Linux   |

### Technical Specifications - Graphics

|   |                                   |  |
|---|-----------------------------------|--|
| <b>NVIDIA Quadro FX 3500, 256 MB</b><br>(Part# ES357AA) | <b>Form Factor</b>                | ATX  |
|   | <b>Bus Type</b>                   | PCI-Express x16  |
|   | <b>Memory</b>                     | 256 MB 700 MHz GDDR3 SDRAM unified frame buffer, Z-buffer and Texture storage  |
|   | <b>Connectors</b>                 | 2 dual-link DVI-I + 3-pin Mini DIN stereo output   |
|   | <b>Display resolution support</b> | Dual integrated analog display controllers supporting up to two analog displays at 2048x1536 @ 85Hz on both displays or dual digital displays at 1920x1200 (single-link) and 3840x2400 (dual-link).<br>NVIEW advanced multi-display desktop and application management seamlessly integrated into Microsoft Windows  |
|   | <b>RAMDAC</b>                     | Dual 400 MHz integrated  |
|   | <b>Architecture Features</b>      | 256-bit memory interface<br>128-bit IEEE floating-point precision graphics pipeline<br>128-bit color precision<br>12-bit sub-pixel precision<br>8x FSAA at 1920x1200, 4x at 2048x1536, rotated grid FSAA sampling algorithm<br>Hardware accelerated antialiased points and lines<br>Hardware OpenGL overlay planes<br>Hardware accelerated two-sided lighting<br>Hardware accelerated clipping planes<br>3rd generation occlusion culling<br>3D volumetric texture support<br>Quad-buffered stereo<br>Dual Link DVI enabling driving digital displays up to 3840x2400 (24Hz)<br>SLI Link |
|   | <b>Shading Architecture</b>       | Fully programmable GPU<br>Long fragment programs (up to 65,536 instructions)<br>Long vertex programs (up to 65,536 instructions)<br>Looping and subroutines (up to 256 loops per vertex program)<br>Dynamic flow control<br>Conditional execution  |
|   | <b>Supported Graphics APIs</b>    | OpenGL 2.0<br>DirectX 9.0  |
|   | <b>Available Graphics Drivers</b> | Microsoft Windows Vista Business 32 and 64, Microsoft Windows XP Professional; Linux - Full Open GL implementation, complete with NVIDIA and ARB extensions. Qualified drivers may be preloaded or available from the HP support Web site:<br><a href="http://welcome.hp.com/country/us/eng/software_drivers.html">http://welcome.hp.com/country/us/eng/software_drivers.html</a> .  |
|   | <b>Maximum Resolution</b>         | Dual DVI-I output – drives dual digital displays at resolutions up to 1920x1200 @ 60Hz (single-link) and 3840x2400 @ 24Hz (dual-link).<br>Internal 400MHz RAMDACs – drives dual analog displays up to 2048x1536 @ 75Hz each  |

|  |                   |  |
|--|-------------------|--|
| <b>NVIDIA Quadro FX 4500, 512 MB with optional G-Sync</b><br>(Part# EA762AA) | <b>Bus Type</b>   | PCI Express x16  |
|  | <b>RAMDAC</b>     | Dual 400 MHz integrated  |
|  | <b>Memory</b>     | 512 MB GDDR3 SDRAM unified graphics memory   |
|  | <b>Connectors</b> | 2 DVI-I analog/digital monitor outputs, 1 3-pin Mini DIN stereo output, DVI-I to VGA adapters included |

### Technical Specifications - Graphics

|   |  |
|---|--|
| <b>Display resolution support</b>         | Dual integrated display controllers supporting up to 2048x1536 @ 75Hz (analog) or 3840x2400 @ 41Hz (digital) on both displays  |
| <b>NVIDIA Quadro FX 4500 Architecture</b> | 256-bit memory interface<br>35.2GB/sec. memory bandwidth<br>Full 128-bit floating point color precision<br>12-bit subpixel precision<br>65,536 fragment instruction<br>65,536 vertex instruction<br>3D volumetric textures<br>Single-system powerwall<br>12 pixels per clock rendering engine<br>Hardware accelerated antialiased points & lines<br>Hardware OpenGL® overlay planes<br>Hardware accelerated two-sided lighting<br>Hardware accelerated clipping planes<br>Hardware two-sided lighting<br>3rd-generation occlusion culling<br>OpenGL quad-buffered stereo<br>Hardware-Accelerated Pixel Read-Back |
| <b>Shading Architecture</b>               | 16 textures per pixel in fragment programs<br>Window ID clipping functionality<br>Hardware accelerated line stippling<br>Fully programmable GPU (OpenGL2.0/DirectX 9.0c class)<br>Long fragment programs (up to 65,536 instructions)<br>Long vertex programs (up to 65,536 instructions)<br>Looping and subroutines (up to 256 loops per vertex program)<br>Dynamic flow control<br>Conditional execution  |
| <b>High Level Shader Languages</b>        | Optimized compiler for Cg and Microsoft HLSL<br>OpenGL 2.0 and DirectX 9.0c support<br>Open source compiler  |
| <b>High-Resolution Antialiasing</b>       | 12-bit subpixel sampling precision enhances AA quality<br>Rotated-grid full-scene antialiasing (RG FSAA)<br>16x FSAA dramatically reduces visual aliasing artifacts or "jaggies" at resolution up to 1920 x 1200   |
| <b>Display Resolution Support</b>         | Dual Dual Link DVI-I output-drives digital displays at resolutions up to 3840 x 2400 @ 41Hz<br>Internal 400 MHz DACs – Two analog displays up to 2048x1536 @ 75 Hz each  |
| <b>nView Architecture</b>                 | Advanced multi-display desktop & application management seamlessly integrated into Microsoft Windows.  |
| <b>Optional G-Sync</b>                    | Delivers Frame lock/Genlock functionality to unprecedented levels of industrial realism, visualization and collaborative capabilities. Frame lock allows the display channels from multiple workstations to be synchronized, thus creating one large "virtual display" that can be driven by a multisystem cluster for performance scalability, while Genlock allows the graphics output to be synchronized to an external source, typically for film and broadcast video applications. The NVIDIA Quadro G-Sync requires an NVIDIA Quadro FX 4500 graphics controller and an available expansion slot.          |

### Technical Specifications - Graphics

|                                |  |
|--------------------------------|--|
| <b>Supported Graphics APIs</b> | OpenGL 2.0 ICD with immediate mode support for all OGL primitive types<br>DirectX 9.0c |
|--------------------------------|--|

|                                       |   |
|---------------------------------------|---|
| <b>NVIDIA Quadro FX 4600 (768 MB)</b> | <p><b>Graphics controller</b> NVIDIA Quadro FX 4600 Workstation GPU</p> <p><b>Bus Type</b> PCI Express x16</p> <p><b>RAMDAC</b> Dual 400 MHz integrated</p> <p><b>Memory</b> 768 MB GDDR3 SDRAM unified graphics memory</p> <p><b>Connectors</b> 2 Dual-Link DVI-I analog/digital monitor outputs, 1 3-pin Mini DIN stereo output, DVI-I to VGA adapters included</p> <p><b>Multi-monitor Support</b> Dual integrated display controllers supporting up to 2048x1536 @ 75Hz (analog) or 3840x2400 @ 41Hz (digital) on both displays</p> <p><b>NVIDIA Quadro FX 4600 Architecture</b> 384-bit memory interface<br/>67.2 GB/sec. memory bandwidth<br/>Full 128-bit floating point color precision<br/>12-bit subpixel precision<br/>65,536 fragment instruction<br/>65,536 vertex instruction<br/>3D volumetric textures<br/>Single-system powerwall<br/>Hardware accelerated antialiased points &amp; lines<br/>Hardware OpenGL® overlay planes<br/>Hardware accelerated two-sided lighting<br/>Hardware accelerated clipping planes<br/>Hardware two-sided lighting<br/>3rd-generation occlusion culling<br/>OpenGL quad-buffered stereo<br/>Hardware-Accelerated Pixel Read-Back</p> <p><b>Shading Architecture</b> 16 textures per pixel in fragment programs<br/>Window ID clipping functionality<br/>Hardware accelerated line stippling<br/>Fully programmable GPU (OpenGL2.0/DirectX 9.0c class)<br/>Long fragment programs (up to 65,536 instructions)<br/>Long vertex programs (up to 65,536 instructions)<br/>Looping and subroutines (up to 256 loops per vertex program)<br/>Dynamic flow control<br/>Conditional execution</p> <p><b>High-level Shader Languages</b> Optimized compiler for Cg and Microsoft® HLSL<br/>OpenGL 2.0 and DirectX 9.0c support<br/>Open source compiler</p> <p><b>High-resolution Antialiasing</b> 12-bit subpixel sampling precision enhances AA quality<br/>Rotated-grid full-scene antialiasing (RG FSAA)<br/>16x FSAA dramatically reduces visual aliasing artifacts or "jaggies" at resolution up to 1920x1200</p> <p><b>Display Resolution Support</b> Dual Dual Link DVI-I output-drives digital displays at resolutions up to 3840 x 2400 @ 41Hz<br/>Internal 400 MHz DACs - Two analog displays up to 2048x1536 @ 75 Hz each</p> <p><b>nView Architecture</b> Advanced multi-display desktop &amp; application management seamlessly integrated into Microsoft Windows®.</p> |
|---------------------------------------|---|

### Technical Specifications - Graphics

**Supported Graphics APIs**

OpenGL 2.0 ICD with immediate mode support for all OGL primitive types,  
DirectX 10 compatible

**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](http://welcome.hp.com/country/us/eng/software_drivers.html)

### Technical Specifications - Monitors

|                               |  |   |  |  |
|-------------------------------|--|---|--|--|
| HP L1965 Flat Panel Monitor   | Panel  | <b>Type</b>   | Active matrix, thin film transistor (TFT)                                    |  |
|                               |  | <b>Viewable Image Area</b><br>(diagonal)  | 19 inches; 48.25 cm maximum viewable   |  |
|                               |  | <b>Screen Opening</b> (WxH)   | 14.9 x 12.0 inches; 38.0 x 30.5 cm   |  |
|                               |  | <b>Viewing Angle</b> (typical)  | 178 degrees horizontal/178 degrees vertical<br>(10:1 minimum contrast ratio) |  |
|                               |  | <b>Brightness</b> (typical)   | 300 nits (cd/m2)   |  |
|                               |  | <b>Contrast Ratio</b> (typical)   | 1000:1 (typical)   |  |
|                               |  | <b>Response Rate</b> (typical)  | 6 ms (typical gray to gray)**  |  |
|                               |  | <b>Pixel Pitch</b>  | 0.294 mm   |  |
|                               |  | <b>Backlight Lamp Life</b><br>(to half brightness)  | 50K hours  |  |
|                               |  | <p>* <b>NOTE:</b> All performance specifications represent the typical specifications provided by HP's component manufacturers; actual performance may vary either higher or lower.</p> <p>**<b>NOTE:</b> 20 ms rise and fall</p> |  |  |
|                               |  | Video/Other Inputs  | <b>Plug and Play</b>   | Yes (supports VESA DDC2B and DDC/CI; PC2001 compliant) |
|                               |  |   | <b>Self Powered USB 2.0 Hub</b>  | One upstream, four downstream ports (cable included)   |
|                               |  |   | <b>Input Signal</b>  | Two DVI-I connectors (VGA analog or digital)           |
| <b>Input Impedance</b>        | 75 ohms $\pm$ 2%   |   |  |  |
| <b>Sync Input</b>             | Separate sync (HSYNC/VSYNC); composite sync, Sync on Green (activated through on-screen display) |   |  |  |
| <b>Video Cable</b>            | One DVI-D to DVI-D, and 1 DVI-I to VGA cables  |   |  |  |
| <b>Video Cable Length</b>     | 71 in (1.8 m)  |   |  |  |
| Signal Interface/ Performance | <b>Horizontal Frequency</b>  |   | 24 to 83 kHz   |  |
|                               | <b>Vertical Frequency</b>  |   | 48 to 76 Hz  |  |
|                               | <b>Native Resolution</b>   |   | 1280 x 1024 @ 75 Hz analog<br>1280 x 1024 @ 60 Hz digital                    |  |
|                               | <b>Maximum Resolution</b><br>(Analog)  | 1280 x 1024 @ 75 Hz analog  |  |  |
|                               | <b>Maximum Resolution</b><br>(Digital)   | 1280 x 1024 @ 75 Hz analog  |  |  |
|                               | <b>Preset VESA Graphic Modes</b> (non-interlaced)  | 640 x 480 @ 60 Hz, 72 Hz, 75 Hz<br>720 x 400 @ 70 Hz<br>800 x 600 @ 60 Hz, 72 Hz, 75 Hz<br>1024 x 768 @ 60 Hz, 70 Hz, 75 Hz<br>1280 x 1024 @ 60 Hz, 75 Hz   |  |  |
|                               | <b>Preset MAC Mode</b>   | 832 x 624 @ 75 Hz<br>1152 x 870 @ 75 Hz   |  |  |
|                               | <b>Preset VGA Mode</b>   | 640 x 480 @ 60 Hz, 72 Hz  |  |  |
|                               | <b>Preset SUN Mode</b>   | 1152 x 900 @ 76 Hz  |  |  |

### Technical Specifications - Monitors

|   |                                  |  |
|---|----------------------------------|--|
|   | <b>Fail Safe Mode</b>            | Yes (limits out of range signal messages)  |
|   | <b>Maximum Pixel Clock Speed</b> | 140 MHz  |
|   | <b>User Programmable Modes</b>   | Yes, 15  |
|   | <b>Anti-Glare</b>                | Yes  |
|   | <b>Anti-Static</b>               | Yes  |
|   | <b>AssetControl</b>              | Yes (accessible on HP Compaq Business Desktops featuring Intelligent Manageability)  |
|   | <b>Default Color Temperature</b> | Yes (6500k, 9300k, SRGB, Custom User)  |
| <b>On Screen Display (OSD) Controls</b> | <b>Buttons or Switches</b>       | Power on/off; 3-button OSD; second level OSD buttons include dual-input switch, dedicated auto adjust switch   |
|   | <b>Languages</b>                 | English, Spanish, French, German, Netherlands, Italian, Japanese, Simplified Chinese   |
|   | <b>User Controls</b>             | Size and Positioning<br>Contrast<br>Brightness<br>Clock, Clock Phase<br>Selectable Color Temperature<br>Serial Number<br>Mode Displayed<br>Sleep Timer<br>Input Selection<br>Factory Reset |
| <b>Power</b>                            | <b>Power Supply</b>              | Auto-ranging, 90 to 265 VAC; internal power supply   |
|   | <b>Input Power</b>               | 100 ~ 240 VAC  |
|   | <b>Nominal Current</b>           | 1.5 A maximum  |
|   | <b>Frequency</b>                 | 50 ~ 60 Hz   |
|   | <b>Typical Power Consumption</b> | < 35 watts   |
|   | <b>Maximum</b>                   | < 55 watts   |
|   | <b>Power Saving</b>              | < 2 watts  |
|   | <b>Off Mode</b>                  | 0 watts (when master power switch is in the off position)  |
|   | <b>Power Cable Length</b>        | 74.8 in (1.9 m); non-captive   |

### Technical Specifications - Monitors

|                                    |  |  |  |                    |
|------------------------------------|--|--|--|--------------------|
| <b>Mechanical</b>                  | <b>Dimensions</b><br>(H x W x D)                 | <b>Unpacked with stand</b>   | 14.85 min to 18.79 max<br>x 15.9 x 8.78 inches<br>(37.72 min to 47.72 max<br>x 40.39 x 22.29 cm) |                    |
|                                    |  | <b>Base Area</b><br>(Footprint D x W)  | 8.78 x 11.88 inches<br>(22.29 x 30.18 cm)  |                    |
|                                    |  | <b>Panel only</b> (without stand)<br>(H x W x D)   | 12.96 x 15.9 x 2.4<br>inches (32.91 x 40.39 x<br>6.1 cm)   |                    |
|                                    |  | <b>Weight</b>  | <b>Unpacked with stand</b>   | 15.6 lbs (7.06 kg) |
|                                    |  |  | <b>Unpacked without stand</b>  | 9.26 lbs (4.19 kg) |
|                                    |  |  | <b>Packaged</b>  | 20.5 lbs (9.27 kg) |
|                                    |  | <b>Bezel Width</b>   | 12.5 mm left and right, 12.75 mm top and bottom  |                    |
|                                    |  | <b>Tilt Range</b>  | -4 degrees to +30 degrees  |                    |
|                                    |  | <b>Swivel Range</b>  | ± 45 degrees horizontal swivel   |                    |
|                                    |  | <b>Height Adjustable</b>   | Yes (4 in/100mm adjustment range)  |                    |
|                                    |  | <b>Pivot Rotation</b>  | Yes, 90 degrees  |                    |
|                                    |  | <b>Base</b>  | Ships attached and is removable  |                    |
|                                    | <b>Environmental</b>                             | <b>Temperature – Operating</b>   | 41° to 95° F (5° to 35° C)   |                    |
| <b>Temperature – Non-operating</b> |  | -4° to 140° F (-20° to 60° C)  |  |                    |
| <b>Humidity – Operating</b>        |  | 20% to 80%   |  |                    |
| <b>Humidity – Non-operating</b>    |  | 5% to 95%  |  |                    |
| <b>Altitude – Operating</b>        |  | 0 to 12,000 ft (0 to 3,658 m)  |  |                    |
|                                    | <b>Altitude – Non-operating</b>                  | 0 to 40,000 ft (0 to 12,192 m)   |  |                    |
| <b>Environmental Data</b>          | <b>Eco-Label Certifications and Declarations</b> | This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks: |  |                    |

- CECP

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

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

### Technical Specifications - Monitors

|                                |  |
|--------------------------------|--|
| <b>Longevity and Upgrading</b> | Upgradeability features contained in the product include:<br>One upstream and four downstream USB ports  |
| <b>Ergonomics</b>              | The monitor meets the ergonomic requirement of EN-ISO 13406-2 for flat panel displays.   |
| <b>Additional Information</b>  | <p>This product is in compliance with the Restrictions of Hazardous Substances (RoHS) Directive, 2002/95/EC.</p> <p>This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive, 2002/96/EC.</p> <p>Plastics parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.</p> <p>Display meets the requirement for low frequency electromagnetic fields per MPR-II, TCO, and prEN50279 A/B/C.</p> <p>This product contains 100% recycled materials (by wt.)</p> <p>This product is 100% recycleable when properly disposed of at end of life.</p> <p>Packaging Materials</p> <ul style="list-style-type: none"><li>• Corrugated - 0.955 kg</li><li>• Plastic (other) - 0.055 kg</li><li>• Polystyrene - 0.24 kg</li></ul>  |
| <b>Material Usage</b>          | <p>This product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at <a href="http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html">http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html</a>):</p> <ul style="list-style-type: none"><li>• Asbestos</li><li>• Certain Azo Colorants</li><li>• Certain Brominated Flame Retardants - may not be used as flame retardants in plastics</li><li>• Cadmium</li><li>• Chlorinated Hydrocarbons</li><li>• Chlorinated Paraffins</li><li>• Formaldehyde</li><li>• Halogenated Diphenyl Methanes</li><li>• Lead carbonates and sulfates</li><li>• Lead and Lead compounds</li><li>• Mercuric Oxide Batteries</li><li>• Nickel - finishes must not be used on the external surface designed to be frequently handled or carried by the user.</li><li>• Ozone Depleting Substances</li></ul> |

- 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.

#### 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>

### Technical Specifications - Monitors

|                                     |   |  |
|-------------------------------------|---|--|
| <b>Options</b>                      | <b>HP Silver Flat Panel Speaker Bar</b> | 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.   |
| <b>Other</b>                        | <b>Accessories Included</b>             | 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.   |
|                                     | <b>Software</b>                         | Pivot Pro software from Portrait Displays, Inc. interacts with your PC's native graphics driver to enable seamless portrait screen redraws with a simple mouse-click or keyboard command. Pivot Pro supports 90-degree portrait and landscape views. Language support is available in English, Japanese, French, German, Spanish, Italian, and Traditional and Simplified Chinese.<br><br>HP Display Assistant is a software utility that allows monitor adjustment, color calibration, and security/asset management using the Display Data Channel Command Interface (DDC/CI) protocol of the connected desktop PC.<br><br>HP Display LiteSaver feature allows you to schedule Sleep mode at preset times to help protect the monitor against image retention, drastically lower power consumption and energy costs, and extend the lifespan of the monitor. |
|                                     | <b>User Guide Languages</b>             | English, Bahasa, B. Portuguese, French, LA Spanish, Korean, Simplified Chinese, Traditional Chinese, Japanese, Danish, Dutch, Finnish, German, Italian, Norwegian, Swedish, Greek, Polish, Russian, Slovenian, Turkish   |
|                                     | <b>Warranty Languages</b>               | English  |
|                                     | <b>Color</b>                            | Carbonite, two-tone carbonite and silver (EMEA only)   |
|                                     | <b>VESA Mounting</b>                    | Yes (swing arm/wall mount not included); base must be removed for mounting options)  |
|                                     | <b>VESA External Mounting</b>           | Yes (standard 4 hole pattern, 100 mm)  |
|                                     | <b>Kensington Lock-ready</b>            | Yes  |
| <b>Certification and Compliance</b> |   | Australian ACA Approval, Canadian Requirements/CSA, CE Marking, China CCIB/CCEE Approval, CISPR Requirements, Eastern European Approvals, FCC Approval, German Ergonomic (TUV and GS Mark), ISO 13406-2 Compliant (Pixel Defect Guidelines), Mexican NOM Approval, MPR-II Compliant, PC2001 Compliant, PC99 Certified, S. Korean MIC Approval, Taiwan BSMI Approval, TCO 99 or 03 depending on region (emissions, ergonomics, environment), TUV-Ergo, UL Listed, VCCI Approvals, Microsoft® Windows® Certification   |

### Technical Specifications - Monitors

|                             |  |
|-----------------------------|--|
| <b>Compatibility</b>        | VESA Video Signal Standard (VSI) Compliant video cards have been tested and proven compatible for use with the HP LP1965 Flat Panel Monitor. Recommended for use with HP products.   |
| <b>Service and Warranty</b> | Three years parts, labor, and on-site service. 24-hour, 90-day, toll-free technical support. Replacement options may include second business day on-site service, or next business day direct replacement, at HP's sole discretion. With direct replacement, HP will ship a replacement display product directly to you. Using the prepaid shipping labels provided, return your failed display to HP in the same packaging as the replacement. Certain restrictions and exclusions apply. For details see your product warranty or contact HP Customer Support. |

#### HP Flat Panel Monitor Panel LP2065

|  |   |
|--|---|
| <b>Type</b>  | 20-inch Active Matrix TFT (thin film transistor)  |
| <b>Viewable Image Area</b><br>(diagonal)           | 20.1 in (51 cm)   |
| <b>Screen Opening</b><br>(W x H)                   | 16.2 x 12.17 inches; 41.1 x 30.9 cm   |
| <b>Viewing Angle</b> (typical)*                    | Up to 178° horizontal/178° vertical (10:1 minimum contrast ratio)   |
| <b>Brightness</b> (typical)*                       | Up to 300 nits (cd/m <sup>2</sup> )   |
| <b>Contrast Ratio</b> (typical)*                   | Up to 800:1   |
| <b>Response Rate</b><br>(typical)*                 | 8 ms (gray to gray), 16 ms (rise + fall)  |
| <b>Pixel Pitch</b>                                 | 0.255 mm  |
| <b>Backlight Lamp Life</b><br>(to half brightness) | 45K hours   |
| <b>Buttons or Switches</b>                         | Input select, auto adjust/OSD up, OSD down, OSD menu select, power  |
| <b>Languages</b>                                   | English, French, German, Spanish, Italian, Dutch, and Japanese  |
| <b>User Controls</b>                               | Brightness, contrast, positioning, color temperature, individual color control, serial number display, full screen resolutions, clock, clock phase, input selection, image control (including scaling), and factory reset |

#### On Screen Display (OSD) Controls

### Technical Specifications - Monitors

|  |   |  |  |
|--|---|--|--|
| <b>Signal Interface/<br/>Performance</b> | <b>Horizontal Frequency</b>                       | 30 to 94 kHz (VGA input); 30 to 92 KHz (DVI input for modes with pixel clock less than 157 MHz)  |  |
|  | <b>Vertical Frequency</b>                         | 48 to 85 Hz (VGA input); 30 to 92 KHz (DVI input for modes with pixel clock less than 157 MHz)   |  |
|  | <b>Native Resolution</b>                          | 1600 x 1200 @ 60 Hz (recommended)  |  |
|  | <b>Preset VESA Graphic Modes (non-interlaced)</b> | 1600 x 1200 @ 60 Hz, 75 Hz (VGA input)<br>1280 x 1024 @ 60 Hz, 75 Hz, 85 Hz<br>1280 x 960 @ 60 Hz<br>1152 x 900 @ 66 Hz<br>1024 x 768 @ 60 Hz, 75 Hz, 85 Hz<br>800 x 600 @ 60 Hz, 85 Hz<br>640 x 480 @ 60 Hz, 75 Hz, 85 Hz |  |
|  | <b>Text Mode</b>                                  | 720 x 400 @ 70 Hz  |  |
|  | <b>Mac Mode</b>                                   | 1152 x 870 @ 75 Hz and 832 x 624 @ 75 Hz   |  |
|  | <b>Sun Mode</b>                                   | 1152 x 900 @ 66 Hz   |  |
|  | <b>Maximum Pixel Clock Speed</b>                  | 202 MHz (VGA input); 162 MHz (DVI input)   |  |
|  | <b>User Programmable Modes</b>                    | Yes, 10  |  |
|  | <b>Anti-Glare</b>                                 | Yes  |  |
|  | <b>Anti-Static</b>                                | Yes  |  |
|  | <b>Default Color Temperature</b>                  | 6500 K   |  |
|  | <b>Video Input</b>                                | <b>Plug and Play</b>   | Yes  |
|  |   | <b>Input Signal</b>  | Four connectors, including one 15-pin mini D-sub VGA, one DVI-I (VGA analog and digital input), one composite video, and one s-video |
|  |   | <b>Self Powered USB 2.0 Hub</b>  | One upstream, four downstream ports (cable included)   |
|  |   | <b>Input Signal</b>  | Two DVI-I connectors (dual VGA analog or dual digital input possible)  |
|  |   | <b>Input Impedance</b>   | 75 ohms $\pm$ 10%  |
| <b>Sync Input</b>                        |   | Separate sync (HSYNC/VSYNC); composite sync, Sync on Green   |  |
| <b>Video Cable</b>                       |   | Two VGA to DVI-I; two DVI-D to DVI-I   |  |
| <b>Power</b>                             | <b>Video Cable Length</b>                         | 5.9 ft (1.8 m)   |  |
|  | <b>Input Power</b>                                | Auto-Ranging, 90 to 132 VAC and 195 to 265 VAC; internal power supply, 50 Hz/60 Hz   |  |
|  | <b>Frequency</b>                                  | 47.5 to 63 Hz  |  |
|  | <b>Typical Power Consumption</b>                  | 55 watts (without USB ports); 70 watts (USB ports fully loaded)  |  |
|  | <b>Maximum</b>                                    | < 75 W   |  |
|  | <b>Power Saving</b>                               | < 2 watts  |  |
|  | <b>Power Cable Length</b>                         | 5.9 ft (1.8 m)   |  |

### Technical Specifications - Monitors

|                      |  |  |
|----------------------|--|--|
| <b>Mechanical</b>    | <b>Dimensions (H x W x D)</b>                                  | <b>Unpacked with stand</b> 16.7 to 21.8 x 17.4 x 8.67 inches;<br>42.5 to 55.5 x 44.3 x 22.0 cm   |
|                      |  | <b>Unpacked w/o stand (head only)</b> 13.58 x 17.4 x 3.42 inches;<br>34.5 x 44.3 x 8.7 cm  |
|                      |  | <b>Packaged</b> 11.77 x 22.2 x 16.77 inches;<br>29.9 x 56.4 x 42.6 cm  |
|                      | <b>Weight</b>  | <b>Unpacked</b> With stand: 20.28 lb (9.2 kg);<br>Without stand: 12.35 lb (5.6 kg)   |
|                      |  | <b>Packaged</b> 26.3 lb (11.95 kg)   |
|                      |  | <b>Tilt Range</b> -5° to + 25° vertical tilt   |
|                      |  | <b>Swivel Range</b> -45° to + 45°  |
|                      |  | <b>Height Adjustable</b> Yes, range 5.1 in (13.0 cm)   |
|                      |  | <b>Pivot Rotation</b> Yes  |
|                      |  | <b>Base</b> Detachable, ships attached   |
| <b>Environmental</b> | <b>Temperature – Operating</b>                                 | 46° to 95° F (10° to 35° C)  |
|                      | <b>Temperature – Non-operating</b>                             | 6° to 140° F (-10° to 60° C)   |
|                      | <b>Humidity – Operating</b>                                    | 20% to 80% non-condensing  |
|                      | <b>Humidity – Non-operating</b>                                | 5% to 85%  |
|                      | <b>Altitude – Operating</b>                                    | +12,000 ft (+3,657.6 m)  |
|                      | <b>Altitude – Non-operating</b>                                | +40,000 ft (+12,192 m)   |
| <b>Options</b>       | <b>HP Silver Flat Panel Speaker Bar - Part number: EE418AA</b> | Powered directly by the monitor or the PC, the Speaker Bar seamlessly attaches to the monitor's lower bezel to bring full audio support to select HP flat panel monitors. Features include dual speakers with full sound range and external jack for headphones. Sold separately. For more information, refer to the HP Silver Flat Panel Speaker Bar QuickSpec. |

### Technical Specifications - Monitors

|                                     |   |
|-------------------------------------|---|
| <b>Other</b>                        | <p><b>Accessories Included</b> VGA to DVI-I cable – connects the graphic card's VGA connector to the monitor's input #1 or 2 (DVI-I analog) connector.</p> <p>DVI-D to DVI-I cable – connects the graphic card's DVI-D digital connector to the monitor's input #1 or #2 (DVI-I digital) connector.</p> <p><b>User Guide Languages</b> English, B. Portuguese, French, LA Spanish, Korean, S. Chinese, T. Chinese, Bahasa, Japanese, Danish, Finnish, German, Norwegian, Spanish, Swedish, Greek, Polish, Russian, Slovenian, Turkish</p> <p><b>Software</b> HP Display Assistant Utility makes it possible to adjust displays settings through the PC using two-way communication via DDCI.</p> <p>HP Display Lite Saver allows ability to power up and down display at predetermined hours of the day to save power and backlight life.</p> <p>Pivot Pro software from Portrait Displays, Inc. interacts with your PC's native graphics driver to enable seamless portrait screen redraws with a simple mouse-click or keyboard command. Pivot Pro supports 90-degree portrait and landscape views. Language support is available in English, Japanese, French, German, Spanish, Italian, and Traditional and Simplified Chinese.</p> <p><b>User Guide Languages</b> English</p> <p><b>Warranty Languages</b> English</p> <p><b>Color</b> Carbonite/Silver</p> <p><b>VESA External Mounting</b> Yes (Standard 4 hole pattern, 100 mm)</p> <p><b>Kensington Lock-Ready</b> Yes</p> |
| <b>Certification and Compliance</b> | Canadian Requirements/CSA, CE Marking, CISPR Requirements, Energy FCC Approval, ISO 13406-2 Pixel Defect Guidelines, Mexican NOM Approval,, MPR-II Compliant, PC2001 Compliant, PC99 Certified, TCO 03 (emissions, ergonomics, environment), TUV-Ergo, UL Listed, VCCI Approvals, Microsoft Windows Certification (Microsoft Windows XP)  |
| <b>Compatibility</b>                | Compatible with platforms using the VESA standard video modes. Recommended for use with HP products.  |
| <b>Service and Warranty</b>         | Three years parts, labor, and on-site service. 24-hour 365-day 1-800 technical support. Replacement options include 2nd business day on-site service or next business day direct replacement. With direct replacement, HP will ship a replacement display product directly to you. Using the shipping labels provided, return your failed display to HP. Certain restrictions and exclusions apply. For details, contact HP Customer Support.   |

### Technical Specifications - Monitors

LP2465

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

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

#### On Screen Display (OSD) Controls

|                            |  |
|----------------------------|--|
| <b>Buttons or Switches</b> | Input Select, Auto Adjust, OSD Up, OSD Down, OSD Menu Select, Power  |
| <b>Languages</b>           | English, French, German, Spanish, Italian, Japanese, Dutch   |
| <b>User Controls</b>       | 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

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

### Technical Specifications - Monitors

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

### Technical Specifications - Monitors

#### Other

**Accessories Included** VGA to DVI-I cable – connects the graphic card's VGA connector to the monitor's input #2 (DVI-I analog) connector  
 DVI-D to DVI-D cable – connects the graphic card's DVI-D digital connector to the monitor's input #2 (DVI-I digital) connector

**Software** Pivot Pro software from Portrait Displays, Inc. interacts with your PC's native graphics driver to enable seamless portrait screen redraws with a simple mouse-click or keyboard command. Pivot Pro supports 90-degree portrait and landscape views. Language support is available in English, Japanese, French, German, Spanish, Italian, and Traditional and Simplified Chinese.

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.

HP Display LiteSaver feature allows you to schedule Sleep mode at preset times to help protect the monitor against image retention, drastically lower power consumption and energy costs, and extend the lifespan of the monitor.

**User Guide Languages** English, B. Portuguese, French, LA Spanish, Korean, S. Chinese, T. Chinese, Bahasa, Japanese, Danish, Finnish, German, Norwegian, Spanish, Swedish, Greek, Polish, Russian, Slovenian, Turkish

**Warranty Languages** English, Canadian French, LA Spanish, Brazilian Portuguese, Danish, German, Castilian Spanish, French, Italian, Dutch, Norwegian, Finnish, Swedish, Bahasa Indonesian, Korean, T. Chinese, S. Chinese

**Color** Carbonite/silver

**VESA External Mounting** Yes (Standard 4 hole pattern, 100 mm)

**Kensington Lock-Ready** Yes

#### Options

**HP Silver Flat Panel Speaker Bar - Part number: EE418AA** Powered directly by the monitor or PC, the Speaker Bar seamlessly attaches to the monitor's lower bezel to bring full audio support to select HP flat panel monitors. Features include dual speakers with full sound range and an external jack for headphones. Sold separately. For more information, refer to the HP Flat Panel Speaker Bar QuickSpec.

### Technical Specifications - Monitors

#### 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 Flat Panel Monitor

#### Panel

|   |  |
|---|--|
| <b>Type</b>                                     | 30.0-inch Wide Format Active Matrix TFT (thin film transistor) |
| <b>Viewable Image Area (diagonal)</b>           | 29.77 in (75.623 cm)   |
| <b>Screen Opening (W x H)</b>                   | 25.3 x 15.8 in (64.3 x 40.3 cm)                                |
| <b>Viewing Angle (typical)*</b>                 | Up to 178° H/ 178° V (10:1 minimum contrast ratio)             |
| <b>Brightness (typical)*</b>                    | 300 nits (cd/m <sup>2</sup> )                                  |
| <b>Contrast Ratio (typical)*</b>                | 1000:1   |
| <b>Response Rate (typical)*</b>                 | 12 ms (8 ms average gray to gray)                              |
| <b>Pixel Pitch</b>                              | 0.250 mm   |
| <b>Backlight Lamp Life (to half brightness)</b> | 40K hours  |
| <b>Color Gamut</b>                              | 92% of NTSC  |
| <b>Buttons or Switches</b>                      | Input select, brightness up, brightness down, power            |
| <b>User Controls</b>                            | Brightness, input selection                                    |

#### On Screen Display (OSD) Controls

### Technical Specifications - Monitors

|  |                                      |  |   |
|--|--------------------------------------|--|---|
| <b>Signal Interface/<br/>Performance</b> | <b>Horizontal Frequency</b>          | 100 KHz  |   |
|  | <b>Vertical Frequency</b>            | 60 Hz  |   |
|  | <b>Native Resolution</b>             | 2560 x 1600 @ 60 Hz<br>(native aspect ratio of 16:10)  |   |
|  | <b>Pixel Clock Speed</b>             | 275 MHz  |   |
|  | <b>Anti-Glare</b>                    | Yes  |   |
|  | <b>Anti-Static</b>                   | Yes  |   |
|  | <b>Default Color<br/>Temperature</b> | 6500 K   |   |
| <b>Video/Other Inputs</b>                | <b>Plug and Play</b>                 | Yes  |   |
|  | <b>Self Powered USB 2.0<br/>Hub</b>  | One upstream, four downstream ports<br>(located on side of monitor, cable included)  |   |
|  | <b>Input Signal</b>                  | Three dual-link DVI-D inputs<br>(Windows PC and graphics card that supports<br>DVI ports with dual-link digital bandwidth and<br>VESA DDC standard for plug-and-play setup<br>requires a DVI-D dual-link graphic card that<br>supports WQXGA<br>(2560 x 1600) resolution.) |   |
| <b>Power</b>                             | <b>Video Cable</b>                   | Two dual-link DVI cables   |   |
|  | <b>Video Cable Length</b>            | 5.9 ft (1.8 m)   |   |
|  | <b>Input Power</b>                   | Auto-Ranging, 100 to 240 VAC; internal<br>power supply, 50 Hz/60 Hz  |   |
|  | <b>Typical Power<br/>Consumption</b> | 118 watts  |   |
|  | <b>Maximum</b>                       | < 176 watts  |   |
|  | <b>Power Saving</b>                  | < 2 watts  |   |
|  | <b>Power Cable Length</b>            | 5.9 ft (1.8 m)   |   |
| <b>Mechanical</b>                        | <b>Dimensions (H x W x D)</b>        | <b>Unpacked w/ stand</b>   | 19.3 to 23.2 x 27.2 x<br>9.5in (49.0 to 59.0 x<br>69.2 x 24.0 cm) |
|  |                                      | <b>Unpacked w/o stand</b>  | 17.9 x 27.2 x 3.3 in<br>(45.5 x 69.2 x 8.4 cm)                    |
|  |                                      | <b>Packaged</b>  | 22.4 x 31.1 x 14.9 in<br>(56.8 x 79.0 x 37.8<br>cm)               |
|  | <b>Weight</b>                        | <b>Unpacked</b>  | 30.6 lbs (13.9 kg)  |
|  | <b>Tilt Range</b>                    | -5° to + 30° vertical  |   |
|  | <b>Swivel Range</b>                  | -45° to + 45°  |   |
|  | <b>Height Adjustable</b>             | Yes, range 5.1 in (100 mm)   |   |
| <b>Pivot Rotation</b>                    | No                                   |  |   |
| <b>Base</b>                              | Detachable, ships detached           |  |   |

### Technical Specifications - Monitors

|  |  |  |   |   |   |                         |             |             |            |                          |         |         |         |            |            |            |            |                                     |   |   |   |                         |              |              |              |              |            |            |            |            |            |            |            |
|--|--|--|---|---|---|-------------------------|-------------|-------------|------------|--------------------------|---------|---------|---------|------------|------------|------------|------------|-------------------------------------|---|---|---|-------------------------|--------------|--------------|--------------|--------------|------------|------------|------------|------------|------------|------------|------------|
| <b>Environmental</b>   | <b>Temperature – Operating</b> 46° to 95° F (10° to 35° C)<br><b>Temperature – Non-operating</b> 6° to 140° F (-10° to 60° C)<br><b>Humidity – Operating</b> 20% to 80% non-condensing<br><b>Humidity – Non-operating</b> 5% to 85%<br><b>Altitude – Operating</b> +12,000 ft<br><b>Altitude – Non-operating</b> +40,000 ft  |  |   |   |   |                         |             |             |            |                          |         |         |         |            |            |            |            |                                     |   |   |   |                         |              |              |              |              |            |            |            |            |            |            |            |
| <b>Environmental Data</b>  | <b>Eco-Label Certifications and Declarations</b> This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks: <ul style="list-style-type: none"> <li>• US Federal Energy Management Program (FEMP)</li> <li>• IT Eco Declaration</li> <li>• TCO 03</li> <li>• Taiwan Green Mark</li> <li>• CECP</li> <li>• Korea Eco-label</li> <li>• EPEAT - Silver</li> </ul>  |  |   |   |   |                         |             |             |            |                          |         |         |         |            |            |            |            |                                     |   |   |   |                         |              |              |              |              |            |            |            |            |            |            |            |
|  | <table border="0"> <tr> <td style="vertical-align: top;"><b>Energy Consumption</b><br/>(in accordance with US Energy Star test method)</td> <td>AC Input Voltage at 100 VAC +/- 5 VAC, 50 Hz +/- 3 Hz</td> <td>AC Input Voltage at 115 VAC +/- 5 VAC, 60 Hz +/- 3 Hz</td> <td>AC Input Voltage at 230 VAC +/- 5 VAC, 50 Hz +/- 3 Hz</td> </tr> <tr> <td><b>Normal Operation</b></td> <td>102.8 watts</td> <td>101.7 watts</td> <td>100.4watts</td> </tr> <tr> <td><b>Sleep<sup>1</sup></b></td> <td>2 watts</td> <td>2 watts</td> <td>2 watts</td> </tr> <tr> <td><b>Off</b></td> <td>0.05 watts</td> <td>0.06 watts</td> <td>0.25 watts</td> </tr> <tr> <td style="vertical-align: top;"><b>Heat Dissipation<sup>2</sup></b></td> <td>AC Input Voltage at 100 VAC +/- 5 VAC, 50 Hz +/- 3 Hz</td> <td>AC Input Voltage at 115 VAC +/- 5 VAC, 60 Hz +/- 3 Hz</td> <td>AC Input Voltage at 230 VAC +/- 5 VAC, 50 Hz +/- 3 Hz</td> </tr> <tr> <td><b>Normal Operation</b></td> <td>350.8 BTU/hr</td> <td>347.0 BTU/hr</td> <td>342.6 BTU/hr</td> </tr> <tr> <td><b>Sleep</b></td> <td>6.8 BTU/hr</td> <td>6.8 BTU/hr</td> <td>6.8 BTU/hr</td> </tr> <tr> <td><b>Off</b></td> <td>0.2 BTU/hr</td> <td>0.2 BTU/hr</td> <td>0.9 BTU/hr</td> </tr> </table> | <b>Energy Consumption</b><br>(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 | <b>Normal Operation</b> | 102.8 watts | 101.7 watts | 100.4watts | <b>Sleep<sup>1</sup></b> | 2 watts | 2 watts | 2 watts | <b>Off</b> | 0.05 watts | 0.06 watts | 0.25 watts | <b>Heat Dissipation<sup>2</sup></b> | AC Input Voltage at 100 VAC +/- 5 VAC, 50 Hz +/- 3 Hz | AC Input Voltage at 115 VAC +/- 5 VAC, 60 Hz +/- 3 Hz | AC Input Voltage at 230 VAC +/- 5 VAC, 50 Hz +/- 3 Hz | <b>Normal Operation</b> | 350.8 BTU/hr | 347.0 BTU/hr | 342.6 BTU/hr | <b>Sleep</b> | 6.8 BTU/hr | 6.8 BTU/hr | 6.8 BTU/hr | <b>Off</b> | 0.2 BTU/hr | 0.2 BTU/hr | 0.9 BTU/hr |
| <b>Energy Consumption</b><br>(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 |   |   |                         |             |             |            |                          |         |         |         |            |            |            |            |                                     |   |   |   |                         |              |              |              |              |            |            |            |            |            |            |            |
| <b>Normal Operation</b>  | 102.8 watts  | 101.7 watts  | 100.4watts  |   |   |                         |             |             |            |                          |         |         |         |            |            |            |            |                                     |   |   |   |                         |              |              |              |              |            |            |            |            |            |            |            |
| <b>Sleep<sup>1</sup></b>   | 2 watts  | 2 watts  | 2 watts   |   |   |                         |             |             |            |                          |         |         |         |            |            |            |            |                                     |   |   |   |                         |              |              |              |              |            |            |            |            |            |            |            |
| <b>Off</b>   | 0.05 watts   | 0.06 watts   | 0.25 watts  |   |   |                         |             |             |            |                          |         |         |         |            |            |            |            |                                     |   |   |   |                         |              |              |              |              |            |            |            |            |            |            |            |
| <b>Heat Dissipation<sup>2</sup></b>  | AC Input Voltage at 100 VAC +/- 5 VAC, 50 Hz +/- 3 Hz  | AC Input Voltage at 115 VAC +/- 5 VAC, 60 Hz +/- 3 Hz                        | AC Input Voltage at 230 VAC +/- 5 VAC, 50 Hz +/- 3 Hz |   |   |                         |             |             |            |                          |         |         |         |            |            |            |            |                                     |   |   |   |                         |              |              |              |              |            |            |            |            |            |            |            |
| <b>Normal Operation</b>  | 350.8 BTU/hr   | 347.0 BTU/hr   | 342.6 BTU/hr  |   |   |                         |             |             |            |                          |         |         |         |            |            |            |            |                                     |   |   |   |                         |              |              |              |              |            |            |            |            |            |            |            |
| <b>Sleep</b>   | 6.8 BTU/hr   | 6.8 BTU/hr   | 6.8 BTU/hr  |   |   |                         |             |             |            |                          |         |         |         |            |            |            |            |                                     |   |   |   |                         |              |              |              |              |            |            |            |            |            |            |            |
| <b>Off</b>   | 0.2 BTU/hr   | 0.2 BTU/hr   | 0.9 BTU/hr  |   |   |                         |             |             |            |                          |         |         |         |            |            |            |            |                                     |   |   |   |                         |              |              |              |              |            |            |            |            |            |            |            |
|  | <p><b>NOTES</b></p> <p><sup>1</sup>This sleep status ignore the input sync signal check cycle when metering the model in sleep mode.</p> <p><sup>2</sup>Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.</p>   |  |   |   |   |                         |             |             |            |                          |         |         |         |            |            |            |            |                                     |   |   |   |                         |              |              |              |              |            |            |            |            |            |            |            |
| <b>Longevity and Upgrading</b>   | Upgradeability features contained in the product include:<br>One upstream and four downstream USB ports  |  |   |   |   |                         |             |             |            |                          |         |         |         |            |            |            |            |                                     |   |   |   |                         |              |              |              |              |            |            |            |            |            |            |            |
| <b>Ergonomics</b>  | The monitor meets the ergonomic requirement of EN-ISO 13406-2 for flat panel displays.   |  |   |   |   |                         |             |             |            |                          |         |         |         |            |            |            |            |                                     |   |   |   |                         |              |              |              |              |            |            |            |            |            |            |            |

### Technical Specifications - Monitors

#### Additional Information

This product is in compliance with the Restrictions of Hazardous Substances (RoHS) Directive, 2002/95/EC.

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

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

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

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

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

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

This product is 97.6% recycleable 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).

### Technical Specifications - Monitors

#### Material Usage

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

[http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen\\_specifications.html](http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html)):

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

#### Packaging

HP follows these guidelines to decrease the environmental impact of product packaging:

- Eliminate the use of heavy metals such as lead, chromium, mercury and cadmium in packaging materials.
- Eliminate the use of ozone-depleting substances (ODS) in packaging materials.
- Design packaging materials for ease of disassembly.
- Maximize the use of post-consumer recycled content materials in packaging materials.
- Use readily recyclable packaging materials 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.

### Technical Specifications - Monitors

|                |  |   |
|----------------|--|---|
|                | <b>End-of-life Management and Recycling</b>                | Hewlett-Packard offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: <a href="http://www.hp.com/recycle">http://www.hp.com/recycle</a> or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.   |
|                | <b>Hewlett-Packard Corporate Environmental Information</b> | For more information about HP's commitment to the environment:<br>Global Citizenship Report<br><a href="http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html">http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html</a><br>Eco-label certifications<br><a href="http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html">http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html</a><br>ISO 14001 certificates:<br><a href="http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html">http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html</a> |
| <b>Other</b>   | <b>Accessories Included</b>                                | Two dual link DVI-D to DVI-D cables - connects the graphic card's DVI-D digital connector to the monitor's input (DVI-D digital) connectors; power cord   |
|                | <b>Software</b>  | HP Display LiteSaver feature allows you to schedule Sleep mode at preset times to help protect the monitor against image retention, drastically lower power consumption and energy costs, and extend the lifespan of the monitor.   |
|                | <b>User Guide Languages</b>                                | English, B. Portuguese, French, LA Spanish, Korean, S. Chinese, T. Chinese, Bahasa, Japanese, Danish, Finnish, German, Norwegian, Spanish, Swedish, Greek, Polish, Russian, Slovenian, Turkish  |
|                | <b>Warranty Languages</b>                                  | English, Canadian French, LA Spanish, Brazilian Portuguese, Danish, German, Castilian Spanish, French, Italian, Dutch, Norwegian, Finnish, Swedish, Bahasa Indonesian, Korean, T. Chinese, S. Chinese   |
|                | <b>Color</b>   | Carbonite   |
| <b>Options</b> | <b>VESA External Mounting</b>                              | Yes (Standard 4 hole pattern, 100 mm)   |
|                | <b>Kensington Lock-Ready</b>                               | Yes   |
|                | <b>HP Flat Panel Speaker Bar - Part number: EE418AA</b>    | Powered directly by the monitor or PC, the Speaker Bar seamlessly attaches to the monitor's lower bezel to bring full audio support to select HP flat panel monitors. Features include dual speakers with full sound range and an external jack for headphones. Sold separately. For more information, refer to the HP Flat Panel Speaker Bar QuickSpec.  |

### Technical Specifications - Monitors

|                                     |  |
|-------------------------------------|--|
| <b>Certification and Compliance</b> | Australian ACA Approval, Canadian Requirements/CSA, CE Marking, China CCIB/CCEE Approval, CISPR Requirements, Eastern European Approvals, Compliant, FCC Approval, German Ergonomic (TUV and GS Mark), ISO 9241-3,7,8 VDT Guidelines, ISO 13406-2 Pixel Defect Guidelines, Mexican NOM Approval, MIC Requirements (New Zealand), MPR-II Compliant, Nordic Approvals (Nemko, Fimko, Demko, Semko), S. Korean MIC Approval, Taiwan BSMI Approval, TCO 99 (emissions, ergonomics, environment), TUV-Ergo, UL Listed, VCCI Approvals.                                |
| <b>Compatibility</b>                | Compatible with platforms using the VESA standard video modes. Recommended for use with HP products.   |
| <b>Service and Warranty</b>         | Three years parts, labor, and on-site service. 24-hour, 90-day, toll-free technical support. Replacement options may include second business day on-site service, or next business day direct replacement, at HP's sole discretion. With direct replacement, HP will ship a replacement display product directly to you. Using the prepaid shipping labels provided, return your failed display to HP in the same packaging as the replacement. Certain restrictions and exclusions apply. For details see your product warranty or contact HP Customer Support. |

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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.