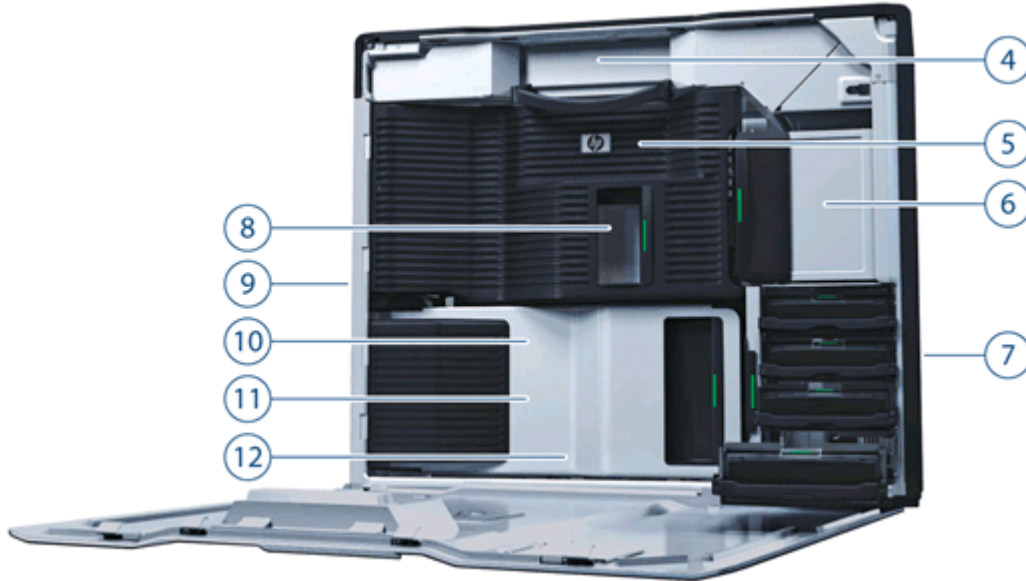


### Overview



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

### Overview



- |  |  |
|--|--|
| <p>4. Choice of 850W, 85% or 1110W, 89% Power Supplies</p> <p>5. 12 DIMM Slots for DDR3 ECC Memory</p> <p>6. 3 External 5.25" Bays</p> <p>7. 4 Internal 3.5" Bays</p> <p>8. 2 Quad Core Intel 5500 Series Processors</p> | <p>9. Rear I/O: 1 IEEE 1394a, 6 USB 2.0, 1 serial, PS/2 keyboard/mouse<br/>2 RJ-45 to Integrated Gigabit LAN<br/>1 Audio Line In, 1 Audio Line Out, 1 Microphone In</p> <p>10. 2 PCIe x16 Gen2 Slots</p> <p>11.. 2 PCIe x8 Gen2, 1 PCIe x4 Gen2, 1 PCIe x4 Gen1, 1 PCI Slot</p> <p>12 3 Internal USB 2.0 ports</p> |
|--|--|

<b>Form Factor</b>	Rackable Minitower
<b>Operating Systems</b>	<p>Preinstalled:</p> <ul style="list-style-type: none"> <li>● Genuine Windows® 7 Ultimate 64-bit*</li> <li>● Genuine Windows 7® Professional 32-bit*</li> <li>● Genuine Windows 7® Professional 64-bit*</li> <li>● HP Linux Installer Kit for Linux [includes drivers for 32-bit &amp; 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]</li> <li>● Red Hat Enterprise Linux Desktop (Preinstall NOT available; 1 year paper license only)</li> </ul> <p>Supported:</p> <ul style="list-style-type: none"> <li>● Genuine Windows® 7 Enterprise 32/64</li> <li>● Genuine Windows® XP Professional 32/64</li> <li>● Genuine Windows® Vista Business 32/64</li> <li>● SUSE Linux Enterprise Desktop 11</li> </ul> <p>Certified:</p> <ul style="list-style-type: none"> <li>● Solaris 10, 11</li> </ul>

### Overview

	<ul style="list-style-type: none"> <li>• Ubuntu 10.04, 10.10, 11.04</li> </ul> <p><b>Notes:</b> For detailed OS/hardware support information for Linux, see: <a href="http://www.hp.com/support/linux_hardware_matrix">http://www.hp.com/support/linux_hardware_matrix</a></p> <p>***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 <a href="http://www.microsoft.com/windows/windows-7/">http://www.microsoft.com/windows/windows-7/</a> for details.</p>
<b>Available Processors</b>	<p>Intel® Xeon® processor X5660 2.80 GHz, 12MB cache 1333 MHz memory, 6-Core          Intel® Xeon® processor X5650 2.66 GHz, 12MB cache 1333 MHz memory, 6-Core          Intel® Xeon® processor E5640 2.66 GHz, 12MB cache 1066 MHz memory, 4-Core          Intel® Xeon® processor E5620 2.40 GHz, 12MB cache 1066 MHz memory, 4-Core          Intel® Xeon® processor X5690 3.46 GHz, 12MB cache 1333 MHz memory, 6-Core          Intel® Xeon® processor X5687 3.60 GHz, 12MB cache 1333 MHz memory, 4-Core          Intel® Xeon® processor X5675 3.06 GHz, 12MB cache 1333 MHz memory, 6-Core          Intel® Xeon® processor X5672 3.20 GHz, 12MB cache 1333 MHz memory, 4-Core          Intel® Xeon® processor X5647 2.93 GHz, 12MB cache 1066 MHz memory, 4-Core          Intel® Xeon® processor E5649 2.53 GHz, 12MB cache 1333 MHz memory, 6-Core          Intel® Xeon® processor E5645 2.40 GHz, 12MB cache 1333 MHz memory, 6-Core          Intel® Xeon® processor E5607 2.26 GHz, 8MB cache 1066 MHz memory, 4-Core          Intel® Xeon® processor E5606 2.13 GHz, 8MB cache 1066 MHz memory, 4-Core</p>
<b>Available Processor Disclaimers</b>	<p>When ordering two processors, the second processor must be the same as the first. Intel processor numbers are not a measurement of higher performance. Processor numbers differentiate features within each processor family, not across different processor families. See: <a href="http://www.intel.com/products/processor_number/">http://www.intel.com/products/processor_number/</a> for details.</p> <p>Quad and Six-Core technologies are designed to improve performance of multithreaded software products and hardware-aware multitasking operating systems and may require appropriate operating system software for full benefits; check with software provider to determine suitability; Not all customers or software applications will necessarily benefit from use of these technologies.</p> <p>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. Processors will not operate (including 32-bit operation) without an Intel® 64 architecture-enabled BIOS. Performance will vary depending on your hardware and software configurations. See: <a href="http://www.intel.com/info/em64t">http://www.intel.com/info/em64t</a> for more information.</p> <p>Intel® Xeon® processor X5687 and Intel® Xeon® processor X5690 REQUIRE the 1110W Power Supply Option.</p> <p>Intel® Xeon® processor X5677 and Intel® Xeon® processor X5680 REQUIRE the 1110W Power Supply Option.</p>
<b>Additional Details</b>	<p>Intel® Nehalem Architecture (5500 Series Xeon)          Intel® Westmere Architecture (5600 Series Xeon)          Up to 6.4GT/s QPI support          3-channel 800/1066/1333 MHz DDR3* memory subsystem          Up to 192GB memory capacity          PCI Express I/O and PCIe x16 Gen2 graphics          Dual integrated Broadcom 5764 Gigabit LAN on Motherboard (LOM)          6 channels of Serial ATA (SATA) and 8 channels of Serial Attached SCSI (SAS) 3.0 Gb/s natively supported internally; SATA RAID level 0, 1, 5 and 10 and SAS RAID** level 0, 1, 10 available on motherboard*          SATA optical drives          High Definition integrated audio with internal speaker          Choice of 850W 85% efficient or 1110W 89% efficient power supply          ENERGY STAR® qualification and energy-saving features available on selected configurations (Not</p>

### Overview

	<p>supported by Linux)</p> <p>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.</p> <p>*Each processor supports up to 3 channels of DDR3 memory. To realize full performance at least 1 DIMM must be inserted into each channel. To get full 6 channel support, 2 processors MUST be installed.</p> <p>**SATA hardware RAID is not supported on Linux systems. The Linux kernel, with built-in software RAID, provides excellent functionality and performance. It is a good alternative to hardware-based RAID. Please visit <a href="http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00060684/c00060684.pdf">http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00060684/c00060684.pdf</a> for RAID capabilities with Linux.</p>				
<b>Form Factor</b>	Rackable Minitower				
<b>Color</b>	Black/Silver				
<b>I/O Slots</b> (see system board section for more details)	<ul style="list-style-type: none"> <li>• 2 PCI Express Gen2 x16 slots (full-length, full-height)</li> <li>• 2 PCI Express Gen2 x8 slots - with x16 connectors (full-length, full-height)</li> <li>• 1 PCI Express Gen2 x4 slot - with x8 connector (half-length, full-height)</li> <li>• 1 PCI Express Gen1 x4 slot - with x8 connector (full-length, full-height)</li> <li>• 1 PCI 32bit/33MHz slot, (full-length, full-height)</li> <li>• 1 Mechanical-only slot, supporting cards which mount only to the I/O bulkhead and not the motherboard (half-length, full-height)</li> <li>• The PCIe x8 connectors are open ended, allowing a PCIe x16 card to be seated in the slot.</li> </ul>				
<b>Bays</b> (see storage section for more details)	Total Bays = 7				
<b>Internal Bays</b>	4 internal 3.5" bays (4 with acoustic dampening rail assemblies)				
<b>External Bays</b>	<p>3 external 5.25" bays</p> <p>Top bay device depth limit: 175mm</p> <p>Middle bay device depth limit: 206mm</p> <p>Bottom bay device depth limit: 206mm</p>				
<b>Front I/O</b>	3 USB 2.0, 1 Headphone Out, 1 Microphone In, and 1 IEEE 1394a				
<b>Rear I/O</b>	<p>1 IEEE-1394a</p> <p>6 USB 2.0</p> <p>1 Serial</p> <p>PS/2 keyboard and mouse</p> <p>2 RJ-45 to integrated Gigabit LAN</p> <p>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.</p>				
<b>Internal USB</b>	<p>3 USB 2.0</p> <p>3 USB 2.0 ports available by one 2x5 header and one 1x5 header: supports either up to two HP Internal USB Port Kits, AMO- EM165AA, one on each header, or one USB Media Card Reader. Each Internal Port Kit has two USB 2.0 connectors.</p>				
<b>Chassis Dimensions</b> (H x W x D)	44.4 x 20.3 x 52.5 cm; 17.5 x 8.0 x 20.7 inches				
<b>System Weight</b>	<p>Exact weights depend upon configuration</p> <p>Minimum config – 19.5 kg (43 lb)</p> <p>Typical config – 21 kg (46 lb)</p> <p>Maximum config – 29 kg (64 lb)</p>				
<b>Temperature</b>	<table border="1"> <tr> <td>Operating:</td> <td>5° to 35° C (40° to 95° F)</td> </tr> <tr> <td>Non-operating</td> <td>-40° to 60° C (-40° to 140° F)</td> </tr> </table>	Operating:	5° to 35° C (40° to 95° F)	Non-operating	-40° to 60° C (-40° to 140° F)
Operating:	5° to 35° C (40° to 95° F)				
Non-operating	-40° to 60° C (-40° to 140° F)				

### Overview

<b>Humidity</b>	Operating:	8% to 85%
	Non-operating	8% to 90%
<b>Maximum Altitude</b> (non-pressurized)	Operating:	3,000 m; 10,000 feet
	Non-operating	9,100 m; 30,000 feet
<b>Power Supply</b>	<p>Choice of:</p> <ul style="list-style-type: none"> <li>850W 85% Efficient wide-ranging, active Power Factor Correction</li> <li>1110W 89% Efficient wide-ranging, active Power Factor Correction</li> </ul> <p><b>NOTE:</b> The 1110W power supply can also supply 1250W of output power when the input voltage is greater than 105V. If the input voltage is less than 105V, but greater than 90V for any reason, the maximum power that can be drawn is 1110W. An uninterruptible power supply (UPS) is highly recommended if 1250W output power is desired.</p> <p>The Z800 power supply efficiency reports can be found at these links:</p> <p>850W - <a href="http://www.plugloadsolutions.com/psu_reports/DELTA_DPS-850DB%20A_850W_80+_Report.pdf">http://www.plugloadsolutions.com/psu_reports/DELTA_DPS-850DB%20A_850W_80+_Report.pdf</a></p> <p>1110W - <a href="http://www.plugloadsolutions.com/psu_reports/DELTA_DPS-1050DBA_S0-035_1250W_Report.pdf">http://www.plugloadsolutions.com/psu_reports/DELTA_DPS-1050DBA_S0-035_1250W_Report.pdf</a></p>	
<b>Interfaces Supported</b>	<ul style="list-style-type: none"> <li>6-channel SATA 3.0 Gb/s Interface (6 Serial-ATA connectors on the motherboard, 4 channels are eSATA configurable for use with eSATA CTO/AMO Kit)</li> <li>8-channel SAS interface (8 SAS connectors on the motherboard), SAS ports can be ported externally by using the SAS Bulkhead and/or Back Panel connector Kits</li> <li>1 Floppy interface (1 Floppy connector), IEEE 1394a, USB 2.0</li> </ul>	
<b>Hard Drive Controller Supported</b>	SATA and SAS controllers	
<b>Backup Devices</b>	For a complete listing of compatible DAT tape drives, LTO tape drives and RDX Removable Disk Backup System offerings, please visit: <a href="http://www.hp.com/go/connect">http://www.hp.com/go/connect</a>	

### Supported Components

#### Processors

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
<b>Four-Core and Six-Core Intel Xeon Processor 5600 Series with Intel® 64 Architecture - High Power</b>				
Intel® Xeon® Processor X5690 6C 3.46 GHz, 130W, 12M cache, 6.40GT/s QPI, DDR3 1333MHz, HT, Turbo	Y	Y	LB217AA	2/14/2011- ----- Requires 1110W Power Supply
Intel® Xeon® Processor X5687 4C 3.60 GHz, 130W, 12M cache, 6.40GT/s QPI, DDR3 1333MHz, HT, Turbo	Y	Y	LB216AA	2/14/2011- ----- Requires 1110W Power Supply
<b>Four-Core and Six-Core Intel Xeon Processor 5600 Series with Intel® 64 Architecture</b>				
Intel® Xeon® Processor E5620 4C 2.40 GHz, 80W, 12M cache, 5.86GT/s QPI, DDR3 1066MHz, HT, Turbo	Y	Y	WG728AA	
Intel® Xeon® Processor E5640 4C 2.66 GHz, 80W, 12M cache, 5.86GT/s QPI, DDR3 1066MHz, HT, Turbo	Y	Y	WG730AA	
Intel® Xeon® Processor X5650 6C 2.66 GHz, 95W, 12M cache, 6.40GT/s QPI, DDR3 1333MHz, HT, Turbo	Y	Y	WG731AA	
Intel® Xeon® Processor X5660 6C 2.80 GHz, 95W, 12M cache, 6.40GT/s QPI, DDR3 1333MHz, HT, Turbo	Y	Y	WG732AA	
Intel® Xeon® Processor X5675 6C 3.06 GHz, 95W, 12M cache, 6.40GT/s QPI, DDR3 1333MHz, HT, Turbo	Y	Y	LB215AA	2/14/2011
Intel® Xeon® Processor X5672 4C 3.20 GHz, 95W, 12M cache, 6.40GT/s QPI, DDR3 1333MHz, HT, Turbo	Y	Y	LB214AA	2/14/2011
Intel® Xeon® Processor X5647 4C 2.93 GHz, 130W, 12M cache, 5.86GT/s QPI, DDR3 1066MHz, HT, Turbo	Y	Y	LB213AA	2/14/2011
Intel® Xeon® Processor E5649 6C 2.53 GHz, 80W, 12M cache, 5.86GT/s QPI, DDR3 1333MHz, HT, Turbo	Y	Y	LB212AA	2/14/2011
Intel® Xeon® Processor E5645 6C 2.40 GHz, 80W, 12M cache, 5.86GT/s QPI, DDR3 1333MHz, HT, Turbo	Y	Y	LB211AA	2/14/2011
Intel® Xeon® Processor E5607 4C 2.26 GHz, 80W, 8M cache, 4.80 GT/s QPI, DDR3 1066MHz	Y	Y	LB210AA	2/14/2011
Intel® Xeon® Processor E5606 4C 2.13 GHz, 80W, 8M cache, 4.80 GT/s QPI, DDR3 1066MHz	Y	Y	LB209AA	2/14/2011
<a href="#">Intel® Xeon® processor X5687 and Intel® Xeon® processor X5690 Require the 1110W Power Supply Option.</a>				

### Supported Components

#### Monitors / Displays

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP LP2065 20-inch LCD Monitor	Y	Y	EF227A4	
HP LP2475w 24-inch Widescreen LCD Monitor	Y	Y	KD911A4	
HP DreamColor LP2480zx Professional Display	Y	Y	GV546A4	
HP LP3065 30-inch Widescreen LCD Monitor	Y	Y	EZ320A4	
HP ZR22w 21.5-inch S-IPS LCD Monitor	Y	Y	VM626A4	
HP ZR24w 24-inch S-IPS LCD Monitor	Y	Y	VM633A4	
HP ZR30w 30-inch S-IPS LCD Monitor	Y	Y	VM617A4	

Supported by all Operating Systems available from HP

Screen size diagonally measured

#### Sub-Section Description/Notes

**NOTE 1:** NCQ (Native Command Queuing) not supported in Red Hat Enterprise Linux  
For hard drives, 1 GB = 1 billion bytes; TB = 1 trillion bytes. Actual formatted capacity is less.

#### SAS Hard Drives

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
<b>HP SAS (Serial Attached SCSI) Hard Drives for HP Workstations</b>				
600GB SAS 15K rpm 6Gb/s 3.5" HDD	Y	Y	VM647AA	
450GB SAS 15K rpm 6Gb/s 3.5" HDD	Y	Y	LU968AA	
300GB SAS 15K rpm 6Gb/s 3.5" HDD	Y	Y	LU967AA	
HP 600GB SAS 10K SFF HDD	Y	Y	A2Z21AA	
HP 450GB SAS 10K SFF HDD	Y	Y	B0A48AA	
HP 300GB SAS 10K SFF HDD	Y	Y	A2Z20AA	

#### Sub-Section Description/Notes

Up to 5 SATA drives, 5 SAS, drives, or 6 SATA 2.5", Small Form Factor (SFF) drives  
If 1st drive is SATA, 2nd drive can be EITHER SATA or SAS  
8 port SAS Controller included on the system board

#### SATA Hard Drives

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
<b>SATA (Serial ATA) Hard Drives for HP Workstations</b>				
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	
3.0TB SATA 7200 rpm 6Gb/s 3.5" HDD	Y	Y	QF298AA	
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

### Supported Components

Up to 5 SATA drives, 5 SAS, drives, or 6 SATA 2.5", Small Form Factor (SFF) drives  
 If 1st drive is SATA, 2nd drive can be EITHER SATA or SAS  
 3TB drive is not supported as a boot device.  
 3TB drives are ONLY supported in positions 2, 3, 4 and 5.  
 3TB drives must use LSI9260 Controller.  
 3TB drives are ONLY supported through HP specials and are not standard CTO devices.

#### SATA Solid State Drives

#### HP Solid State Drives for Workstations

HP 300GB SATA SSD	Y	Y	LZ069AA
HP 160GB SATA SSD	Y	Y	LZ704AA
HP 256GB SATA SSD	Y	Y	A3D26AA
HP 128GB SATA SSD	Y	Y	A3D25AA

#### Hard Drive Controllers

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
<b>Factory integrated RAID on motherboard for SATA drives</b>				
RAID 0 Configuration - Striped Array	Y	Y		See note 1
RAID 0 Data Configuration -- Boot/OS Drive + 2 Drive Striped Array	Y	Y		See note 2
RAID 1 Configuration - Mirrored Array	Y	Y		See note 3
RAID 10 Configuration - Striped/Mirrored Array	Y	Y		
RAID 5 Configuration - Parity Array	Y	Y		See note 4
<b>Integrated SATA 3.0 Gb/s Controller</b>				
Integrated SATA 3.0 Gb/s Controller	Y	Y		
<b>Integrated LSI SAS 1068E Controller with RAID 0, 1, 1E/10E</b>				
Integrated LSI SAS 1068E Controller with RAID 0 (IS), RAID 1(IM), RAID 10(IME) capability	Y	Y		
<b>HP SAS Back Panel Connector kit</b>				
HP SAS Back Panel Connector kit	Y	Y		Must have 4 or fewer SAS hard drives to configure this option
<b>HP SAS Back Panel Bulkhead Connector Kit</b>				
HP SAS Back Panel Bulkhead Connector Kit	Y	Y		HP SAS Back Panel Connector kit required. Internal SAS HD drives are not supported
<b>LSI MegaRAID® 9260-8i SAS 6Gb/s ROC RAID Card and iBBU08 Battery Backup Unit</b>				
LSI MegaRAID® 9260-8i SAS 6Gb/s ROC RAID Card	Y	Y	WE465AA	





### Supported Components

NVIDIA Quadro 6000 REQUIRES the Z800 with the 1110W Power Supply Option

2nd Quadro 4000 REQUIRES the Z800 with the 1110W Power Supply Option

2nd Quadro 5000 REQUIRES the Z800 with the 1110W Power Supply Option

**NOTE 1:** Nvidia Q600 Graphics is NOT supported when there is greater than 128GB of memory present AND Microsoft Windows is installed

### High Performance GPU Computing

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
NVIDIA Tesla C2075 Compute Processor	Y	Y	QB035AA	Note #2

**NOTE #1:** Dual (2) NVIDIA Tesla C2050 processors are supported with 1110 W chassis. Supported with "No Integrated Graphics" or FX380 only. Not supported with dual 130w/high power processors.

**NOTE #2:** Only supported with 1110 W chassis. Supported with "HP Hi Perf GPU Compute Graphics Only", Q400, Q600, FX380, Q5000, Q6000 and Q2000 only. Not supported with 2 graphics cards. Not supported with dual 130W high powered processors and FX5800 or Q6000 graphic cards and RAM Fullmem. Not supported with OS WIN32.

### Memory

CTO	Option Kit Part Number	Support Notes
<b>PC3-10600 DDR3-1333 ECC Registered DIMMs CTO</b>		
12GB (3x4GB) DDR3-1333 ECC Registered RAM 1-CPU		1 Processor Configuration
24GB (6x4GB) DDR3-1333 ECC Registered RAM 1-CPU		1 Processor Configuration
24GB (6x4GB) DDR3-1333 ECC Registered RAM 2-CPU		2 Processors Required
32GB (8x4GB) DDR3-1333 ECC Registered RAM 2-CPU		2 Processors Required
48GB (12x4GB) DDR3-1333 ECC Registered RAM 2-CPU		2 Processors Required
48GB (6x8GB) DDR3-1333 ECC Registered RAM 2-CPU		2 Processors Required
64GB (8x4GB+4x8GB) DDR3-1333 ECC Registered RAM 2-CPU		2 Processors Required
64GB (8x8GB) DDR3-1333 ECC Registered RAM 2-CPU		2 Processors Required
72GB (6x4GB+6x8GB) DDR3-1333 ECC Registered RAM 2-CPU		2 Processors Required
96GB (12x8GB) DDR3-1333 ECC Registered RAM 2-CPU		2 Processors Required
<b>PC3-10600 DDR3-1333 ECC Unbuffered DIMMs CTO</b>		
2GB (1x2GB) DDR3-1333 ECC Unbuffered RAM 1-CPU		1 Processor Configuration

### Supported Components

4GB (2x2GB) DDR3-1333 ECC Unbuffered RAM 1-CPU	1 Processor Configuration
6GB (3x2GB) DDR3-1333 ECC Unbuffered RAM 1-CPU	1 Processor Configuration
8GB (4x2GB) DDR3-1333 ECC Unbuffered RAM 1-CPU	1 Processor Configuration
12GB (6x2GB) DDR3-1333 ECC Unbuffered RAM 2-CPU	2 Processors Required
16GB (8x2GB) DDR3-1333 ECC Unbuffered RAM 2-CPU	2 Processors Required
24GB (12x2GB) DDR3-1333 ECC Unbuffered RAM 2-CPU	2 Processors Required
<b>PC3-8500R DDR3-1066 ECC Registered DIMMs CTO</b>	
96GB (6x16GB) DDR3-1066 ECC Registered RAM 2-CPU	2 Processors Required
128GB (8x8GB+4x16GB) DDR3-1066 ECC Registered RAM 2-CPU	2 Processors Required
144GB (6x8GB+6x16GB) DDR3-1066 ECC Registered RAM 2-CPU	2 Processors Required
160GB (10x16GB) DDR3-1066 ECC Registered RAM 2-CPU	2 Processors Required
192GB (12x16GB) DDR3-1066 ECC Registered RAM 2-CPU	2 Processors Required

#### Sub-Section Description/Notes

The 16GB DIMMs used on the Z800 are DDR3, 1066MHz. The 8GB DIMMs are DDR3, 1333MHz. When combined with the 16GB 1066MHz DIMMs, the 8GB DIMMs run at a maximum of 1066MHz.

#### AMO

##### PC3-10600 DDR3-1333 ECC Registered DIMMs AMO

8GB (1x8GB) DDR3-1333 ECC Registered RAM	FX622AA
4GB (1x4GB) DDR3-1333 ECC Registered RAM	FX621AA

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

2GB (1x2GB) DDR3-1333 ECC Unbuffered RAM	FX699AA
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##### PC3-8500R DDR3-1066 ECC Registered DIMMs AMO

16GB (1x16GB) DDR3-1066 ECC Registered RAM	NL674AA
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**NOTE:** You cannot intermix registered and unbuffered DIMMs. The system will not work.

### Supported Components

#### 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	NH222AA	See note 1

**NOTE 1:** The SoundBlaster X-Fi Titanium audio card is supported on the HP Z Series Workstations with Microsoft Windows XP Pro 32-bit and 64-bit and Microsoft Vista 32-bit and 64-bit versions. Linux is not supported.

#### Optical and Removable Storage

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP 16X DVD-ROM SATA Drive (non-Lightscribe version)	Y	Y	AR629AA	See note 2
HP 16X DVD+/-RW SuperMulti SATA Drive (non-Lightscribe version)	Y	Y	QS208AA	
HP Slot Load DVD+/-RW Drive	Y	N		See note 1
HP Blu-Ray Writer	Y	Y	AR482AA	
HP 22-in-1 Media Card Reader Kit (Workstations)	N	Y	NK361AA	
<b>HP DX115 Removable Drive Enclosure</b>				
HP DX115 Carrier with 160GB SATA HDD	Y	Y	FZ577AA	
HP DX115 Removable HDD Frame/Carrier	N	Y	FZ576AA	
HP DX115 Removable HDD Carrier	N	Y	NB792AA	

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.

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.

**NOTE 1:** May only order one.

**NOTE 2:** Cannot be 2nd drive.

#### Controller Cards

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP IEEE 1394b FireWire PCIe Card	Y	Y	NK653AA	
HP SuperSpeed USB 3.0 PCIe x1 Card	Y	Y	BM867AA	3/1/2011

### Supported Components

#### 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	
HP NC360T PCI Express Dual Port Gigabit NIC	N	Y	KU004AA	
Intel Gigabit CT Desktop NIC	N	Y	FH969AA	

"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.

#### Racking and Physical Security

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Security Cable with Kensington Lock	N	Y	PC766A	
HP Chassis Intrusion Sensor	Y	N		
HP Z6/Z8 Adjustable Sliding Rail Rack Kit	N	Y	NN124AA	

#### 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	Y	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	

### Supported Components

#### Other Hardware

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP Internal USB Port Kit	Y	Y	EM165AA	
HP SAS Back Panel Connector Kit	Y	Y	EM164AA	
HP eSATA PCI Cable Kit	Y	Y	GM110AA	
HP Power Cord Kit	Y	Y		
HP ENERGY STAR 5.0 Enabled Configuration	Y	Y		

#### Software

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP Performance Advisor	Y	N		Supports Windows 7 only. Available as a web download/install starting 1/7/2010. Included in the Windows 7 preload starting 3/1/2010.
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		Must select as a Configure to Order Option. Delivered as a "Drop in the Box" CD
PDF Complete - Corporate Edition	Y	N		
Buy Office	Y	N		
Parallels Workstation 4.0 Extreme	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

### Supported Components

Professional and Enterprise, Windows Vista Business, Ultimate and Enterprise, and RHEL V6

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#### Operating Systems

#### Support Notes

Genuine Windows® 7 Ultimate 64-bit See Note 1

Genuine Windows® 7 Professional 32-bit See Note 1

Genuine Windows® 7 Professional 64-bit See Note 1

HP Linux Installer Kit

Red Hat Enterprise Linux (RHEL) Workstation - Paper License (1yr) Not Preloaded - Drop In Box

SUSE Linux Enterprise Desktop 11 Not Preloaded on the Z800 - Supported only.

**NOTE 1:** 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.

### System Technical Specifications

<b>System Board</b>	
<b>System Board Form Factor</b>	Custom Form Factor, 13" x 14.25" (330.20mm x 361.95mm)
<b>Processor Socket</b>	Dual LGA 1366
<b>CPU Bus Speed</b>	QPI: Up to 6.4GT/sec
<b>Chipset</b>	Intel® 5520
<b>Super I/O Controller</b>	SMSC SCH5327, Rev B
<b>Memory Expansion Slots</b>	12 slots (6 slots per CPU)
<b>Memory Type Supported</b>	DDR3, RDIMM (Registered) or UDIMM (Unbuffered), ECC
<b>Memory Modes</b>	NUMA (Non-Uniform Memory Architecture), Memory Node Interleave
<b>Memory Speed Supported</b>	800MHz, 1066MHz, & 1333MHz
<b>Maximum Memory</b>	Supports up to 24GB using UDIMMs Supports up to 192GB using RDIMMs

Capacity	Single Processor					
	CPU0					
	DIMM1	DIMM2	DIMM3	DIMM4	DIMM5	DIMM6
1GB	1GB					
2GB	1GB		1GB			
3GB	1GB		1GB		1GB	
4GB	2GB		2GB			
6GB	2GB		2GB		2GB	
8GB	2GB	2GB	2GB		2GB	
12GB	2GB	2GB	2GB	2GB	2GB	2GB
16GB	4GB	4GB	4GB		4GB	
24GB	4GB	4GB	4GB	4GB	4GB	4GB
32GB	8GB	4GB	8GB	4GB	8GB	
48GB	8GB	8GB	8GB	8GB	8GB	8GB



### System Technical Specifications

Capacity	Dual Processor											
	CPU0						CPU1					
	DIMM1	DIMM2	DIMM3	DIMM4	DIMM5	DIMM6	DIMM7	DIMM8	DIMM9	DIMM10	DIMM11	DIMM12
2GB	1GB						1GB					
4GB	1GB		1GB				1GB		1GB			
6GB	1GB		1GB		1GB		1GB		1GB		1GB	
8GB	2GB		2GB				2GB		2GB			
12GB	2GB		2GB		2GB		2GB		2GB		2GB	
18GB	2GB	1GB	2GB	1GB	2GB	1GB	2GB	1GB	2GB	1GB	2GB	1GB
16GB	2GB	2GB	2GB		2GB		2GB	2GB	2GB		2GB	
24GB	2GB	2GB	2GB	2GB	2GB	2GB	2GB	2GB	2GB	2GB	2GB	2GB
32GB	4GB	4GB	4GB		4GB		4GB	4GB	4GB		4GB	
48GB	4GB	4GB	4GB	4GB	4GB	4GB	4GB	4GB	4GB	4GB	4GB	4GB
64GB	8GB	4GB	8GB	4GB	4GB	4GB	8GB	4GB	8GB	4GB	4GB	4GB
96GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB	8GB
144GB	16GB	8GB	16GB	8GB	16GB	8GB	16GB	8GB	16GB	8GB	16GB	8GB
160GB	16GB	16GB	16GB	16GB	16GB		16GB	16GB	16GB	16GB	16GB	
192GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB	16GB

**Memory Configuration**  
(Supported)

- Not all memory configurations possible are represented below. Also, 512 MB configurations are not supported for 64-Bit operating systems.
- Only ECC DIMMs are supported.
- RDIMM and UDIMM memory modules cannot be mixed in the system.
- Do not install memory modules into memory slots if corresponding processor is not installed.
- Dual processor configurations with memory modules installed for only one processor is not supported.
- The 4GB DIMM for Z4 and Z6 is not compatible with the Z8 4GB DIMM. They are not interchangeable.

**PCI Express Connectors**

PCIe2 x16, qty 2  
 PCIe2 x16 (x8 electrical), qty 2  
 PCIe2 x8 (x4 electrical), qty 1  
 PCIe x8 (x4 electrical), qty 1

**PCI Connectors (5.0V)**

PCI 32b, 33MHz (supports 64-bit cards), qty 1

**Supported Drive Interfaces**

<b>SATA</b>	Integrated 6-channel SATA 3.0Gb/sec controller with RAID 0, 1, 5, 10 and NCQ. (Factory integrated RAID is Microsoft Windows only)
<b>Serial Attached SCSI</b>	Integrated 8-channel SAS 3.0Gb/sec controller with HW RAID 0, 1, 10.
<b>Integrated RAID</b>	SATA: RAID 0, 1, 5, 10 SAS: HW RAID 0, 1, 10
<b>Integrated Graphics</b>	None
<b>Network Controller</b>	Dual Controller Broadcom 5764 PCI-E LAN Controller Memory Integrated 48KB receive buffer and 8KB transmit buffer Data rates supported 10/100/1000 Mb/s Compliance IEEE 802.3, 802.3AB and 802.3u compliant, 802.3x flow control Bus architecture PCIe 1.0a Data path width X1 to each controller

### System Technical Specifications

		Data path speed 2.5 Gb/s per direction transfer rate Data transfer mode Bus-master DMA Power requirement 1.0 watts @ +3.3V AUX supply Boot ROM support Yes Network transfer rate 10BASE-T (half-duplex) 10 Mb/s 10BASE-T (full-duplex) 20 Mb/s 100BASE-TX (half-duplex) 100 Mb/s 100BASE-TX (full-duplex) 200 Mb/s 1000BASE-T (full-duplex) 2000 Mb/s Microsoft Windows Vista Business 32 and 64, Microsoft Windows XP Management capabilities WOL, PXE 2.1 and ASF 2.0
	<b>PCI-X Connectors</b>	None
	<b>PCI Card Guide</b>	Yes
	<b>Wake on LAN</b>	Yes
	<b>Integrated Trusted Platform Module</b>	TPM 1.2
	<b>ASF 1.0 &amp; 2.0 (Alert Standard Format)</b>	Yes
	<b>SATA Connectors</b>	6 ports/connectors (Included are 4 eSATA configurable with optional eSATA After-Market Option cable kit)
<b>IEEE 1394 Connector(s)</b>	<b>Front</b>	Yes, 1394a
	<b>Rear</b>	Yes, 1394a
	<b>Internal</b>	None
<b>USB Connector(s)</b>	<b>Front</b>	Yes, qty 3
	<b>Rear</b>	Yes, qty 6
	<b>Internal</b>	Yes, qty 3  3 USB 2.0 ports available by one 2x5 header and one 1x5 header: supports either up to two HP Internal USB Port Kits, AMO- EM165AA, one on each header, or one USB Media Card Reader. Each Internal Port Kit has two USB 2.0 connectors.
<b>HD Integrated Audio</b>	Yes	
<b>Flash ROM</b>	Yes, SPI Rom	
<b>CPU Fan Header</b>	Yes, qty 2	
<b>Chassis Fan Header</b>	Yes, a single fan header for 2 fans.	
<b>Front PCI Fan Header</b>	Yes, qty 2	
<b>Front Control Panel/Speaker Header</b>	Yes	
<b>CMOS Battery Holder - Lithium</b>	Yes	
<b>Integrated Trusted Platform Module</b>	Integrated TPM 1.2	
<b>Power Supply Headers</b>	Yes: 9x2, 5x2, 4x2	
<b>Power Switch, Power LED &amp; Hard Drive LED Header</b>	Yes	

### System Technical Specifications

<b>Clear Password Jumper</b>	Yes
<b>Serial Port</b>	Yes, on rear panel
<b>Parallel Port</b>	No
<b>Keyboard/Mouse</b>	Yes
<b>Power Supply</b>	850W 85% Efficient Wide-Ranging, Active PFC, Custom 1110W 89% Efficient Wide-Ranging, Active PFC, Custom <b>NOTE:</b> The 1110W power supply can also supply 1250W of output power when the input voltage is greater than 105V. If the input voltage is less than 105V, but greater than 90V for any reason, the maximum power that can be drawn is 1110W. An uninterruptible power supply (UPS) is highly recommended if 1250W output power is desired.
<b>Operating Voltage Range</b>	90–269 VAC
<b>Rated Voltage Range</b>	850W: 100–127 VAC 200–240 VAC  1110W: 100 VAC 115 VAC 200–240 VAC
<b>Rated Line Frequency</b>	50–60 Hz
<b>Operating Line Frequency Range</b>	47–66 Hz 393 – 407 Hz
<b>Rated Input Current</b>	850W: 11A @ 100–127V, 5.5A @ 200–240V 1110W: 12A @ 100V 1250W: 12A @ 115V, 10A @ 200–240V
<b>Heat Dissipation</b>	850W: Typical = 1707 BTU/hr, Max = 3558 BTU/hr 1110W: Typical = 2128 BTU/hr, Max-1 = 4457 BTU/hr, Max-2 = 5019 BTU/hr
<b>Power Supply Fan</b>	850W: 2x80x25 mm variable speed 1110W: 2x80x25 mm variable speed
<b>ENERGY STAR® qualified (Config Dependent)</b>	Yes
<b>80 PLUS Compliant</b>	Yes. 850W 85% For the ECOs PSU Efficiency Report for the power supply, please go to this link: <a href="http://www.plugloadsolutions.com/psu_reports/DELTA_DPS-850DB_A_850W_80+_Report.pdf">http://www.plugloadsolutions.com/psu_reports/DELTA_DPS-850DB_A_850W_80+_Report.pdf</a> Yes. 1110W 89% For the ECOs PSU Efficiency Report for the power supply, please go to this link: <a href="http://www.plugloadsolutions.com/psu_reports/DELTA_DPS-1050DBA_S0-035_1250W_Report.pdf">http://www.plugloadsolutions.com/psu_reports/DELTA_DPS-1050DBA_S0-035_1250W_Report.pdf</a>
<b>FEMP Standby Power Compliant 115V (Wake-on LAN disabled) (&lt;2W in S5 - Power Off)</b>	Yes
<b>Power consumption in sleep mode (as defined by ENERGY STAR) - Suspend to RAM (S3)</b>	850W: <20W 1110W: <20W

### System Technical Specifications

<b>Built-in Self Test (BIST) LED</b>	Yes		
<b>Surge Tolerant Full Ranging Power Supply (withstands power surges up to 2000V)</b>	Yes		
<b>ENERGY STAR® qualified</b>	Yes		
<b>AUX IN (audio)</b>	No		
<b>Clear CMOS Button</b>	Yes		
<b>Chassis Speaker Header</b>	Yes, as part of Front UI (Control Panel) cable header		
<b>Multibay Header</b>	No		
<b>Integrated Gigabit Ethernet</b>	Yes, dual port.		
<b>Access Panel Solenoid Lock Header</b>	No		
<b>Access Panel Intrusion Sensor Header</b>	Yes, as part of Front UI (Control Panel) cable header		
<b>Memory Fan Connector</b>	Yes, blind-mate		
<b>Z800 Required Power Supply Info</b>			
<b>Power Supply</b>	<b>850W Custom PSU – (Wide Ranging Active PFC)</b>		<b>1110W/1250W* Custom PSU – (Wide Ranging Active PFC)</b>
<b>Operating Voltage Range</b>	90 – 269 VAC		90 – 269 VAC
<b>Rated Voltage Range</b>	100–127 VAC 200–240 VAC	118 VAC	100 VAC 115 VAC 200–240 VA 118 VAC
<b>Rated Line Frequency</b>	50-60 Hz	400 Hz	50-60 Hz 400 Hz
<b>Operating Line Frequency Range</b>	47 – 66 Hz	393 – 407 Hz	47 – 66 Hz 393 – 407 Hz
<b>Rated Input Current</b>	11.0A @ 110-127 VAC 5.5A @ 200-240 VAC	11.0A @ 118 VAC	12A @ 100 VAC, 1110 W 12A @ 115 VAC, 1250 W 10A @ 200-240 VAC, 1250 W 12A @ 118 VAC, 1250W
<b>Heat Dissipation (Configuration and software dependent)</b>	Typical 1707 btu/hr (430 kg-cal/hr) Max 3538 btu/hr (892 kg-cal/hr)		Typical 2128 btu/hr (536 kg-cal/hr) Max1 4457 btu/hr (1123 kg-cal/hr) Max2 5019 btu/hr (1265 kg-cal/hr)
<b>Power Supply Fan</b>	2x80x25 mm variable speed		2x80x25 mm variable speed
<b>Energy Star Compliant (config dependent)</b>	YES		YES
<b>80 PLUS® Compliant</b>	YES, BRONZE		YES, SILVER
<b>FEMP Standby Power Compliant@115V (Wake-on LAN disabled)(&lt;2W in S5-Power Off)</b>	YES		YES

### System Technical Specifications

<b>EuP Compliant@230V (&lt;1 W in S5-Power Off)</b>	YES	YES
<b>Power Consumption in sleep mode (as defined by ENERGY STAR) – Suspend to RAM (S3) (Instantly Available PC) measured at 115V.</b>	<20W	<20W
<b>Built-in Self Test LED</b>	YES	YES
<b>Surge Tolerant Full Ranging Power Supply (withstands power surges up to 2000V)</b>	YES	YES
*Input Voltage Restrictions		

### System Configuration

<b>Example Configuration #1</b>	<b>Processor Info</b>	1xXeon E5504 (2.00GHz, 4MB/800)
	<b>Memory Info</b>	3x1GB DR 1067 MHz (UDIMM)
	<b>Graphics Info</b>	1xFX1800
	<b>Disks/Optical/Floppy</b>	1x250GB SATA / 1 Optical / 1 Floppy
	<b>PSU</b>	850W 80 PLUS® BRONZE

<b>Energy Consumption</b>	<b>115 VAC</b>		<b>230 VAC</b>		<b>100 VAC</b>	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows Idle (S0)	130.5 W		127.4 W		130.5 W	
Windows Busy Typ (S0)	205.32 W		201.97 W		208.41 W	
Windows Busy Max (S0)	240.84		235.49 W		245.00 W	
Sleep (S3)	6.39 W	6.02 W	6.82 W	6.43 W	6.37 W	5.98 W
Off (S5)	1.43 W	1.20 W	1.85 W	1.65 W	1.39 W	1.17 W
Zero Power Mode (EuP)	0.40 W		0.85 W		0.37 W	

<b>Heat Dissipation**</b>	<b>115 VAC</b>		<b>230 VAC</b>		<b>100 VAC</b>	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows Idle (S0)	445.4 btu/hr		434.82 btu/hr		445.40 btu/hr	
Windows Busy Typ (S0)	700.76 btu/hr		689.32 btu/hr		711.30 btu/hr	
Windows Busy Max (S0)	821.99 btu/hr		803.73 btu/hr		836.19 btu/hr	
Sleep (S3)	21.8 btu/hr	20.6 btu/hr	23.3 btu/hr	21.9 btu/hr	21.7 btu/hr	20.4 btu/hr
Off (S5)	4.88 btu/hr	4.10 btu/hr	6.31 btu/hr	5.63 btu/hr	4.74 btu/hr	3.99 btu/hr
Zero Power Mode (EuP)	1.37 btu/hr		2.90 btu/hr		1.26 btu/hr	

### System Technical Specifications

<b>Example Configuration #2</b>	<b>Processor Info</b>	2xXeon E5570 (2.93GHz, 8MB/1333)
	<b>Memory Info</b>	6x1GB DR 1333 MHz (UDIMM)
	<b>Graphics Info</b>	1xFX3800
	<b>Disks/Optical/Floppy</b>	2x250GB SATA / 2 Optical / 1 Floppy
	<b>PSU</b>	850W 80 PLUS® BRONZE

Energy Consumption	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows Idle (S0)	199.10 W		196.20 W		198.20 W	
Windows Busy Typ (S0)	445.20 W		434.90 W		443.40 W	
Windows Busy Max (S0)	516.50 W		504.00 W		524.60 W	
Sleep (S3)	7.84 W	7.49 W	8.29 W	7.89 W	7.92 W	7.47 W
Off (S5)	1.43 W	1.21 W	1.86 W	1.64 W	1.39 W	1.18 W
Zero Power Mode (EuP)	0.41 W		0.84 W		0.38 W	

Heat Dissipation**	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows Idle (S0)	679.53 btu/hr		669.63 btu/hr		676.46 btu/hr	
Windows Busy Typ (S0)	1519.47 btu/hr		1484.31 btu/hr		1513.32 btu/hr	
Windows Busy Max (S0)	1762.81 btu/hr		1720.15 btu/hr		1790.46 btu/hr	
Sleep (S3)	26.8 btu/hr	25.6 btu/hr	28.3 btu/hr	26.9 btu/hr	27.1 btu/hr	25.5 btu/hr
Off (S5)	4.88 btu/hr	4.13 btu/hr	6.35 btu/hr	5.60 btu/hr	4.74 btu/hr	4.03 btu/hr
Zero Power Mode (EuP)	1.40 btu/hr		2.87 btu/hr		1.30 btu/hr	

<b>Example Configuration #3</b>	<b>Processor Info</b>	2xW5580 (3.2GHZ, 8MB/1333)
	<b>Memory Info</b>	6x4GB DR 1333 MHz (RDIMM)
	<b>Graphics Info</b>	1xFX4800
	<b>Disks/Optical/Floppy</b>	2x300GB 15k SAS / 2 Optical / 1 Floppy
	<b>PSU</b>	1110W 80 PLUS® SILVER

Energy Consumption	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows Idle (S0)	259.5 W		253.10 W		260.10 W	
Windows Busy Typ (S0)	624.90 W		615.60 W		638.70 W	
Windows Busy Max (S0)	738.10 W		732.40 W		749.70 W	
Sleep (S3)	12.53 W	11.58 W	12.59 W	11.63 W	12.56 W	11.56 W
Off (S5)	2.12 W	1.32 W	2.56 W	1.73 W	2.10 W	1.30 W
Zero Power Mode (EuP)	0.46 W		0.87 W		0.43 W	

### System Technical Specifications

Heat Dissipation**	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows Idle (S0)	885.67 btu/hr		896.83 btu/hr		887.72 btu/hr	
Windows Busy Typ (S0)	2132.78 btu/hr		2101.04 btu/hr		2179.88 btu/hr	
Windows Busy Max (S0)	2519.14 btu/hr		2499.68 btu/hr		2558.73 btu/hr	
Sleep (S3)	42.8 btu/hr	39.5 btu/hr	42.9 btu/hr	39.7 btu/hr	42.9 btu/hr	39.5 btu/hr
Off (S5)	7.24 btu/hr	4.51 btu/hr	8.74 btu/hr	5.90 btu/hr	7.15 btu/hr	4.44 btu/hr
Zero Power Mode (EuP)	1.40 btu/hr		2.87 btu/hr		1.30 btu/hr	

<b>Example Configuration #4</b>	<b>Processor Info</b>	2xW5580 (3.2GHZ, 8MB/1333)
	<b>Memory Info</b>	8x4GB DR 1333 MHz (RDIMM)
	<b>Graphics Info</b>	2xFX5800
	<b>Disks/Optical/Floppy</b>	4x300GB 15k SAS / 2 Optical / 1 Floppy
	<b>PSU</b>	1110W 80 PLUS® SILVER

Energy Consumption	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows Idle (S0)	436.40 W		426.60 W		433.60 W	
Windows Busy Typ (S0)	845.60 W		811.90 W		855.30 W	
Windows Busy Max (S0)	970.30 W		966.30 W		994.50 W	
Sleep (S3)	13.82 W	12.70 W	14.00 W	13.06 W	13.88 W	12.75 W
Off (S5)	2.12 W	1.33 W	2.54 W	1.73 W	2.24 W	1.30 W
Zero Power Mode (EuP)	0.46 W		0.86 W		0.43 W	

Heat Dissipation**	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
Windows Idle (S0)	1489.43 btu/hr		1455.99 btu/hr		1479.88 btu/hr	
Windows Busy Typ (S0)	2886.03 btu/hr		2771.01 btu/hr		2919.14 btu/hr	
Windows Busy Max (S0)	3311.63 btu/hr		3297.98 btu/hr		3394.23 btu/hr	
Sleep (S3)	47.2 btu/hr	43.4 btu/hr	47.8 btu/hr	44.6 btu/hr	47.4 btu/hr	43.5 btu/hr
Off (S5)	7.24 btu/hr	4.54 btu/hr	8.67 btu/hr	5.90 btu/hr	7.65 btu/hr	4.44 btu/hr
Zero Power Mode (EuP)	1.40 btu/hr		2.87 btu/hr		1.30 btu/hr	

<b>Example Configuration #5</b>	<b>Processor Info</b>	2xIntel Xeon W5580 (3.2GHZ, 8MB/1333)
	<b>Memory Info</b>	8x2GB DR 1333 MHz (UDIMM)
	<b>Graphics Info</b>	1xFX5800
	<b>Disks/Optical/Floppy</b>	2x1000GB SATA / 1 Optical / 1 Floppy
	<b>PSU</b>	1110W 80 PLUS®

### System Technical Specifications

Energy Consumption	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
<b>On-Idle (ENERGY STAR* Idle (S0))</b>	174.0 W		169.9 W		172.1 W	
<b>ENERGY STAR = PMAX Windows running Unneck and Viewperf</b>	569.4 W		556.7 W		570.1 W	
<b>ENERGY STAR "Sleep" (S3)</b>	9.4 W	–	9.8 W	–	9.7 W	–
<b>ENERGY STAR "Standby" (Off) (S5)</b>	2.1W	–	2.6 W	–	2.2 W	–

Heat Dissipation**	115 VAC		230 VAC		100 VAC	
	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
<b>On-Idle (ENERGY STAR* Idle (S0))</b>	593.9 btu/hr		579.9 btu/hr		587.4 btu/hr	
<b>ENERGY STAR = PMAX Windows running Unneck and Viewperf</b>	1943.4 btu/hr		1900.0 btu/hr		1945.8 btu/hr	
<b>ENERGY STAR "Sleep" (S3)</b>	32.1 btu/hr	–	33.4 btu/hr	–	33.1 btu/hr	–
<b>ENERGY STAR "Standby" (Off) (S5)</b>	7.2 btu/hr	–	8.9btu/hr	–	7.5 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)		
<b>System Configuration (Entry level)</b>	<b>Processor Info</b>	Dual Intel Xeon X5570 quad-core 2.93 GHz
	<b>Memory Info</b>	4 x 1GB DDR3 1333 MHz
	<b>Graphics Info</b>	Single NVIDIA NVS 290
	<b>Disks/Optical/Floppy</b>	2 x 250 GB 7200 RPM SATA/ CD/DVD-ROM/ TEAC 3.5" Floppy



### System Technical Specifications

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)		Sound Power ( LWAd, bels )	Deskside Sound Pressure (LpAm, decibels)
	<b>Idle</b>	3.9	21
	<b>SATA Hard drive Operating</b> (random reads)	3.9	22
	<b>Floppy Drive Operating</b> (continuous copy)	Not Tested	Not Tested
	<b>DVD-ROM Operating</b> (sequential reads)	5.0	36

System Configuration (High-end)	Processor Info	Dual Intel Xeon W5580 quad-core 3.2 GHz
	Memory Info	4 x 1GB DDR3 1333 MHz
	Graphics Info	Single NVIDIA FX 4800
	Disks/Optical/Floppy	2 x 450 GB 15K SAS/ CD/DVD-ROM/ TEAC 3.5" Floppy

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)		Sound Power ( LWAd, bels )	Deskside Sound Pressure (LpAm, decibels)
	<b>Idle</b>	4.6	28
	<b>SATA Hard drive Operating</b> (random reads)	4.9	31
	<b>Floppy Drive Operating</b> (continuous copy)	Not Tested	Not Tested
	<b>DVD-ROM Operating</b> (sequential reads)	5.1	35

Environmental Requirements	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% RH, non-condensing Non-operating: 8% to 90% RH, non-condensing
	Maximum Altitude	Operating: 3,000 m (10,000 feet) Non-operating: 9,100 m (30,000 feet)
	Dynamic (new)	Shock Operating: ½-sine: 40g, 2-3ms Non-operating: ½-sine: 160 cm/s, 2-3ms (~100g) square: 422 cm/s, 20g <b>NOTE:</b> Values represent individual shock events and do not indicate repetitive shock events.  Vibration Operating random: 0.5g (rms), 5-300 Hz Non-operating random: 2.0g (rms), 10-500 Hz <b>NOTE:</b> Values do not indicate continuous vibration.

### System Technical Specifications

	<b>Cooling</b>	Above 1524 m (5000 ft) altitude, maximum operating temperature is de-rated by 1° C (1.8° F) per 305 m (1000 ft) elevation increase
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### Physical Security and Serviceability

<b>Access Panel</b>	Tool-less Includes system board and memory information
<b>Optical Drive</b>	Tool-less, no carrier or rails required
<b>Floppy Drive</b>	Tool-less
<b>Hard Drives</b>	Tool-less
<b>Expansion Cards</b>	Tool-less
<b>Processor Socket</b>	Tool-less
<b>Green User Touch Points</b>	Yes, on tool-free internal chassis components
<b>Color-coordinated Cables and Connectors</b>	Yes
<b>Memory</b>	Tool-less
<b>System Board</b>	Tool-less, retained by Front PCI Card Guide
<b>Dual Color Power and HD LED on Front of Computer</b>	Yes
<b>Configuration Record SW</b>	Yes
<b>Over-Temp Warning on Screen</b>	Yes
<b>Restore CD/DVD Set</b>	Restores the computer to its original factory shipping image - Can be obtained via HP Support
<b>Dual Function Front Power Switch</b>	Yes, causes a fail-safe power off when held for 4 seconds
<b>Padlock Support</b>	No
<b>Cable Lock Support</b>	Yes, Kensington Cable Lock (optional): Prevents entire system theft only. 3mm x 7mm slot at rear of system
<b>Universal Chassis Clamp Lock Support</b>	No
<b>Solenoid Lock and Hood Sensor</b>	No
<b>Rear Port Control Cover</b>	Yes, locks rear IO cables to prevent cable theft
<b>Serial, Parallel, USB, Audio, Network, Enable/Disable Port Control</b>	Yes
<b>Removable Media Write/Boot Control</b>	Yes, prevents ability to boot from removable media on supported devices (and can disable writes to media)
<b>Power-On Password</b>	Yes, prevents an unauthorized person from booting up the workstation
<b>Setup Password</b>	Yes, prevents an unauthorized person from changing the workstation configuration

### System Technical Specifications

<b>3.3V Aux Power LED on System PCA</b>	No
<b>NIC LEDs (integrated) (Green &amp; Amber)</b>	Yes
<b>CPUs and Heatsinks</b>	A torx driver (T15) is needed to remove the CPU heatsink(s) before the CPU can be removed. CPU removal is tool-less
<b>Power Supply Diagnostic LED</b>	Yes
<b>Front Power Button</b>	Yes
<b>Front Power LED</b>	Yes, blue (normal), red (fault)
<b>Front Hard Drive Activity LED</b>	Yes, green
<b>Front ODD Activity LED</b>	Yes
<b>Internal Speaker</b>	Yes
<b>System/Emergency ROM Flash Recovery</b>	Recovers corrupted system BIOS.
<b>Alert Standard Format (ASF) Specification</b>	Industry-standard specification for network alerting in operating system-absent environments
<b>Cooling Solutions</b>	Air cooled forced convection, liquid cooling (optional)
<b>Power Supply Fans</b>	2x - 80mm x 25mm
<b>CPU Heatsink Fan</b>	Mainstream (<=95W): 80mm x 15mm Performance (>95W): 92mm x 15mm
<b>MXM Heatsink Fan</b>	Rear: 2x - 92mm x 25mm Front (850W config): 1x - 92mm x 25mm (upper position) Front (1110W config): 2x - 92mm x 25mm
<b>Memory Heatsink Fan</b>	2x - 80mm x 25mm
<b>HP Advanced System Diagnostics Offline Edition</b>	<p>HP Vision Diagnostics Offline Edition</p> <p>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. This utility enables you to:</p> <ul style="list-style-type: none"> <li>● Run diagnostics</li> <li>● View the hardware configuration of the system</li> </ul> <p>Key features and benefits</p> <p>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. Vision Diagnostics helps provide higher system availability. Typical uses of Vision Diagnostics are:</p> <ul style="list-style-type: none"> <li>● Testing and diagnosing apparent hardware failures</li> <li>● Documenting system configurations for upgrade planning, standardization, inventory tracking, disaster recovery, and maintenance</li> </ul>

### System Technical Specifications

	<ul style="list-style-type: none"> <li>• Sending configuration information to another location for more in-depth analysis</li> </ul>
<b>Access Panel Key Lock</b>	Yes, prevents removal of the access panel and all internal components including optical and floppy drives
<b>ACPI-Ready Hardware</b>	Advanced Configuration and Power Management Interface (ACPI). <ul style="list-style-type: none"> <li>• Allows the system to wake from a low power mode.</li> <li>• Controls system power consumption, making it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system</li> </ul>
<b>Trusted Platform Module Chip with optional ProtectTools Software</b>	Yes
<b>Integrated Chassis Handles</b>	Yes
<b>Power Supply</b>	Tool-less, direct-connect (blind-mate)
<b>PCIe Card Retention</b>	Yes, rear (all), middle (full-height cards), front (full-length with extender cards)
<b>Flash ROM</b>	Yes, SPI Rom
<b>Diagnostic Power Switch LED on board</b>	Yes
<b>Clear Password Jumper</b>	Yes
<b>Clear CMOS Button</b>	Yes
<b>CMOS Battery Holder</b>	Yes
<b>DIMM Connectors</b>	Yes
<b>HP ProtectTools Security Manager</b>	Yes - not supported on Microsoft XP x64 or Linux

<b>BIOS</b>	
<b>BIOS 32-bit Services</b>	Standard BIOS 32-Bit Service Directory Proposal v0.4. BIOS supports 32 and 64-bit Operating systems.
<b>PCI 3.0 Support</b>	Full BIOS support for PCI Express through industry standard interfaces.
<b>ATAPI</b>	ATAPI Removable Media Device BIOS Specification Version 1.0.
<b>BBS</b>	BIOS Boot Specification v1.01.
<b>WMI Support</b>	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.
<b>BIOS Boot Spec 1.01+</b>	Provides more control over how and from what devices the workstation will boot.
<b>BIOS Power On</b>	Users can define a specific date and time for the system to power on.
<b>ROM Based Computer Setup Utility (F10)</b>	Review and customize system settings controlled by the BIOS.
<b>System/Emergency ROM Flash Recovery with Video</b>	Recovers system BIOS in corrupted Flash ROM.
<b>Replicated Setup</b>	Saves BIOS settings to diskette or USB flash drive in human readable file. Repset.exe utility can then replicate these settings on machines being deployed without entering Computer Configuration Utility (F10 setup).

### System Technical Specifications

<b>SMBIOS</b>	System Management BIOS 2.6, for system management information
<b>Boot Control</b>	Disables the ability to boot from removable media on supported devices.
<b>Memory Change Alert</b>	Alerts management console if memory is removed or changed.
<b>Thermal Alert</b>	Monitors the temperature state within the chassis. Three modes: <ul style="list-style-type: none"> <li>• NORMAL - normal temperature ranges.</li> <li>• ALERTED - excessive temperatures are detected. Raises a flag so action can be taken to avoid shutdown or provide for a smoother system shutdown.</li> <li>• SHUTDOWN - excessive temperatures are encountered. Automatically shuts down the computer without warning before hardware component damage occurs.</li> </ul>
<b>Remote ROM Flash</b>	Provides secure, fail-safe ROM image management from a central network console.
<b>ACPI (Advanced Configuration and Power Management Interface)</b>	Allows the system to enter and wake from low power modes (sleep states). Enables an operating system to control system power consumption based on the dynamic workload. Makes it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system. Supports ACPI 2.0 for full compatibility with 64-Bit operating systems.
<b>Ownership Tag</b>	A user-defined string stored in non-volatile memory that is displayed in the BIOS splash screen.
<b>Remote Wakeup/Remote Shutdown</b>	System administrators can power on, restart, and power off a client computer from a remote location.
<b>ASF 2.0 Compliant</b>	Allows workstation status to be monitored on a remote console.
<b>Instantly Available PC (Suspend to RAM - ACPI sleep state S3)</b>	Allows for very low power consumption with quick resume time.
<b>Remote System Installation via F12 (PXE 2.1) (Remote Boot from Server)</b>	Allows a new or existing system to boot over the network and download software, including the operating system.
<b>ROM revision levels</b>	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.
<b>System board revision level</b>	Allows management SW to read the revision level of the system board Revision level is digitally encoded into the HW and cannot be modified.
<b>Start-up Diagnostics (Power-on Self-Test)</b>	Assesses system health at boot time with selectable levels of testing.
<b>Auto Setup when new hardware installed</b>	System automatically detects addition of new hardware.
<b>Keyboard-less Operation</b>	The system can be booted without a keyboard.
<b>Localized ROM Setup</b>	Common BIOS image supports System Configuration Utility (F10 Setup) menus in 12 languages with local keyboard mappings.
<b>Asset Tag</b>	Allows the user or MIS to set a unique tag string in non-volatile memory.
<b>Per-slot Control</b>	Allows I/O slot parameters (option ROM enable/disable, bus latency) to be configured individually.
<b>Adaptive Cooling</b>	Fan control parameters are set according to detected hardware configuration for optimal acoustics.
<b>Pre-boot Diagnostics</b>	Early (pre-video) critical errors are reported via beeps and blinks on the power LED.

### System Technical Specifications

<b>Industry Standard Specification Support</b>	
<b>Industry Standard</b>	Revision Supported by the BIOS
<b>ACPI</b>	Advanced Configuration and Power Management Interface, Version 2.0c
<b>ASF</b>	Alert Standard Format Specification, Version 2.0
<b>ATA (IDE)</b>	AT Attachment 6 with Packet Interface (ATA/ATAPI-6), Revision 3b
<b>CD Boot</b>	"El Torito" Bootable CD-ROM Format Specification Version 1.0
<b>EDD</b>	<ul style="list-style-type: none"> <li>Enhanced Disk Drive Specification Version 1.1</li> <li>BIOS Enhanced Disk Drive Specification Version 3.0</li> </ul>
<b>EHCI</b>	Enhanced Host Controller Interface for Universal Serial Bus, Revision 1.0
<b>PCI</b>	<ul style="list-style-type: none"> <li>PCI Local Bus Specification, Revision 2.3</li> <li>PCI Power Management Specification, Revision 1.1</li> <li>PCI Firmware Specification, Revision 3.0, Draft .7</li> </ul>
<b>PCI Express</b>	PCI Express Base Specification, Revision 2.0
<b>PMM</b>	POST Memory Manager Specification, Version 1.01
<b>SATA</b>	<ul style="list-style-type: none"> <li>Serial ATA Specification, Revision 1.0a</li> <li>Serial ATA 3.0Gb/s: Extensions to Serial ATA 1.5Gb/s, Revision 1.0</li> </ul>
<b>SPD</b>	PC SDRAM Serial Presence Detect (SPD) Specification, Revision 1.2B
<b>TPM</b>	Trusted Computing Group TPM Specification Version 1.2
<b>UHCI</b>	Universal Host Controller Interface Design Guide, Revision 1.1
<b>USB</b>	Universal Serial Bus Revision 1.1 Specification  Universal Serial Bus Revision 2.0 Specification
<b>SMBIOS</b>	System Management BIOS Reference Specification, Version 2.6

### Social and Environmental Responsibility

<b>Eco-Label Certifications &amp; Declarations</b>	<p>This product has received or is in the process of being certified to the following approvals and may be labeled with one or more of these marks:</p> <ul style="list-style-type: none"> <li>ENERGY STAR qualified selectable configurations (Not in Linux)</li> <li>EPEAT Gold registered in the U.S. EPEAT registration varies by country. See <a href="http://www.epeat.net">www.epeat.net</a> for registration status by country</li> <li>US Federal Energy Management Program (FEMP)</li> <li>China Energy Conservation Program</li> <li>IT ECO declaration</li> <li>Japan PC Green label*</li> </ul> <p>*This product conforms to the examination standards (2003 version) under JEITA's 'PC Green Label System.'</p>
<b>Batteries</b>	<p>This product complies with ISO standards:</p> <ul style="list-style-type: none"> <li>EU Directive 91/ 157/ EEC</li> <li>EU Directive 93/ 86/ EEC</li> <li>EU Directive 98/ 101/ EEC</li> </ul>

### System Technical Specifications

	<p>Batteries used in the product do not contain:</p> <ul style="list-style-type: none"> <li>● Mercury greater than 5ppm by weight</li> <li>● Cadmium greater than 10ppm by weight</li> <li>● Lead greater than 4000ppm by weight</li> </ul> <p>Battery size: CR2032 (coin cell) Battery type: Lithium Metal</p>
<b>Restricted Material Usage</b>	<p>This product does not contain any of the following substances in excess of regulatory limits (refer to the HP General Specification for the Environment at <a href="http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html">http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html</a>):</p> <ul style="list-style-type: none"> <li>● Asbestos</li> <li>● Batteries - Mercury</li> <li>● Batteries - Cadmium</li> <li>● Batteries - Lead (non-rechargeable)</li> <li>● Batteries - Non-rechargeable Alkaline and Carbon-Zinc Batteries</li> <li>● Batteries - Classification as "Not Restricted" for Transport</li> <li>● Brominated Flame Retardants (PBBs, PBDEs, including DecaBDE)</li> <li>● Brominated Flame Retardants (all BFRs in external case plastic parts)</li> <li>● Cadmium and its compounds</li> <li>● Certain Azo Colorants</li> <li>● Chlorinated Hydrocarbons</li> <li>● Chlorinated Paraffins</li> <li>● Formaldehyde</li> <li>● Formaldehyde - emissions</li> <li>● Hexavalent Chromium and its compounds in metallic applications</li> <li>● Hexavalent Chromium and its compounds in non-metallic applications</li> <li>● Lead and its compounds</li> <li>● Lead in paint</li> <li>● Lead in Polyvinyl Chloride (PVC) coating of external cables, wires and cords</li> <li>● Mercury and its compounds</li> <li>● Nickel on external surfaces</li> <li>● Ozone Depleting Substances (ODS)</li> <li>● Polycyclic Aromatic Hydrocarbons (PAH)</li> <li>● Perfluorooctane sulfonates (PFOS) in parts</li> <li>● Perfluorooctane sulfonates (PFOS) in preparations</li> <li>● Polychlorinated Biphenyls (PCBs) and Polychlorinated Terphenyls (PCTs)</li> <li>● Polychlorinated Naphthalenes</li> <li>● Polyvinyl Chloride (PVC) in external case plastic parts</li> <li>● Radioactive Substances</li> <li>● Tributyl Tin (TBT), Triphenyl Tin (TPT), Tributyl Tin Oxide (TBTO)</li> </ul>
<b>End-of-Life Management and Recycling</b>	<p>Hewlett-Packard offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: <a href="http://www.hp.com/recycle">http://www.hp.com/recycle</a> or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.</p>
<b>Hewlett-Packard Corporate Environmental Information</b>	<p>For more information about HP's commitment to the environment:</p> <p>Global Citizenship Report: <a href="http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html">http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html</a></p> <p>Eco-label certifications: <a href="http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html">http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html</a></p>

### System Technical Specifications

	ISO 14001 certificates: <a href="http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html">http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html</a>
<b>Additional Information</b>	<ul style="list-style-type: none"> <li>This product is in compliance with the Restrictions of Hazardous Substances (RoHS) directive - 2002/95/EC.</li> <li>This product is in compliance with California Proposition 65 (State of California; Safe Drinking Water and Toxic Enforcement Act of 1986).</li> <li>This product contains 0% recycled materials (by wt.)</li> </ul>
<b>Packaging</b>	<p>HP Workstation product packaging meets the following (refer to the HP General Specification for the Environment at: <a href="http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html">http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html</a>):</p> <ul style="list-style-type: none"> <li>Does not contain restricted substances listed in HP Standard 011-1 General Specification for the Environment (see link above).</li> <li>Does not contain ozone-depleting substances (ODS).</li> <li>Design packaging materials for ease of disassembly.</li> <li>Does not contain heavy metals (lead, mercury, cadmium or hexavalent chromium) in excess of 100 ppm sum total for all heavy metals listed.</li> <li>Maximizes the use of post-consumer recycled content materials in packaging materials.</li> <li>All packaging material is recyclable.</li> <li>Reduces size and weight of packages to improve transportation fuel efficiency.</li> <li>Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards.</li> </ul>
<b>Packaging Materials</b>	
<b>Internal</b>	LDPE Foam: .592 kg
<b>External</b>	Cardboard carton and insert: 1.842 kg

<b>Manageability</b>	
<b>Industry Standard Specifications</b>	<p>This product meets the following industry standard specifications for manageability functionality:</p> <ul style="list-style-type: none"> <li>ASF 2.0 (via integrated Broadcom LAN)</li> </ul>
<b>Remote Manageability Software Solutions</b>	<p>The HP Z800 Workstation is supported on the following remote manageability software consoles:</p> <ul style="list-style-type: none"> <li>LANDesk Management Suite (PSG recommended solution)</li> <li>Microsoft System Center Configuration Manager</li> <li>HP Client Automation Enterprise</li> </ul> <p>For questions or support for manageability needs, please visit: <a href="http://www.hp.com/go/easydeploy">http://www.hp.com/go/easydeploy</a></p>
<b>System Software Manager</b>	<p>For questions or support for SSM, please visit: <a href="http://www.hp.com/go/ssm">http://www.hp.com/go/ssm</a></p>
<b>Service, Support, and Warranty</b>	<p>On-site Warranty and Service (<b>Note 1</b>): Three-years, limited warranty and service offering delivers on-site, next business-day (<b>Note 2</b>) service for parts and labor and includes free telephone support (<b>Note 3</b>) 8am - 5pm. Global coverage (<b>Note 2</b>) ensures that any product purchased in one country and transferred to another, non-restricted country will remain fully covered under the original warranty and service offering.</p> <p><b>NOTE 1:</b> Terms and conditions may vary by country. Certain restrictions and exclusions apply.  <b>NOTE 2:</b> 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.  <b>NOTE 3:</b> 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.</p>



### System Technical Specifications

	<p>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: <a href="http://www.hp.com/go/lookuptool">http://www.hp.com/go/lookuptool</a>. Additional HP Care Pack Services information by product is available at: <a href="http://www.hp.com/hps/carepack">http://www.hp.com/hps/carepack</a>. Service levels and response times for HP Care Packs may vary depending on your geographic location.</p>
<b>Product Change Notification</b>	<ul style="list-style-type: none"><li>• Program to proactively communicate Product Change Notifications (PCNs) and Customer Advisories by email to customers, based on a user-defined profile.</li><li>• PCNs provide advance notification of hardware and software changes to be implemented in the factory providing time to plan for transition.</li><li>• Customer Advisories provide concise, effective problem resolution, greatly reducing the need to call technical support.</li></ul>

### 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
WG692AV	Intel Xeon E5620 2.40 12MB/1066 4C CPU-1
WG702AV	Intel Xeon E5620 2.40 12MB/1066 4C CPU-2
WG695AV	Intel Xeon X5650 2.66 12MB/1333 6C CPU-1
WG705AV	Intel Xeon X5650 2.66 12MB/1333 6C CPU-2

#### Hard Drives

Product #	Offering
FX475AV	HP 250GB SATA 7200 1st HDD
FX485AV	HP 250GB SATA 7200 2nd HDD
FX495AV	HP 250GB SATA 7200 3rd HDD
FX505AV	HP 250GB SATA 7200 4th HDD
FX515AV	HP 250GB SATA 7200 5th HDD
FX477AV	HP 500GB SATA 7200 1st HDD
FX487AV	HP 500GB SATA 7200 2nd HDD
FX497AV	HP 500GB SATA 7200 3rd HDD
FX507AV	HP 500GB SATA 7200 4th HDD
FX517AV	HP 500GB SATA 7200 5th HDD

#### Graphics

Product #	Offering
FY879AV	NVIDIA Quadro NVS 295 256MB Graphics Card
FY888AV	NVIDIA Quadro NVS 295 256MB Graphics (2nd)

#### Memory

Product #	Offering
NL660AV	3GB (3x1GB) DDR3-1333 ECC Unbuffered RAM 1-CPU
NL661AV	6GB (3x2GB) DDR3-1333 ECC Unbuffered RAM 1-CPU
XB971AV	12GB (3x4GB) DDR3-1333 ECC Unbuffered RAM 1-CPU
NL663AV	4GB (4x1GB) DDR3-1333 ECC Unbuffered RAM 2-CPU
NL664AV	6GB (6x1GB) DDR3-1333 ECC Unbuffered RAM 2-CPU
NL666AV	12GB (6x2GB) DDR3-1333 ECC Unbuffered RAM 2-CPU
XB973AV	24GB (6x4GB) DDR3-1333 ECC Unbuffered RAM 2-CPU

### Stable & Consistent Offerings

<b>Optical and Removable Storage</b>	<b>Product #</b>	<b>Offering</b>
	FX535AV	HP 16X DVD+-RW SuperMulti SATA 1st Drive
	FX537AV	HP 16X DVD+-RW SuperMulti SATA 1st Drive

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<b>Input Devices</b>	<b>Product #</b>	<b>Offering</b>
	FX531AV	HP USB Optical Scroll Mouse
	FY898AV	HP USB Standard Keyboard

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<b>Operating Systems</b>	<b>Product #</b>	<b>Offering</b>
	VM440AV	Genuine Windows® 7 Professional 64-bit

### Technical Specifications - Processors

<b>Processors</b>	Intel® Xeon® Processor X5690 6C 3.46 GHz, 130W, 12M cache, 6.40GT/s QPI, DDR3 1333MHz, HT, Turbo	LB217AA
	Intel® Xeon® Processor X5687 4C 3.60 GHz, 130W, 12M cache, 6.40GT/s QPI, DDR3 1333MHz, HT, Turbo	LB216AA

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## Introduction

Intel's latest-generation microarchitecture represents the next step in unprecedented processor performance and dynamic scalability. Designed from the ground up to take advantage of hafnium-based Intel® 32nm hi-k metal gate silicon technology, Intel® Microarchitecture (Westmere) unleashes parallel processing performance enabled by Intel® QuickPath technology providing an integrated memory controller and high-speed interconnect per independent processing core.

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## Performance and Features

Maximum multitasking performance Intel® Microarchitecture (Westmere) 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 4-12 cores and up to 24+ 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 1-24 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.

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## Turbo Boost Technology

This technology, now built into Xeon 5600 processors, will increase the speed of your processor on demand (from OS) if the CPU is operating below power / thermal specifications:

Benefit of Turbo Boost (how much CPU speed up) depends on number of active cores.

Likelihood of Turbo Boost operation increases when fewer cores are active.

Likelihood of Turbo Boost operation increases when dynamic power mgt is enabled

### Technical Specifications - Processors

<b>Processors</b>	Intel® Xeon® Processor X5675 6C 3.06 GHz, 95W, 12M cache, 6.40GT/s QPI, DDR3 1333MHz, HT, Turbo	LB215AA
	Intel® Xeon® Processor X5672 4C 3.20 GHz, 95W, 12M cache, 6.40GT/s QPI, DDR3 1333MHz, HT, Turbo	LB214AA
	Intel® Xeon® Processor X5660 6C 2.80 GHz, 95W, 12M cache, 6.40GT/s QPI, DDR3 1333MHz, HT, Turbo	WG732AA
	Intel® Xeon® Processor X5650 6C 2.66 GHz, 95W, 12M cache, 6.40GT/s QPI, DDR3 1333MHz, HT, Turbo	WG731AA
	Intel® Xeon® Processor E5649 6C 2.53 GHz, 80W, 12M cache, 5.86GT/s QPI, DDR3 1333MHz, HT, Turbo	LB212AA
	Intel® Xeon® Processor X5647 4C 2.93 GHz, 130W, 12M cache, 5.86GT/s QPI, DDR3 1066MHz, HT, Turbo	LB213AA
	Intel® Xeon® Processor E5645 6C 2.40 GHz, 80W, 12M cache, 5.86GT/s QPI, DDR3 1333MHz, HT, Turbo	LB211AA
	Intel® Xeon® Processor E5640 4C 2.66 GHz, 80W, 12M cache, 5.86GT/s QPI, DDR3 1066MHz, HT, Turbo	WG730AA
	Intel® Xeon® Processor E5620 4C 2.40 GHz, 80W, 12M cache, 5.86GT/s QPI, DDR3 1066MHz, HT, Turbo	WG728AA
	Intel® Xeon® Processor E5607 4C 2.26 GHz, 80W, 8M cache, 4.80 GT/s QPI, DDR3 1066MHz	LB210AA
	Intel® Xeon® Processor E5606 4C 2.13 GHz, 80W, 8M cache, 4.80 GT/s QPI, DDR3 1066MHz	LB209AA

### Introduction

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### Technical Specifications - Processors

controllers and high-speed point-to-point interconnects to unleash the performance of future versions of next-generation Intel® multi-core processors.

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### **Turbo Boost Technology**

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Likelihood of Turbo Boost operation increases when fewer cores are active.

Likelihood of Turbo Boost operation increases when dynamic power mgt is enabled

### Technical Specifications - Monitors / Displays

<b>HP LP2065 20-inch LCD Monitor</b>	<b>QuickSpecs URL</b> <b>Part Number</b>	<a href="http://h18000.www1.hp.com/products/quickspecs/12377_div/12377_div.html">http://h18000.www1.hp.com/products/quickspecs/12377_div/12377_div.html</a> Workstation Volume Channel EF227A4  Workstation Value Channel EF227A5
<b>HP LP2475w 24-inch Widescreen LCD Monitor</b>	<b>QuickSpecs URL</b> <b>Part Number</b>	<a href="http://h18000.www1.hp.com/products/quickspecs/13134_div/13134_div.html">http://h18000.www1.hp.com/products/quickspecs/13134_div/13134_div.html</a> KD911A8
<b>HP DreamColor LP2480zx Professional Display</b>	<b>QuickSpecs URL</b> <b>Part Number</b>	<a href="http://h18000.www1.hp.com/products/quickspecs/13081_div/13081_div.html">http://h18000.www1.hp.com/products/quickspecs/13081_div/13081_div.html</a> GV546A8
<b>HP LP3065 30-inch Widescreen LCD Monitor</b>	<b>QuickSpecs URL</b> <b>Part Number</b>	<a href="http://h18000.www1.hp.com/products/quickspecs/12621_div/12621_div.html">http://h18000.www1.hp.com/products/quickspecs/12621_div/12621_div.html</a> Workstation Volume and Business Desktop Channel EZ320A4#XXX  Workstation Value Channel EZ320A5#XXX
<b>HP ZR22w 21.5-inch S-IPS LCD Monitor</b>	<b>QuickSpecs URL</b> <b>Part Number</b>	<a href="http://h18000.www1.hp.com/products/quickspecs/13556_div/13556_div.html">http://h18000.www1.hp.com/products/quickspecs/13556_div/13556_div.html</a> VM626A4
<b>HP ZR24w 24-inch S-IPS LCD Monitor</b>	<b>QuickSpecs URL</b> <b>Part Number</b>	<a href="http://h18000.www1.hp.com/products/quickspecs/13557_div/13557_div.html">http://h18000.www1.hp.com/products/quickspecs/13557_div/13557_div.html</a> VM633A8
<b>HP ZR30w 30-inch S-IPS LCD Monitor</b>	<b>QuickSpecs URL</b> <b>Part Number</b>	<a href="http://h18000.www1.hp.com/products/quickspecs/13635_div/13635_div.html">http://h18000.www1.hp.com/products/quickspecs/13635_div/13635_div.html</a> VM617A8

### Technical Specifications - Hard Drives

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

	<b>450GB SAS 15K rpm 6Gb/s 3.5" HDD</b>	<b>Capacity</b>	450GB		
		<b>Height</b>	1 in; 2.54 cm		
		<b>Width</b>		<b>Media Diameter</b>	3.5 in; 8.9 cm
				<b>Physical Size</b>	4 in; 10.17 cm
		<b>Interface</b>	SAS		
		<b>Synchronous Transfer Rate (Maximum)</b>	6Gb/s		
		<b>Buffer</b>	16MB		
		<b>Seek Time (typical reads, includes controller overhead, including settling)</b>		<b>Single Track</b>	0.2 ms
				<b>Average</b>	3.4 ms
				<b>Full Stroke</b>	6.6 ms
		<b>Rotational Speed</b>	15,000 rpm		
		<b>Operating Temperature</b>	50° to 95° F (10° to 35° C)		

	<b>300GB SAS 15K rpm 6Gb/s 3.5" HDD</b>	<b>Capacity</b>	300GB		
		<b>Height</b>	1 in; 2.54 cm		
		<b>Width</b>		<b>Media Diameter</b>	3.5 in; 8.9 cm
				<b>Physical Size</b>	4 in; 10.17 cm
		<b>Interface</b>	SAS		
		<b>Synchronous Transfer Rate (Maximum)</b>	6Gb/s		
		<b>Buffer</b>	16MB		



### Technical Specifications - Hard Drives

	<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track</b>	0.2 ms
		<b>Average</b>	3.4 ms
		<b>Full Stroke</b>	6.6 ms
	<b>Rotational Speed</b>		15,000 rpm
	<b>Operating Temperature</b>		50° to 95° F (10° to 35° C)
<b>HP 300GB SAS 10K SFF HDD</b>	<b>Capacity</b>		300GB
	<b>Height</b>		0.6 in; 1.53 cm
	<b>Width</b>	<b>Media Diameter</b>	2.5 in; 6.36 cm
		<b>Physical Size</b>	2.75 in; 6.99 cm
	<b>Interface</b>		SAS 6Gb/s
	<b>Synchronous Transfer Rate</b> (Maximum)		Up to 600MB/s
	<b>Buffer</b>		64MB
	<b>Cache</b>		multi-segmentable cache buffer
	<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track</b>	0.4 ms (max)
		<b>Average</b>	3.6 ms
		<b>Full Stroke</b>	7.3 ms
	<b>Rotational Speed</b>		10,000 rpm
	<b>Logical Blocks</b>		585,937,500
	<b>Operating Temperature</b>		41° to 131° F (5° to 55° C)
<b>HP 450GB SAS 10K SFF HDD</b>	<b>Capacity</b>		450GB
	<b>Height</b>		0.6 in; 1.53 cm
	<b>Width</b>	<b>Media Diameter</b>	2.5 in; 6.36 cm
		<b>Physical Size</b>	2.75 in; 6.99 cm
	<b>Interface</b>		SAS 6Gb/s
	<b>Synchronous Transfer Rate</b> (Maximum)		Up to 600MB/s
	<b>Buffer</b>		64MB
	<b>Cache</b>		multi-segmentable cache buffer
	<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track</b>	0.4ms (max)
		<b>Average</b>	3.6ms
		<b>Full Stroke</b>	7.3ms
	<b>Rotational Speed</b>		10K
	<b>Operating Temperature</b>		41° to 131° F (5° to 55° C)
<b>HP 600GB SAS 10K SFF</b>	<b>Capacity</b>		600GB

### Technical Specifications - Hard Drives

#### HDD

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

#### SATA (Serial ATA) Hard Drives for HP Workstations

##### 600GB SATA 10K rpm SFF in 3.5" Frame HDD

<b>Capacity</b>	600GB
<b>Height</b>	1 in; 2.54 cm
<b>Width</b>	<b>Media Diameter</b> 2.5 in; 6.36 cm
	<b>Physical Size</b> 4 in; 10.17 cm
<b>Interface</b>	Serial ATA (3.0Gb/s)
<b>Synchronous Transfer Rate (Maximum)</b>	Up to 300MB/s
<b>Buffer</b>	32MB
<b>Cache</b>	Segmentable
<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track</b> 0.4 ms (max)
	<b>Average</b> 3.6 ms
	<b>Full Stroke</b> 9.0 ms
<b>Rotational Speed</b>	10,000 rpm
<b>Logical Blocks</b>	1,172,123,568
<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)

##### 300GB SATA 10K rpm SFF in 3.5" Frame HDD

<b>Capacity</b>	300,069,052,416 bytes
<b>Height</b>	1 in; 2.54 cm
<b>Width</b>	<b>Media Diameter</b> 2.5 in; 6.36 cm
	<b>Physical Size</b> 4 in; 10.17 cm
<b>Interface</b>	Serial ATA (3.0 Gb/s), Native Command Queuing enabled
<b>Synchronous Transfer Rate (Maximum)</b>	Up to 300 MB/s

### Technical Specifications - Hard Drives

	<b>Buffer</b>	16 MB	
	<b>Seek Time</b> (typical reads, includes controller overhead, including settling)		<b>Single Track</b> 0.7 ms (maximum)
			<b>Average</b> 4.4 ms
			<b>Full Stroke</b> 9.5 ms
	<b>Rotational Speed</b>	10,000 rpm	
	<b>Logical Blocks</b>	586,072,368	
	<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)	
<b>160GB SATA 10K rpm SFF in 3.5" Frame HDD</b>	<b>Capacity</b>	160,041,885,696 bytes	
	<b>Height</b>	1 in; 2.5 cm	
	<b>Width</b>		<b>Media Diameter</b> 2.5 in; 6.36 cm
			<b>Physical Size</b> 4 in; 10.17 cm
	<b>Interface</b>	Serial ATA (1.5 Gb/s), Native Command Queuing enabled	
	<b>Synchronous Transfer Rate</b> (Maximum)	Up to 300 MB/s	
	<b>Buffer</b>	16 MB	
	<b>Seek Time</b> (typical reads, includes controller overhead, including settling)		<b>Single Track</b> 0.7 ms (maximum)
			<b>Average</b> 4.4 ms
			<b>Full Stroke</b> 9.5 ms
	<b>Rotational Speed</b>	10,000 rpm	
	<b>Logical Blocks</b>	312,581,808	
	<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)	
<b>2.0TB SATA 7200 rpm 3Gb/s 3.5" HDD</b>	<b>Capacity</b>	2.0TB	
	<b>Height</b>	1 in; 2.54 cm	
	<b>Width</b>		<b>Media Diameter</b> 3.5 in; 8.9 cm
			<b>Physical Size</b> 4.0 in; 10.17 cm
	<b>Interface</b>	Serial ATA (3.0 Gb/s), Native Command Queuing Enabled	
	<b>Synchronous Transfer Rate</b> (Maximum)	Up to 300MB/s	
	<b>Buffer</b>	64MB	
	<b>Seek Time</b> (typical reads, includes controller overhead, including settling)		<b>Single Track</b> 1.0 ms
			<b>Average</b> 10 ms
			<b>Full Stroke</b> Not Specified
	<b>Rotational Speed</b>	7,200 rpm	
	<b>Logical Blocks</b>	3,907,029,168	
	<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)	

### Technical Specifications - Hard Drives

<b>1.5TB SATA 7200 rpm 3Gb/s 3.5" HDD</b>	<b>Capacity</b>	1.5TB		
	<b>Height</b>	1 in; 2.54 cm		
	<b>Width</b>		<b>Media Diameter</b> 3.5 in; 8.9 cm	
			<b>Physical Size</b> 4.0 in; 10.17 cm	
	<b>Interface</b>	Serial ATA (3.0 Gb/s), Native Command Queuing enabled		
	<b>Synchronous Transfer Rate (Maximum)</b>	Up to 300MB/s		
	<b>Buffer</b>	32MB		
	<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track</b>	2 ms	
		<b>Average</b>	11 ms	
		<b>Full Stroke</b>	21 ms	
	<b>Rotational Speed</b>	7,200 rpm		
	<b>Logical Blocks</b>	2,930,277,168		
	<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)		
<b>1TB SATA 7200 rpm 3.0Gb/s 3.5" HDD</b>	<b>Capacity</b>	1,000,204,886,016 bytes		
	<b>Height</b>	1 in; 2.5 cm		
	<b>Width</b>		<b>Media Diameter</b> 3.5 in; 8.9 cm	
			<b>Physical Size</b> 4 in; 10.17 cm	
	<b>Interface</b>	Serial ATA (3.0 Gb/s), Native Command Queuing enabled		
	<b>Synchronous Transfer Rate (Maximum)</b>	Up to 300 MB/s		
	<b>Buffer</b>	32 MB		
	<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track</b>	2 ms	
		<b>Average</b>	11 ms	
		<b>Full Stroke</b>	21 ms	
	<b>Rotational Speed</b>	7,200 rpm		
	<b>Logical Blocks</b>	1,953,525,168		
	<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)		
<b>500GB SATA 7200 rpm 3Gb/s 3.5" HDD</b>	<b>Capacity</b>	500,107,862,016 bytes		
	<b>Height</b>	1 in; 2.5 cm		
	<b>Width</b>		<b>Media Diameter</b> 3.5 in; 8.9 cm	
			<b>Physical Size</b> 4 in; 10.17 cm	
	<b>Interface</b>	Serial ATA (3.0 Gb/s), Native Command Queuing enabled		

### Technical Specifications - Hard Drives

	<b>Synchronous Transfer Rate (Maximum)</b>	300 MB/s	
	<b>Buffer</b>	16 MB	
	<b>Seek Time</b> (typical reads, includes controller overhead, including settling)		<b>Single Track</b> 2 ms
			<b>Average</b> 11 ms
			<b>Full Stroke</b> 21 ms
	<b>Rotational Speed</b>	7,200 rpm	
	<b>Logical Blocks</b>	976,773,168	
	<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)	
<b>320GB SATA 7200 rpm 3Gb/s 3.5" HDD</b>	<b>Capacity</b>	320,072,933,376 bytes	
	<b>Height</b>	0.98 in; 2.5 cm	
	<b>Width</b>		<b>Media Diameter</b> 3.5 in; 8.9 cm
			<b>Physical Size</b> 4.0 in; 10.17 cm
	<b>Interface</b>	Serial ATA (3.0 Gb/s), Native Command Queuing enabled	
	<b>Synchronous Transfer Rate (Maximum)</b>	300 MB/s	
	<b>Buffer</b>	8 MB	
	<b>Seek Time</b> (typical reads, includes controller overhead, including settling)		<b>Single Track</b> 2 ms
			<b>Average</b> 12 ms
			<b>Full Stroke</b> 21 ms
	<b>Rotational Speed</b>	7,200 rpm	
	<b>Logical Blocks</b>	625,142,448	
	<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)	
<b>250GB SATA 7200 rpm 3Gb/s 3.5" HDD</b>	<b>Capacity</b>	250,059,350,016 bytes	
	<b>Height</b>	1 in; 2.5 cm	
	<b>Width</b>		<b>Media Diameter</b> 3.5 in; 8.9 cm
			<b>Physical Size</b> 4 in; 10.17 cm
	<b>Interface</b>	Serial ATA (3.0 Gb/s), Native Command Queuing enabled	
	<b>Synchronous Transfer Rate (Maximum)</b>	300 MB/s	
	<b>Buffer</b>	8 MB	
	<b>Seek Time</b> (typical reads, includes controller overhead, including settling)		<b>Single Track</b> 2 ms
			<b>Average</b> 11 ms
			<b>Full Stroke</b> 21 ms
	<b>Rotational Speed</b>	7,200 rpm	

### Technical Specifications - Hard Drives

	<b>Logical Blocks</b>	488,397,168	
	<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)	
<b>160GB SATA 7200 rpm 3Gb/s 3.5" HDD</b>	<b>Capacity</b>	160,041,885,696 bytes	
	<b>Height</b>	1 in; 2.5 cm	
	<b>Width</b>	<b>Media Diameter</b>	3.5 in; 8.9 cm
		<b>Physical Size</b>	4 in; 10.2 cm
	<b>Interface</b>	Serial ATA (3.0 Gb/s), Native Command Queuing enabled	
	<b>Synchronous Transfer Rate (Maximum)</b>	300 MB/s	
	<b>Buffer</b>	8 MB	
	<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track</b>	2 ms
		<b>Average</b>	11 ms
		<b>Full Stroke</b>	21 ms
	<b>Rotational Speed</b>	7,200 rpm	
	<b>Logical Blocks</b>	312,581,808	
	<b>Operating Temperature</b>	41° to 131° F (5° to 55° C)	
<b>3.0TB SATA 7200 rpm 6Gb/s 3.5" HDD</b>	<b>Capacity</b>	3.0TB	
	<b>Height</b>	1 in; 2.54 cm	
	<b>Width</b>	<b>Media Diameter</b>	3.5 in; 8.9 cm
		<b>Physical Size</b>	4.0 in; 10.17 cm
	<b>Interface</b>	Serial ATA (6.0Gb/s), NCQ enabled	
	<b>Synchronous Transfer Rate (Maximum)</b>	Up to 6.0 Gb/s	
	<b>Buffer</b>	64MB	
	<b>Seek Time</b> (typical reads, includes controller overhead, including settling)	<b>Single Track</b>	0.6 ms
		<b>Average</b>	11 ms
		<b>Full Stroke</b>	Not specified
	<b>Rotational Speed</b>	7200 rpm	
	<b>Operating Temperature</b>	41° to 140° F (5° to 60° C)	

### Technical Specifications - Hard Drives

<b>HP Solid State Drives for Workstations</b>	<b>HP 160GB SATA 3Gb/s SSD</b>	<b>Capacity</b>	160GB	
		<b>Width</b>		<b>Media Diameter</b> NaN in; NaN cm
				<b>Physical Size</b> 2.5 in; 6.36 cm
		<b>Interface</b>	SATA	
		<b>Synchronous Transfer Rate (Maximum)</b>	3Gb/s	
		<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)	
	<b>HP 300GB SATA 3Gb/s SSD</b>	<b>Capacity</b>	300GB	
		<b>Width</b>		<b>Physical Size</b> 2.5 in; 6.36 cm
		<b>Interface</b>	SATA	
		<b>Synchronous Transfer Rate (Maximum)</b>	3Gb/s	
		<b>Operating Temperature</b>	32° to 158° F (0° to 70° C)	

### Technical Specifications - Hard Drive Controllers

<b>Integrated LSI SAS 1068E Controller with RAID 0, 1, 1E/10E</b>	<b>PCI Bus</b>	PCI-Express x8 lanes	
	<b>PCI Modes</b>	Bus Master DMA	
	<b>RAID Levels</b>	RAID 0, 1, 1E/10E	
	<b>PCI Data Burst Transfer Rate</b>	8 PCI-Express lanes at 2.5Gbps in each direction for a total bandwidth of 5.0Gbps for each full duplex lane. Total aggregate bandwidth of up to 4GBps possible.	
	<b>SAS Bandwidth</b>	<b>Full Duplex</b>	LSI's SAS1068E 8-port SAS/SATA controller supports 1.5 and 3.0Gb/s per port data transfer rates.
	<b>PCI Card Type</b>	N/A	
	<b>PCI Voltage</b>	N/A	
	<b>PCI Power</b>	N/A	
	<b>Bracket</b>	N/A	
	<b>Certification Level</b>	PCI-Express 1.0a	
	<b>IO Bus</b>	Eight 3Gbps SAS/SATA ports	
	<b>SAS Processor</b>	LSISAS1068E	
	<b>Internal Connectors</b>	Four- SATA x1 connectors	
	<b>External Connectors</b>	None	
<b>Maximum Number of SCSI Devices</b>	32		
<b>LED Indicators</b>	On-board activity and fault LEDs		
<b>Integrated Mirroring</b>	Integrated Mirroring option available		

<b>LSI MegaRAID® 9260-8i SAS 6Gb/s ROC RAID Card and iBBU08 Battery Backup Unit</b>	<b>PCI Bus</b>	PCI-Express (Gen2) V2.0 x8 lanes	
	<b>PCI Modes</b>	Bus Master DMA	
	<b>RAID Levels</b>	RAID 0, 1, 5, and 6 RAID spans 10, 50 and 60	
	<b>PCI Data Burst Transfer Rate</b>	Up to 4GB/s	
	<b>PCI Card Type</b>	Low profile, single PCIe slot design with full height bracket.	
		The optional iBBU08 Battery Backup unit mounts on the controller card and the assembly remains within a single PCIe slot width.	
	<b>PCI Voltage</b>	+3.3V Add-in Card	
	<b>PCI Power</b>	12.5 Watts	
	<b>Certification Level</b>	PCI-Express 2.0	
	<b>IO Bus</b>	Eight 3 Gb/s and 6Gb/s compatible SAS/SATA ports	
<b>Internal Connectors</b>	Two SAS SFF8087 x4		
<b>External Connectors</b>	None		



### Technical Specifications - Hard Drive Controllers

**Maximum Number of SCSI** 32.

**Devices**

**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

<b>NVIDIA Quadro NVS 295 256MB Graphics Card</b>	<b>Form Factor</b>	2.731 inches (H) × 6.600 inches (L), Half-Height
	<b>Graphics Controller</b>	NVIDIA Quadro NVS 295 Graphics Board
	<b>Bus Type</b>	PCI Express x16, Generation 2.0
	<b>Memory</b>	256 MB GDDR3 SDRAM unified graphics memory
	<b>Connectors</b>	2 DisplayPort Comes with 2 DisplayPort to DVI-D Adapters ('DisplayPort to VGA' and 'DisplayPort to DL DVI' adapters available as an accessory)
	<b>Maximum Resolution</b>	Two DisplayPort outputs drive two digital displays up to 2560 x 1600
	<b>Display Output</b>	<b>NOTE: This card supports up to two displays</b> <ul style="list-style-type: none"><li>• Drives DisplayPort enabled digital displays at resolutions up to 2560 × 1600 at 60 Hz with reduced blanking</li><li>• 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)</li></ul>
	<b>Supported Graphics APIs</b>	OpenGL 3.0 DirectX 10.0
	<b>Available Graphics Drivers</b>	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) WS4 (64-bit and 32-bit) <i>* WS4 not supported on Z200 &amp; Z200 SFF</i> Red Hat Enterprise Linux(RHEL) 5 Desktop/Workstation (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) 6 Desktop/Workstation (64-bit and 32-bit) SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit)  HP qualified drivers may be preloaded or available from the HP support Web site: <a href="http://welcome.hp.com/country/us/en/support.html">http://welcome.hp.com/country/us/en/support.html</a>  SUSE Linux Enterprise drivers may also be obtained from: <a href="ftp://download.nvidia.com/novell">ftp://download.nvidia.com/novell</a> or <a href="http://www.nvidia.com">http://www.nvidia.com</a>
	<b>Power Consumption</b>	<24 Watts

### Technical Specifications - Graphics

<b>NVIDIA NVS 300 512MB Graphics Card</b>	<b>Form Factor</b>	2.7 inches (H) x 5.7 inches (L), Half-Height
	<b>Graphics Controller</b>	NVIDIA NVS 300 Graphics Board
	<b>Bus Type</b>	PCI Express x16, Generation 2.0
	<b>Memory</b>	512 MB GDDR3 SDRAM unified graphics memory
	<b>Connectors</b>	DMS-59 Includes DMS-59 to Dual DVI-I adapter DMS-59 to Dual DisplayPort adapter and DMS-59 to Dual VGA adapter available as an option DMS-59 to Dual DisplayPort adapter required for HP ZR30w Display
	<b>Maximum Resolution</b>	DVI: two digital displays up to 1920 x 1200 DisplayPort: two digital displays up to 2560 x 1600 VGA: two analog displays up to 1920 x 1080
	<b>Image Quality Features</b>	
	<b>Display Output</b>	This card support up to two displays: <ul style="list-style-type: none"><li>• Drives DVI enabled digital displays at resolutions up to 1920 x 1200 at 60 Hz with reduced blanking</li><li>• Drives DisplayPort enabled digital displays at resolutions up to 2560 x 1600 at 60 Hz with reduced blanking (through optional DMS-59 to DisplayPort adapter)</li><li>• Drives VGA enabled analog displays at resolutions up to 1920 x 1080 (through optional DMS-59 to VGA adapter)</li></ul>
	<b>Supported Graphics APIs</b>	OpenGL 3.3 DirectX 10.1
	<b>Available Graphics Drivers</b>	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) 5 Desktop/Workstation Red Hat Enterprise Linux(RHEL) 6 Desktop/Workstation SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit)  HP qualified drivers may be preloaded or available from the HP support Web site: <a href="http://welcome.hp.com/country/us/en/support.html">http://welcome.hp.com/country/us/en/support.html</a>  Novell SUSE Linux Enterprise drivers may also be obtained from: <a href="ftp://download.nvidia.com/novell">ftp://download.nvidia.com/novell</a> or <a href="http://www.nvidia.com">http://www.nvidia.com</a>
	<b>Power Consumption</b>	<18 Watts

### Technical Specifications - Graphics

<b>AMD FirePro 2270 512MB Graphics Card</b>	<b>Form Factor</b>	Low Profile, Half Length, 2.3" x 6.6"
	<b>Graphics Controller</b>	AMD FirePro™ 2270 Professional Graphics
	<b>Bus Type</b>	PCI Express™ x16 Generation 2.0
	<b>Memory</b>	512MB DDR3
	<b>Connectors</b>	DMS-59 connector to support breakout cables for dual DisplayPort, DVI and VGA output. DMS-59 to Dual DVI adapter included. (Display Port and VGA adapters sold separately)
	<b>Maximum Resolution</b>	Digital 2560x1600 (DisplayPort) Analog 1920x1200 (DVI 60 Hz/ VGA 75Hz)
	<b>RAMDAC</b>	400 MHz DAC, 10-bit per channel
	<b>Display Output</b>	Card supports up to two displays
	<b>Supported Graphics APIs</b>	DirectX 11 and OpenGL 4.0
	<b>Available Graphics Drivers</b>	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit)
<b>Power Consumption</b>	HP qualified drivers may be preloaded or available from the HP support Web site: <a href="http://welcome.hp.com/country/us/en/support.html">http://welcome.hp.com/country/us/en/support.html</a> 17W Maximum	

<b>NVIDIA Quadro 400 512MB Graphics Card</b>	<b>Form Factor</b>	Low Profile, 2.7 inches (H) x 5.6 inches (L)
	<b>Graphics Controller</b>	NVIDIA Quadro 400 Graphics Board
	<b>Bus Type</b>	PCI Express x 16, Generation 2.0
	<b>Memory</b>	512MB DDR3 SDRAM
	<b>Connectors</b>	One (1) Dual-link DVI-I One (1) DisplayPort 1.1 Includes one DisplayPort to DVI-D adapter
	<b>Maximum Resolution</b>	DisplayPort 1.1: 2560 x 1600 @ 60 Hz Dual Link DVI-I: 2560 x 1600 @ 60 Hz Analog: 2048 x 1536 @ 85 Hz
	<b>RAMDAC</b>	Dual internal 400 MHz DACs
	<b>Display Output</b>	This card supports up to two displays
	<b>Supported Graphics APIs</b>	OpenGL 3.2 DirectX 10.1 Shader Model 4.1
	<b>Available Graphics Drivers</b>	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) WS4 (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) 5 Desktop/Workstation SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit)

### Technical Specifications - Graphics

HP qualified drivers may be preloaded or available from the HP support Web site: <http://welcome.hp.com/country/us/en/support.html>

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 Card**

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

### Technical Specifications - Graphics

<b>AMD FirePro V3900 1GB Graphics Card</b>	<b>Form Factor</b>	Full height, half length (full-height bracket included)
	<b>Graphics Controller</b>	AMD FirePro™ V3900 professional graphics
	<b>Bus Type</b>	PCI Express® x16, Generation 2.1
	<b>Memory</b>	1GB DDR3 memory
	<b>Connectors</b>	1 DL DVI, 1 DP output One DP to DVI adapter included
	<b>Maximum Resolution</b>	2560x1600 per display (5120x1600 max. horizontal resolution)
	<b>Display Output</b>	1 DisplayPort® 1.2 1 Dual-link DVI
	<b>Supported Graphics APIs</b>	OpenCL™ 1.1, DirectX® 11 and OpenGL 4.2
	<b>Available Graphics Drivers</b>	Genuine Windows® 7 Professional (64-bit and 32-bit) Genuine Windows Vista® Business (64-bit and 32-bit) Microsoft® Windows XP® Professional (64-bit and 32-bit) Linux®* (32-bit or 64-bit)
		HP qualified drivers may be preloaded or available from the HP support Web site: <a href="http://welcome.hp.com/country/us/en/support.html">http://welcome.hp.com/country/us/en/support.html</a>
	<b>Power Consumption</b>	<50W
	<b>Note</b>	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 <a href="http://www.amd.com/firepro">www.amd.com/firepro</a> for details.

<b>AMD FirePro V4900 1GB Graphics Card</b>	<b>Form Factor</b>	Full height (4.37 in) , half length (6.61 in)
	<b>Graphics Controller</b>	AMD FirePro™ V4900 Professional Graphics
	<b>Bus Type</b>	PCI Express™ x16, Generation 2.1
	<b>Memory</b>	1GB GDDR5
	<b>Connectors</b>	2 DisplayPort, 1 dual link DVI Output, One DP to DVI adapter included
	<b>Maximum Resolution</b>	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
	<b>RAMDAC</b>	
	<b>Image Quality Features</b>	Up to 3 independent outputs with ATI Eyefinity technology support (More information at: <a href="http://www.amd.com/us/products/technologies/eyefinity/">www.amd.com/us/products/technologies/eyefinity/</a> ). 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
		<b>NOTE:</b> The use of more than two displays on Linux requires support for xrandr

### Technical Specifications - Graphics

<b>Supported graphics APIs</b>	<p>1.2 or greater in the X server.</p> <p>DirectX 11 and OpenGL 4.1. OpenCL 1.2 DirectCompute 11</p>
<b>Available graphics drivers</b>	<p>Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit)</p> <p>HP qualified drivers may be preloaded or the latest HP qualified drivers are available from the HP support Web site: <a href="http://welcome.hp.com/country/us/en/support.html">http://welcome.hp.com/country/us/en/support.html</a></p>
<b>Power Consumption</b>	<75W
<b>Note</b>	<p>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 <a href="http://www.amd.com/firepro">www.amd.com/firepro</a> for details.</p>

#### AMD FirePro V5900 2GB Graphics Card

<b>Form Factor</b>	Full-height, full length, single slot
<b>Graphics Controller</b>	AMD FirePro™ V5900 Professional Graphics
<b>Bus Type</b>	PCI Express™ x16, Generation 2.1
<b>Memory</b>	2GB GDDR5
<b>Connectors</b>	<p>2 x Display Port 1.2 1 x Dual-link DVI One DP to DVI adapter included with card</p>
<b>Maximum Resolution</b>	2560 x 1600
<b>Display Output</b>	Up to 3 simultaneous displays (using AMD Eyefinity with Windows 7 or Linux)
<b>Shading Architecture</b>	Shader Model 5.0
<b>Supported Graphics APIs</b>	DirectX 11 and OpenGL 4.1
<b>Available Graphics Drivers</b>	<p>Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit)</p> <p>HP qualified drivers may be preloaded or available from the HP support Web site: <a href="http://welcome.hp.com/country/us/en/support.html">http://welcome.hp.com/country/us/en/support.html</a></p>
<b>Power Consumption</b>	< 75W
<b>Note</b>	<p>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</p>

### Technical Specifications - Graphics

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](http://www.amd.com/firepro) for details.

<b>NVIDIA Quadro 2000 1GB Graphics Card</b>	<b>Form Factor</b>	4.376" H x 7" L Single Slot
	<b>Graphics Controller</b>	NVIDIA Quadro 2000 Graphics Card
	<b>Bus Type</b>	PCI Express 2.0 x16
	<b>Memory</b>	1 GB GDDR5 128-bit
	<b>Connectors</b>	1 DVI-I output, 2 DisplayPort outputs One DP to DVI adapter included with card
	<b>Maximum Resolution</b>	DVI to VGA, DisplayPort to VGA and DisplayPort to DVI adapters available as accessories Dual DisplayPort (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz) Dual-link DVI-I output (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz)
	<b>Image Quality Features</b>	<ul style="list-style-type: none"><li>● Up to 16K x16K texture and render processing</li><li>● Transparent multisampling and super sampling</li><li>● 16x angle independent anisotropic filtering</li><li>● 128-bit floating point performance</li><li>● 32-bit per-component floating point texture filtering and blending</li><li>● Support for any combination of two connected displays</li><li>● DisplayPort 1.1a, HDMI 1.3a, and HDCP support</li><li>● NVIDIA® 3D Vision™ technology, 3D DLP, Interleaved, and other 3D stereo format support</li><li>● Full OpenGL quad buffered stereo support</li><li>● Underscan/overscan compensation and hardware scaling</li><li>● NVIDIA® nView® multi-display technology</li></ul>
	<b>Shading Architecture</b>	Shader Model 5.0
	<b>Supported Graphics APIs</b>	OpenGL 4.1 DirectX 11
	<b>Available Graphics Drivers</b>	CUDA API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux (RHEL) 5 Desktop/Workstation (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) 6 Desktop/Workstation SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit)

HP qualified drivers may be preloaded or available from the HP support Web site: <http://welcome.hp.com/country/us/en/support.html>

SUSE Linux Enterprise drivers may also be obtained from:



### Technical Specifications - Graphics

<ftp://download.nvidia.com/novell> or <http://www.nvidia.com>

**Power Consumption** 62 Watts

**NVIDIA Quadro 5000  
2.5GB Graphics Card**

**Form Factor** 4.376" H x 9.75" L  
Dual Slot

**Graphics Controller** NVIDIA Quadro 5000 Graphics Card

**Bus Type** PCI Express 2.0 x16

**Memory** 2.5 GB GDDR5  
320-bit

**Connectors** DVI-I (1), DP (2), Stereo (1)  
One DP to DVI adapter included with card

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)  
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
- Transparent multisampling and super sampling
- 16x angle independent anisotropic filtering
- 128-bit floating point performance
- 32-bit per-component floating point texture filtering and blending
- Support for any combination of two connected displays
- DisplayPort 1.1a, HDMI 1.3a, and HDCP support
- NVIDIA 3D Vision™ technology, 3D DLP, Interleaved, and other 3D stereo format support
- Full OpenGL quad buffered stereo support
- Underscan/overscan compensation and hardware scaling
- NVIDIA nView® multi-display technology

**Shading Architecture** Shader Model 5.0

**Supported Graphics APIs** OpenGL 4.0  
DirectX 11  
CUDA API support includes:  
CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran

**Available Graphics Drivers** Genuine Windows 7 Professional (64-bit and 32-bit)  
Genuine Windows Vista Business (64-bit and 32-bit)  
Microsoft Windows XP Professional (64-bit and 32-bit)  
Red Hat Enterprise Linux (RHEL) 5 Desktop/Workstation (64-bit and 32-bit)  
Red Hat Enterprise Linux (RHEL) 6 Desktop/Workstation  
SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit)

HP qualified drivers may be preloaded or available from the HP support Web site: <http://welcome.hp.com/country/us/en/support.html>

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 - Graphics

<b>NVIDIA Quadro 4000 2GB Graphics Card</b>	<b>Form Factor</b>	4.376" H x 9.50" L Single Slot
	<b>Graphics Controller</b>	NVIDIA Quadro 4000 Graphics Card
	<b>Bus Type</b>	PCI Express 2.0 x16
	<b>Memory</b>	2 GB GDDR5 256-bit
	<b>Connectors</b>	1 DVI-I output, 2 DisplayPort outputs; One DP to DVI adapter included with card
	<b>Maximum Resolution</b>	DVI to VGA, DisplayPort to VGA and DisplayPort to DVI (single-link or dual-link) adapters available as accessories (Optional stereo bracket available from 3rd party) Dual DisplayPort (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz) Dual-link DVI-I output (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz)
	<b>RAMDAC</b>	400 MHz integrated RAMDAC
	<b>Image Quality Features</b>	<ul style="list-style-type: none"> <li>● Up to 16K x16K texture and render processing</li> <li>● Transparent multisampling and super sampling</li> <li>● 16x angle independent anisotropic filtering</li> <li>● 128-bit floating point performance</li> <li>● 32-bit per-component floating point texture filtering and blending</li> <li>● Support for any combination of two connected displays</li> <li>● DisplayPort 1.1a, HDMI 1.3a, and HDCP support</li> <li>● NVIDIA 3D Vision™ technology, 3D DLP, Interleaved, and other 3D stereo format support</li> <li>● Full OpenGL quad buffered stereo support</li> <li>● Underscan/overscan compensation and hardware scaling</li> <li>● NVIDIA nView® multi-display technology</li> </ul>
	<b>Shading Architecture</b>	Shader Model 5.0
	<b>Supported Graphics APIs</b>	OpenGL 4.0 DirectX 11 CUDA API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran
	<b>Available Graphics Drivers</b>	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux (RHEL) 5 Desktop/Workstation (64-bit and 32-bit) Red Hat Enterprise Linux (RHEL) 6 Desktop/Workstation SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit)
		HP qualified drivers may be preloaded or available from the HP support Web site: <a href="http://welcome.hp.com/country/us/en/support.html">http://welcome.hp.com/country/us/en/support.html</a>
		Novell SUSE Linux Enterprise drivers may also be obtained from: <a href="ftp://download.nvidia.com/novell">ftp://download.nvidia.com/novell</a> or <a href="http://www.nvidia.com">http://www.nvidia.com</a>
	<b>Power Consumption</b>	142 Watts

### Technical Specifications - Graphics

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<b>NVIDIA Quadro 6000 6GB Graphics Card</b>	<b>Form Factor</b>	4.376" H x 9.75" L Dual Slot
	<b>Graphics Controller</b>	NVIDIA Quadro 6000 Graphics Card
	<b>Bus Type</b>	PCI Express 2.0 x16
	<b>Memory</b>	6 GB GDDR5 384-bit ECC Memory
	<b>Connectors</b>	1 DVI-I output, 2 DisplayPort outputs, 1 Stereo(3-pin mini DIN); One DP to DVI adapter included with card
		DVI to VGA, DisplayPort to VGA and DisplayPort to dual link DVI adapters available as accessories
	<b>Maximum Resolution</b>	Dual DisplayPort (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz) Dual-link DVI-I output (up to 2560 x 1600 @ 60Hz and 1920x1200 @ 120Hz)
	<b>Image Quality Features</b>	<ul style="list-style-type: none"><li>● 30-bit color</li><li>● Up to 16K x16K texture and render processing</li><li>● Transparent multisampling and super sampling</li><li>● 16x angle independent anisotropic filtering</li><li>● 128-bit floating point performance</li><li>● 32-bit per-component floating point texture filtering and blending</li><li>● 64x full scene antialiasing (FSAA) / 128x FSAA in SLI Mode</li><li>● Support for any combination of two connected displays</li><li>● DisplayPort 1.1a, HDMI 1.3a, and HDCP support</li><li>● NVIDIA 3D Vision™ technology, 3D DLP, Interleaved, and other 3D stereo format support</li><li>● Full OpenGL quad buffered stereo support</li><li>● Underscan/overscan compensation and hardware scaling</li><li>● NVIDIA nView® multi-display technology</li></ul>
	<b>Shading Architecture</b>	Shader Model 5.0
	<b>Supported Graphics APIs</b>	OpenGL 4.0 DirectX 11 CUDA API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran
	<b>Available Graphics Drivers</b>	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux (RHEL) 5 Desktop/Workstation (64-bit and 32-bit) Red Hat Enterprise Linux (RHEL) 6 Desktop/Workstation SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit)
		HP qualified drivers may be preloaded or available from the HP support Web site: <a href="http://welcome.hp.com/country/us/en/support.html">http://welcome.hp.com/country/us/en/support.html</a>
		Novell SUSE Linux Enterprise drivers may also be obtained from: <a href="ftp://download.nvidia.com/novell">ftp://download.nvidia.com/novell</a> or <a href="http://www.nvidia.com">http://www.nvidia.com</a>
	<b>Power Consumption</b>	<250 Watts

### Technical Specifications - Graphics

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<b>AMD FirePro V7900 2GB Graphics Card</b>	<b>Form Factor</b>	Full height, full length, single slot
	<b>Graphics Controller</b>	AMD FirePro™ V7900 Professional Graphics
	<b>Bus Type</b>	PCI Express™ x16, Generation 2.1
	<b>Memory</b>	2GB GDDR5
	<b>Connectors</b>	4 x DisplayPort 1.2 Two DP to DVI adapters included with card
	<b>Maximum Resolution</b>	2560 x1600
	<b>Display Output</b>	Up to 4 simultaneous displays (using AMD Eyefinity with Windows 7 or Linux)
	<b>Shading Architecture</b>	Shader Model 5.0
	<b>Supported Graphics APIs</b>	DirectX 11 and OpenGL 4.1
	<b>Available Graphics Drivers</b>	Genuine Windows 7 Professional (64-bit and 32-bit) Genuine Windows Vista Business (64-bit and 32-bit) Microsoft Windows XP Professional (64-bit and 32-bit) Red Hat Enterprise Linux(RHEL) SUSE Linux Enterprise Desktop 11 (64-bit and 32-bit)
	<b>Power Consumption</b>	HP qualified drivers may be preloaded or available from the HP support Web site: <a href="http://welcome.hp.com/country/us/en/support.html">http://welcome.hp.com/country/us/en/support.html</a> < 150W
	<b>Note</b>	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 <a href="http://www.amd.com/firepro">www.amd.com/firepro</a> for details.

### Technical Specifications - High Performance GPU Computing

#### NVIDIA Tesla C2075 Compute Processor

<b>Form Factor</b>	4.376 inches by 9.75 inches Dual Slot
<b>System Interface</b>	PCI Express Gen2 ×16
<b>Video Outputs</b>	One Dual Link DVI-I (Entry graphics level of performance)
<b>Memory</b>	6GB GDDR5
<b>Peak Memory Bandwidth</b>	+170 GB/s
<b>Supported APIs</b>	CUDA API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran
<b>Supported Operating Systems</b>	Genuine Windows 7 Professional (64-bit) Genuine Windows Vista Business (64-bit) Microsoft Windows XP Professional (64-bit) Red Hat Enterprise Linux (RHEL) 5, 6 Desktop/Workstation (64-bit) SUSE Linux Enterprise Desktop 11 (64-bit)
	HP qualified drivers may be preloaded or available from the HP support Web site: <a href="http://welcome.hp.com/country/us/en/support.html">http://welcome.hp.com/country/us/en/support.html</a>
	Novell SUSE Linux Enterprise drivers may also be obtained from: <a href="ftp://download.nvidia.com/novell">ftp://download.nvidia.com/novell</a> or <a href="http://www.nvidia.com">http://www.nvidia.com</a>
<b>Processor Cores</b>	448 CUDA cores
<b>Power Consumption</b>	~215 Watts

**NOTE 1:** A 1110W PSU is required for Tesla C2075 on the Z800

**NOTE 2:** A 600W PSU is required for Tesla C2075 on the Z400

**NOTE 3:** A 1125W PSU is required for Tesla C2075 on the Z820

### Technical Specifications - Multimedia and Audio Devices

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

### Technical Specifications - Optical and Removable Storage

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

<b>HP DVD+/-RW Drive</b>	<b>Description</b>	5.25-inch, half-height, tray-load
	<b>Mounting Orientation</b>	Either horizontal or vertical
	<b>Interface Type</b>	SATA/ATAPI
	<b>Dimensions (WxHxD)</b>	15.0 x 4.4 x 20.3 cm (5.9 x 1.7 x 8.0 in)
	<b>Disc Formats</b>	DVD-RAM
		DVD+R
DVD+RW		
DVD+R DL		
DVD-R DL		
	DVD-R	
	DVD-RW	

### Technical Specifications - Optical and Removable Storage

	CD-R CD-RW		
<b>Disc Capacity</b>	<b>DVD-ROM</b>		8.5 GB DL or 4.7 GB standard
	<b>Full Stroke DVD</b>		< 250 ms (seek)
	<b>Full Stroke CD</b>		< 210 ms (seek)
<b>Maximum Data Transfer Rates</b>	<b>CD ROM Read</b>		CD-ROM, CD-R Up to 40X CD-RW Up to 32X
	<b>DVD ROM Read</b>	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
<b>Power</b>	<b>Source</b>		SATA DC power receptacle
	<b>DC Power Requirements</b>		5 VDC ± 5%-100 mV ripple p-p 12 VDC ± 5%-200 mV ripple p-p
	<b>DC Current</b>		5 VDC - <1000 mA typical, <1600 mA maximum 12 VDC - <600 mA typical, <1400 mA maximum
<b>Operating Environmental</b> (all conditions non-condensing)	<b>Temperature</b>		41° to 122° F (5° to 50° C)
	<b>Relative Humidity</b>		10% to 90%
	<b>Maximum Wet Bulb Temperature</b>		86° F (30° C)
	<b>Operating Systems Supported</b>		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*. Red Hat Enterprise Linux(RHEL) WS4**, 5, 6 Desktop/Workstation SUSE Linux Enterprise Desktop 10 & 11
	<b>Kit Contents</b>		No driver is required for this device. Native support is provided by the operating system. HP SATA SuperMulti DVD Writer Drive, Roxio Easy Media Creator software, Intervideo WinDVD Software, installation guide, and DVD+R media.



### Technical Specifications - Optical and Removable Storage

<b>HP Slot Load DVD+/-RW Drive</b>	<b>Description</b>	Slim-Line, Slot-load
	<b>Mounting Orientation</b>	Either horizontal or vertical
	<b>Interface Type</b>	SATA
	<b>Dimensions (WxHxD)</b>	12.7 x 1.2 x 12.9 cm (5 x 0.5 x 5 in)
	<b>Disc Formats</b>	DVD-RAM DVD+R DVD+RW DVD+R DL DVD-R DL DVD-R DVD-RW CD-R CD-RW
	<b>Disc Capacity</b>	<b>DVD-ROM</b> 5/9/10/18 G DVD-Single / Dual (PTP, OTP) (Read Only) 4.7G DVD±R/RW (Read & Write) DVD±R Dual (Read & Write) 80mm DVD DVD-RAM (Read & Write)
		<b>CD-ROM</b> 650 MB CD-ROM (Read Only) 80mm CD 800/700/650/ CD-Recordable (Read & Write) 700/650MB CD-Rewritable (Read & Write) 700/650MB High Speed CD-Rewritable (Read & Write) 700/650MB Ultra & Ultra+ Speed CD-Rewritable (Read & Write)
		<b>Full Stroke DVD</b> < 270 ms (seek)
		<b>Full Stroke CD</b> < 250 ms (seek)
	<b>Maximum Data Transfer Rates</b>	<b>CD ROM Read</b> CD-ROM, CD-R and CD-RW Up to 24X <b>DVD ROM Read</b> DVD-RAM Up to 5X DVD Single layer Up to 8X DVD Dual Layer up to 6X
	<b>Power</b>	<b>Source</b> SATA DC power receptacle <b>DC Power Requirements</b> 5 VDC ± 5%-100 mV ripple p-p <b>DC Current</b> 5 VDC 40 mA typical, 800 mA maximum
	<b>Operating Environmental</b> (all conditions non-condensing)	<b>Temperature</b> 41° to 122° F (5° to 50° C) <b>Relative Humidity</b> 10% to 90%
		<b>Operating Systems Supported</b> Windows Vista Business 64*, Windows Vista Business 32*, Windows Vista Home Basic 32*, Windows XP Professional or Windows XP Home 32*. Red Hat Enterprise Linux(RHEL) WS4, 5, 6 Desktop/Workstation, SUSE Linux Enterprise Desktop 10 & 11, No driver is required for this device. Native support is provided by the operating system.
		<b>Kit Contents</b> Factory integrated only. Not available as a kit.

<b>HP Blu-Ray Writer</b>	<b>Description</b>	5.25-inch, half-height, tray-load
	<b>Mounting Orientation</b>	Either horizontal or vertical
	<b>Interface Type</b>	SATA
	<b>Dimensions (WxHxD)</b>	15.0 x 4.4 x 20.3 cm (5.9 x 1.7 x 8.0 in)

### Technical Specifications - Optical and Removable Storage

<b>Disc Formats</b>	BD-ROM BD-R BD-RE DVD-RAM DVD+R DVD+RW DVD+R DL DVD-R DL DVD-R DVD-RW CD-R CD-RW		
<b>Disc Capacity</b>	<b>DVD-ROM</b>	8.5 GB DL or 4.7 GB standard	
	<b>Blu-ray</b>	50 GB DL or 25 GB standard	
	<b>Full Stroke DVD</b>	< 250 ms (seek)	
	<b>Full Stroke CD</b>	< 210 ms (seek)	
	<b>Blu-ray</b>	<275 ms (seek)	
	<b>Startup Time</b>	<b>BD-ROM (SL/DL)</b>	25S / 28S
		<b>BD-R (SL/DL)</b>	25S / 28S
		<b>BD-RE (SL/DL)</b>	25S / 28S
		<b>DVD-ROM (SL/DL)</b>	18S / 18S
		<b>DVD-R (SL/DL)</b>	25S / 25S
		<b>DVD-RW</b>	25S
		<b>DVD+R (SL/DL)</b>	25S / 25S
		<b>DVD+RW</b>	25S
		<b>DVD-RAM</b>	45S
		<b>CD-ROM</b>	15S
<b>Maximum Data Transfer Rates</b>	<b>CD ROM Read</b>	<b>CD-ROM</b>	Up to 40X
		<b>CD-R</b>	Up to 40X
		<b>CD-RW</b>	Up to 40X
	<b>DVD ROM Read</b>	<b>DVD-RAM</b>	Up to 5X
		<b>DVD+RW</b>	Up to 10X
		<b>DVD-RW</b>	Up to 10X
		<b>DVD+R DL</b>	Up to 8X
		<b>DVD-R DL</b>	Up to 8X
		<b>DVD-ROM</b>	Up to 16X
		<b>DVD-ROM DL</b>	Up to 8X
		<b>DVD+R</b>	Up to 12X
		<b>DVD-R</b>	Up to 12X
	<b>Blu-Ray</b>	<b>BD-ROM</b>	Up to 6X
		<b>BD-ROM DL</b>	Up to 4.8X
		<b>BD-R</b>	Up to 6X
		<b>BD-R DL</b>	Up to 4.8X

### Technical Specifications - Optical and Removable Storage

<b>Power</b>	<b>Source</b>	BD-R	Up to 6X
	<b>DC Power Requirements</b>	BD-RE SL/DL	Up to 4.8X
	<b>DC Current</b>	SATA DC power receptacle	
	<b>Operating Environmental</b> (all conditions non-condensing)	<b>Temperature</b>	5 VDC $\pm$ 5%-100 mV ripple p-p 12 VDC $\pm$ 10%-100 mV ripple p-p
	<b>Relative Humidity</b>	5 VDC -900 mA typical, 1200 mA maximum 12 VDC -1000 mA typical, 1600 mA maximum	
	<b>Maximum Wet Bulb Temperature</b>	41° to 122° F (5° to 50° C)	
	<b>Operating Systems Supported</b>	15% to 80%	
		86° F (30° C)	
		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*. Red Hat Enterprise Linux(RHEL) WS4**, 5, 6 Desktop/Workstation, SUSE Linux Enterprise Desktop 10 & 11	
		<a href="#">* No driver is required for this device. Native support is provided by the operating system.</a>	
		<a href="#">** RHEL WS4 not supported on Z200/Z200SFF</a>	
	<b>Kit Contents</b>	HP Blue Laser RW Drive, Roxio Easy Media Creator software, Intervideo WinDVD Software, installation guide.	
<b>Disclaimer</b>	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.		

### Technical Specifications - Optical and Removable Storage

<b>HP 22-in-1 Media Card Reader</b>	<b>Description</b>	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.
	<b>Mounting Orientation</b>	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.
	<b>Interface Type</b>	USB 2.0 (one channel dedicated to the separate USB port; one channel dedicated to the flash memory card slots)
	<b>Dimensions (WxHxD)</b>	124.5 x 101.6 x 25.4 mm (4.9 x 4.0 x 1.0 in)
	<b>Disc Formats</b>	Picture Micro SD Micro SDHC SD SDHC SDXC Mini SD Mini SDHC MultiMediaCard Reduced Size MultiMediaCard (RS MultiMediaCard) MultiMedia Card 4.2 (MultiMediaCard Plus, including MultiMediaCard Plus HC) Reduced Size MultiMedia Card 4.2 (MultiMediaCard Mobile, including MultiMediaCard Mobile HC) CompactFlash Card Type I CompactFlash Card Type II MicroDrive Memory Stick (MS) MagicGate Memory Stick (MG) MagicGate Memory Stick Duo Memory Stick Select Memory Stick Duo (MS Duo) Memory Stick PRO (MS PRO) Memory Stick PRO Duo (MS PRO Duo) Memory Stick PRO-HG Duo  Two additional formats are usable with adapters (not supplied): MultiMediaCard Micro Memory Stick Micro (M2)

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<b>HP DX115 Removable Drive Enclosure</b>	<b>Interface Type</b>	Compatible with SAS or SATA controllers
	<b>Dimensions (WxHxL)</b>	147.6 x 41.1 x 205 mm (5.81 x 1.62 x 8.08 in)
	<b>Weight</b>	Frame and Carrier: 1.73 kg (3.8 lbs) Carrier: 0.45 kg (1 lbs)

### Technical Specifications - Controller Cards

<b>HP IEEE 1394b FireWire PCIe Card</b>	<b>Data Transfer Rate</b>	Supports up to 800 Mbps
	<b>Devices Supported</b>	IEEE-1394 compliant devices
	<b>Bus Type</b>	PCIe card full height PCIe slots
	<b>Ports</b>	Two IEEE-1394b bilingual 9-Pin Connector (Rear)
	<b>Internal Connectors</b>	One 10-Pin header Connector
	<b>System Requirements</b>	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.
	<b>Temperature – Operating</b>	50° to 131° F (10° to 55° C)
	<b>Temperature – Storage</b>	-22° to 140° F (-30° to 60° C)
	<b>Relative Humidity – Operating</b>	20% to 80%
	<b>Compliances</b>	FCC Part 15B, cULus 60950, CE Mark EN55022B(1995)/EN55024-1998 STD, Taiwan BSMI CNS13438, Korea MIC
<b>Operating Systems Supported</b>	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.	

<b>HP SuperSpeed USB 3.0 PCIe x1 Card</b>	<b>Dimensions (HxD)</b>	Full-height: 4.13 x 2.32 in; Low profile: 2.68 x 2.32 in (Full-height: 104.89 x 59.04 mm; Low profile: 68.09 x 59.04 mm)
	<b>Ports</b>	2 External
	<b>Operating Systems Supported</b>	Microsoft Windows 7, Windows Vista*, Windows XP Professional (32-bit and 64-bit); Red Hat Enterprise Linux 6.0, SuSE Linux Enterprise Desktop 11
	<b>Kit Contents</b>	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.
	<b>Regulatory Approvals and registrations</b>	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
<b>Weight</b>	0.21 lb (95.0 g)	

\* 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

**Warranty**

The HP Super Speed USB 3.0 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

<b>Integrated Broadcom 5764 PCIe LOM Controller</b>	<b>Connector</b>	RJ45
	<b>Data Rates Supported</b>	10/100/1000BT
	<b>Bus Architecture</b>	PCIe X1
	<b>Alerting</b>	ASF 2.0

<b>Broadcom (5761) NetXtreme Gigabit Ethernet Plus NIC</b>	<b>Connector</b>	RJ-45
	<b>Controller</b>	Broadcom 5761 PCI-Express LAN Controller
	<b>Memory</b>	8 MB NVRAM serial Flash
	<b>Data Rates Supported</b>	10/100/1000 Mbps
	<b>Compliance</b>	IEEE 802.1P, 802.1Q, 802.2, 802.3, 802.3AB, 802.3u, and 802.3x
	<b>Bus Architecture</b>	PCI-Express
	<b>Data Path Width</b>	Single Channel PCI-Express
	<b>Data Transfer Mode</b>	Bus Master DMA
	<b>Hardware Certifications</b>	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)
	<b>Power Requirement</b>	1.8W @ 3.3V
	<b>Boot ROM Support</b>	Yes
	<b>Network Transfer Mode</b>	Full-duplex Half-duplex (not available for the 1000BASE-T transceiver)
	<b>Network Transfer Rate</b>	10BASE-T (half-duplex) 10 Mbps 10BASE-T (full-duplex) 20 Mbps 100BASE-TX (half-duplex) 100 Mbps 100BASE-TX (full-duplex) 200 Mbps 1000BASE-T (full-duplex) 2000 Mbps
	<b>Operating Temperature</b>	32° to 131°F (0° to 55° C)
	<b>Operating Humidity</b>	131° F (55° C) with 5% to 95% non-condensing humidity
	<b>Dimensions</b>	7 cm x 10.5 cm (2.75 in x 4.13 in), low profile compatible
<b>Operating System Driver Support</b>	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 Red Hat Enterprise Linux (RHEL) 5, 6; Novell SLED 10 & 11	
<b>Management Capabilities</b>	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	
<b>Kit Contents</b>	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

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



### Technical Specifications - Networking and Communications

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

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