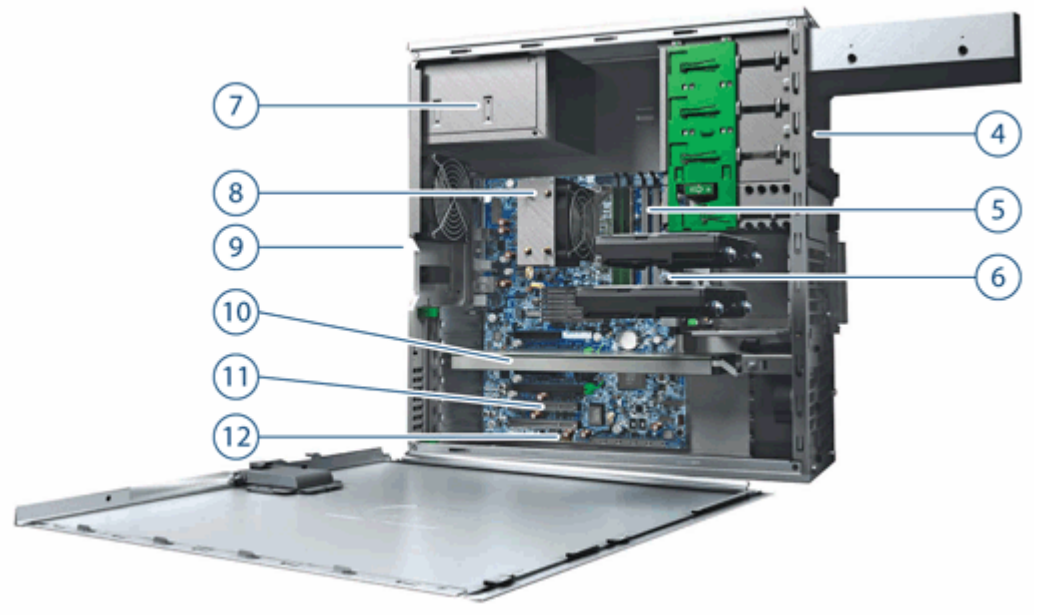
Overview


1. 3 External 5.25" Bays
2. Power Button
3. Front I/O: 2 USB 2.0, 1 IEEE 1394a, Headphone, Microphone




4. 3 External 5.25” Bays
5. 4-DIMM slots/ 6-DIMM slots (depending on base unit model) for DDR3 ECC memory
9. Rear I/O: 6 USB 2.0, PS/2 keyboard/mouse
   1 RJ-45 to Integrated Gigabit LAN
   1 Audio Line In, 1 Audio Line Out, 1 Microphone In

## Overview

6. 2 Internal 3.5” Bays
7. 475W, 85% efficient Power Supply
8. Dual/Quad/Six Core Intel 3500/3600 Series Processors
10. 2 PCIe x16 Gen2 Slots
11. 1 PCIe x4 Gen2, 1 PCIe x4 Gen1, 2 PCI Slots
12. 4 Internal USB 2.0 ports

| | |
|---|---|
| **Form Factor** | Convertible Minitower |
| **Operating Systems** | Preinstalled:<br>• Genuine Windows® 7 Ultimate 64-Bit*<br>• Genuine Windows® 7 Professional 32-Bit*<br>• Genuine Windows® 7 Professional 64-Bit*<br>• HP Linux Installer Kit for Linux [includes drivers for 32-bit & 64-bit OS versions of Red Hat Enterprise Linux(RHEL) 4 Workstation, Red Hat Enterprise Linux (RHEL) 5 Workstation, Red Hat Enterprise Linux (RHEL) 6 Workstation, 64-bit SUSE Linux Enterprise Desktop (SLED) 11]<br>• SUSE Linux Enterprise Desktop 11 Linux preloaded<br>• Red Hat Enterprise Linux Desktop (Preinstall NOT available; 1 year paper license only)<br><br>Supported:<br>• Genuine Windows® 7 Enterprise 32/64<br>• Genuine Windows® XP Professional 32/64<br>• Genuine Windows® Vista Business 32/64<br><br>Certified:<br>• Solaris 10, 11<br>• Ubuntu 10.04, 11.04, 11.10<br><br>* Systems may require upgraded and/or separately purchased hardware and/or a DVD drive to install the Windows 7 software and take full advantage of Windows 7 functionality. See http://www.microsoft.com/windows/windows-7/ for details.<br><br>**Notes**: For detailed OS/hardware support information for Linux, see: http://www.hp.com/support/linux_hardware_matrix |
| **Available Processors** | Intel® Xeon® Processor W3503 2.40 GHz, 4MB cache, 1066 memory, 4.8GT/s QPI, Dual-Core<br>Intel Xeon Processor W3505 2.53 GHz, 4MB cache, 1066 memory, 4.8GT/s QPI, Dual-Core<br>Intel Xeon Processor W3520 2.66 GHz, 8MB cache, 1066 memory, 4.8 GT/s QPI, Quad-Core, HT, Turbo<br>Intel Xeon Processor W3550 3.06 GHz, 8MB cache, 1066 memory, 4.8 GT/s QPI, Quad-Core, HT, Turbo<br>Intel Xeon Processor W3565 3.20 GHz, 8MB cache, 1066 memory, 4.8 GT/s QPI, Quad-Core, HT, Turbo<br>Intel Xeon Processor W3670 3.20 GHz, 12MB cache, 1066 memory, 4.8 GT/s QPI, Six-Core, HT, Turbo<br>Intel Xeon Processor W3680 3.33 GHz, 12MB cache, 1333 memory, 6.4 GT/s QPI, Six-Core, HT, Turbo<br>Intel Xeon Processor W3690 3.46 GHz, 12MB cache, 1333 memory, 6.4 GT/s QPI, Six-Core, HT, Turbo |
| **Available Processor Disclaimers** | Intel's numbering is not a measurement of higher performance. Processor numbers differentiate features within each processor family, not across different processor families. See: http://www.intel.com/products/processor_number/ for details.<br>64-bit computing on 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.<br>Dual-Core, Quad-Core and Six-Core technologies are designed to improve performance of multithreaded software products and hardware-aware multitasking operating systems and may |

Overview

| | | |
|---|---|---|
| | require appropriate operating system software for full benefits. Check with software provider to determine suitability. Not all customers or software applications will necessarily benefit from use of these technologies. | |
| **Chipset** | Intel® X58 Express | |
| **Convertibility** | Yes. 5.25" drives rotate for Minitower or Desktop orientation. | |
| **Expansion Slots** (see system board section for more details) | • 2 PCI slots (full-height, full-length)<br>• 1 PCI Express Gen1 slot x8 mechanical/x4 electrical<br>• 1 PCI Express Gen2 slot x8 mechanical/x4 electrical<br>• 2 PCI Express Gen2 slots x16 (one dedicated for graphics)<br><br>**NOTE:** The PCIe x8 connectors are open ended, allowing a PCIe x16 card to be seated in the slot. | |
| **Expansion Bays** (see storage section for more details) | • 2 internal 3.5" bays<br>• 3 external 5.25" bays<br><br>**NOTE:** Third external 5.25" bay is not full depth; maximum depth 170 mm (6.7 inches) | |
| **Memory** | PC3-10600 DDR3-1333 ECC Unbuffered DIMMs | |
| **Front I/O** | 2 USB 2.0, 1 IEEE 1394a standard, 1 audio out, and 1 microphone. | |
| **Internal I/O** | 4 USB 2.0 ports available by two separate 2x5 headers: supports either up to two HP Internal USB Port Kits, AMO- EM165AA (one port on each Kit), or up to two USB Media Card Readers, or one Internal Port kit and one USB Media Card Reader. | |
| **Rear I/O** | 6 USB 2.0, 2 USB 3.0 (requires optional PCIe card), 1 optional serial port, 2 optional IEEE 1394a or 1394b ports (requires PCI card), 2 PS/2, RJ-45 (NIC), 1 audio line in, 1 audio line out, 1 microphone in; audio ports can be retasked to function as line in, line out, microphone, or headphone. | |
| **Interfaces Supported** | 22-in-1 Media Card Reader (optional) | |
| **Chassis Dimensions** (HxWxD) | Standard minitower orientation: 45.02 x 16.79 x 45.53 cm (17.7 x 6.6 x 17.9 in)<br>Converted desktop orientation: 45.02 x 16.79 x 45.53 cm (17.7 x 6.6 x 17.9 in) | |
| **Weight** | Exact weights depend upon configuration<br>Minimum: 13.5 kg (29.8 lbs)<br>Standard: 15.1 kg (33.2 lbs)<br>Maximum: 19.6 kg (43.2 lbs) | |
| **Temperature** | Operating: | 5° to 35°C (40° to 95°F) |
| | Non-operating | -40° to 60°C (-40° to 140°F) |
| **Humidity** | Operating: | 8% to 85% |
| | Non-operating | 8% to 90% |
| **Maximum Altitude** (non-pressurized) | Operating: | 3,000 m; 10,000 feet |
| | Non-operating | 9,100 m; 30,000 feet |
| **Power Supply** | 475 watts wide-ranging, active Power Factor Correction, 85% Efficient<br>The Z400 475W power supply efficiency report can be found at this link: http://www.plugloadsolutions.com/psu_reports/80PLUS_DELTA_DPS-475CB-1%20A_475W_Report.pdf<br>(Optional) 600 watts wide-ranging, active Power Factor Correction, 80% Efficient<br><br>This power supply option has been discontinued on Z400 as of June 30, 2012<br><br>The Z400 600W power supply efficiency report can be found at this link: http://www.plugloadsolutions.com/psu_reports/DELTA_DPS-650LB%20B_ECOS%202171_600W_Report.pdf | |
| **Color** | Jack Black/Alloy metallic | |
| **Tape Backup** | For a complete listing of compatible tape offerings, please visit: http://www.hp.com/products1/storage/compatibility/tapebackup/Workstations/index.html | |

Supported Components

**Processors**

| | Factory Configured | Option Kit | Option Kit Part Number | Support Notes |
|---|---|---|---|---|
| **Quad/Six-Core Intel® Xeon® Processor 3500/3600 Series with Intel® 64 Architecture** | | | | |
| Intel Xeon W3503, 2.40GHz, 4MB cache, 1066 memory, 4.8GT/s QPI, Dual-Core | Y | N | | |
| Intel Xeon W3505, 2.53GHz, 4MB cache, 1066 memory, 4.8GT/s QPI, Dual-Core | Y | N | | |
| Intel Xeon W3520, 2.66GHz, 8MB cache, 1066 memory, 4.8GT/s QPI, Quad-Core, HT, Turbo | Y | N | | |
| Intel Xeon W3550, 3.06GHz, 8MB cache, 1066 memory, 4.8GT/s QPI, Quad-Core, HT, Turbo | Y | N | | |
| Intel Xeon W3565, 3.20GHz, 8MB cache, 1066 memory, 4.8GT/s QPI, Quad-Core, HT, Turbo | Y | N | | |
| Intel Xeon W3670, 3.20GHz, 12MB cache, 1066 memory, 4.8GT/s QPI, Six-Core, HT, Turbo | Y | N | | |
| Intel Xeon W3680, 3.33GHz, 12MB cache, 1333 memory, 6.4GT/s, Six-Core, HT, Turbo | Y | N | | |
| Intel Xeon W3690, 3.46GHz, 12MB cache, 1333 memory, 6.4GT/s QPI, Six-Core, HT, Turbo | Y | N | | |

HP Liquid Cooling Option is available for all the above processors.
Intel's numbering is not a measurement of higher performance.

**Monitors / Displays**

| | Factory Configured | Option Kit | Option Kit Part Number | Support Notes |
|---|---|---|---|---|
| HP DreamColor LP2480zx Professional Display | Y | Y | GV546A8 | |
| HP ZR30w 30-inch S-IPS LCD Monitor | Y | Y | VM617A8 | |
| HP ZR2740w 27-inch LED Backlit IPS Monitor | Y | Y | XW476A8 | |
| HP ZR2440w 24-inch LED Backlit IPS Monitor | Y | Y | XW477A8 | |
| HP ZR24w 24-inch S-IPS LCD Monitor | Y | Y | VM633A8 | |
| HP LP2475w 24-inch Widescreen LCD Monitor | Y | Y | KD911A8 | |
| HP ZR2240w 21.5-inch LED Backlit IPS Monitor | Y | Y | XW475A8 | |
| HP ZR2040w 20-inch LED Backlit IPS Monitor | Y | Y | LM975A8 | |

Supported by all Operating Systems available from HP

Screen Size Diagonally Measured

Supported Components

| | | Factory Configured | Option Kit | Option Kit Part Number | Support Notes |
|---|---|---|---|---|---|
| **SAS Hard Drives** | **HP SAS (Serial Attached SCSI) Hard Drives for HP Workstations** | | | | |
| | 300GB SAS 15K rpm 6Gb/s 3.5" HDD | Y | Y | LU967AA | |
| | 450GB SAS 15K rpm 6Gb/s 3.5" HDD | Y | Y | LU968AA | |
| | 600GB SAS 15K rpm 6Gb/s 3.5" HDD | Y | Y | VM647AA | |
| | HP 300GB SAS 10K SFF HDD | Y | Y | A2Z20AA | |
| | HP 450GB SAS 10K SFF HDD | Y | Y | B0A48AA | |
| | HP 600GB SAS 10K SFF HDD | Y | Y | A2Z21AA | |
| | **Sub-Section Description/Notes** | | | | |
| | **NOTE:** SAS controller add-in card required | | | | |
| | Up to (4) 3.5-inch 15K rpm SAS drives: 300, 450, 600 GB; 2.4 TB max | | | | |
| | Up to (2) 2.5-inch 10K rpm SAS drives: 300, 450, 600 GB; 1.2 TB max | | | | |
| | Removable Boot Drive option | | | | |
| **SATA Hard Drives** | **SATA (Serial ATA) Hard Drives for HP Workstations** | | | | |
| | 250GB SATA 7200 rpm 3Gb/s 3.5" HDD | Y | Y | PY278AA | |
| | 500GB SATA 7200 rpm 3Gb/s 3.5" HDD | Y | Y | PV943A | |
| | 1TB SATA 7200 rpm 3.0Gb/s 3.5" HDD | Y | Y | GE262AA | |
| | 1.5TB SATA 7200 rpm 3Gb/s 3.5" HDD | Y | Y | VH997AA | |
| | 2.0TB SATA 7200 rpm 3Gb/s 3.5" HDD | Y | Y | WE464AA | |
| | 160GB SATA 10K rpm SFF in 3.5" Frame HDD | Y | Y | EW222AA | |
| | 300GB SATA 10K rpm SFF in 3.5" Frame HDD | Y | Y | FM802AA | |
| | 600GB SATA 10K rpm SFF in 3.5" Frame HDD | Y | Y | XP309AA | |
| | **Sub-Section Description/Notes** | | | | |
| | Up to (4) 3.5-inch 7200 rpm SATA drives: 250, 500 GB, 1.0, 1.5, 2.0 TB; 8.0 TB max | | | | |
| | Up to (4) 2.5-inch 10K rpm SATA drives: 160, 300, 600 GB; 2.4 TB max | | | | |
| | Removable Boot Drive option | | | | |
| **SATA Solid State Drives** | **HP Solid State Drives for Workstations** | | | | |
| | HP 160GB SATA SSD | Y | Y | LZ704AA | |
| | HP 300GB SATA SSD | Y | Y | LZ069AA | |
| | HP 128GB SATA SSD | Y | Y | A3D25AA | Note 1 |
| | HP 256GB SATA SSD | Y | Y | A3D26AA | Note 1 |
| | **NOTE 1:** Only available as first drive (boot drive) | | | | |
| | For hard drives, 1 GB = 1 billion bytes; TB = 1 trillion bytes. Actual formatted capacity is less. | | | | |

Supported Components

| Hard Drive Controllers | | Factory Configured | Option Kit | Option Kit Part Number | Support Notes |
|---|---|---|---|---|---|
| | **Integrated SATA 3.0 Gb/s Controller** | | | | |
| | Integrated SATA 3.0 Gb/s Controller | Y | N | | |
| | **Factory integrated RAID on motherboard for SATA drives** | | | | |
| | RAID 0 Configuration - Striped Array | Y | N | | Note 1 |
| | RAID 0 Data Configuration -- Boot/OS Drive + 2 Drive Striped Array | Y | N | | Notes 1 and 2 |
| | RAID 1 Configuration - Mirrored Array | Y | N | | Note 1 |
| | **LSI 9212 4-Port SAS 6Gb/s RAID Card** | | | | |
| | LSI 9212 4-Port SAS 6Gb/s RAID Card | Y | Y | XP310AA | Notes 2 and 3 |
| | **LSI MegaRAID® SAS 8888ELP Host Bus Adapter (HBA)** | | | | |
| | LSI 8888ELP 8-port SAS HW RAID Card | N | Y | GE258AA | |
| | **LSI MegaRAID® 9260-8i SAS 6Gb/s ROC RAID Card and iBBU08 Battery Backup Unit** | | | | |
| | LSI MegaRAID® 9260-8i SAS 6Gb/s ROC RAID Card | N | Y | WE465AA | |
| | Optional: LSI iBBU08 Battery Backup Unit for LSI 9260-8i | N | Y | LA783AA | |

**NOTE 1:** All drives must be identical in size, speed, and type for RAID arrays.
Specific user-configured hardware SAS RAID configurations are supported on Linux systems. Please visit: http://www.hp.com/support/linux_hardware_matrix for details.

**NOTE 2:** In RAID 0 Data Configuration, Boot/OS Drive must be SATA.

**NOTE 3:** Specific user-configured hardware SAS RAID configurations are supported on this Linux system. Please visit: http://www.hp.com/support/linux_hardware_matrix for details.
SATA hardware RAID is not supported on Linux systems. The Linux kernel, with built-in software RAID, provides excellent functionality and performance and 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.

All RAID arrays must be less than 2 TB, except for SATA RAID 0 Data Arrays.

## Supported Components

### Graphics

| | Factory Configured | Option Kit | Option Kit Part Number | Support Notes | Supported # of cards | Supported Mixed |
|---|---|---|---|---|---|---|
| **Professional 2D** | | | | | | |
| NVIDIA Quadro NVS 295 256MB PCIe Graphics Card | Y | Y | FY943AA | Note 1 | 2 | Yes |
| NVIDIA NVS 300 512MB Graphics | Y | Y | XP612AA | Note 2 | 2 | Yes |
| NVIDIA Quadro NVS 450 512MB Graphics | Y | Y | FH519AA | Note 3 | 2 | Yes |
| **Entry 3D** | | | | | | |
| NVIDIA Quadro 400 512MB Graphics | Y | Y | LD542AA | | 2 | No |
| NVIDIA Quadro 600 1GB Graphics | Y | Y | WS093AA | | 2 | No |
| AMD FirePro V3900 1GB Graphics | Y | Y | A6R69AA | | 2 | No |
| AMD FirePro V4900 1GB Graphics | Y | Y | A3J92AA | | 2 | No |
| **Mid-range 3D** | | | | | | |
| NVIDIA Quadro 2000 1GB Graphics | Y | Y | WS094AA | | 2 | No |
| NVIDIA Quadro 2000D (Spec DVI only card) | N | Y | A9C88AA | | 2 | No |
| AMD FirePro V5900 2GB Graphics | Y | Y | LS992AA | | 2 | No |
| **High End 3D** | | | | | | |
| AMD FirePro V7900 2GB Graphics | Y | Y | LS993AA | | 1 | No |
| NVIDIA Quadro 4000 2GB Graphics | Y | Y | WS095AA | | 1 | No |
| NVIDIA Quadro 5000 2.5GB Graphics | Y | Y | WS096AA | | 1 | No |

**NOTE 1:** If 1st graphics card is NVS 295, 2nd graphics card must be NVS 295

**NOTE 2**: If 1st graphics card is NVS 300, 2nd graphics card must be NVS 300

**NOTE 3**: If 1st graphics card is NVS 450, 2nd graphics card must be NVS 450, NVS 295, or NVS 300

### Memory

| CTO | Option Kit Part Number | Support Notes |
|---|---|---|
| **PC3-10600 DDR3-1333 ECC Unbuffered DIMMs CTO** | | |
| 2GB (1x2GB) DDR3-1333 ECC Unbuffered RAM 1-CPU | | |
| 3GB (3x1GB) DDR3-1333 ECC Unbuffered RAM 1-CPU | | |
| 4GB (2x2GB) DDR3-1333 ECC Unbuffered RAM 1-CPU | | |
| 4GB (1x4GB) DDR3-1333 ECC Unbuffered RAM 1-CPU | | |
| 6GB (6x1GB) DDR3-1333 ECC Unbuffered RAM 1-CPU | | |
| 6GB (3x2GB) DDR3-1333 ECC Unbuffered RAM 1-CPU | | |
| 8GB (2x4GB) DDR3-1333 ECC Unbuffered RAM 1-CPU | | |
| 8GB (4x2GB) DDR3-1333 ECC Unbuffered RAM 1-CPU | | |
| 12GB (3x4GB) DDR3-1333 ECC Unbuffered RAM 1-CPU | | |

Supported Components

12GB (6x2GB) DDR3-1333 ECC Unbuffered RAM 1-CPU
16GB (4x4GB) DDR3-1333 ECC Unbuffered RAM 1-CPU
24GB (6x4GB) DDR3-1333 ECC Unbuffered RAM 1-CPU

**Sub-Section Description/Notes**

**NOTE:** DIMMs should be distributed across all three memory channels for optimal performance. Each processor supports up to 3 channels of DDR3 memory. To realize full performance at least 1 DIMM must be inserted into each channel.
The CPUs determine the speed at which the memory is clocked. If a 1066MHz capable CPU is used in the system, the maximum speed the memory will run at is 1066MHz regardless of the specified speed of the memory.

**AMO**

**PC3-10600 DDR3-1333 ECC Unbuffered DIMMs AMO**

| | |
|---|---|
| 1GB (1x1GB) DDR3-1333 ECC Unbuffered RAM | FX698AA |
| 2GB (1x2GB) DDR3-1333 ECC Unbuffered RAM | FX699AA |
| 4GB (1x4GB) DDR3-1333 ECC Unbuffered RAM | NL797AA |

**NOTE:** Only unbuffered DDR3 DIMMs are supported.

**Multimedia and Audio Devices**

| | Factory Configured | Option Kit | Option Kit Part Number | Support Notes |
|---|---|---|---|---|
| Integrated Intel/Realtek HD ALC262 Audio | Y | N | | |
| HP Thin USB Powered Speakers | Y | Y | KK912AA | |
| Creative X-Fi Titanium PCIe Audio Card | Y | Y | Y | Notes 1 and 2 |

**NOTE 1:** The SoundBlaster X-Fi Titanium audio card is supported on Windows 7 Professional 32-Bit and 64-Bit and Windows 7 Ultimate 64-bit.

**NOTE 2:** The SoundBlaster X-Fi Titanium audio card is supported on specific Linux operating systems. Please visit: http://www.hp.com/support/linux_hardware_matrix for details.

**Optical and Removable Storage**

| | Factory Configured | Option Kit | Option Kit Part Number | Support Notes |
|---|---|---|---|---|
| HP 16X DVD-ROM SATA Drive (non Lightscribe) | Y | Y | AR629AA | Notes 1 and 2 |
| HP 16X DVD+/-RW SuperMulti SATA Drive (non-Lightscribe) | Y | Y | QS208AA | Note 2 |
| HP Blu-ray Writer | Y | Y | AR482AA | Note 3 |
| HP 22-in-1 Media Card Reader Kit (Workstations) | Y | Y | NK361AA | |

**NOTE 1:** Not supported as a 2nd drive option.

**NOTE 2:** Actual speeds may vary. Does not permit copying of commercially available DVD movies or other copyright protected materials. Intended for creation and storage of your original material and other lawful uses. Double Layer discs can store more data than single layer discs. However, double-layer discs burned with this drive may not be compatible with many existing single-layer DVD drives and players.

**NOTE 3:** As Blu-ray is a new format containing new technologies, certain disc, digital connection, compatibility and/or performance issues may arise, and do not constitute defects in the product.

## Supported Components

Flawless playback on all systems is not guaranteed. In order for some Blu-ray titles to play, they may require a DVI or HDMI digital connection and your display may require HDCP support. HD-DVD movies cannot be played on this workstation.

### Controller Cards

| | Factory Configured | Option Kit | Option Kit Part Number | Support Notes |
|---|---|---|---|---|
| HP FireWire/IEEE 1394a PCI Card | Y | Y | PA997A | |
| HP IEEE 1394b FireWire PCIe Card | Y | Y | NK653AA | |
| HP USB 3.0 2x2 Port SuperSpeed PCIe x1 Card | Y | Y | QT587AA | |

### Networking and Communications

| | Factory Configured | Option Kit | Option Kit Part Number | Support Notes |
|---|---|---|---|---|
| Integrated Broadcom 5764 PCIe LOM Controller | Y | N | | |
| Broadcom NetXtreme Gigabit Ethernet Plus NIC (PCIe) | Y | Y | FS215AA | Note 1 |
| Intel Gigabit CT Desktop NIC | N | Y | FH969AA | |
| HP NC360T PCI Express Dual Port Gigabit NIC | N | Y | KU004AA | |

**NOTE 1:** This is a PCI Express card based on the Broadcom 5761 chip.
"Gigabit" Ethernet indicates compliance with IEEE standard 802.3ab for Gigabit Ethernet, and does not connote actual operating speed of 1 Gb/sec. For high speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required.
The Broadcom (5761) NetXtreme Gigabit Ethernet Plus NIC and the Intel Gigabit CT NIC are supported on the following Linux operating systems:
Red Hat Enterprise Linux(RHEL) WS4, 5 Desktop/Workstation
Novell SLED 10 & 11

### Racking and Physical Security

| | Factory Configured | Option Kit | Option Kit Part Number | Support Notes |
|---|---|---|---|---|
| Security Cable with Kensington Lock | N | Y | PC766A | |
| HP Solenoid Hood Lock & Hood Sensor | Y | N | | |
| HP (CMT) Solenoid Lock | N | Y | DE618A | |
| HP xw4/Z4 Depth Adjustable Fixed Rail Rack Kit | N | Y | EK729AA | |

## Supported Components

### Input Devices

| | Factory Configured | Option Kit | Option Kit Part Number | Support Notes |
|---|---|---|---|---|
| HP PS/2 Standard Keyboard | Y | Y | DT527A | |
| HP USB Standard Keyboard | Y | Y | DT528A | |
| HP PS/2 Optical Scroll Mouse | Y | Y | EY703AA | |
| HP USB 2-Button Optical Scroll Mouse | Y | Y | DC172B | |
| HP USB Laser Mouse | Y | Y | GW405AA | |
| HP USB Optical 3-Button Mouse | Y | Y | DY651A | |
| HP USB Smart Card Keyboard | N | Y | ED707AA | |
| HP 2.4GHz Wireless Keyboard & Mouse | N | Y | NB896AA | |
| HP USB Optical 3-Button 2.9M OEM Mouse | N | Y | ET424AA | |
| HP SpaceExplorer 3D USB Controller | N | Y | RY429AA | |
| HP SpacePilot 3D USB Intelligent Controller | N | Y | EF390AA | |

### Other Hardware

| | Factory Configured | Option Kit | Option Kit Part Number | Support Notes |
|---|---|---|---|---|
| Configure minitower in desktop orientation | Y | N | | |
| HP ENERGY STAR 5.0 Enabled Configuration | Y | N | | |
| HP Workstation Mouse Pad | Y | N | | Japan only |
| HP eSATA PCI Cable Kit | Y | Y | GM110AA | |
| HP Power Cord Kit | N | Y | DM293A | |
| HP Serial Port Adapter | Y | Y | PA716A | |
| HP Internal USB Port Kit | N | Y | EM165AA | |
| HP Optical Bay HDD Mounting Bracket | N | Y | NQ099AA | |
| HP Workstation to LTO SAS Int. Cable | N | Y | EH925A | |
| HP Z4 Fan and Front Card Guide Kit | Y | Y | VH190AA | |
| Autodesk AutoCAD Certification Label | Y | N | | See Note 1 |

**NOTE 1:** Only available with the following graphics cards: NVIDIA Quadro 400, 600, 2000, 4000, and 5000 and AMD FirePro V3800, V4800, V5900, and V7900

## Supported Components

### Software

| | Factory Configured | Option Kit | Option Kit Part Number | Support Notes |
|---|---|---|---|---|
| HP Performance Advisor | Y | N | | |
| Roxio Easy Media Creator (DVD/Blu-ray Disc burner software) | Y | N | | |
| Intervideo WinDVD (DVD player/burner software) | Y | N | | |
| HP ProtectTools Security | Y | N | | Note 1 |
| PDF Complete - Corporate Edition | Y | N | | |
| HP Power Assistant | Y | N | | |
| Buy Office | Y | N | | |
| HP Remote Graphics Software (RGS) V5 | Y | N | | Will be preloaded starting 12/1/11. Supports both 32 and 64 bit versions of Windows 7 Professional and Enterprise, Windows XP Professional and Enterprise, Windows Vista Business, Ultimate and Enterprise, and RHEL V6 |

**NOTE 1:** Must select as a Configure to Order Option. Delivered as a "Drop in the Box" CD

### Operating Systems

| | Support Notes |
|---|---|
| Genuine Windows® 7 Ultimate 64-bit | Note 1 |
| Genuine Windows® 7 Professional 32-bit | Note 1 |
| Genuine Windows® 7 Professional 64-bit | Note 1 |
| HP Linux Installer Kit | Note 2 |
| SUSE Linux Enterprise Desktop 11 | Note 2 |
| Red Hat Enterprise Linux (RHEL) Workstation - Paper License (1yr) | Note 3 |

**NOTE 1:** See http://www.microsoft.com/windows/windows-7/ for support details.

**NOTE 2:** See: http://www.hp.com/workstations/software/linux

**NOTE 3:** This second OS must be ordered with the HPIKL as the first OS.

| | |
|---|---|
| | **NOTE:** Restricted Material Usage updated to match GSE. |
| **System Board** | |
| **System Board Form Factor** | ATX 243.84 x 304.8 mm (9.6 x 12 inches) |
| **Processor Socket** | Single LGA1366 |
| **CPU Bus Speed** | QPI: Up to 6.4GT/sec |
| **Chipset** | Intel® X58 Express |
| **Super I/O Controller** | SMSC SCH5327, Rev B |
| **Memory Expansion Slots** | 6 DDR3 memory slots |
| **Memory Type Supported** | DDR3, UDIMM (Unbuffered), ECC |
| **Memory Modes** | Channel Interleaved |
| **Memory Speed Supported** | 800MHz, 1066MHz, and 1333MHz DDR3 |
| **Memory Protection** | ECC available on data, parity on address and command |

| Memory Size (GB) | HP Z400 4-DIMM | | | | HP Z400 6-DIMM | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | DIMM1 | DIMM2 | DIMM3 | DIMM4 | DIMM1 | DIMM2 | DIMM3 | DIMM4 | DIMM5 | DIMM6 |
| 1 | 1 GB | | | | 1 GB | | | | | |
| 2 | 1 GB | 1 GB | | | 1 GB | 1 GB | | | | |
| 3 | 1 GB | 1 GB | 1 GB | | 1 GB | 1 GB | 1 GB | | | |
| 4 | 1 GB | 1 GB | 1 GB | 1 GB | 1 GB | 1 GB | 1 GB | 1 GB | | |
| 4 | 2 GB | 2 GB | | | 2 GB | 2 GB | | | | |
| 6 | 2 GB | 2 GB | 2 GB | | 2 GB | 2 GB | 2 GB | | | |
| 8 | 2 GB | 2 GB | 2 GB | 2 GB | 2 GB | 2 GB | 2 GB | 2 GB | | |
| 8 | 4 GB | 4 GB | | | 4 GB | 4 GB | | | | |
| 12 | NA | | | | 2 GB | 2 GB | 2 GB | 2 GB | 2 GB | 2 GB |
| 12 | 4 GB | 4 GB | 2 GB | 2 GB | 4 GB | 4 GB | 2 GB | 2 GB | | |
| 12 | 4 GB | 4 GB | 4 GB | | 4 GB | 4 GB | 4 GB | | | |
| 16 | 4 GB | 4 GB | 4 GB | 4 GB | 4 GB | 4 GB | 4 GB | 4 GB | | |
| 24 | NA | | | | 4 GB | 4 GB | 4 GB | 4 GB | 4 GB | 4 GB |

| | | |
|---|---|---|
| **Memory Configuration** (Supported) | • The 4GB DIMM for Z400 and Z600 is NOT compatible with the 4GB DIMMs offered on the Z800.<br>• They are NOT interchangeable.<br>• Only ECC DIMMs are supported. | |
| **Note on Maximum Memory** | *Maximum memory capacities assume 64-bit operating systems, such as genuine Windows® Vista Business 64, XP Professional x64 Edition, Red Hat Linux 64-bit. Genuine Windows Vista Business 32 and XP Professional (32-bit) support up to 4 GB. 32-bit Linux supports up to 8 GB. | |
| **PCI Express Connectors** | 2 x16 PCIe Gen2<br>1 x8 PCIe (x4)Gen2<br>1 x8 PCIe (x4) Gen1 | |
| **PCI Connectors** (5.0V) | 2 PCI | |
| **Supported Drive Interfaces** | **SATA** | Integrated 6-channel SATA 3.0Gb/sec controller with RAID 0, 1, 5, 10 and NCQ. (Factory integrated RAID is Microsoft Windows only) |

System Technical Specifications

| | | |
|---|---|---|
| | **Serial Attached SCSI** | Hardware RAID is not supported on Linux systems. The Linux kernel, with built-in software RAID, provides excellent functionality and performance. It is a good alternative to hardware-based RAID. Please visit: http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00060684/c00060684.pdf for RAID capabilities with Linux. |
| | **Integrated RAID** | **NOTE:** Requires identical hard drives (speeds, capacity, interface) |
| | **Integrated Graphics** | No |
| | **Network Controller** | Integrated HP Gbit LAN by Broadcom with the following management capabilities: WOL, PXE 2.1 and ASF 2.0 |
| | **External SATA** (eSATA) | 4 ports are eSATA configurable with optional eSATA After-Market Option cable kit. |
| | **IDE connector** | No |
| | **Floppy connector** | Yes |
| | **Audio** | High Definition Integrated Realtek ALC262 Audio with Line in, Line Out, Microphone, Headphone |
| | **CD-ROM input** (Audio) | No |
| | **AUX INPUT** (Audio) | Yes |
| **IEEE 1394 Connector(s)** | **Front** | 6-DIMM Z400: 1 IEEE 1394a standard |
| | **Rear** | 2 optional IEEE 1394a or IEEE 1394b, requires optional PCI card |
| | **Internal** | No |
| **USB Connector(s)** | **Front** | 2 USB 2.0 |
| | **Rear** | 6 USB 2.0; 2 USB 3.0, requires optional PCIe card |
| | **Internal** | 4 USB 2.0 ports available by two separate 2x5 headers: supports either up to two HP Internal USB Port Kits, AMO- EM165AA (one port on each Kit), or up to two USB Media Card Readers, or one Internal Port kit and one USB Media Card Reader. |
| **HD Integrated Audio** | High Definition Integrated Realtek ALC262 Audio with Line in, Line Out, Microphone, Headphone | |
| **Flash ROM** | Yes | |
| **CPU Fan Header** | Yes | |
| **Chasiss Fan Header** | 1 Rear System Chassis Fan Header, 1 Optional Front Chassis Fan Header | |
| **Front PCI Fan Header** | Yes | |
| **Front Control Panel/Speaker Header** | Yes | |
| **CMOS Battery Holder - Lithium** | Yes | |
| **Integrated Trusted Platform Module** | Integrated TPM 1.2 | |
| **Power Supply Headers** | Yes | |
| **Power Switch, Power LED & Hard Drive LED Header** | Yes | |
| **Clear Password Jumper** | Yes | |
| **Serial Port** | Single Port (Requires optional Serial Port Adapter) | |
| **Parallel Port** | No | |
| **Keyboard/Mouse** | USB or PS/2 | |
| **Hood Lock Header** | Yes | |

| | |
|---|---|
| **Hood Sensor Header** | Yes |

**Z400 Required power supply info**

| **Power Supply** | **475W Custom PSU - (Wide Ranging, Active PFC)** | | **600W Custom PSU - (Wide Ranging, Active PFC)** | |
|---|---|---|---|---|
| **Operating Voltage Range** | **90 - 269 VAC** | | **90 - 269 VAC** | |
| **Rated Voltage Range** | **100 - 127 VAC 200 - 240 VAC** | **118 VAC** | **100 - 127 VAC 200 - 240 VAC** | **118 VAC** |
| **Rated Line Frequency** | **50-60 Hz** | **400Hz** | **50-60 Hz** | **400Hz** |
| **Operating Line Frequency Range** | **47 - 66 Hz** | **393-407 Hz** | **47 - 66 Hz** | **393-407 Hz** |
| **Rated Input Current** | **10A @ 100-127 VAC 6A @ 200-240 VAC** | **10A @ 118 VAC** | **10A @ 100-127 VAC 6A @ 200-240 VAC** | **10A @ 118 VAC** |
| **Heat Dissipation (Configuration & software dependent)** | **Typical 954 btu/hr (240.3 kg-cal/hr) Max 1977 btu/hr (498.2 kg-cal/hr)** | | **Typical 1536 btu/hr (387 kg-cal/hr) Max 2560 btu/hr (645 kg-cal/hr)** | |
| **Power Supply Fan** | **92x25 mm variable speed** | | **92x25 mm variable speed** | |
| **ENERGY STAR Qualified (Configuration dependent)** | **YES** | | **NO** | |
| **80 PLUS® Compliant** | **YES, 85%** | | **YES, 80%** | |
| **FEMP Standby Power Compliant @115V (Wake-on LAN disabled) (<2W in S5 - Power Off)** | **YES** | | **YES** | |
| **EuP Compliant @ 230V (<1 W in S5 - Power Off)** | **YES** | | **YES** | |
| **Power Consumption in sleep mode (as defined by ENERGY STAR) - Suspend to RAM (S3) (Instantly Available PC) measured at 115V.** | **<6W** | | **<6W** | |
| **Built-in Self Test LED** | **YES** | | **YES** | |
| **Surge Tolerant Full Ranging Power Supply (withstands power surges up to 2000V)** | **YES** | | **YES** | |

**System Configuration**

## System Technical Specifications

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ***Example Configuration #1*** | Processor Info<br>Memory Info<br>Graphics Info<br>Disks/Optical/Floppy<br>PSU | 1x Intel Xeon W3503<br>1x1GB DDR3 1333 (UDIMM)<br>NVS295<br>1x160GB SATA / 1 Optical / 0 Floppy<br>475W 85% | | | | | |
| **Energy Consumption** | | 115 VAC | | 230 VAC | | 100 VAC | |
| | | LAN Enabled | LAN Disabled | LAN Enabled | LAN Disabled | LAN Enabled | LAN Disabled |
| | Windows Idle (S0) | 86.23 W | | 85.26 W | | 85.90 W | |
| | Windows Busy Typ (S0) | 140.90 W | | 137.85 W | | 140.40 W | |
| | Windows Busy Max (S0) | 153.20 W | | 152.96 W | | 155.00 W | |
| | Sleep (S3) | 4.17 W | 3.96 W | 4.03 W | 3.79 W | 4.14 W | 3.90W |
| | Off (S5) | 1.25 W | 1.14 W | 1.51 W | 1.35 W | 1.23 W | 1.12 W |
| | Zero Power Mode (EuP) | 0.31 W | | 0.61 W | | 0.29W | |
| **Heat Dissipation**** | | 115 VAC | | 230 VAC | | 100 VAC | |
| | | LAN Enabled | LAN Disabled | LAN Enabled | LAN Disabled | LAN Enabled | LAN Disabled |
| | Windows Idle (S0) | 294.30 btu/hr | | 290.99 btu/hr | | 293.18 btu/hr | |
| | Windows Busy Typ (S0) | 480.89 btu/hr | | 470.48 btu/hr | | 479.19 btu/hr | |
| | Windows Busy Max (S0) | 522.87 btu/hr | | 522.05 btu/hr | | 529.02 btu/hr | |
| | Sleep (S3) | 14.2 btu/hr | 13.5 btu/hr | 13.8 btu/hr | 12.9 btu/hr | 14.1 btu/hr | 13.3 btu/hr |
| | Off (S5) | 4.27 btu/hr | 3.89 btu/hr | 5.15 btu/hr | 4.61 btu/hr | 4.20 btu/hr | 3.82 btu/hr |
| | Zero Power Mode (EuP) | 1.04 btu/hr | | 2.06 btu/hr | | 0.98 btu/hr | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ***Example Configuration #2*** | Processor Info<br>Memory Info<br>Graphics Info<br>Disks/Optical/Floppy<br>PSU | 1 x Intel Xeon W3570<br>4x4GB DDR3 1333MHz (UDIMM)<br>1xFX4800<br>4x450GB SAS / 1 Optical / 0 Floppy<br>475W 85% | | | | | |
| **Energy Consumption** | | 115 VAC | | 230 VAC | | 100 VAC | |
| | | LAN Enabled | LAN Disabled | LAN Enabled | LAN Disabled | LAN Enabled | LAN Disabled |
| | Windows Idle (S0) | 180.70 W | | 178.30 W | | 181.00 W | |
| | Windows Busy Typ (S0) | 404.60 W | | 393.20 W | | 407.50 W | |
| | Windows Busy Max (S0) | 482.80 W | | 469.10 W | | 488.60 W | |
| | Sleep (S3) | 4.84 W | 4.65 W | 5.13 W | 4.94 W | 4.85 W | 4.66 W |
| | Off (S5) | 1.18 W | 1.07 W | 1.61 W | 1.37 W | 1.16 W | 1.05W |
| | Zero Power Mode (EuP) | 0.32 W | | 0.61 W | | 0.29 W | |
| **Heat Dissipation**** | | 115 VAC | | 230 VAC | | 100 VAC | |
| | | LAN Enabled | LAN Disabled | LAN Enabled | LAN Disabled | LAN Enabled | LAN Disabled |
| | Windows Idle (S0) | 616.73 btu/hr | | 608.54 btu/hr | | 617.75 btu/hr | |
| | Windows Busy Typ (S0) | 1380.90 btu/hr | | 1341.99 btu/hr | | 1390.80 btu/hr | |
| | Windows Busy Max (S0) | 1647.80 btu/hr | | 1601.04 btu/hr | | 1667.59 btu/hr | |
| | Sleep (S3) | 16.5 btu/hr | 15.9 btu/hr | 17.5 btu/hr | 16.9 btu/hr | 16.6 btu/hr | 15.9 btu/hr |
| | Off (S5) | 4.03 btu/hr | 3.65 btu/hr | 5.49 btu/hr | 4.68 btu/hr | 3.96 btu/hr | 3.58 btu/hr |
| | Zero Power Mode (EuP) | 1.08 btu/hr | | 2.06 btu/hr | | 0.98 btu/hr | |

System Technical Specifications

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ***Example Configuration #3*** | Processor Info<br>Memory Info<br>Graphics Info<br>Disks/Optical/Floppy<br>PSU | 1 x Intel Xeon W3520<br>3x1GB DDR3 1333MHz (UDIMM)<br>1xFX1800<br>1x250GB SATA / 1 Optical / 0 Floppy<br>475W 85% | | | | | |
| **Energy Consumption** | | 115 VAC | | 230 VAC | | 100 VAC | |
| | | LAN Enabled | LAN Disabled | LAN Enabled | LAN Disabled | LAN Enabled | LAN Disabled |
| | Windows Idle (S0) | 96.70 W | | 95.10 W | | 97.71 W | |
| | Windows Busy Typ (S0) | 237.99 W | | 233.03 W | | 239.04 W | |
| | Windows Busy Max (S0) | 268.79 W | | 267.95 W | | 274.90 W | |
| | Sleep (S3) | 3.89 W | 3.65 W | 4.20 W | 3.96 W | 3.83 W | 3.61 W |
| | Off (S5) | 1.20 W | 1.06 W | 1.51 W | 1.35 W | 1.17 W | 1.02 W |
| | Zero Power Mode (EuP) | 0.31 W | | 0.60 W | | 0.29 W | |
| **Heat Dissipation**** | | 115 VAC | | 230 VAC | | 100 VAC | |
| | | LAN Enabled | LAN Disabled | LAN Enabled | LAN Disabled | LAN Enabled | LAN Disabled |
| | Windows Idle (S0) | 330.04 btu/hr | | 324.58 btu/hr | | 333.48 btu/hr | |
| | Windows Busy Typ (S0) | 812.26 btu/hr | | 795.33 btu/hr | | 815.84 btu/hr | |
| | Windows Busy Max (S0) | 917.38 btu/hr | | 914.51 btu/hr | | 938.23 btu/hr | |
| | Sleep (S3) | 13.3 btu/hr | 12.5 btu/hr | 14.3 btu/hr | 13.5 btu/hr | 13.1 btu/hr | 12.3 btu/hr |
| | Off (S5) | 4.10 btu/hr | 3.60 btu/hr | 5.15 btu/hr | 4.61 btu/hr | 3.99 btu/hr | 3.48 btu/hr |
| | Zero Power Mode (EuP) | 1.05 btu/hr | | 2.05 btu/hr | | 0.97 btu/hr | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| ***Example Configuration #4*** | Processor Info<br>Memory Info<br>Graphics Info<br>Disks/Optical/Floppy<br>PSU | 1 x Intel Xeon W3680<br>6x2GB DDR3 1333MHz (UDIMM)<br>1xTesla C2050<br>2x500GB SATA / 1 Optical / 0 Floppy<br>600W 80% | | | | | |
| **Energy Consumption** | | 115 VAC | | 230 VAC | | 100 VAC | |
| | | LAN Enabled | LAN Disabled | LAN Enabled | LAN Disabled | LAN Enabled | LAN Disabled |
| | Windows Idle (S0) | 114.11 W | | 112.80 W | | 113.10 W | |
| | Windows Busy Typ (S0) | 411.11 W | | 403.4 W | | 409.50 W | |
| | Windows Busy Max (S0) | 460.0 W | | 460.40 W | | 458.10 W | |
| | Sleep (S3) | 3.67 W | 3.41 W | 4.12 W | 3.85 W | 3.64 W | 3.41 W |
| | Off (S5) | 1.19 W | 1.05 W | 1.61 W | 1.47 W | 1.15 W | 1.01 W |
| | Zero Power Mode (EuP) | 0.38 W | | 0.79 W | | 0.35W | |
| **Heat Dissipation**** | | 115 VAC | | 230 VAC | | 100 VAC | |
| | | LAN Enabled | LAN Disabled | LAN Enabled | LAN Disabled | LAN Enabled | LAN Disabled |
| | Windows Idle (S0) | 389.46 btu/hr | | 384.99 btu/hr | | 386.01 btu/hr | |
| | Windows Busy Typ (S0) | 1403.12 btu/hr | | 1376.80 btu/hr | | 1397.62 btu/hr | |
| | Windows Busy Max (S0) | 1569.98 btu/hr | | 1571.35 btu/hr | | 1563.50 btu/hr | |
| | Sleep (S3) | 12.53 btu/hr | 11.64 btu/hr | 14.06 btu/hr | 13.14 btu/hr | 12.42 btu/hr | 11.64 btu/hr |
| | Off (S5) | 4.06 btu/hr | 3.58 btu/hr | 5.49 btu/hr | 5.02 btu/hr | 3.92 btu/hr | 3.45btu/hr |
| | Zero Power Mode (EuP) | 1.31 btu/hr | | 2.69 btu/hr | | 1.19 btu/hr | |

System Technical Specifications

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|---|---|---|---|---|---|---|---|
| ***Example Configuration #5 (ENERGY STAR Qualified)*** | Processor Info<br>Memory Info<br>Graphics Info<br>Disks/Optical/Floppy<br>I/O<br>PSU | 1x Intel Xeon W3570<br>4x2GB DDR3 1333MHz (UDIMM)<br>1 x FX4800<br>2x1000GB SATA / 1 Optical / 0 Floppy<br>1xBroadcom 5761 Gigabit PCIe NIC<br>475W 85% | | | | | |
| **Energy Consumption** | | 115 VAC | | 230 VAC | | 100 VAC | |
| | | LAN Enabled | LAN Disabled | LAN Enabled | LAN Disabled | LAN Enabled | LAN Disabled |
| | **On-Idle (ENERGY STAR® Idle (S0))** | 99.8 W | | 97.7 W | | 100.3 W | |
| | **ENERGY STAR® PMAX Windows running Linpack and Viewperf** | 323.1 W | | 316.6 W | | 325.4 W | |
| | **ENERGY STAR® "Sleep" (S3)** | 4.6 W | - | 4.8 W | - | 4.6 W | - |
| | **ENERGY STAR® "Standby" (Off) (S5)** | 1.8 W | - | 2.1 W | - | 1.7 W | - |
| **Heat Dissipation**** | | 115 VAC | | 230 VAC | | 100 VAC | |
| | | LAN Enabled | LAN Disabled | LAN Enabled | LAN Disabled | LAN Enabled | LAN Disabled |
| | **On-Idle (ENERGY STAR® Idle (S0))** | 340.6 btu/hr | | 333.5 btu/hr | | 342.3 btu/hr | |
| | **ENERGY STAR® PMAX Windows running Linpack and Viewperf** | 1102.7 btu/hr | | 1080.6 btu/hr | | 1110.6 btu/hr | |
| | **ENERGY STAR® "Sleep" (S3)** | 15.7 btu/hr | - | 16.4 btu/hr | - | 15.7 btu/hr | - |
| | **ENERGY STAR® "Standby" (Off) (S5)** | 1.8 btu/hr | - | 2.1 btu/hr | - | 1.7 btu/hr | - |

**NOTES:**
* Energy Star low energy mode
** Heat dissipation is calculated based on the measured watts, assuming the service level is attained for one hour.
This product is in compliance with US executive order 13221, WOL (wake on LAN) disabled.

| **Declared Noise Emissions** (Entry-level and High-end configurations) | | |
|---|---|---|
| | | |
| **System Configuration (Entry level)** | **Processor Info** | Intel Xeon Processor W3505 2.53 GHz |
| | **Memory Info** | 4 x 1GB DDR3 1333 MHz |
| | **Graphics Info** | NVIDIA Quadro NVS 295 |
| | **Disks/Optical/Floppy** | 1 x 160 GB 7200 RPM SATA / DVD-ROM / No Floppy |

| **Declared Noise Emissions** (in accordance with ISO 7779 and ISO 9296) | | **Sound Power** ( LWAd, bels ) | **Deskside Sound Pressure** |
|---|---|---|---|
| | Idle | 4.0 Bels | 23 dB |
| | Hard drive Operating (random reads) | 4.0 Bels | 23 dB |
| | Floppy Drive Operating (continuous copy) | | |
| | DVD-ROM Operating (sequential reads) | 5.1 Bels | 38 dB |

| | | |
|---|---|---|
| **System Configuration (High-end)** | **Processor Info** | Intel Xeon Processor W3570 3.20 GHz |
| | **Memory Info** | 4 x 1GB DDR3 1333 MHz |
| | **Graphics Info** | NVIDIA Quadro FX 4600 |
| | **Disks/Optical/Floppy** | 2 x 450 GB 15K SAS / DVD-ROM / No Floppy |

| | | **Sound Power** ( LWAd, bels ) | **Deskside Sound Pressure** |
|---|---|---|---|
| **Declared Noise Emissions** (in accordance with ISO 7779 and ISO 9296) | Idle | 4.7 Bels | 37 dB |
| | Hard drive Operating (random reads) | 5.1 Bels | 38 dB |
| | Floppy Drive Operating (continuous copy) | | |
| | DVD-ROM Operating (sequential reads) | 5.3 Bels | 38 dB |

| | | |
|---|---|---|
| **Environmental Requirements** | **Temperature** | Operating: 5° to 35° C (40° to 95° F)<br>Non-operating: -40° to 60° C (-40° to 140° F) |
| | **Humidity** | Operating: 8% to 85% RH, non-condensing<br>Non-operating: 8% to 90% RH, non-condensing |
| | **Maximum Altitude** | Operating: 3,000 m (10,000 feet)<br>Non-operating: 9,100 m (30,000 feet) |
| | **Dynamic** (new) | Shock<br>Operating: ½-sine: 40g, 2-3ms<br>Non-operating:<br>½-sine: 160 cm/s, 2-3ms (~100g)<br>square: 422 cm/s, 20g<br>**NOTE:** Values represent individual shock events and do not indicate repetitive shock events.<br><br>Vibration<br>Operating random: 0.5g (rms), 5-300 Hz<br>Non-operating random: 2.0g (rms), 10-500 Hz<br>**NOTE:** Values do not indicate continuous vibration. |
| | **Cooling** | Above 1524 m (5,000 ft) altitude, maximum operating temperature is de-rated by 1° C (1.8° F) per 305 m (1,000 ft) elevation increase |

## Physical Security and Serviceability

| | |
|---|---|
| **Access Panel** | Tool-less<br>Includes system board and memory information |
| **Optical Drive** | Tool-less |
| **Floppy Drive** | Tool-less |
| **Hard Drives** | Tool-less |
| **Expansion Cards** | Tool-less |
| **Processor Socket** | Tool-less |
| **Green User Touch Points** | Yes, on tool-free internal chassis mechanisms |
| **Color-coordinated Cables and Connectors** | Yes |

System Technical Specifications

| | |
|---|---|
| **Memory** | Tool-less |
| **System Board** | Tool-less |
| **Dual Color Power and HD LED on Front of Computer** | Yes |
| **Configuration Record SW** | Yes |
| **Over-Temp Warning on Screen** | Yes |
| **Restore CD/DVD Set** | Restores the computer to its original factory shipping image - Can be obtained via HP Support |
| **Dual Function Front Power Switch** | Yes, causes a fail-safe power off when held for 4 seconds |
| **Padlock Support** | Yes (optional): Locks side cover and secures chassis from theft<br>5.56 mm (0.2188 in) diameter padlock loop at rear of system |
| **Cable Lock Support** | Yes, Kensington Cable Lock (optional): Locks side cover and secures chassis from theft<br>3 mm x 7 mm slot at rear of system |
| **Universal Chassis Clamp Lock Support** | Yes (optional): 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<br>Threaded feature at rear of system |
| **Solenoid Lock and Hood Sensor** | Yes (optional)<br>The Solenoid Hood Lock eliminates the need for a physical key by making the chassis lockable through software and a password. You can also lock and unlock the chassis remotely over the network. The Sensor Kit detects when the access panel has been removed |
| **Rear Port Control Cover** | Yes, locks rear IO cables to prevent cable theft |
| **Serial, Parallel, USB, Audio, Network, Enable/Disable Port Control** | Yes, enables or disables serial, USB, audio, and network ports |
| **Removable Media Write/Boot Control** | Yes, prevents ability to boot from removable media on supported devices (and can disable writes to media) |
| **Power-On Password** | Yes, prevents an unauthorized person from booting up the workstation |
| **Setup Password** | Yes, prevents an unauthorized person from changing the workstation configuration |
| **3.3V Aux Power LED on System PCA** | Yes |
| **NIC LEDs (integrated) (Green & Amber)** | Yes |
| **CPUs and Heatsinks** | A T-15 Torx or flat blade screwdriver is needed to remove the CPU heatsink before the CPU can be removed. CPU removal is tool-less |
| **Power Supply Diagnostic LED** | Yes |
| **Front Power Button** | Yes, ACPI multi-function |
| **Front Power LED** | Yes, blue (normal), red (fault) |
| **Front Hard Drive Activity LED** | Yes, green |
| **Front ODD Activity LED** | Yes |
| **Internal Speaker** | Yes |
| **System/Emergency ROM Flash Recovery** | Recovers corrupted system BIOS. |

System Technical Specifications

| | |
|---|---|
| **Alert Standard Format (ASF) Specification** | Version 2.0 support<br><br>Industry-standard specification for network alerting in operating system-absent environments |
| **Cooling Solutions** | Air cooled forced convection, Optional processor liquid cooling solution |
| **Power Supply Fans** | 92 mm x 92 mm x 25 mm 2-wire (non-serviceable)(475W)<br><br>92 mm x 92 mm x 25 mm 4-wire (non-serviceable)(600W) |
| **CPU Heatsink Fan** | Mainstream (<=95W): 80 mm x 80 mm x 15 mm 5-wire PWM<br>Performance (>95W): 92 mm x 92 mm x 25 mm 5-wire PWM |
| **MXM Heatsink Fan** | 92 mm x 92mm x 25 mm 4-wire PWM |
| **Memory Heatsink Fan** | No |
| **HP Advanced System Diagnostics Offline Edition** | HP Vision Diagnostics Offline Edition<br>The diagnostics utility must be booted from USB or CD, and enables you to perform testing and to view critical computer hardware and software configuration information from various sources.<br><br>This utility enables you to:<br><br>● Run diagnostics<br>● View the hardware configuration of the system<br><br>Key features and benefits<br>HP Vision Diagnostics simplifies the process of effectively identifying, diagnosing, and isolating the hardware issues. In addition to robust management tools, service tools can be invaluable in quickly resolving system problems. To streamline the service process and resolve problems quickly, it is necessary to have the right information available at the time that a service call is placed. The primary information requirement, which is also the one that provides the greatest insight into potential system issues, is the configuration of the system. HP Vision Diagnostics helps provide higher system availability. Typical uses of Vision Diagnostics are:<br><br>● Testing and diagnosing apparent hardware failures<br>● Documenting system configurations for upgrade planning, standardization, inventory tracking, disaster recovery, and maintenance<br>● Sending configuration information to another location for more in-depth analysis |
| **Access Panel Key Lock** | No |
| **ACPI-Ready Hardware** | Advanced Configuration and Power Management Interface (ACPI).<br><br>● Allows the system to wake from a low power mode.<br>● Controls system power consumption, making it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system |
| **Trusted Platform Module Chip with optional ProtectTools Software** | Yes, Infineon SLB9635TT1.2 |
| **Integrated Chassis Handles** | No |
| **Power Supply** | Requires T15 Torx or flat blade screwdriver |
| **PCI Card Retention** | Yes, rear (all), middle (none), front (full-length cards with extender) |
| **Flash ROM** | Yes |
| **Diagnostic Power Switch LED on board** | Yes |
| **Clear Password Jumper** | Yes |

System Technical Specifications

| | |
|---|---|
| **Clear CMOS Button** | Yes |
| **CMOS Battery Holder** | Yes |
| **DIMM Connectors** | Yes |
| **HP ProtectTools Security Manager** | Yes - Not supported on Microsoft XP x64 or Linux |

| **BIOS** | |
|---|---|
| **BIOS 32-bit Services** | Standard BIOS 32-bit Service Directory Proposal v0.4 |
| **PCI 3.0 Support** | Full BIOS support for PCI Express through industry standard interfaces. |
| **ATAPI** | ATAPI Removable Media Device BIOS Specification Version 1.0. |
| **BBS** | BIOS Boot Specification v1.01. |
| **WMI Support** | WMI is Microsoft's implementation of Web-Based Enterprise Management (WBEM) for Windows. WMI is fully compliant with the Distributed Management Task Force (DMTF) Common Information Model (CIM) and WBEM specifications. |
| **BIOS Boot Spec 1.01+** | Provides more control over how and from what devices the workstation will boot. |
| **BIOS Power On** | Users can define a specific date and time for the system to power on. |
| **ROM Based Computer Setup Utility (F10)** | Review and customize system configuration settings controlled by the BIOS. |
| **System/Emergency ROM Flash Recovery with Video** | Recovers system BIOS in corrupted Flash ROM. |
| **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 Configuration Utility (F10 Setup). |
| **SMBIOS** | System Management BIOS 2.6, for system management information. |
| **Boot Control** | Disables the ability to boot from removable media on supported devices. |
| **Memory Change Alert** | Alerts management console if memory is removed or changed. |
| **Thermal Alert** | Monitors the temperature state within the chassis. Three modes:<br>• NORMAL - normal temperature ranges.<br>• ALERTED - excessive temperatures are detected. Raises a flag so action can be taken to avoid shutdown or provide for a smoother system shutdown.<br>• SHUTDOWN - excessive temperatures are encountered. Automatically shuts down the computer without warning before hardware component damage occurs. |
| **Remote ROM Flash** | Provides secure, fail-safe ROM image management from a central network console. |
| **ACPI (Advanced Configuration and Power Management Interface)** | Allows the system to enter and resume from low power modes (sleep states).<br>Enables an operating system to control system power consumption based on the dynamic workload.<br>Makes it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system.<br>Supports ACPI 2.0 for full compatibility with 64-bit operating systems. |
| **Ownership Tag** | A user-defined string stored in non-volatile memory that is displayed in the BIOS splash screen. |
| **Remote Wakeup/Remote Shutdown** | System administrators can power on, restart, and power off a client computer from a remote location. |
| **Instantly Available PC (Suspend to RAM - ACPI sleep state S3)** | Allows for very low power consumption with quick resume time. |

System Technical Specifications

| | |
|---|---|
| **Remote System Installation via F12 (PXE 2.1) (Remote Boot from Server)** | Allows a new or existing system to boot over the network and download software, including the operating system. |
| **ROM revision levels** | Reports the system BIOS revision level in Computer Configuration Utility (F10 Setup). Version is available through an industry standard interface (SMBIOS) so that management SW applications can use and report this information. |
| **System board revision level** | Allows management SW to read revision level of the system board.<br>Revision level is digitally encoded into the HW and cannot be modified. |
| **Start-up Diagnostics (Power-on Self-Test)** | Assesses system health at boot time with selectable levels of testing. |
| **Auto Setup when new hardware installed** | System automatically detects addition of new hardware. |
| **Keyboard-less Operation** | The system can be booted without a keyboard. |
| **Localized ROM Setup** | Common BIOS image supports System Configuration Utility (F10 Setup) menus in 12 languages with local keyboard mappings. |
| **Asset Tag** | The user or MIS to set a unique tag string in non-volatile memory. |
| **Per-slot Control** | Allows I/O slot parameters (option ROM enable/disable, bus latency) to be configured individually. |
| **Adaptive Cooling** | Control parameters are set according to detected hardware configuration for optimal acoustics. |
| **Pre-boot Diagnostics** | (Pre-video) critical errors are reported via beeps and blinks on the power LED. |
| **Industry Standard Specification Support** | |
| **Industry Standard** | Revision Supported by the BIOS |
| **ACPI** | Advanced Configuration and Power Management Interface, Version 2.0c |
| **ASF** | Alert Standard Format Specification, Version 2.0 |
| **ATA (IDE)** | AT Attachment 6 with Packet Interface (ATA/ATAPI-6), Revision 3b |
| **CD Boot** | "El Torito" Bootable CD-ROM Format Specification Version 1.0 |
| **EDD** | • Enhanced Disk Drive Specification Version 1.1<br>• BIOS Enhanced Disk Drive Specification Version 3.0 |
| **EHCI** | Enhanced Host Controller Interface for Universal Serial Bus, Revision 1.0 |
| **PCI** | PCI Local Bus Specification, Revision 2.3<br>PCI Power Management Specification, Revision 1.1<br>PCI Firmware Specification, Revision 3.0, Draft .7 |
| **PCI Express** | PCI Express Base Specification, Revision 2.0 |
| **PMM** | POST Memory Manager Specification, Version 1.01 |
| **SATA** | • Serial ATA Specification, Revision 1.0a<br>• Serial ATA 3 Gb/s: Extensions to Serial ATA 1.5 Gb/s, Revision 1.0 |
| **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** | Universal Serial Bus Revision 1.1 Specification<br><br>Universal Serial Bus Revision 2.0 Specification<br><br>Universal Serial Bus Revision 3.0 Specification |
| **SMBIOS** | System Management BIOS Reference Specification, Version 2.6 |

## Social and Environmental Responsibility

System Technical Specifications

| | |
|---|---|
| **Eco-Label Certifications & Declarations** | This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks:<br><br>• ENERGY STAR® (energy-saving features available on selected configurations -Windows only)<br>• US Federal Energy Management Program (FEMP)<br>• EPEAT Gold registered in the U.S. EPEAT registration varies by country. See www.epeat.net for registration status by country<br>• China Energy Conservation Program<br>• IT ECO declaration<br>• Japan PC Green label*<br><br>*This product conforms to the examination standards (2003 version) under JEITA's 'PC Green Label System.' |
| **Batteries** | This product complies with ISO standards:<br><br>• EU Directive 91/ 157/ EEC<br>• EU Directive 93/ 86/ EEC<br>• EU Directive 98/ 101/ EEC<br><br>Batteries used in the product do not contain:<br><br>• Mercury greater than 5ppm by weight<br>• Cadmium greater than 10ppm by weight<br>• Lead greater than 40ppm by weight<br><br>Battery size: CR2032 (coin cell)<br>Battery type: Lithium |
| **Restricted Material Usage** | This product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html):<br><br>• Asbestos<br>• Batteries - Mercury<br>• Batteries - Cadmium<br>• Batteries - Lead (non-rechargeable)<br>• Batteries - Non-rechargeable Alkaline and Carbon-Zinc Batteries<br>• Batteries - Classification as "Not Restricted" for Transport<br>• Brominated Flame Retardants (PBBs, PBDEs, including DecaBDE)<br>• Brominated Flame Retardants (all BFRs in external case plastic parts)<br>• Cadmium and its compounds<br>• Certain Azo Colorants<br>• Chlorinated Hydrocarbons<br>• Chlorinated Paraffins<br>• Formaldehyde<br>• Formaldehyde - emissions<br>• Hexavalent Chromium and its compounds in metallic applications<br>• Hexavalent Chromium and its compounds in non-metallic applications<br>• Lead and its compounds<br>• Lead in paint<br>• Lead in Polyvinyl Chloride (PVC) coating of external cables, wires and cords<br>• Mercury and its compounds<br>• Nickel on external surfaces<br>• Ozone Depleting Substances (ODS)<br>• Polycyclic Aromatic Hydrocarbons (PAH)<br>• Perfluorooctane sulfonates (PFOS) in parts<br>• Perfluorooctane sulfonates (PFOS) in preparations<br>• Polychlorinated Biphenyls (PCBs) and Polychlorinated Terphenyls (PCTs)<br>• <br>• <br>• |

| | |
|---|---|
| | • Polychlorinated Naphthalenes<br>• Polyvinyl Chloride (PVC) in external case plastic parts<br>• Radioactive Substances<br>• Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO) |
| **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.<br><br>This product is greater than 90% recyclable by weight when properly disposed of at end of life.<br>This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive - 2002/96/EC. |
| **Hewlett-Packard Corporate Environmental Information** | For more information about HP's commitment to the environment, please see the Global Citizenship Report: http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html<br>Eco-label certifications:<br>http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html<br>ISO 14001 certificates:<br>http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html |
| **Additional Information** | This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2002/95/EC.<br>This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).<br>This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive - 2002/96/EC.<br>Plastic parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043.<br>This product contains 0% recycled materials (by weight)<br>This product is >90% recycle-able when properly disposed of at end of life. |
| **Packaging** | HP follows these guidelines to decrease the environmental impact of product packaging:<br><br>• Eliminate the use of heavy metals such as lead, chromium, mercury, and cadmium in packaging materials.<br>• Eliminate the use of ozone-depleting substances (ODS) in packaging materials.<br>• Design packaging materials for ease of disassembly.<br>• Maximize the use of post-consumer recycled content materials in packaging materials.<br>• Use readily recyclable packaging materials such as paper and corrugated materials.<br>• Reduce size and weight of packages to improve transportation fuel efficiency.<br>• Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards. |
| **Packaging Materials** | |
| **Internal** | LDPE Foam: .366 kg |
| **External** | Cardboard carton and insert: 1.536 kg |

System Technical Specifications

| Manageability | |
|---|---|
| **Industry Standard Specifications** | This product meets the following industry standard specifications for manageability functionality:<br>• ASF 2.0 (via integrated Broadcom LAN) |
| **Remote Manageability Software Solutions** | The HP Z400 Workstation is supported on the following remote manageability software consoles:<br>• LANDesk Management Suite (PSG recommended solution)<br>• Microsoft System Center Configuration Manager<br>• HP Client Automation Enterprise<br>For questions or support for manageability needs, please visit: http://www.hp.com/go/easydeploy |
| **System Software Manager** | For questions or support for SSM, please visit: http://www.hp.com/go/ssm |
| **Service, Support, and Warranty** | On-site Warranty and Service (Note 1): Three-years, limited warranty and service offering delivers on-site, next business-day (Note 2) service for parts and labor and includes free telephone support (Note 3) 8am - 5pm. Global coverage (Note 2) ensures that any product purchased in one country and transferred to another, non-restricted country will remain fully covered under the original warranty and service offering.<br><br>**NOTE 1:** Terms and conditions may vary by country. Certain restrictions and exclusions apply.<br>**NOTE 2:** On-site service may be provided pursuant to a service contract between HP and an authorized HP third-party provider, and is not available in certain countries. Global service response times are based on commercially reasonable best effort and may vary by country.<br>**NOTE 3:** Technical telephone support applies only to HP-configured, HP and HP-qualified, third-party hardware and software. Toll-free calling and 24x7 support service may not be available in some countries.<br>HP Care Pack Services extend service contracts beyond the standard warranties. Service starts from date of hardware purchase. To choose the right level of service for your HP product, use the HP Care Pack Services Lookup Tool at: http://www.hp.com/go/lookuptool. Additional HP Care Pack Services information by product is available at: http://www.hp.com/hps/carepack. Service levels and response times for HP Care Packs may vary depending on your geographic location. |
| **Product Change Notification** | • Program to proactively communicate Product Change Notifications (PCNs) and Customer Advisories by email to customers, based on a user-defined profile.<br>• PCNs provide advance notification of hardware and software changes to be implemented in the factory providing time to plan for transition.<br>• Customer Advisories provide concise, effective problem resolution, greatly reducing the need to call technical support. |

Stable & Consistent Offerings

As part of its commitment to hardware, software, and solution innovation, HP is proud to introduce this breakthrough platform configuration stability to HP Workstation customers. HP Stable & Consistent Offerings are built on the foundation of a carefully chosen set of hardware and software designed and tested to work with all HP Z Workstation platforms through their end of life. These components and their corresponding HP Workstation platform compatibility are outlined in this section.

HP Stable & Consistent Offerings are available worldwide to all HP Workstation customers-no special programs, no additional cost-no kidding. Simply select your hardware and software components when you customize your HP Workstation and be assured that you'll be able to buy that same configuration throughout the lifecycle of the product.

| | | |
|---|---|---|
| **Processors** | **Product #** | **Offering** |
| | NF136AV | Intel Xeon W3520, 2.66GHz, 8MB cache, 1066 memory, 4.8GT/s QPI, Quad-Core, HT, Turbo |
| | VU898AV | Intel Xeon W3565, 3.20GHz, 8MB cache, 1066 memory, 4.8GT/s QPI, Quad-Core, HT, Turbo |
| | WH058AV | Intel Xeon W3680, 3.33GHz, 12MB cache, 1333 memory, 6.4GT/s QPI, Six-Core, HT, Turbo |
| **Hard Drives** | **Product #** | **Offering** |
| | FX638AV | HP 250GB SATA 7200 1st HDD |
| | FX648AV | HP 250GB SATA 7200 2nd HDD |
| | FX658AV | HP 250GB SATA 7200 3rd HDD |
| | FX640AV | HP 500GB SATA 7200 1st HDD |
| | FX650AV | HP 500GB SATA 7200 2nd HDD |
| | FX660AV | HP 500GB SATA 7200 3rd HDD |
| | XB107AV | HP 500GB SATA 7200 4th HDD |
| **Graphics** | **Product #** | **Offering** |
| | FZ347AV | NVIDIA Quadro NVS 295 256MB Graphics Card |
| | FZ356AV | NVIDIA Quadro NVS 295 256MB Graphics (2nd) |
| | WS070AV | NVIDIA Quadro 2000 1GB Graphics |
| | WS071AV | NVIDIA Quadro 2000 1GB Graphics (2nd) |
| **Memory** | **Product #** | **Offering** |
| | NL980AV | 3GB (3x1GB) DDR3-1333 ECC Unbuffered RAM |
| | NL982AV | 6GB (3x2GB) DDR3-1333 ECC Unbuffered RAM |
| | NL984AV | 12GB (3x4GB) DDR3-1333 ECC Unbuffered RAM |
| **Optical and Removable Storage** | **Product #** | **Offering** |
| | FX681AV | HP 16X DVD+-RW SuperMulti SATA 1st Drive |
| | FX682AV | HP 16X DVD+-RW SuperMulti SATA 2nd Drive |
| **Input Devices** | **Product #** | **Offering** |
| | FX677AV | HP USB Optical Scroll Mouse |
| | FZ362AV | HP USB Standard Keyboard |

Stable & Consistent Offerings

| Operating Systems | Product # | Offering |
|---|---|---|
| | VM432AV | Genuine Windows® 7 Professional 64-bit |

| | |
|---|---|
| **Processors** | Intel Xeon W3503, 2.40GHz, 4MB cache, 1066 memory, 4.8GT/s QPI, Dual-Core |
| | Intel Xeon W3505, 2.53GHz, 4MB cache, 1066 memory, 4.8GT/s QPI, Dual-Core |
| | Intel Xeon W3520, 2.66GHz, 8MB cache, 1066 memory, 4.8GT/s QPI, Quad-Core, HT, Turbo |
| | Intel Xeon W3550, 3.06GHz, 8MB cache, 1066 memory, 4.8GT/s QPI, Quad-Core, HT, Turbo |
| | Intel Xeon W3565, 3.20GHz, 8MB cache, 1066 memory, 4.8GT/s QPI, Quad-Core, HT, Turbo |
| | Intel Xeon W3670, 3.20GHz, 12MB cache, 1066 memory, 4.8GT/s QPI, Six-Core, HT, Turbo |
| | Intel Xeon W3680, 3.33GHz, 12MB cache, 1333 memory, 6.4GT/s QPI, Six-Core, HT, Turbo |
| | Intel Xeon W3690, 3.46GHz, 12MB cache, 1333 memory, 6.4GT/s QPI, Six-Core, HT, Turbo |

## Introduction

Intel's latest-generation microarchitecture represents the next step in unprecedented processor performance and dynamic scalability. Designed from the ground up, Intel® Microarchitecture unleashes parallel processing performance technology providing an integrated memory controller and high-speed interconnect per independent processing core.

## Performance and Features

Intel® Microarchitecture offers the latest in processor innovation, including:

- Dynamic scalability, managed cores, threads, cache, interfaces, and power for energy-efficient performance on demand
- Design and performance scalability for servers, workstations, notebooks and desktops with support for 2-8+ cores and up to 16+ threads with Intel® Hyper-Threading Technology (Intel® HT Technology), and scalable cache sizes, system interconnects, and integrated memory controllers
- Intel® Turbo Boost Technology delivers additional performance automatically when needed by taking advantage of the processor's power and thermal headroom. This enables increased performance of both multi-threaded and single-threaded workloads.
- Intel Hyper-Threading Technology brings high-performance applications into mainstream computing with 1-16+ threads optimized for a new generation multi-core processor architecture.
- Scalable shared memory of Intel® QuickPath technology features memory distributed to each processor with integrated memory controllers and high-speed point-to-point interconnects to unleash the performance of future versions of next-generation Intel® multi-core processors.
- Multi-level shared cache improves performance and efficiency by reducing latency to frequently used data.

## Turbo Boost Technology

This technology, now built into Xeon 3500 Series Quad-Core and Xeon 3600 6-Core processors, will increase the speed of your processor on demand if the CPU is operating below power or thermal specifications:

- Benefit of Turbo Boost (how much the CPU speeds up) depends on number of active cores
- Likelihood of Turbo Boost operation increases when less cores are active and when dynamic power management is enabled

Technical Specifications - Monitors / Displays

| | | |
|---|---|---|
| **HP DreamColor LP2480zx Professional Display** | **QuickSpecs URL** | http://h18000.www1.hp.com/products/quickspecs/13081_div/13081_div.html |
| | **Part Number** | GV546A8 |
| **HP ZR30w 30-inch S-IPS LCD Monitor** | **QuickSpecs URL** | http://h18000.www1.hp.com/products/quickspecs/13635_div/13635_div.html |
| | **Part Number** | VM617A8 |
| **HP ZR2740w 27-inch LED Backlit IPS Monitor** | **QuickSpecs URL** | http://h18000.www1.hp.com/products/quickspecs/14144_div/14144_div.html |
| | **Part Number** | XW476A8 |
| **HP ZR2440w 24-inch LED Backlit IPS Monitor** | **QuickSpecs URL** | http://h18000.www1.hp.com/products/quickspecs/14145_div/14145_div.html |
| | **Part Number** | XW477A8 |
| **HP ZR24w 24-inch S-IPS LCD Monitor** | **QuickSpecs URL** | http://h18000.www1.hp.com/products/quickspecs/13557_div/13557_div.html |
| | **Part Number** | VM633A8 |
| **HP LP2475w 24-inch Widescreen LCD Monitor** | **QuickSpecs URL** | http://h18000.www1.hp.com/products/quickspecs/13134_div/13134_div.html |
| | **Part Number** | KD911A8 |
| **HP ZR2240w 21.5-inch LED Backlit IPS Monitor** | **QuickSpecs URL** | http://h18000.www1.hp.com/products/quickspecs/14143_div/14143_div.html |
| | **Part Number** | XW475A8 |
| **HP ZR2040w 20-inch LED Backlit IPS Monitor** | **QuickSpecs URL** | http://h18000.www1.hp.com/products/quickspecs/14142_div/14142_div.html |
| | **Part Number** | LM975A8 |

Technical Specifications - Hard Drives

| | | | | |
|---|---|---|---|---|
| **HP SAS (Serial Attached SCSI) Hard Drives for HP Workstations** | **600GB SAS 15K rpm 6Gb/s 3.5" HDD** | **Capacity** | 600GB | |
| | | **Height** | 1 in; 2.54 cm | |
| | | **Width** | **Media Diameter** | 3.5 in; 8.9 cm |
| | | | **Physical Size** | 4 in; 10.17 cm |
| | | **Interface** | SAS | |
| | | **Synchronous Transfer Rate** (Maximum) | 6.0 Gb/s | |
| | | **Buffer** | 16 MB | |
| | | **Seek Time** (typical reads, includes controller overhead, including settling) | **Single Track** | 0.2 ms |
| | | | **Average** | 3.4 ms |
| | | | **Full Stroke** | 6.6 ms |
| | | **Rotational Speed** | 15,000 rpm | |
| | | **Logical Blocks** | 1,172,123,568 - 512 byte blocks | |
| | | **Operating Temperature** | 50° to 95° F (10° to 35° C) | |
| | **450GB SAS 15K rpm 6Gb/s 3.5" HDD** | **Capacity** | 450GB | |
| | | **Height** | 1 in; 2.54 cm | |
| | | **Width** | **Media Diameter** | 3.5 in; 8.9 cm |
| | | | **Physical Size** | 4 in; 10.17 cm |
| | | **Interface** | SAS | |
| | | **Synchronous Transfer Rate** (Maximum) | 6Gb/s | |
| | | **Buffer** | 16MB | |
| | | **Seek Time** (typical reads, includes controller overhead, including settling) | **Single Track** | 0.2 ms |
| | | | **Average** | 3.4 ms |
| | | | **Full Stroke** | 6.6 ms |
| | | **Rotational Speed** | 15,000 rpm | |
| | | **Operating Temperature** | 50° to 95° F (10° to 35° C) | |
| | **300GB SAS 15K rpm 6Gb/s 3.5" HDD** | **Capacity** | 300GB | |
| | | **Height** | 1 in; 2.54 cm | |
| | | **Width** | **Media Diameter** | 3.5 in; 8.9 cm |
| | | | **Physical Size** | 4 in; 10.17 cm |
| | | **Interface** | SAS | |
| | | **Synchronous Transfer Rate** (Maximum) | 6Gb/s | |
| | | **Buffer** | 16MB | |
| | | **Seek Time** (typical reads, includes controller overhead, including settling) | **Single Track** | 0.2 ms |
| | | | **Average** | 3.4 ms |
| | | | **Full Stroke** | 6.6 ms |
| | | **Rotational Speed** | 15,000 rpm | |
| | | **Operating Temperature** | 50° to 95° F (10° to 35° C) | |
| | **HP 300GB SAS 10K SFF HDD** | **Capacity** | 300GB | |
| | | **Height** | 0.6 in; 1.53 cm | |

| | | | |
|---|---|---|---|
| | **Width** | **Media Diameter** | 2.5 in; 6.36 cm |
| | | **Physical Size** | 2.75 in; 6.99 cm |
| | **Interface** | SAS 6Gb/s | |
| | **Synchronous Transfer Rate** (Maximum) | Up to 600MB/s | |
| | **Buffer** | 64MB | |
| | **Cache** | multi-segmentable cache buffer | |
| | **Seek Time** (typical reads, includes controller overhead, including settling) | **Single Track** | 0.4 ms (max) |
| | | **Average** | 3.6 ms |
| | | **Full Stroke** | 7.3 ms |
| | **Rotational Speed** | 10,000 rpm | |
| | **Logical Blocks** | 585,937,500 | |
| | **Operating Temperature** | 41° to 131° F (5° to 55° C) | |
| **HP 450GB SAS 10K SFF HDD** | **Capacity** | 450GB | |
| | **Height** | 0.6 in; 1.53 cm | |
| | **Width** | **Media Diameter** | 2.5 in; 6.36 cm |
| | | **Physical Size** | 2.75 in; 6.99 cm |
| | **Interface** | SAS 6Gb/s | |
| | **Synchronous Transfer Rate** (Maximum) | Up to 600MB/s | |
| | **Buffer** | 64MB | |
| | **Cache** | multi-segmentable cache buffer | |
| | **Seek Time** (typical reads, includes controller overhead, including settling) | **Single Track** | 0.4ms (max) |
| | | **Average** | 3.6ms |
| | | **Full Stroke** | 7.3ms |
| | **Rotational Speed** | 10K | |
| | **Operating Temperature** | 41° to 131° F (5° to 55° C) | |
| **HP 600GB SAS 10K SFF HDD** | **Capacity** | 600GB | |
| | **Height** | 0.6 in; 1.53 cm | |
| | **Width** | **Media Diameter** | 2.5 in; 6.36 cm |
| | | **Physical Size** | 2.75 in; 6.99 cm |
| | **Interface** | SAS 6Gb/s | |
| | **Synchronous Transfer Rate** (Maximum) | Up to 600MB/s | |
| | **Buffer** | 64MB | |
| | **Cache** | multi-segmentable cache buffer | |
| | **Seek Time** (typical reads, includes controller overhead, including settling) | **Single Track** | 0.4 ms (max) |
| | | **Average** | 3.6 ms |
| | | **Full Stroke** | 7.3 ms |
| | **Rotational Speed** | 10,000 rpm | |
| | **Logical Blocks** | 1,172,123,568 | |
| | **Operating Temperature** | 41° to 131° F (5° to 55° C) | |

## Technical Specifications - Hard Drives

| | | | | |
|---|---|---|---|---|
| **SATA (Serial ATA) Hard Drives for HP Workstations** | **600GB SATA 10K rpm SFF in 3.5" Frame HDD** | **Capacity** | 600GB | |
| | | **Height** | 1 in; 2.54 cm | |
| | | **Width** | **Media Diameter** | 2.5 in; 6.36 cm |
| | | | **Physical Size** | 4 in; 10.17 cm |
| | | **Interface** | Serial ATA (3.0Gb/s) | |
| | | **Synchronous Transfer Rate** (Maximum) | Up to 300MB/s | |
| | | **Buffer** | 32MB | |
| | | **Cache** | Segmentable | |
| | | **Seek Time** (typical reads, includes controller overhead, including settling) | **Single Track** | 0.4 ms (max) |
| | | | **Average** | 3.6 ms |
| | | | **Full Stroke** | 9.0 ms |
| | | **Rotational Speed** | 10,000 rpm | |
| | | **Logical Blocks** | 1,172,123,568 | |
| | | **Operating Temperature** | 41° to 131° F (5° to 55° C) | |
| | **300GB SATA 10K rpm SFF in 3.5" Frame HDD** | **Capacity** | 300,069,052,416 bytes | |
| | | **Height** | 1 in; 2.54 cm | |
| | | **Width** | **Media Diameter** | 2.5 in; 6.36 cm |
| | | | **Physical Size** | 4 in; 10.17 cm |
| | | **Interface** | Serial ATA (3.0 Gb/s), Native Command Queuing enabled | |
| | | **Synchronous Transfer Rate** (Maximum) | Up to 300 MB/s | |
| | | **Cache** | 16 MB | |
| | | **Seek Time** (typical reads, includes controller overhead, including settling) | **Single Track** | 0.7 ms (maximum) |
| | | | **Average** | 4.4 ms |
| | | | **Full Stroke** | 9.5 ms |
| | | **Rotational Speed** | 10,000 rpm | |
| | | **Logical Blocks** | 586,072,368 | |
| | | **Operating Temperature** | 41° to 131° F (5° to 55° C) | |
| | **160GB SATA 10K rpm SFF in 3.5" Frame HDD** | **Capacity** | 160,041,885,696 bytes | |
| | | **Height** | 1 in; 2.5 cm | |
| | | **Width** | **Media Diameter** | 2.5 in; 6.36 cm |
| | | | **Physical Size** | 4 in; 10.17 cm |
| | | **Interface** | Serial ATA (1.5 Gb/s), Native Command Queuing enabled | |
| | | **Synchronous Transfer Rate** (Maximum) | Up to 300 MB/s | |
| | | **Buffer** | 16 MB | |
| | | **Seek Time** (typical reads, includes controller overhead, including settling) | **Single Track** | 0.7 ms (maximum) |
| | | | **Average** | 4.4 ms |
| | | | **Full Stroke** | 9.5 ms |
| | | **Rotational Speed** | 10,000 rpm | |
| | | **Logical Blocks** | 312,581,808 | |

| | | | |
|---|---|---|---|
| | **Operating Temperature** | 41° to 131° F (5° to 55° C) | |
| **2.0TB SATA 7200 rpm 3Gb/s 3.5" HDD** | **Capacity** | 2.0TB | |
| | **Height** | 1 in; 2.54 cm | |
| | **Width** | **Media Diameter** | 3.5 in; 8.9 cm |
| | | **Physical Size** | 4.0 in; 10.17 cm |
| | **Interface** | Serial ATA (3.0 Gb/s), Native Command Queuing Enabled | |
| | **Synchronous Transfer Rate** (Maximum) | Up to 300MB/s | |
| | **Buffer** | 64MB | |
| | **Seek Time** (typical reads, includes controller overhead, including settling) | **Single Track** | 1.0 ms |
| | | **Average** | 10 ms |
| | | **Full Stroke** | Not Specified |
| | **Rotational Speed** | 7,200 rpm | |
| | **Logical Blocks** | 3,907,029,168 | |
| | **Operating Temperature** | 41° to 131° F (5° to 55° C) | |
| **1.5TB SATA 7200 rpm 3Gb/s 3.5" HDD** | **Capacity** | 1.5TB | |
| | **Height** | 1 in; 2.54 cm | |
| | **Width** | **Media Diameter** | 3.5 in; 8.9 cm |
| | | **Physical Size** | 4.0 in; 10.17 cm |
| | **Interface** | Serial ATA (3.0 Gb/s), Native Command Queuing enabled | |
| | **Synchronous Transfer Rate** (Maximum) | Up to 300MB/s | |
| | **Buffer** | 32MB | |
| | **Seek Time** (typical reads, includes controller overhead, including settling) | **Single Track** | 2 ms |
| | | **Average** | 11 ms |
| | | **Full Stroke** | 21 ms |
| | **Rotational Speed** | 7,200 rpm | |
| | **Logical Blocks** | 2,930,277,168 | |
| | **Operating Temperature** | 41° to 131° F (5° to 55° C) | |
| **1TB SATA 7200 rpm 3.0Gb/s 3.5" HDD** | **Capacity** | 1,000,204,886,016 bytes | |
| | **Height** | 1 in; 2.5 cm | |
| | **Width** | **Media Diameter** | 3.5 in; 8.9 cm |
| | | **Physical Size** | 4 in; 10.17 cm |
| | **Interface** | Serial ATA (3.0 Gb/s), Native Command Queuing enabled | |
| | **Synchronous Transfer Rate** (Maximum) | Up to 300 MB/s | |
| | **Buffer** | 32 MB | |
| | **Seek Time** (typical reads, includes controller overhead, including settling) | **Single Track** | 2 ms |
| | | **Average** | 11 ms |
| | | **Full Stroke** | 21 ms |

Technical Specifications - Hard Drives

| | | | |
|---|---|---|---|
| | **Rotational Speed** | 7,200 rpm | |
| | **Logical Blocks** | 1,953,525,168 | |
| | **Operating Temperature** | 41° to 131° F (5° to 55° C) | |
| **500GB SATA 7200 rpm 3Gb/s 3.5" HDD** | **Capacity** | 500,107,862,016 bytes | |
| | **Height** | 1 in; 2.5 cm | |
| | **Width** | **Media Diameter** | 3.5 in; 8.9 cm |
| | | **Physical Size** | 4 in; 10.17 cm |
| | **Interface** | Serial ATA (3.0 Gb/s), Native Command Queuing enabled | |
| | **Synchronous Transfer Rate** (Maximum) | 300 MB/s | |
| | **Buffer** | 16 MB | |
| | **Seek Time** (typical reads, includes controller overhead, including settling) | **Single Track** | 2 ms |
| | | **Average** | 11 ms |
| | | **Full Stroke** | 21 ms |
| | **Rotational Speed** | 7,200 rpm | |
| | **Logical Blocks** | 976,773,168 | |
| | **Operating Temperature** | 41° to 131° F (5° to 55° C) | |
| **250GB SATA 7200 rpm 3Gb/s 3.5" HDD** | **Capacity** | 250,059,350,016 bytes | |
| | **Height** | 1 in; 2.54 cm | |
| | **Width** | **Media Diameter** | 3.5 in; 8.9 cm |
| | | **Physical Size** | 4.0 in; 10.17 cm |
| | **Interface** | Serial ATA (3.0 Gb/s), Native Command Queuing enabled | |
| | **Synchronous Transfer Rate** (Maximum) | 300 MB/s | |
| | **Buffer** | 8 MB | |
| | **Seek Time** (typical reads, includes controller overhead, including settling) | **Single Track** | 2 ms |
| | | **Average** | 11 ms |
| | | **Full Stroke** | 21 ms |
| | **Rotational Speed** | 7,200 rpm | |
| | **Logical Blocks** | 488,397,168 | |
| | **Operating Temperature** | 41° to 131° F (5° to 55° C) | |

## Technical Specifications - Hard Drives

| | | | | |
|---|---|---|---|---|
| **HP Solid State Drives for Workstations** | **HP 160GB SATA SSD** | **Capacity** | 160GB | |
| | | **Width** | **Physical Size** | 2.5 in; 6.36 cm |
| | | **Interface** | SATA 3Gb/s | |
| | | **Synchronous Transfer Rate** (Maximum) | Up to 270MB/s (Sequential Read) | |
| | | **Operating Temperature** | 32° to 158° F (0° to 70° C) | |
| | **HP 300GB SATA SSD** | **Capacity** | 300GB | |
| | | **Width** | **Physical Size** | 2.5 in; 6.36 cm |
| | | **Interface** | SATA 3Gb/s | |
| | | **Synchronous Transfer Rate** (Maximum) | Up to 270MB/s (Sequential Read) | |
| | | **Operating Temperature** | 32° to 158° F (0° to 70° C) | |
| | **HP 128GB SATA 6Gb/s SSD** | **Capacity** | 128GB | |
| | | **Width** | **Physical Size** | 2.5 in; 6.36 cm |
| | | **Interface** | SATA 6Gb/s | |
| | | **Synchronous Transfer Rate** (Maximum) | Up to 500MB/s (Sequential Read) | |
| | | **Operating Temperature** | 32° to 158° F (0° to 70° C) | |
| | **HP 256GB SATA 6Gb/s SSD** | **Interface** | SATA 6Gb/s | |
| | | **Synchronous Transfer Rate** (Maximum) | Up to 500MB/s (Sequential Read) | |
| | | **Operating Temperature** | 32° to 158° F (0° to 70° C) | |

Technical Specifications - Hard Drive Controllers

| | | | |
|---|---|---|---|
| **LSI 9212 4-Port SAS 6Gb/s RAID Card** | **PCI Bus** | 8-lane, 5GT/s PCI Express 2.0 | |
| | **PCI Modes** | Bus Master DMA | |
| | **RAID Levels** | RAID 0, 1, 1E and 10 | |
| | **PCI Data Burst Transfer Rate** | Half Duplex, x4 PCIe 2000 MB/s<br>Full Duplex, x8 PCIe 4000 MB/s | |
| | **SAS Bandwidth** | **Half Duplex** | Single lane - 600 MB/s<br>Wide Port (2 lanes) - 1200 MB/s<br>Wide Port (4 lanes) - 2400 MB/s |
| | | **Full Duplex** | Single SAS Lane - 1200 MB/s<br>Wide Port (2 lanes) -2400 MB/s<br>Wide Port (4 lanes) - 4800 MB/s |
| | **PCI Card Type** | 3.3V Add-in card | |
| | **PCI Voltage** | 12 V ± 10% | |
| | **PCI Power** | 13.5 Watts | |
| | **Bracket** | Full height and Low-profile | |
| | **Certification Level** | PCI-Express 2.0 | |
| | **IO Bus** | 1x4 6Gb/s SAS ports | |
| | **SAS Processor** | LSISAS2008 | |
| | **Internal Connectors** | Four x1 SATA | |
| | **External Connectors** | None | |
| | **Maximum Number of SCSI Devices** | 256 | |
| | **LED Indicators** | Internal<br>Activity/Fault per x4 port - Heartbeat | |

| | | |
|---|---|---|
| **LSI MegaRAID® SAS 8888ELP Host Bus Adapter (HBA)** | **PCI Bus** | PCI-Express x8 lanes |
| | **PCI Modes** | Bus Master DMA |
| | **RAID Levels** | RAID 0, 1, and 5<br>RAID spans 10 and 50 |
| | **PCI Data Burst Transfer Rate** | Up to 3Gb/s per port |
| | **Full Duplex** | Up to 1.5 GB/s |
| | **PCI Voltage** | +3.3V Add-in Card |
| | **PCI Power** | 19.2 Watts Maximum |
| | **Certification Level** | PCI-Express 1.0a |
| | **IO Bus** | Eight 3Gb/s SAS/SATA ports |
| | **Internal Connectors** | Two SAS SFF8087 x4 |
| | **External Connectors** | Two SAS SFF8088 x4 |
| | **Maximum Number of SCSI DeviceS** | 32 |
| | **LED Indicators** | Connector LEDs indicate whether the internal or external connector is active for ports 0-3 and 4-7 |

## Technical Specifications - Hard Drive Controllers

| | | |
|---|---|---|
| **LSI MegaRAID® 9260-8i SAS 6Gb/s ROC RAID Card and iBBU08 Battery Backup Unit** | **PCI Bus** | PCI-Express (Gen2) V2.0 x8 lanes |
| | **PCI Modes** | Bus Master DMA |
| | **RAID Levels** | RAID 0, 1, 5, and 6<br>RAID spans 10, 50 and 60 |
| | **PCI Data Burst Transfer Rate** | Up to 4GB/s |
| | **PCI Card Type** | Low profile, single PCIe slot design with full height bracket.<br><br>The optional iBBU08 Battery Backup unit mounts on the controller card and the assembly remains within a single PCIe slot width. |
| | **PCI Voltage** | +3.3V Add-in Card |
| | **PCI Power** | 12.5 Watts |
| | **Certification Level** | PCI-Express 2.0 |
| | **IO Bus** | Eight 3 Gb/s and 6Gb/s compatible SAS/SATA ports |
| | **Internal Connectors** | Two SAS SFF8087 x4 |
| | **External Connectors** | None |
| | **Maximum Number of SCSI Devices** | 32.<br>**NOTE:** HP Workstations do not support this many internal drives. |
| | **LED Indicators** | Connector LEDs indicate whether the internal connector is active for ports 0-3 and 4-7 |

Technical Specifications - Graphics

| | | |
|---|---|---|
| **NVIDIA Quadro NVS 295 256MB Graphics Card** | **Form Factor** | 2.731 inches (H) × 6.600 inches (L), Half-Height |
| | **Graphics Controller** | NVIDIA Quadro NVS 295 Graphics Board |
| | **Bus Type** | PCI Express x16, Generation 2.0 |
| | **Memory** | 256 MB GDDR3 SDRAM unified graphics memory |
| | **Connectors** | 2 DisplayPort<br>Comes with 2 DisplayPort to DVI-D Adapters<br>('DisplayPort to VGA' and 'DisplayPort to DL DVI' adapters available as an accessory) |
| | **Maximum Resolution** | Two DisplayPort outputs drive two digital displays up to 2560 x 1600<br><br>**NOTE:** This card supports up to two displays |
| | **Display Output** | • Drives DisplayPort enabled digital displays at resolutions up to 2560 × 1600 at 60 Hz with reduced blanking<br>• Drives DVI enabled digital displays at resolutions up to 1920 × 1200 at 60 Hz with reduced blanking (through DisplayPort to DVI-D (single link) cable) |
| | **Supported Graphics APIs** | OpenGL 3.0<br>DirectX 10.0 |
| | **Available Graphics Drivers** | Genuine Windows 7 Professional (64-bit and 32-bit)<br>Genuine Windows Vista Business (64-bit and 32-bit)<br>Microsoft Windows XP Professional (64-bit and 32-bit)<br>Red Hat Enterprise Linux(RHEL) WS4 (64-bit and 32-bit)<br>* WS4 not supported on Z200 & Z200 SFF<br>Red Hat Enterprise Linux(RHEL) 5 Desktop/Workstation (64-bit and 32-bit)<br>Red Hat Enterprise Linux(RHEL) 6 Desktop/Workstation (64-bit and 32-bit)<br>SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit)<br><br>HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html<br><br>SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com |
| | **Power Consumption** | <24 Watts |

## Technical Specifications - Graphics

| | | |
|---|---|---|
| **NVIDIA NVS 300 512MB Graphics** | **Form Factor** | 2.7 inches (H) x 5.7 inches (L), Half-Height |
| | **Graphics Controller** | NVIDIA NVS 300 Graphics Board |
| | **Bus Type** | PCI Express x16, Generation 2.0 |
| | **Memory** | 512 MB GDDR3 SDRAM unified graphics memory |
| | **Connectors** | DMS-59<br>Includes DMS-59 to Dual DVI-I adapter<br>DMS-59 to Dual DisplayPort adapter and DMS-59 to Dual VGA adapter available as an option<br>DMS-59 to Dual DisplayPort adapter required for HP ZR30w Display |
| | **Maximum Resolution** | DVI: two digital displays up to 1920 x 1200<br>DisplayPort: two digital displays up to 2560 x 1600<br>VGA: two analog displays up to 1920 x 1080 |
| | **Image Quality Features** | |
| | **Display Output** | This card support up to two displays:<br>• Drives DVI enabled digital displays at resolutions up to 1920 × 1200 at 60 Hz with reduced blanking<br>• Drives DisplayPort enabled digital displays at resolutions up to 2560 × 1600 at 60 Hz with reduced blanking (through optional DMS-59 to DisplayPort adapter)<br>• Drives VGA enabled analog displays at resolutions up to 1920 x 1080 (through optional DMS-59 to VGA adapter) |
| | **Supported Graphics APIs** | OGL 3.3<br>DirectX 10.1 |
| | **Available Graphics Drivers** | Genuine Windows 7 Professional (64-bit and 32-bit)<br>Genuine Windows Vista Business (64-bit and 32-bit)<br>Microsoft Windows XP Professional (64-bit and 32-bit)<br>Red Hat Enterprise Linux(RHEL) 5 Desktop/Workstation<br>Red Hat Enterprise Linux(RHEL) 6 Desktop/Workstation<br>SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit)<br><br>HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html<br><br>Novell SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com |
| | **Power Consumption** | <18 Watts |

## Technical Specifications - Graphics

| | | |
|---|---|---|
| **NVIDIA Quadro NVS 450 512MB Graphics** | **Form Factor** | ATX Full Height, 1/2 length<br>Passive cooling |
| | **Bus Type** | PCI Express x16, Generation 2.0 |
| | **Memory** | 512 MB GDDR3 (256MB per GPU) |
| | **Connectors** | Four DisplayPort;<br>Four DisplayPort to DVI-D adapters included.<br>('DisplayPort to VGA' and 'DisplayPort to Dual Link DVI' adapters available as an accessory) |
| | **Maximum Resolution** | DisplayPort connectors support ultra-high-resolution panels (up to 2560 x 1600)<br><br>**NOTE:** This card supports up to four displays |
| | **Supported Graphics APIs** | OpenGL 3.0<br>DirectX 10.0 |
| | **Available Graphics Drivers** | Genuine Windows 7 Professional (64-bit and 32-bit)<br>Genuine Microsoft Windows Vista (64-bit and 32-bit)<br>Microsoft Windows XP Professional (64-bit and 32-bit)<br>Red Hat Enterprise Linux(RHEL) 5 Desktop/Workstation<br>Red Hat Enterprise Linux(RHEL) 6 Desktop/Workstation<br>SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit)<br><br>HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html<br><br>SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com |
| | **Power Consumption** | <40 Watts |
| **NVIDIA Quadro 400 512MB Graphics** | **Form Factor** | Low Profile, 2.7 inches (H) x 5.6 inches (L) |
| | **Graphics Controller** | NVIDIA Quadro 400 Graphics Board |
| | **Bus Type** | PCI Express x 16, Generation 2.0 |
| | **Memory** | 512MB DDR3 SDRAM |
| | **Connectors** | One (1) Dual-link DVI-I<br>One (1) DisplayPort 1.1<br>Includes one DisplayPort to DVI-D adapter |
| | **Maximum Resolution** | DisplayPort 1.1: 2560 x 1600 @ 60 Hz<br>Dual Link DVI-I: 2560 x 1600 @ 60 Hz<br>Analog: 2048 x1536 @ 85 Hz |
| | **RAMDAC** | Dual internal 400 MHz DACs |
| | **Display Output** | This card supports up to two displays |
| | **Supported Graphics APIs** | OpenGL 3.2<br>DirectX 10.1 Shader Model 4.1 |
| | **Available Graphics Drivers** | Genuine Windows 7 Professional (64-bit and 32-bit)<br>Genuine Windows Vista Business (64-bit and 32-bit)<br>Microsoft Windows XP Professional (64-bit and 32-bit)<br>Red Hat Enterprise Linux(RHEL) WS4 (64-bit and 32-bit)<br>Red Hat Enterprise Linux(RHEL) 5 Desktop/Workstation<br>SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit)<br><br>HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html<br><br>Novell SUSE Linux Enterprise drivers may also be obtained from: |

| | | |
|---|---|---|
| | | ftp://download.nvidia.com/novell or http://www.nvidia.com |
| | **Power Consumption** | < 35 Watts |
| **NVIDIA Quadro 600 1GB Graphics** | **Form Factor** | 2.731" H x 6.6" L<br>Single Slot<br>Small Form Factor |
| | **Graphics Controller** | NVIDIA Quadro 600 Graphics Card |
| | **Bus Type** | PCI Express 2.0 x16 |
| | **Memory** | 1 GB GDDR3<br>128-bit |
| | **Connectors** | 1 DVI-I output, 1DisplayPort output<br>One DP to DVI adapter included with card<br><br>DVI to VGA, DisplayPort to VGA and DisplayPort to DVI adapters available as accessories |
| | **Maximum Resolution** | DisplayPort (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz)<br>Dual-link DVI-I output (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz) |
| | **Shading Architecture** | Shader Model 5.0 |
| | **Supported Graphics APIs** | OpenGL 4.1<br>DirectX 11<br><br>CUDA API support includes:<br>CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran |
| | **Available Graphics Drivers** | Genuine Windows 7 Professional (64-bit and 32-bit)<br>Genuine Windows Vista Business (64-bit and 32-bit)<br>Microsoft Windows XP Professional (64-bit and 32-bit)<br>Red Hat Enterprise Linux (RHEL) 5 Desktop/Workstation (64-bit and 32-bit)<br>Red Hat Enterprise Linux(RHEL) 6 Desktop/Workstation<br>SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit)<br><br>HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html<br><br>SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com |
| | **Power Consumption** | 40 Watts |

## Technical Specifications - Graphics

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|---|---|---|
| **AMD FirePro V3900 1GB Graphics** | **Form Factor** | Full height, half length (full-height bracket included) |
| | **Graphics Controller** | AMD FirePro™ V3900 professional graphics |
| | **Bus Type** | PCI Express® x16, Generation 2.1 |
| | **Memory** | 1GB DDR3 memory |
| | **Connectors** | 1 DL DVI, 1 DP output<br>One DP to DVI adapter included |
| | **Maximum Resolution** | 2560x1600 per display (5120x1600 max. horizontal resolution) |
| | **Display Output** | 1 DisplayPort® 1.2<br>1 Dual-link DVI |
| | **Supported Graphics APIs** | OpenCL™ 1.1, DirectX® 11 and OpenGL 4.2 |
| | **Available Graphics Drivers** | Genuine Windows® 7 Professional (64-bit and 32-bit)<br>Genuine Windows Vista® Business (64-bit and 32-bit)<br>Microsoft® Windows XP® Professional (64-bit and 32-bit)<br>Red Hat Enterprise Linux(RHEL)<br>SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit)<br><br>HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html |
| | **Power Consumption** | <50W |
| | **Note** | AMD Eyefinity technology can support multiple displays using a single enabled AMD FirePro™ professional graphics card; the number of supported displays varies by card model. Microsoft® Windows® 7, Windows Vista®, or Linux® is required in order to support more than 2 displays. Depending on the card model, native DisplayPort™ connectors and/or certified DisplayPort™ active or passive adapters to convert your monitor's native input to your card's DisplayPort™ or Mini-DisplayPort™ connector(s) may be required. See www.amd.com/firepro for details. |
| **AMD FirePro V4900 1GB Graphics** | **Form Factor** | Full height (4.37 in) , half length (6.61 in) |
| | **Graphics Controller** | AMD FirePro™ V4900 Professional Graphics |
| | **Bus Type** | PCI Express™ x16, Generation 2.1 |
| | **Memory** | 1GB GDDR5 |
| | **Connectors** | 2 DisplayPort, 1 dual link DVI Output, One DP to DVI adapter included |
| | **Maximum Resolution** | Up to three digital displays at resolutions up to 2560 x 1600 @ 60Hz or up to three analog displays, one at resolutions up to 2048 x 1536 @ 85Hz, plus two resolutions up to 1920 x 1200 @ 60Hz (165 MHz dot clock) Note: This card supports up to three displays with Windows 7, Vista or Linux, and up to two displays on XP |
| | **RAMDAC** | |
| | **Image Quality Features** | Up to 3 independent outputs with ATI Eyefinity technology support (More information at: www.amd.com/us/products/technologies/eyefinity/). Full 30-bit display pipeline. Advanced video capabilities, including high fidelity gamma, color correction and scaling. Dedicated hardware (UVD2) for H.264, VC-1, and MPEG2 decode<br>**NOTE:** The use of more than two displays on Linux requires support for xrandr 1.2 or greater in the X server. |
| | **Supported graphics APIs** | DirectX 11 and OpenGL 4.1.<br>OpenCL 1.2<br>DirectCompute 11 |
| | **Available graphics** | Genuine Windows 7 Professional (64-bit and 32-bit) |

Technical Specifications - Graphics

| | | |
|---|---|---|
| | **drivers** | Genuine Windows Vista Business (64-bit and 32-bit)<br>Microsoft Windows XP Professional (64-bit and 32-bit)<br>Red Hat Enterprise Linux(RHEL)<br>SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit)<br><br>HP qualified drivers may be preloaded or the latest HP qualified drivers are available from the HP support Web site:<br>http://welcome.hp.com/country/us/en/support.html |
| | **Power Consumption** | <75W |
| | **Note** | AMD Eyefinity technology can support multiple displays using a single enabled AMD FirePro™ professional graphics card; the number of supported displays varies by card model. Microsoft® Windows® 7, Windows Vista®, or Linux® is required in order to support more than 2 displays. Depending on the card model, native DisplayPort™ connectors and/or certified DisplayPort™ active or passive adapters to convert your monitor's native input to your card's DisplayPort™ or Mini-DisplayPort™ connector(s) may be required. See www.amd.com/firepro for details. |
| **NVIDIA Quadro 2000 1GB Graphics** | **Form Factor** | 4.376" H x 7" L<br>Single Slot |
| | **Graphics Controller** | NVIDIA Quadro 2000 Graphics Card |
| | **Bus Type** | PCI Express 2.0 x16 |
| | **Memory** | 1 GB GDDR5<br>128-bit |
| | **Connectors** | 1 DVI-I output, 2 DisplayPort outputs<br>One DP to DVI adapter included with card<br><br>DVI to VGA, DisplayPort to VGA and DisplayPort to DVI adapters available as accessories |
| | **Maximum Resolution** | Dual DisplayPort (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz)<br>Dual-link DVI-I output (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz) |
| | **Image Quality Features** | • Up to 16K x16K texture and render processing<br>• Transparent multisampling and super sampling<br>• 16x angle independent anisotropic filtering<br>• 128-bit floating point performance<br>• 32-bit per-component floating point texture filtering and blending<br>• Support for any combination of two connected displays<br>• DisplayPort 1.1a, HDMI 1.3a, and HDCP support<br>• NVIDIA® 3D Vision™ technology, 3D DLP, Interleaved, and other 3D stereo format support<br>• Full OpenGL quad buffered stereo support<br>• Underscan/overscan compensation and hardware scaling<br>• NVIDIA® nView® multi-display technology |
| | **Shading Architecture** | Shader Model 5.0 |
| | **Supported Graphics APIs** | OpenGL 4.1<br>DirectX 11<br><br>CUDA API support includes:<br>CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran |
| | **Available Graphics Drivers** | Genuine Windows 7 Professional (64-bit and 32-bit)<br>Genuine Windows Vista Business (64-bit and 32-bit)<br>Microsoft Windows XP Professional (64-bit and 32-bit) |

| | | |
|---|---|---|
| | | Red Hat Enterprise Linux (RHEL) 5 Desktop/Workstation (64-bit and 32-bit)<br>Red Hat Enterprise Linux(RHEL) 6 Desktop/Workstation<br>SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit)<br><br>HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html<br><br>SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com |
| | **Power Consumption** | 62 Watts |
| **NVIDIA Quadro 2000D (Spec DVI only card)** | **Form Factor** | 4.376" H x 7" L<br>Single Slot |
| | **Graphics Controller** | NVIDIA Quadro 2000D Graphics Card |
| | **Bus Type** | PCI Express 2.0 x16 |
| | **Memory** | 1 GB GDDR5<br>128-bit |
| | **Connectors** | 2 Dual Link DVI outputs |
| | **Maximum Resolution** | Dual-link DVI output (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz) |
| | **Image Quality Features** | • Up to 16K x16K texture and render processing<br>• Transparent multisampling and super sampling<br>• 16x angle independent anisotropic filtering<br>• 128-bit floating point performance<br>• 32-bit per-component floating point texture filtering and blending<br>• Support for any combination of two connected displays<br>• Dual Link DVI, HDMI 1.3a, and HDCP support<br>• NVIDIA® 3D Vision™ technology, 3D DLP, Interleaved, and other 3D stereo format support<br>• Full OpenGL quad buffered stereo support<br>• Underscan/overscan compensation and hardware scaling<br>• NVIDIA® nView® multi-display technology |
| | **Shading Architecture** | Shader Model 5.0 |
| | **Supported Graphics APIs** | OpenGL 4.0<br>DirectX 11<br><br>CUDA API support includes:<br>CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran |
| | **Available Graphics Drivers** | Genuine Windows 7 Professional (64-bit and 32-bit)<br>Genuine Windows Vista Business (64-bit and 32-bit)<br>Microsoft Windows XP Professional (64-bit and 32-bit)<br>Red Hat Enterprise Linux (RHEL) 5 Desktop/Workstation (64-bit and 32-bit)<br>Red Hat Enterprise Linux(RHEL) 6 Desktop/Workstation<br>SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit)<br><br>HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html<br><br>SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com |
| | **Power Consumption** | 62 Watts |

| | | |
|---|---|---|
| **AMD FirePro V5900 2GB Graphics** | **Form Factor** | Full-height, full length, single slot |
| | **Graphics Controller** | AMD FirePro™ V5900 Professional Graphics |
| | **Bus Type** | PCI Express™ x16, Generation 2.1 |
| | **Memory** | 2GB GDDR5 |
| | **Connectors** | 2 x Display Port 1.2<br>1 x Dual-link DVI<br>One DP to DVI adapter included with card |
| | **Maximum Resolution** | 2560 x 1600 |
| | **Display Output** | Up to 3 simultaneous displays (using AMD Eyefinity with Windows 7 or Linux) |
| | **Shading Architecture** | Shader Model 5.0 |
| | **Supported Graphics APIs** | DirectX 11 and OpenGL 4.1 |
| | **Available Graphics Drivers** | Genuine Windows 7 Professional (64-bit and 32-bit)<br>Genuine Windows Vista Business (64-bit and 32-bit)<br>Microsoft Windows XP Professional (64-bit and 32-bit)<br>Red Hat Enterprise Linux(RHEL)<br>SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit)<br><br>HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html |
| | **Power Consumption** | < 75W |
| | **Note** | AMD Eyefinity technology can support multiple displays using a single enabled AMD FirePro™ professional graphics card; the number of supported displays varies by card model. Microsoft® Windows® 7, Windows Vista®, or Linux® is required in order to support more than 2 displays. Depending on the card model, native DisplayPort™ connectors and/or certified DisplayPort™ active or passive adapters to convert your monitor's native input to your card's DisplayPort™ or Mini-DisplayPort™ connector(s) may be required. See www.amd.com/firepro for details. |
| **AMD FirePro V7900 2GB Graphics** | **Form Factor** | Full height, full length, single slot |
| | **Graphics Controller** | AMD FirePro™ V7900 Professional Graphics |
| | **Bus Type** | PCI Express™ x16, Generation 2.1 |
| | **Memory** | 2GB GDDR5 |
| | **Connectors** | 4 x DisplayPort 1.2<br>Two DP to DVI adapters included with card |
| | **Maximum Resolution** | 2560 x1600 |
| | **Display Output** | Up to 4 simultaneous displays (using AMD Eyefinity with Windows 7 or Linux) |
| | **Shading Architecture** | Shader Model 5.0 |
| | **Supported Graphics APIs** | DirectX 11 and OpenGL 4.1 |
| | **Available Graphics Drivers** | Genuine Windows 7 Professional (64-bit and 32-bit)<br>Genuine Windows Vista Business (64-bit and 32-bit)<br>Microsoft Windows XP Professional (64-bit and 32-bit)<br>Red Hat Enterprise Linux(RHEL)<br>SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit)<br><br>HP qualified drivers may be preloaded or available from the HP support |

| | | |
|---|---|---|
| | | Web site: http://welcome.hp.com/country/us/en/support.html |
| | **Power Consumption** | < 150W |
| | **Note** | AMD Eyefinity technology can support multiple displays using a single enabled AMD FirePro™ professional graphics card; the number of supported displays varies by card model. Microsoft® Windows® 7, Windows Vista®, or Linux® is required in order to support more than 2 displays. Depending on the card model, native DisplayPort™ connectors and/or certified DisplayPort™ active or passive adapters to convert your monitor's native input to your card's DisplayPort™ or Mini-DisplayPort™ connector(s) may be required. See www.amd.com/firepro for details. |
| **NVIDIA Quadro 4000 2GB Graphics** | **Form Factor** | 4.376" H x 9.50" L<br>Single Slot |
| | **Graphics Controller** | NVIDIA Quadro 4000 Graphics Card |
| | **Bus Type** | PCI Express 2.0 x16 |
| | **Memory** | 2 GB GDDR5<br>256-bit |
| | **Connectors** | 1 DVI-I output, 2 DisplayPort outputs;<br>One DP to DVI adapter included with card<br><br>DVI to VGA, DisplayPort to VGA and DisplayPort to DVI (single- link or dual-link) adapters available as accessories<br>(Optional stereo bracket available from 3rd party) |
| | **Maximum Resolution** | Dual DisplayPort (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz)<br>Dual-link DVI-I output (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz) |
| | **RAMDAC** | 400 MHz integrated RAMDAC |
| | **Image Quality Features** | • Up to 16K x16K texture and render processing<br>• Transparent multisampling and super sampling<br>• 16x angle independent anisotropic filtering<br>• 128-bit floating point performance<br>• 32-bit per-component floating point texture filtering and blending<br>• Support for any combination of two connected displays<br>• DisplayPort 1.1a, HDMI 1.3a, and HDCP support<br>• NVIDIA 3D Vision™ technology, 3D DLP, Interleaved, and other 3D stereo format support<br>• Full OpenGL quad buffered stereo support<br>• Underscan/overscan compensation and hardware scaling<br>• NVIDIA nView® multi-display technology |
| | **Shading Architecture** | Shader Model 5.0 |
| | **Supported Graphics APIs** | OpenGL 4.0<br>DirectX 11<br>CUDA API support includes:<br>CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran |
| | **Available Graphics Drivers** | Genuine Windows 7 Professional (64-bit and 32-bit)<br>Genuine Windows Vista Business (64-bit and 32-bit)<br>Microsoft Windows XP Professional (64-bit and 32-bit)<br>Red Hat Enterprise Linux (RHEL) 5 Desktop/Workstation (64-bit and 32-bit)<br>Red Hat Enterprise Linux (RHEL) 6 Desktop/Workstation<br>SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit)<br><br>HP qualified drivers may be preloaded or available from the HP support |

| | | |
|---|---|---|
| | | Web site: http://welcome.hp.com/country/us/en/support.html<br><br>Novell SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com |
| | **Power Consumption** | 142 Watts |
| **NVIDIA Quadro 5000 2.5GB Graphics** | **Form Factor** | 4.376" H x 9.75" L<br>Dual Slot |
| | **Graphics Controller** | NVIDIA Quadro 5000 Graphics Card |
| | **Bus Type** | PCI Express 2.0 x16 |
| | **Memory** | 2.5 GB GDDR5<br>320-bit |
| | **Connectors** | DVI-I (1), DP (2), Stereo (1)<br>One DP to DVI adapter included with card<br><br>DVI to VGA, DisplayPort to VGA and DisplayPort to DVI adapters available as accessories |
| | **Maximum Resolution** | Dual DisplayPort (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz)<br>Dual-link DVI-I output (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz) |
| | **Image Quality Features** | • Up to 16K x16K texture and render processing<br>• Transparent multisampling and super sampling<br>• 16x angle independent anisotropic filtering<br>• 128-bit floating point performance<br>• 32-bit per-component floating point texture filtering and blending<br>• Support for any combination of two connected displays<br>• DisplayPort 1.1a, HDMI 1.3a, and HDCP support<br>• NVIDIA 3D Vision™ technology, 3D DLP, Interleaved, and other 3D stereo format support<br>• Full OpenGL quad buffered stereo support<br>• Underscan/overscan compensation and hardware scaling<br>• NVIDIA nView® multi-display technology |
| | **Shading Architecture** | Shader Model 5.0 |
| | **Supported Graphics APIs** | OpenGL 4.0<br>DirectX 11<br>CUDA API support includes:<br>CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran |
| | **Available Graphics Drivers** | Genuine Windows 7 Professional (64-bit and 32-bit)<br>Genuine Windows Vista Business (64-bit and 32-bit)<br>Microsoft Windows XP Professional (64-bit and 32-bit)<br>Red Hat Enterprise Linux (RHEL) 5 Desktop/Workstation (64-bit and 32-bit)<br>Red Hat Enterprise Linux (RHEL) 6 Desktop/Workstation<br>SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit)<br><br>HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html<br><br>Novell SUSE Linux Enterprise drivers may also be obtained from: ftp://download.nvidia.com/novell or http://www.nvidia.com |
| | **Power Consumption** | 152 Watts |

Technical Specifications - Multimedia and Audio Devices

| | | |
|---|---|---|
| **HP Thin USB Powered Speakers** | **Frequency Response** (-3dB, 24-bit/96kHz input) | FO to 20kHz |
| | **Dimensions** | Speakers: 14.52 x 9.50 x 2.45 cm (5.72 x 3.74 x 0.96 in) per speaker |

| | | |
|---|---|---|
| **SoundBlaster (Creative Labs) X-Fi Titanium PCIe Audio Card** | **24-bit Analog-to-Digital conversion of analog inputs** | 96kHz sample rate |
| | **24-bit Digital-to-Analog conversion of digital sources** | 96kHz to analog 7:1 speaker output |
| | **24-bit Digital-to-Analog conversion of stereo digital sources** | 8, 11.025, 16, 22.05, 24, 32, 44.1, 48 and 96kHz |
| | **16-bit to 24-bit recording sampling rates** | 16-bit/44.1kHz, 16-bit/48kHz, 24-bit/44.1kHz, 24-bit/48kHz and 24-bit/96kHz with direct monitoring |
| | **Enhanced SoundFont support** | Up to 24-bit resolution |
| | **Signal-to-Noise Ratio** (2okHz Low-pass filter, A-Weighted) | 109dB |
| | **Total Harmonic Distortion + Noise at 1kHz** (20kHz Low-pass filter) | .004% |
| | **Frequency Response** (-3dB, 24-bit/96kHz input) | 10Hz to 46kHz |
| | **Frequency Response** (-3dB, 24-bit/192kHz input) | 10Hz to 46kHz |
| | **Speaker and Headphone connections** | Stereo to 7.1 (Line Out via three 3.5mm mini jacks) |
| | **Flexijack** | Line In/ Microphone In/Optical Out via shared 3.5mm mini jack |
| | **Front Panel Header** | Intel HD Audio Compatible (2x5 pin) |
| | **Operating System** | Windows 7 Professional 32-bit and 64-bit<br>Microsoft Windows Vista Business 32-bit and 64-bit<br>Microsoft® Windows® XP Professional SP2<br>Microsoft Windows XP Professional x64 Edition |
| | **Minimum System Requirements** | **System RAM** 512MB<br>**Operating System** Windows Vista 32-bit and 64-bit version or Windows XP 32-bit or 64-bit version |

Technical Specifications - Optical and Removable Storage

| | | | |
|---|---|---|---|
| **HP DVD-ROM Drive** | **Description** | 5.25-inch, half-height, tray-load | |
| | **Mounting Orientation** | Either horizontal or vertical | |
| | **Interface Type** | SATA/ATAPI | |
| | **Dimensions** (WxHxD) | 15.0 x 4.4 x 20.3 cm (5.9 x 1.7 x 8.0 in) | |
| | **Disc Capacity** | **DVD-ROM** | Single layer: Up to 4.7 GB Double layer: Up to 8.5 GB |
| | **Access Times** | **DVD-ROM Single Layer** | < 140 ms (typical) |
| | | **CD-ROM Mode 1** | < 125 ms (typical) |
| | | **Full Stroke DVD** | < 250 ms (seek) |
| | | **Full Stroke CD** | < 210 ms (seek) |
| | **Power** | **Source** | SATA DC power receptacle |
| | | **DC Power Requirements** | 5 VDC ± 5%-100 mV ripple p-p<br>12 VDC ± 5%-200 mV ripple p-p |
| | | **DC Current** | 5 VDC - <1000 mA typical, < 1600 mA maximum<br>12 VDC - < 600 mA typical, < 1400 mA maximum |
| | **Operating Environmental** (all conditions non-condensing) | **Temperature** | 41° to 122° F (5° to 50° C) |
| | | **Relative Humidity** | 10% to 90% |
| | | **Maximum Wet Bulb Temperature** | 86° F (30° C) |
| | | **Operating Systems Supported** | Windows 7 Professional 32-bit and 64-bit, Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32*.<br>Red Hat Enterprise Linux(RHEL) WS4**, 5, 6 Desktop/Workstation,<br>Removed reference to "Novell" because of acquisition and changed product reference to "SUSE Linux Enterprise Desktop 10 & 11",<br>No driver is required for this device. Native support is provided by the operating system. |

| | | | |
|---|---|---|---|
| **HP DVD+/-RW Drive** | **Description** | 5.25-inch, half-height, tray-load | |
| | **Mounting Orientation** | Either horizontal or vertical | |
| | **Interface Type** | SATA/ATAPI | |
| | **Dimensions** (WxHxD) | 15.0 x 4.4 x 20.3 cm (5.9 x 1.7 x 8.0 in) | |
| | **Disc Formats** | DVD-RAM<br>DVD+R<br>DVD+RW<br>DVD+R DL<br>DVD-R DL<br>DVD-R<br>DVD-RW<br>CD-R<br>CD-RW | |
| | **Disc Capacity** | **DVD-ROM** | 8.5 GB DL or 4.7 GB standard |
| | | **Full Stroke DVD** | < 250 ms (seek) |
| | | **Full Stroke CD** | < 210 ms (seek) |

## Technical Specifications - Optical and Removable Storage

| | | | |
|---|---|---|---|
| **Maximum Data Transfer Rates** | **CD ROM Read** | CD-ROM, CD-R Up to 40X<br>CD-RW Up to 32X | |
| | **DVD ROM Read** | DVD-RAM | Up to 12X |
| | | DVD+RW | Up to 8X |
| | | DVD-RW | Up to 8X |
| | | DVD+R DL | Up to 8X |
| | | DVD-R DL | Up to 8X |
| | | DVD-ROM | Up to 16X |
| | | DVD-ROM DL | Up to 8X |
| | | DVD+R | Up to 16X |
| | | DVD-R | Up to 16X |
| **Power** | **Source** | SATA DC power receptacle | |
| | **DC Power Requirements** | 5 VDC ± 5%-100 mV ripple p-p<br>12 VDC ± 5%-200 mV ripple p-p | |
| | **DC Current** | 5 VDC -1000 mA typical, 1600 mA maximum<br>12 VDC -600 mA typical, 1400 mA maximum | |
| **Operating Environmental** (all conditions non-condensing) | **Temperature** | 41° to 122° F (5° to 50° C) | |
| | **Relative Humidity** | 10% to 90% | |
| | **Maximum Wet Bulb Temperature** | 86° F (30° C) | |
| | **Operating Systems Supported** | Windows 7 Professional 32-bit and 64-bit, Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32*.<br>Red Hat Enterprise Linux(RHEL) WS4**, 5, 6 Desktop/Workstation<br>SUSE Linux Enterprise Desktop 10 & 11<br><br>No driver is required for this device. Native support is provided by the operating system. | |
| | **Kit Contents** | HP SATA SuperMulti DVD Writer Drive, Roxio Easy Media Creator software, Intervideo WinDVD Software, installation guide, and DVD+R media. | |

| | | |
|---|---|---|
| **HP Blu-Ray Writer** | **Description** | 5.25-inch, half-height, tray-load |
| | **Mounting Orientation** | Either horizontal or vertical |
| | **Interface Type** | SATA |
| | **Dimensions** (WxHxD) | 15.0 x 4.4 x 20.3 cm (5.9 x 1.7 x 8.0 in) |
| | **Disc Formats** | BD-ROM<br>BD-R<br>BD-RE<br>DVD-RAM<br>DVD+R<br>DVD+RW<br>DVD+R DL<br>DVD-R DL<br>DVD-R<br>DVD-RW<br>CD-R<br>CD-RW |

## Technical Specifications - Optical and Removable Storage

| | | | |
|---|---|---|---|
| **Disc Capacity** | **DVD-ROM** | 8.5 GB DL or 4.7 GB standard | |
| | **Blu-ray** | 50 GB DL or 25 GB standard | |
| | **Full Stroke DVD** | < 250 ms (seek) | |
| | **Full Stroke CD** | < 210 ms (seek) | |
| | **Blu-ray** | Blu-ray | |
| | **Startup Time** (Time to drive ready from tray loading) | BD-ROM (SL/DL) | 25S / 28S |
| | | BD-R (SL/DL) | 25S / 28S |
| | | BD-RE (SL/DL) | 25S / 28S |
| | | DVD-ROM (SL/DL) | 18S / 18S |
| | | DVD-R (SL/DL) | 25S / 25S |
| | | DVD-RW | 25S |
| | | DVD+R (SL/DL) | 25S / 25S |
| | | DVD+RW | 25S |
| | | DVD-RAM | 45S |
| | | CD-ROM | 45S |
| **Maximum Data Transfer Rates** | **CD ROM Read** | CD-ROM | Up to 40X |
| | | CD-R | Up to 40X |
| | | CD-RW | Up to 40X |
| | **DVD ROM Read** | DVD-RAM | Up to 5X |
| | | DVD+RW | Up to 10X |
| | | DVD-RW | Up to 10X |
| | | DVD+R DL | Up to 8X |
| | | DVD-R DL | Up to 8X |
| | | DVD-ROM | Up to 16X |
| | | DVD-ROM DL | Up to 8X |
| | | DVD+R | Up to 12X |
| | | DVD-R | Up to 12X |
| | **Blu-Ray** | BD-ROM | Up to 6X |
| | | BD-ROM DL | Up to 4.8X |
| | | BD-R | Up to 6X |
| | | BD-R DL | Up to 4.8X |
| | | BD-R | Up to 6X |
| | | BD-RE SL/DL | Up to 4.8X |
| **Power** | **Source** | SATA DC power receptacle | |
| | **DC Power Requirements** | 5 VDC ± 5%-100 mV ripple p-p<br>12 VDC ± 10%-100 mV ripple p-p | |
| | **DC Current** | 5 VDC -900 mA typical, 1200 mA maximum<br>12 VDC -1000 mA typical, 1600 mA maximum | |
| **Operating Environmental** (all conditions non-condensing) | **Temperature** | 41° to 122° F (5° to 50° C) | |
| | **Relative Humidity** | 15% to 80% | |
| | **Maximum Wet Bulb Temperature** | 86° F (30° C) | |
| | **Operating Systems Supported** | Windows 7 Professional 32-bit and 64-bit, Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32*.<br>Red Hat Enterprise Linux(RHEL) WS4**, 5, 6 | |

| | | |
|---|---|---|
| | | Desktop/Workstation,<br>SUSE Linux Enterprise Desktop 10 & 11<br><br>* No driver is required for this device. Native support is provided by the operating system.<br><br>** RHEL WS4 not supported on Z200/Z200SFF |
| | **Kit Contents** | HP Blue Laser RW Drive, Roxio Easy Media Creator software, Intervideo WinDVD Software, installation guide. |
| | **Disclaimer** | As Blu-Ray is a new format containing new technologies, certain disc, digital connection, compatibility and/or performance issues may arise, and do not constitute defects in the product. Flawless playback on all systems is not guaranteed. In order for some Blu-Ray titles to play, they may require a DVI or HDMI digital connection and your display may require HDCP support. HD-DVD movies cannot be played on this workstation. |

| | | |
|---|---|---|
| **HP 22-in-1 Media Card Reader** | **Description** | The Media Card Reader device uses the same physical form factor and mounting as a Floppy Disk Drive. The device connects to a 2x5 two-channel USB header on the motherboard of the system. There is no USB controller card provided. Please see the Disc Formats section below for a list of flash memory card formats that are supported. |
| | **Mounting Orientation** | The Media Card Reader can be mounted in a dedicated Floppy Drive bay (if the chassis provides one) or in an appropriate Optical Bay adapter. It will operate in any orientation. |
| | **Interface Type** | USB 2.0 (one channel dedicated to the separate USB port; one channel dedicated to the flash memory card slots) |
| | **Dimensions** (WxHxD) | 124.5 x 101.6 x 25.4 mm (4.9 x 4.0 x 1.0 in) |
| | **Disc Formats** | Picture<br>Micro SD<br>Micro SDHC<br>SD<br>SDHC<br>SDXC<br>Mini SD<br>Mini SDHC<br>MultiMediaCard<br>Reduced Size MultiMediaCard (RS MultiMediaCard)<br>MultiMedia Card 4.2 (MultiMediaCard Plus, including MultiMediaCard Plus HC)<br>Reduced Size MultiMedia Card 4.2 (MultiMediaCard Mobile, including MultiMediaCard Mobile HC)<br>CompactFlash Card Type I<br>CompactFlash Card Type II<br>MicroDrive<br>Memory Stick (MS)<br>MagicGate Memory Stick (MG)<br>MagicGate Memory Stick Duo<br>Memory Stick Select<br>Memory Stick Duo (MS Duo)<br>Memory Stick PRO (MS PRO)<br>Memory Stick PRO Duo (MS PRO Duo)<br>Memory Stick PRO-HG Duo |

Two additional formats are usable with adapters (not supplied):
MultiMediaCard Micro
Memory Stick Micro (M2)

Technical Specifications - Controller Cards

| | | |
|---|---|---|
| **HP FireWire/IEEE 1394a PCI Card** | **Data Transfer Rate** | Burst Data Rate up to 400 Mbps |
| | **Device Interface Protocol** | IEEE-1394a |
| | **Devices Supported** | IEEE-1394 compliant devices |
| | **Bus Type** | PCI card with brackets for low profile and full height PCI slots. |
| | **Certification Level** | FCC Part 15B, cULus 60950, CE Mark EN55022B(1995)/EN55024-1998 STD, Taiwan BSMI CNS13438, Korea MIC |
| | **Ports** | Two IEEE 1394 6-Pin Connector (Rear) |
| | **Internal Connectors** | One 10-Pin (9 Contacts) Custom Connector |
| | **System Requirements** | Windows 7 Professional 32-bit and 64-bit, Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32*. No driver is required for this device. Native support is provided by the operating system.<br>* 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.<br><br>Pentium II 266 or above<br>128-MB RAM<br>1-GB Hard Drive<br>CD-ROM drive<br>Built-in sound system<br>Available PCI slot |
| | **Temperature - Operating** | 50° to 131° F (10° to 55° C) |
| | **Temperature - Storage** | -22° to 140° F (-30° to 60° C) |
| | **Relative Humidity - Operating** | 20% to 80% |
| | **Operating Systems Supported** | Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows 2000, Windows XP Professional or Windows XP Home 32*<br><br>* 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 - Controller Cards

| | | |
|---|---|---|
| **HP IEEE 1394b FireWire PCIe Card** | **Data Transfer Rate** | Supports up to 800 Mbps |
| | **Devices Supported** | IEEE-1394 compliant devices |
| | **Bus Type** | PCIe card full height PCIe slots |
| | **Ports** | Two IEEE-1394b bilingual 9-Pin Connector (Rear) |
| | **Internal Connectors** | One 10-Pin header Custom Connector |
| | **System Requirements** | Windows 7 Professional 32-bit and 64-bit, Microsoft® Windows® XP Professional, Windows XP Home, Windows Vista, SLED 11 and RHEL 6. Intel Pentium® G series or higher processor, 128-MB RAM, 1-GB Hard Drive, CD-ROM drive,built in sound system, Available PCIe slot. |
| | **Temperature – Operating** | 50° to 131° F (10° to 55° C) |
| | **Temperature – Storage** | –22° to 140° F (–30° to 60° C) |
| | **Relative Humidity – Operating** | 20% to 80% |
| | **Compliances** | FCC Part 15B, cULus 60950, CE Mark EN55022B(1995)/EN55024-1998 STD, Taiwan BSMI CNS13438, Korea MIC |
| | **Operating Systems Supported** | Windows 7 Professional 32-bit and 64-bit, Windows Vista® Business 32-bit and 64-bit, Windows® XP Professional, XP Professional 64-bit. Not supported on Linux. |

| | | |
|---|---|---|
| **HP USB 3.0 2x2 Port SuperSpeed PCIe x1 Card** | **Dimensions** (HxD) | TBD |
| | **Ports** | 2 External, 2 internal |
| | **Operating Systems Supported** | Microsoft Windows 7, Windows Vista*, Windows XP Professional (32-bit and 64-bit); Red Hat Enterprise Linux 6, SUSE Linux Enterprise Desktop 11<br>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. |
| | **Kit Contents** | I/O and Security Software and Documentation CD with software drivers and documentation, HP SuperSpeed USB 3.0 PCIe x1 card (with full-height expansion bracket attached), SATA to SATA split power extension cable, Low profile expansion bracket to replace the full-height expansion bracket required on some computer models and HP SuperSpeed USB 3.0 PCIe x1 Card Quick Setup. |
| | **Regulatory Approvals and registrations** | FCC 15B, CE EN55022+ EN55024, VCCI, CISPR 22 AS/NZS CISPR 22, LCIE CB service(ITE/AV) IEC 60950-1, Korea EMC, UL USB-IF |
| | **Weight** | 0.21 lb (95.0 g) |
| | **Warranty** | The HP USB 3.0 2x2 Port Super Speed PCIe x1 Card has either a one-year limited warranty or the remainder of the warranty of the HP product in which it is installed. Technical support is available seven days a week, 24 hours a day, by phone, as well as online support forums. Certain restrictions and exclusions apply. |

Technical Specifications - Networking and Communications

**NOTE 1**: "Gigabit" Ethernet indicates compliance with IEEE standard 802.3ab for Gigabit Ethernet, and does not connote actual operating speed of 1 Gb/sec. For high speed transmission, connection to a Gigabit Ethernet server and network infrastructure is required.

| | | |
|---|---|---|
| **Integrated Broadcom 5764 PCIe LOM Controller** | **Connector** | RJ45 |
| | **Data Rates Supported** | 10/100/1000BT |
| | **Bus Architecture** | PCIe X1 |
| | **Alerting** | ASF 2.0 |

| | | |
|---|---|---|
| **Broadcom (5761) NetXtreme Gigabit Ethernet Plus NIC** | **Connector** | RJ-45 |
| | **Controller** | Broadcom 5761 PCI-Express LAN Controller |
| | **Memory** | 8 MB NVRAM serial Flash |
| | **Data Rates Supported** | 10/100/1000 Mbps |
| | **Compliance** | IEEE 802.1P, 802.1Q, 802.2, 802.3, 802.3AB, 802.3u, and 802.3x |
| | **Bus Architecture** | PCI-Express |
| | **Data Path Width** | Single Channel PCI-Express |
| | **Data Transfer Mode** | Bus Master DMA |
| | **Hardware Certifications** | FCC class B, Canada and US NRTL Mark, C-Tick for Australia, BSMI for Taiwan, VCCI for Japan, MIC for Korea, GOST for Russia, UL listed (E212044), European Union Notice (CE 0682) |
| | **Power Requirement** | 1.8W @ 3.3V |
| | **Boot ROM Support** | Yes |
| | **Network Transfer Mode** | Full-duplex<br>Half-duplex (not available for the 1000BASE-T transceiver) |
| | **Network Transfer Rate** | 10BASE-T (half-duplex) 10 Mbps<br>10BASE-T (full-duplex) 20 Mbps<br>100BASE-TX (half-duplex) 100 Mbps<br>100BASE-TX (full-duplex) 200 Mbps<br>1000BASE-T (full-duplex) 2000 Mbps |
| | **Operating Temperature** | 32° to 131°F (0° to 55° C) |
| | **Operating Humidity** | 131° F (55° C) with 5% to 95% non-condensing humidity |
| | **Dimensions** | 7 cm x 10.5 cm (2.75 in x 4.13 in), low profile compatible |
| | **Operating System Driver Support** | Windows 7 Professional 32-bit and 64-bit, Windows Vista 32-bit SP1, Windows Vista x64 SP1, Windows XP 32 bit professional, Windows XP x64<br>Red Hat Enterprise Linux (RHEL) 5, 6; Novell SLED 10 & 11 |
| | **Management Capabilities** | ACPI, WOL and DMI 2.0, PXE 2.0, WfM 2.0, Broadcom mgmt utility, ASF2.0, DASH 1.0 and DASH 1.1 profiles |
| | **Kit Contents** | Broadcom NetXtreme Gigabit Ethernet Plus NIC, Broadcom NetXtreme Gigabit Ethernet Plus NIC USB Cable Assembly, CD, drivers, quick install guide, product warranty statement |

## Technical Specifications - Networking and Communications

| | | |
|---|---|---|
| **Intel Gigabit CT Desktop NIC** | **Connector** | RJ-45 |
| | **Controller** | Intel WG82574L Gigabit Ethernet Controller |
| | **Memory** | Integrated Dual 48K configurable transmit receive FIFO Buffers |
| | **Data Rates Supported** | 10/100/1000 Mbps |
| | **Compliance** | IEEE 802.1P, 802,1Q, 802.2, 802.3, 802.3AB and 802.3u compliant, 802.3x flow control |
| | **Bus Architecture** | PCI-E 1.0a |
| | **Data Path Width** | X1, 250 MB/s, Bi-directional interface |
| | **Data Transfer Mode** | Bus-master DMA |
| | **Hardware Certifications** | FCC, B, CE, TUV- cTUVus Mark Canada and United States, TUV- GS Mark for European Union |
| | **Power Requirement** | Aux 3.3V, 3.0 Watts in 1000base-T and 2.0 Watts in 100Base-T |
| | **Boot ROM Support** | Yes |
| | **Network Transfer Rate** | 10BASE-T (half-duplex) 10 Mbps<br>10BASE-T (full-duplex) 20 Mbps<br>100BASE-TX (half-duplex) 100 Mbps<br>100BASE-TX (full-duplex) 200 Mbps<br>1000BASE-T (full-duplex) 2000 Mbps |
| | **Operating Temperature** | 32° to 131°F (0° to 55° C) |
| | **Operating Humidity** | 85% at 131° F (55° C) |
| | **Dimensions** | 12.1 x 5.7 x 2.0 cm (4.75 x 2.25 x 0.8 in) |
| | **Operating System Driver Support** | Windows 7 Professional 32-bit and 64-bit, Windows Vista Business 64, Windows Vista Business 32, Windows XP Professional, Windows XP x64.<br>Red Hat Enterprise Linux 4 (RHEL4.8 or newer)*, Red Hat Enterprise Linux 5 (RHEL5.3 or newer), Red Hat Enterprise Linux 6, SUSE Linux Enterprise Desktop (SLED) 11<br><br>RHEL 4 and 5, SLED 10, are not supported on the Z220 CMT/SFF |
| | **Management Capabilities** | WOL , PXE, DMI, WFM 2.0 |
| | **Kit Contents** | Intel Gigabit CT Desktop NIC, low profile bracket, CD containing Intel PROset II NIC drivers, quick install guide, product warranty statement |

## Technical Specifications - Networking and Communications

| | | |
|---|---|---|
| **HP NC360T PCI Express Dual Port Gigabit NIC** | **Connector** | Two RJ-45 |
| | **Controller** | Intel 82571EB |
| | **Memory** | Integrated 96KB |
| | **Data Rates Supported** | 10/100/1000 Mbps |
| | **Compliance** | 802.3, 802.3u, 802.3x, 802.3ab, 802.3ad, 802.1p, 802.1Q |
| | **Bus Architecture** | PCI-E 1.0a |
| | **Data Path Width** | Four lane (x4) PCI Express compatible with x4, x8, and x16 PCI Express slots |
| | **Data Transfer Mode** | Bus-master DMA |
| | **Hardware Certifications** | FCC Class B, VCCI Class B, BSMI Class A, CISPR 22 Class B, EN 55022 Class B, EN55024-1, ICES-003 Class B, MIC Class B, ACA Class B, UL, Canada UL, EN60950 |
| | **Power Requirement** | 1280 mA @ 3.3V typical |
| | **Boot ROM Support** | Yes |
| | **Network Transfer Rate** | 10BASE-T (half-duplex) 10 Mbps<br>10BASE-T (full-duplex) 20 Mbps<br>100BASE-TX (half-duplex) 100 Mbps<br>100BASE-TX (full-duplex) 200 Mbps<br>1000BASE-T (full-duplex) 2000 Mbps |
| | **Operating Temperature** | 32° to 131°F (0° to 55° C) |
| | **Operating Humidity** | 0% to 95% non-condensing |
| | **Dimensions** | 12.95 x 6.8 cm (5.1 x 2.7 in) |
| | **Operating System Driver Support** | Windows Vista Business 64, Windows Vista Business 32, Windows XP Professional, Windows XP Professional x64 Edition.<br>Red Hat Enterprise Linux(RHEL) WS4, 5, 6 Desktop/Workstation<br>Novell SLED 10 & SLED 11 |
| | **Management Capabilities** | WOL , PXE 2.1 |
| | **Kit Contents** | HP NC360T PCI Express Dual Port Gigabit NIC, low profile bracket, CD containing Intel PROset II NIC drivers, quick install guide, product warranty statement |



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.