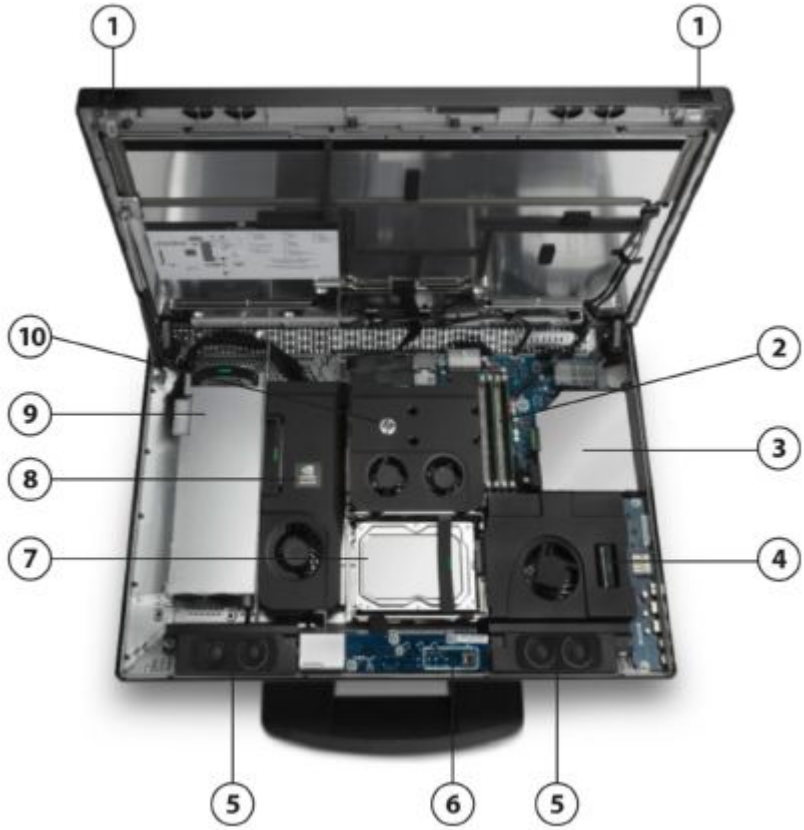
Overview



1. Latches
2. Memory Slots
3. Optical Drive Bay
4. System Blower
5. Front facing speakers
6. Internal USB 2.0 Port
7. Hard Drive Bay
8. MXM graphics
9. Power supply
10. CPU cooler

1. Power Button
2. System Activity LED
3. Optical Drive Eject Button
4. Slot load Optical Drive
5. 4-in-1 Media Card Reader
6. Firewire 1394a
7. USB 3.0 (2 ports)
8. Audio In/Out

Overview

1. Digital Microphone array
2. HD Webcam
3. Front Facing Speakers
4. Stand
5. 27” LED backlit IPS Display

Overview

1. Audio In/Out, Subwoofer Out
2. 4 USB 2.0 ports
3. S/PDIF (digital optical audio)
4. LAN
5. DisplayPort In/Out
6. Power

Form Factor	All in One
Operating Systems	Genuine Windows® 7 Professional 32-Bit(1) Genuine Windows® 7 Professional 64-Bit(1) HP Linux Installer Kit(2) SUSE Linux Enterprise Desktop 11(4) Red Hat Enterprise Linux Desktop(3,4) **NOTE 1**: Systems may require upgraded and/or separately purchased hardware and/or 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. **NOTE 2**: HP Linux Installer Kit Includes drivers for 32-bit and 64-bit OS versions of Red Hat Enterprise Linux (RHEL) 5 Workstation, RHEL 6 Workstation, and 64-bit SUSE Linux Enterprise Desktop (SLED) 11. See http://www.hp.com/go/linux for details. **NOTE 3:** RHEL Desktop is not available as a preinstall from HP. RHEL Desktop is only available a a one-year paper license drop-in-the-box. **NOTE 4**: For detailed OS/hardware support information for Linux, see: http://www.hp.com/support/linux_hardware_matrix.

Overview

Available Processors

Name	Cores	Clock Speed (GHz)	Intel® Turbo Boost Technology[1]	Cache (MB)	Memory Speed (MHz)	Hyper-Threading	Featuring Intel® vPro™ Tech-nology	Intel® HD Graphics	TD (W
Intel® Xeon® E3-1280 processor	4	3.5	3.9	8	1333	Y	Y	N/A	9
Intel Xeon E3-1245 processor	4	3.3	3.7	8	1333	Y	Y	3000	9
Intel® Core™ i3-2120 processor	2	3.3	N/A	3	1333	Y	N/A	2000	6

[1]The specifications shown in this column represent the maximum frequency (GHz) of one processor core when accelerated with Intel Turbo Boost Technology. Turbo boost stepping occurs in 100MHz increments. Processors that do not have turbo functionality are denoted as N/A.

Available Processor Disclaimers

Intel Xeon E3 and Intel Core i3 processors can support either ECC or non-ECC memory.
Intel's numbering is not a measurement of higher performance. Processor numbers differentiate features within each processor family, not across different processor families. See: http://www.intel.com/products/processor_number/ for details.
64-bit computing on Intel® 64 architecture requires a computer system with a processor, chipset, BIOS, operating system, device drivers and applications enabled for Intel 64 architecture. Processor will not operate (including 32-bit operation) without an Intel 64 architecture-enabled BIOS. Performance will vary depending on your hardware and software configurations. See: http://www.intel.com/info/em64t for more information.
Dual-Core and Quad-Core technologies are designed to improve performance of multithreaded software products and hardware-aware multitasking operating systems and may require appropria operating system software for full benefits; check with software provider to determine suitability; N all customers or software applications will necessarily benefit from use of these technologies.

Integrated Display

See below for detailed information

Panel

Type: IPS (in-plane switching) LED Backlit LCD

Viewable Image Area: 68.5 cm, (27 in.) widescreen; diagonally measured

Screen Opening (W x H): 59.8 x 33.6 cm, (23.5 x 13.3 in.)

Optimal Resolution: 2560 x 1440 @ 60 Hz; 3.7MP

Aspect Ratio: 16:9 Widescreen

Viewing Angle (typical): Up to 178° horizontal/178° vertical (10:1 minimum contrast ratio)

Maximum Brightness (typical)*: 380 nits cd/m2

Minimum Brightness (typical)*: 50 nits cd/m2

Contrast Ratio (typical)*: 1000:1

Dynamic Contrast Ratio (typical)*: N/A

Response Time (typical)*: 12 ms (gray to gray); 14 ms (on/off)

Pixel Pitch: 0.2331 mm

Backlight Lamp Life (to half brightness): 39,000 hours minimum

Color Gamut Area vs. NTSC: 96% (CIE 1976), 77% (CIE 1931)

Overview

	Color Gamut Coverage of sRGB: 100% (CIE 1931) Color Support: Up to 1.07 billion colors **NOTES**: *All performance specifications represent the typical specifications provided by HP's component manufacturers; actual performance may vary either higher or lower. On Screen Display (OSD) Controls Buttons or Switches: Source, Minus, Plus, Power On/Off Languages: N/A User Controls: Brightness, Source Signal Interface/Performance Horizontal Frequency: 90 kHz Vertical Frequency: 60 Hz Native Resolution: 2560 x 1440 @ 60 Hz; 3.7MP Preset VESA Graphic Modes (non-interlaced): 2560 x 1440 @ 60 Hz Maximum Pixel Clock Speed: 250 MHz User Programmable Modes: None Anti-Glare: Yes Default Color Temperature: 6500 K	
Color	Jack Black	
Convertibility	The Z1 can either be placed on the desktop in the traditional display method or mounted on a wal with the industry standard VESA mount.	
Expansion Slots (see system board section for more details)	• 1 MXM (dedicated for graphics) • 3 miniPCIe full-length	
Expansion Bays (see storage section for more details)	1 internal 3.5" bay, or 2 internal 2.5" bays	
Side I/O	2 USB 3.0, 1 IEEE 1394a, 1 4-in-1 Media Card Reader, 1 Headphone, 1 Mic; Mic can be re-taske to function as Line-in	
Internal I/O	1 USB 2.0 Type A on Rear IO board, 2 internal on 9-pin header	
Rear I/O	1 DisplayPort, 4 USB 2.0, 1 RJ45 LAN, 1 Subwoofer, 1 optical S/PDIF, 1 Audio Line-in, and 1 Audio Line-out	
Chassis Dimensions (HxWxD)	Standard display orientation WITH stand: 584.2mm x 660.4mm x 419.1mm (23in. x 26in. x 16.5ir Standard display orientation WITHOUT stand: 457.2mm x 660.4mm x 81.28mm (18in. x 26in. x 3.2in.)	
Weight	Exact weights depend upon configuration; Max system weight WITH stand: 21.32 kg (47 lbs); Stand weight 5.9 kg (13 lbs)	
Temperature	Operating:	40° to 95°F (5° to 35°C)
	Non-operating	-40° to 140°F (-40° to 60°C)
Humidity	Operating:	8% to 85%
	Non-operating	8% to 90%
Maximum Altitude (non-pressurized)	Operating:	3,000 m (10,000 ft)
	Non-operating	9,100 m (30,000 ft).

Overview

Power Supply	400 watts wide-ranging, active Power Factor Correction, 90% Efficient The Power Supply Efficiency Report for this product may be found at these links: TBD
Chipset	Intel® C206 chipset
Memory	4 DIMM slots, supporting up to 32GB ECC or 8GB non-ECC Unbuffered DDR3 1600 MHz
Memory Disclaimers	The CPU determines the speed at which the memory is clocked. If a 1333MHz capable CPU is used in the system, the maximum speed the memory will run at is 1333MHz regardless of the specified speed of the memory.
Workstation ISV Certifications	See the latest list of certifications at http://www.hp.com/united-states/campaigns/workstations/partnerships.html

Supported Components

Processors

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Intel® Xeon® processor E3 family				
Intel Xeon processor E3-1280, 3.50 GHz, 95W, 8 MB cache, 1333 MHz memory, Quad-Core, HT, featuring Intel vPro Technology	Y	N		See Note 1
Intel Xeon processor E3-1245, 3.30 GHz, 95W, 8 MB cache, 1333 MHz memory, Quad-Core, HT, HD Graphics P3000, featuring Intel vPro Technology	Y	N		See Note 2
2nd generation Intel® Core™ processor family				
Intel Core i3-2120 processor, 3.30 GHz, 65W, 3 MB cache, 1333 MHz memory, Dual-Core, HT, Intel HD Graphics 2000	Y	N		See Note 1

NOTE 1: These processors support either ECC or non-ECC memory
NOTE 2: Intel HD Graphics P3000 provides improved desktop performance and supports workstation-specific graphics drivers for improved compatibility and performance on select professional applications compared to Intel HD Graphics 2000.

Monitors / Displays

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP Z1 27-inch WLED IPS Display				
HP DreamColor LP2480zx Professional Display				
HP ZR30w 30-inch S-IPS LCD Monitor				
HP ZR2740w 27-inch LED Backlit IPS Monitor				
HP ZR2440w 24-inch LED Backlit IPS Monitor				
HP ZR24w 24-inch S-IPS LCD Monitor				
HP ZR24w 24-inch S-IPS LCD Monitor				
HP ZR2040w 20-inch LED Backlit IPS Monitor				

NOTES:
Supported by all Operating Systems available from HP

Screen Size Diagonally Measured

Supported Components

Hard Drives

		Factory Configured	Option Kit	Option Kit Part Number	Support Notes
SATA Hard Drives	**SATA (Serial ATA) Hard Drives for HP Workstations**				
	250GB SATA 7200 rpm 6Gb/s 3.5" HDD	Y	Y		
	500GB SATA 7200 rpm 6Gb/s 3.5" HDD	Y	Y		
	1TB SATA 7200 rpm 6Gb/s 3.5" HDD	Y	Y		
	2.0TB SATA 7200 rpm 6Gb/s 3.5" HDD	Y	Y		
	300GB SATA 10K rpm SFF HDD	Y	Y		
	600GB SATA 10K rpm SFF HDD				
SATA Solid State Drives	**HP Solid State Drives (SSDs) for Workstations**				
	HP 160GB SATA SSD	Y	Y		
	HP 300GB SATA SSD	Y	Y		

		Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Hard Drive Controllers	**Factory integrated RAID on motherboard for SATA drives**				
	RAID 0 Configuration - Striped Array	Y	N		
	RAID 1 Configuration - Mirrored Array	Y	N		

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 http://h20000.www2.hp.com/bc/docs/support/SupportManual/c00060684/c00060684.pdf for RAID capabilities with Linux.

All drives must be identical in type and capacity

All RAID arrays must be less than 2 TB

NOTE 1: Requires identical hard drives (speeds, capacity, interface).

Supported Components

Graphics

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes	Support Multi Mixed
Integrated Intel HD Graphics Media Accelerators					
Intel HD Graphics P3000	Y	N		On select CPUs	1
Intel HD Graphics 2000	Y	N		On select CPUs	1
Entry 3D					
NVIDIA Quadro 500M 1GB Graphics	Y	N			1
Mid-range 3D					
NVIDA Quadro 1000M 2GB Graphics	Y	N			1
NVIDIA Quadro 3000M 2GB Graphics	Y	N			1
High End 3D					
NVIDIA Quadro 4000M 2GB Graphics	Y	N			1

NOTE 1: If a discrete graphics card is installed, Intel integrated graphics is disabled.

Memory

CTO	Option Kit Part Number	Support Notes
DDR3-1600 ECC Unbuffered DIMMs - CTO		
HP 32GB (4x8GB) DDR3-1600 ECC RAM		
HP 16GB (2x8GB) DDR3-1600 ECC RAM		
HP 16GB (4x4GB) DDR3-1600 ECC RAM		
HP 8GB (2x4GB) DDR3-1600 ECC RAM		
HP 8GB (4x2GB) DDR3-1600 ECC RAM		
HP 4GB (2x2GB) DDR3-1600 ECC RAM		
DDR3-1600 nECC Unbuffered DIMMs CTO		
HP 8GB (4x2GB) DDR3-1600 nECC RAM		
HP 4GB (2x2GB) DDR3-1600 nECC RAM		
HP 2GB (1x2GB) DDR3-1600 nECC RAM		

Sub-Section Description/Notes

Intel® Xeon E3 and Intel Core i3 processors can support either ECC or non-ECC memory.

Two channels of DDR3 memory are supported. To realize full performance at least one DIMM must be inserted into each channel.

The CPU determines the speed at which the memory is clocked. If a 1333MHz capable CPU is used in the system, the maximum speed the memory will run at is 1333MHz regardless of the specified speed of the memory.

Only unbuffered DDR3 DIMMs are supported.

AMO		
DDR3-1600 ECC Unbuffered DIMMs - AMO		
HP 8GB (1x8GB) DDR3-1600 ECC RAM		
HP 4GB (1x4GB) DDR3-1600 ECC RAM		
HP 2GB (1x2GB) DDR3-1600 ECC RAM		
DDR3-1600 nECC Unbuffered DIMMs AMO		
HP 2GB (1x2GB) DDR3-1600 nECC RAM		

Supported Components

Multimedia and Audio Devices	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP HD 2MP 1080p Webcam	Y	N		
Integrated HP Digital Mic Array	Y	N		

Optical and Removable Storage	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP Slot Load DVD+/-RW Drive	Y	N		
HP Blu-ray Writer Slot Load	Y	Y	B2P97AA	

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.

Networking and Communications	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
Integrated Intel 82579LM PCIe GbE Controller	Y	N		
Integrated Intel 802.11 a/g/n Wireless LAN & Bluetooth® Combo Card	Y	N		See note 1

NOTE 1: Card is factory installed into miniPCIe slot 1.

Racking and Physical Security	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP Chassis Intrusion Sensor	Y	Y		
Security Cable with Kensington Lock	N	Y	PC766A	

Input Devices	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP USB Standard Keyboard	Y	Y		
HP USB 2-Button Optical Scroll Mouse	Y	Y		
HP Wireless Keyboard and Mouse	Y	Y		

Supported Components

Other Hardware

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP Power Cord Kit	N	Y		
HP Workstation Mouse Pad	Y	N		Japan only
HP Energy Star Enabled Configuration	Y	N		

Software

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP Performance Advisor	Y	N		See note 1
HP Remote Graphics Software (RGS) V5	Y	N		See note 2
HP ProtectTools Security	Y	N		See note 3
MS Office Home & Business 2010	Y	N		See note 4
HP Power Assistant	Y	N		
Roxio Easy Media Creator (DVD/Blu-ray Disc burner software)	Y	N		
Intervideo WinDVD (DVD player/burner software	Y	N		
PDF Complete - Trial Edition	Y	N		

NOTE 1: Available as a free download here: www.hp.com/go/performanceadvisor
NOTE 2: Supports both 32 and 64 bit versions of Windows 7 Professional and Enterprise, Windows XP Professional and Enterprise, and RHEL V6
NOTE 3: Must select as a Configure to Order option. Delivered as a "Drop in the Box" CD
NOTE 4: Must select as a Configure to Order option

Operating Systems

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

NOTE 1: See http://www.microsoft.com/windows/windows-7/ for support details.
NOTE 2: For detailed OS/hardware support information for Linux, see: http://www.hp.com/support/linux_hardware_matrix.
NOTE 3: This second OS must be ordered with the HP Linux Installer Kit as the first OS.

System Board		
System Board Form Factor	Custom Motherboard, Custom Rear IO board, Custom Side IO board	
Processor Socket	Single LGA 1155	
CPU Bus Speed	DMI	
Chipset	Intel® PCH C206	
Super I/O Controller	Nuvoton NPCD379H	
Memory Expansion Slots	4 DDR3 memory slots	
Memory Type Supported	2GB, 4GB, and 8GB ECC Unbuffered DIMMs; 2GB non-ECC Unbuffered DIMMs Mixing of ECC and non-ECC DIMMs is not supported	
Memory Speed Supported	Up to 1600MHz DDR3	
Maximum Memory	32GB ECC or 8GB non-ECC	
Memory Configuration (Supported)	Only ECC DIMMs are supported.	
PCI Express Connectors	1 MXM slot (PCIe Gen2 x16, DP x 2) 3 miniPCIe slots (PCIe Gen2 x1, USB 2.0)	
Supported Drive Interfaces	**SATA**	Integrated Serial ATA interfaces (2x 6Gb/s SATA in blue, 1x 3Gb/s SATA in black). **NOTE:** the Z1 supports a maximum of two SATA SFF/SSD drives only. RAID 0 and 1 supported. (Factory integrated RAID is Microsoft Windows only).
	Integrated RAID	**NOTE:** Requires identical hard drives (speeds, capacity, interface)
	Integrated Graphics	• Integrated Intel HD Graphics 2000 (on Intel Core i3 processors). • Integrated Intel HD Graphics P3000 (on Intel Xeon E3-12x5 processors). • Unified Memory Architecture (UMA)- A region of system memory is reserved and dedicated to the graphics display. • DirectX 10.0 compliant. • OpenGL 3.0 on Intel HD Graphics P3000) • Integrated graphics can support dual display across the embedded DP to the LCD panel and the DP output on the Rear IO.
	Network Controller	Integrated Gbit LAN MAC by Intel PHY Lewisville 82579LM; Management capabilities WOL, PXE 2.1 and AMT 7
IEEE 1394 Connector(s)	**Side**	1 IEEE 1394a
USB Connector(s)	**Side**	2 USB 3.0
	Rear	4 USB 2.0
	Internal	1 USB 2.0 Type A, 2 USB 2.0 on a 9-pin header
HD Integrated Audio	Intel HD / IDT 92HD91 codec	
Flash ROM	Yes	
CPU Fan Header	Yes	

Front Control Panel/Speaker Header	Yes
CMOS Battery Holder - Lithium	Yes
Integrated Trusted Platform Module	Integrated TPM 1.2. TPM module disabled where restricted by law.
Power Supply Headers	Yes
Power Switch, Power LED & Hard Drive LED Header	Yes
Clear Password Jumper	Yes
Serial Port	Single Port (Requires optional Serial Port Adapter)
Parallel Port	No
Keyboard/Mouse	USB

Z1 Required power supply info

Power Supply	**400W Wide Ranging, Active PFC, 90% Efficient**
Operating Voltage Range	**90-264 VAC**
Rated Voltage Range	**100-240 VAC**
Rated Line Frequency	**50/60 Hz**
Operating Line Frequency Range	**47-63 Hz**
Rated Input Current	**5A @ 100-240V**
Heat Dissipation	**Typical: TBD btu/hr (TBD kg-cal/hr) Maximum: TBD btu/hr (TBD kg-cal/hr)**
Power Supply Fan	**Two 40x20mm variable speed fans**
ENERGY STAR Qualified (Configuration dependent)	**Yes**
80 PLUS® Compliant	**Yes, Gold.**
FEMP Standby Power Compliant	**Yes, <2W in S5-Power Off @ 115VAC**
EuP Compliant @ 230V (<1 W in S5 - Power Off)	**YES**
Power consumption in sleep mode (as defined by ENERGY STAR) - Suspend to RAM (S3)	**<4W**
Built-in Self Test LED	**Yes**
Surge Tolerant Full Ranging Power Supply (withstands power surges up to 2000V)	**Yes**
ErP Lot 6- Tier 1 Compliance @ 230V (<1W in S5- Power Off)	**Yes**
ErP Lot 6- Tier 2 Compliance @ 230V (<0.5W in S5- Power Off)	**Yes**

System Configuration

System Technical Specifications

Example Configuration	Processor Info Memory Info Graphics Info Disks/Optical/Floppy PSU	xxxxx xxxxx xxxxx xxxxx xxxxx					
Energy Consumption		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)						
	Windows Busy Typ (S0)						
	Windows Busy Max (S0)						
	Sleep (S3)						
	Off (S5)						
	Zero Power Mode (EuP)						
Heat Dissipation**		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)						
	Windows Busy Typ (S0)						
	Windows Busy Max (S0)						
	Sleep (S3)						
	Off (S5)						
	Zero Power Mode (EuP)						

Declared Noise Emissions (Entry-level and High-end configurations)		
System Configuration (Entry level)	**Processor Info**	
	Memory Info	
	Graphics Info	
	Disks/Optical/Floppy	

Declared Noise Emissions (in accordance with ISO 7779 and ISO 9296)		**Sound Power** (LWAd, bels)	**Deskside Sound Pressure** (LpAm, decibels
	Idle		
	SATA Hard drive Operating (random reads)		
	DVD-ROM Operating (sequential reads)		

System Technical Specifications

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

Physical Security and Serviceability	
Access Panel	Tool-less Includes system board and memory information
Expansion Cards	MXM graphics assembly is tool-less. MiniPCIe cards are screw-in.
Processor Socket	Tool-less, except for the processor heatsink.
Green User Touch Points	Yes, on tool-free internal chassis mechanisms
Color-coordinated Cables and Connectors	Yes
Memory	Tool-less
System Board	Screw-In for motherboard, Rear IO and Side IO boards.
Dual Color Power and HD LED on Side of Computer	Yes
Configuration Record SW	Yes
Over-Temp Warning on Screen	Yes
Restore CD/DVD Set	Restores the computer to its original factory shipping operating system. Orderable with the workstation, or available from Support.
Dual Function Side Power Switch	Causes a fail-safe power off when held for 4 seconds
Cable Lock Support	Yes, Kensington Cable Lock (optional): Locks side cover and secures chassis from theft 3mm x 7mm slot at rear of system
Solenoid Lock and Hood Sensor	No, Solenoid Lock Yes, Hood Sensor (optional) The Sensor Kit detects when the access panel has been opened.

System Technical Specifications

Rear Port Control Cover	Yes, locks rear IO cables to prevent cable theft
Serial, Parallel, USB, Audio, Network, Enable/Disable Port Control	Yes, enables or disables USB, audio, and network ports
Removable Media Write/Boot Control	Yes, prevents ability to boot from removable media on supported devices (and can disable writes to media)
Power-On Password	Yes, prevents an unauthorized person from booting up the workstation.
Setup Password	Yes, prevents an unauthorized person from changing the workstation configuration
3.3V Aux Power LED on System PCA	No
NIC LEDs (integrated) (Green & Amber)	Yes
CPUs and Heatsinks	A T-15 Torx or flat blade screwdriver is needed to remove the CPU heatsink before the CPU can be removed. CPU removal is tool-less
Power Supply Diagnostic LED	Yes
Side Power Button	Yes, ACPI multi-function
Side Power LED	Yes, blue (normal), red (fault)
Side Hard Drive Activity LED	Yes, green
Side ODD Activity LED	Yes, green
Internal Stereo Speakers	Yes, Two 4W speakers
System/Emergency ROM Flash Recovery	Recovers corrupted system BIOS.
Cooling Solutions	Air cooled forced convection
Power Supply Fans	40 mm x 40 mm x 20 mm 4-wire PWM (non-serviceable)
CPU Heatsink Fan	Yes, Two 80 mm blowers
MXM Heatsink Fan	Yes, One 110 mm blower with MXM graphics assembly
System Blower	Yes, 110 mm blower
HP Vision Diagnostics Offline Edition	HP Vision 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.
Access Panel Key Lock	No
ACPI-Ready Hardware	Advanced Configuration and Power Management Interface (ACPI). ● Allows the system to wake from a low power mode ● Controls system power consumption, making it possible to place individual cards and peripherals in a low-power or powered-off state without affecting other elements of the system
Trusted Platform Module Chip with optional ProtectTools Software	Yes
Integrated Chassis Handles	Yes, One on top-rear of system
Power Supply	Tool-less
miniPCIe Card Retention	Yes

Flash ROM	Yes
Diagnostic Power Switch LED on board	No
Clear Password Jumper	Yes
Clear CMOS Button	Yes
CMOS Battery Holder	Yes
DIMM Connectors	Yes
HP ProtectTools Security Manager	Yes - Not supported on Linux

BIOS	
BIOS 32-bit Services	Standard BIOS 32-bit Service Directory Proposal v0.4
ATAPI	ATAPI Removable Media Device BIOS Specification Version 1.0.
BBS	BIOS Boot Specification v1.01.
WMI Support	WMI is Microsoft's implementation of Web-Based Enterprise Management (WBEM) for Windows. WMI is fully compliant with the Distributed Management Task Force (DMTF) Common Information Model (CIM) and WBEM specifications.
BIOS Boot Spec 1.01+	Provides more control over how and from what devices the workstation will boot.
BIOS Power On	Users can define a specific date and time for the system to power on.
ROM Based Computer Setup Utility (F10)	Review and customize system configuration settings controlled by the BIOS.
System/Emergency ROM Flash Recovery with Video	Recovers system BIOS in corrupted Flash ROM.
Replicated Setup	Saves BIOS settings to USB flash device in human readable file. Repset.exe utility can then replicate these settings on machines being deployed without entering Computer Configuration Utility (F10 Setup).
SMBIOS	System Management BIOS 2.7.1, for system management information
Boot Control	Disables the ability to boot from removable media on supported devices.
Memory Change Alert	Alerts management console if memory is removed or changed.
Thermal Alert	Monitors the temperature state within the chassis. Three modes: ● NORMAL - normal temperature ranges. ● ALERTED - excessive temperatures are detected. Raises a flag so action can be taken to avoid shutdown or provide for a smoother system shutdown. ● SHUTDOWN - excessive temperatures are encountered. Automatically shuts down the computer without warning before hardware component damage occurs.
Remote ROM Flash	Provides secure, fail-safe ROM image management from a central network console.
ACPI (Advanced Configuration and Power Management Interface)	Allows the system to enter and resume 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.
Ownership Tag	A user-defined string stored in non-volatile memory that is displayed in the BIOS splash screen.
Remote Wakeup/ Remote Shutdown	System administrators can power on, restart, and power off a client computer from a remote location.
Instantly Available PC (Suspend to RAM - ACPI sleep state S3)	Allows for very low power consumption with quick resume time

System Technical Specifications

Remote System Installation via F12 (PXE 2.1) (Remote Boot from Server)	Allows a new or existing system to boot over the network and download software, including the operating system.
ROM revision levels	Reports the system BIOS revision level in Computer Configuration Utility (F10 Setup). Version is available through an industry standard interface (SMBIOS) so that management SW applications can use and report this information.
System board revision level	Allows management SW to read revision level of the system board. Revision level is digitally encoded into the HW and cannot be modified.
Start-up Diagnostics (Power-on Self-Test)	Assesses system health at boot time with selectable levels of testing.
Auto Setup when new hardware installed	System automatically detects addition of new hardware.
Keyboard-less Operation	The system can be booted without a keyboard
Localized ROM Setup	Common BIOS image supports System Configuration Utility (F10 Setup) menus in 12 languages with local keyboard mappings.
Asset Tag	The user or MIS to set a unique tag string in non-volatile memory.
Per-slot Control	Allows I/O slot parameters (option ROM enable/disable, bus latency) to be configured individually.
Adaptive Cooling	Control parameters are set according to detected hardware configuration for optimal acoustics.
Pre-boot Diagnostics	(Pre-video) critical errors are reported via beeps and blinks on the power LED.
Intel® Active Management Technology (AMT)	AMT 7.0; Allows workstation status to be monitored on a remote console
Industry Standard Specification Support	
ACPI	Advanced Configuration and Power Management Interface, Version 1.0
ASF	No
ATA (IDE)	AT Attachment 6 with Packet Interface (ATA/ATAPI-6), Revision 3b
CD Boot	"El Torito" Bootable CD-ROM Format Specification Version 1.0
EDD	• Enhanced Disk Drive Specification Version 1.1 • BIOS Enhanced Disk Drive Specification Version 3.0
EHCI	Enhanced Host Controller Interface for Universal Serial Bus, Revision 1.0
PCI Express	• PCI Express Mini Card Electromechanical Specification Revision 1.2 • PCI Express Base Specification, Revision 2.0 • MXM Graphics Module Mobile PCI Express Module Electromechanical Specification Version 3.0, Revision 1.1
PMM	POST Memory Manager Specification, Version 1.01
SATA	• Serial ATA Specification, Revision 1.0a • Serial ATA II: Extensions to Serial ATA 1.0, Revision 2.6 • Serial ATA II Cables and Connectors Volume 2 Gold • Serial ATA III: Revision 3.0 Specification
SPD	PC SDRAM Serial Presence Detect (SPD) Specification, Revision 1.2B
TPM	Trusted Computing Group TPM Specification Version 1.2
USB	• Universal Serial Bus Revision 1.1 Specification • Universal Serial Bus Revision 2.0 Specification • Universal Serial Bus Revision 3.0 Specification
UEFI	UEFI 2.1

Social and Environmental Responsibility

Eco-Label Certifications & Declarations	This product has received or is in the process of being certified to the following approvals and ma be labeled with one or more of these marks: • ENERGY STAR® (energy-saving features available on selected configurations -Windows only) o US • Federal Energy Management Program (FEMP) o China Energy Conservation Program o IT ECO declaration
Batteries	Batteries used in the product do not contain: • Mercury greater than 5ppm by weight • Cadmium greater than 10ppm by weight • Lead greater than 40ppm by weight
Restricted Material Usage	This product meets the material restrictions specified in HP's General Specification for the Environment. http://www.hp.com/hpinfo/globalcitizenship/environment/pdf/gse.pdf Hewlett-Packard is committed to compliance with all applicable environmental laws and regulations, including the European Union Restriction of Hazardous Substances (RoHS) Directive HP's goal is to exceed compliance obligations by meeting the requirements of the RoHS Directiv on a worldwide basis.
BFR/PVC-Free Statement	This product is brominated flame retardant and polyvinyl chloride free (BFR/PVC-free); meeting the evolving definition of "BFR/PVC-free" as set forth in the "iNEMI Position Statement on the 'Definition of Low-Halogen Electronics (BFR/CFR/PVC-Free).'" Plastic parts contain <1,000 ppm (0.1 percent) of bromine (if the Br source is from BFRs) and <1,000 ppm (0.1 percent) of chlorine (if the Cl source is from CFRs or PVC or PVC copolymers). All printed circuit board (PCB) and substrate laminates contain bromine/chlorine total <1,500 ppm (0.15 percent) with a maximum chlorine of 900 ppm (0.09 percent) and maximum bromine being 900 ppm (0.09 percent). Service parts after purchase may not be BFR/PVC-free. Exceptions to this claim that may be shipped w the product include the power cord, keyboard, mouse and video adapters which may not be BFR/PVC-free.
Packaging	HP Workstation product packaging meets the following (refer to the HP General Specification for the Environment at http://www.hp.com/hpinfo/globalcitizenship/environment/supplychain/gen_specifications.html: • Does not contain restricted substances listed in HP Standard 011-1 General Specification for the Environment (see link above). • Does not contain ozone-depleting substances (ODS). • Does not contain heavy metals (lead, mercury, cadmium or hexavalent chromium) in exce of 100 ppm sum total for all heavy metals listed. • Maximize the use of post-consumer recycled content materials in packaging materials. • All packaging material is recyclable. • All packaging material is designed for ease of disassembly. • Reduce size and weight of packages to improve transportation fuel efficiency. • Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards
Packaging Materials	
Internal	EPE - Expanded Polyethylene foam The Expanded Polyethylene packaging material is made from 100% recycled content
External	Cardboard carton and accessory carton: minimum 80% recycled content

Manageability

Industry Standard Specifications	This product meets the following industry standard specifications for manageability functionality: • DASH 1.1 required functionalities via integrated Intel LAN

System Technical Specifications

Intel Active Management Technology (AMT)	Intel Active Management Technology (AMT) 7.0 An advanced set of remote management features and functionality which provides network administrators the latest and most effective tools to remotely discover, heal, and protect network client systems regardless of the system's health or power state. AMT 7.0 includes the following advanced management functions: • Power Management (on, off, reset) • Hardware Inventory (includes BIOS and firmware revisions • Hardware Alerting • Agent Presence • System Defense Filters • SOL/IDER • Cisco NAC/SDN Support • ME Wake-on-LAN • DASH 1.1 compliance • IPv6 Support • Fast Call for Help - a client inside or outside the firewall may initiate a call for help via BIOS screen, periodic connections, or alert triggered connection o Remote Scheduled Maintenance - pre-schedule when the PC connects to the IT or servic provider console for maintenance. Remote PCs can get required patches, be inventoried, etc by connecting to their IT console or Service Provider when it's convenient • Remote Alerts - automatically alert IT or service provider if issues arise • Access Monitor - Provides oversight into Intel® AMT actions to support security requireme • PC Alarm Clock • Microsoft NAP Support • Host Base set-up and configuration • Management Engine (ME) firmware roll back • Enhanced KVM resolution
Intel® vPro™ Technology	The HP Z1 workstation supports Intel vPro technology when configured with a processor branded "featuring Intel vPro Technology"
Remote Manageability Software Solutions	The HP Z1 Workstation is supported on the following remote manageability software consoles: • LANDesk Management Suite (PSG recommended solution) • Microsoft System Center Configuration Manager • HP Client Automation Enterprise For questions or support for manageability needs, please visit http://www.hp.com/go/easydeploy
System Software Manager	For questions or support for SSM, please visit: http://www.hp.com/go/ssm
Service, Support, and Warranty	On-site Warranty and Service (Note 1): Three-years, limited warranty and service offering delivers on-site, next business-day (Note 2) service for parts and labor and includes free telephone suppo (Note 3) 8am - 5pm. Global coverage (Note 2) ensures that any product purchased in one countr and transferred to another, non-restricted country will remain fully covered under the original warranty and service offering. **NOTE 1:** Terms and conditions may vary by country. Certain restrictions and exclusions apply. **NOTE 2:** On-site service may be provided pursuant to a service contract between HP and an authorized HP third-party provider, and is not available in certain countries. Global service response times are based on commercially reasonable best effort and may vary by country. **NOTE 3:** Technical telephone support applies only to HP-configured, HP and HP-qualified, third-party hardware and software. Toll-free calling and 24x7 support service may not be available in some countries. HP Care Pack Services extend service contracts beyond the standard warranties. Service starts from date of hardware purchase. To choose the right level of service for your HP product, use the HP Care Pack Services Lookup Tool at: http://www.hp.com/go/lookuptool. Additional HP Care Pack Services information by product is available at: http://www.hp.com/hps/carepack. Service levels and response times for HP Care Packs may vary depending on your geographic location.

Product Change Notification	● Program to proactively communicate Product Change Notifications (PCNs) and Customer Advisories by email to customers, based on a user-defined profile. ● PCNs provide advance notification of hardware and software changes to be implemented in the factory providing time to plan for transition. ● Customer Advisories provide concise, effective problem resolution, greatly reducing the need to call technical support.

Hard Drives	Product #	Offering
	A2H01AV	HP 250GB SATA 7200 1st HDD
	A2H02AV	HP 500GB SATA 7200 1st HDD
	A3S86AV	HP 300GB SATA 10K SFF 1st HDD
	A3S88AV	HP 300GB SATA 10K SFF 2nd HDD

Memory	Product #	Offering
	A2H27AV	HP 4GB (2x2GB) DDR3-1600 nECC RAM
	A2H29AV	HP 4GB (2x2GB) DDR3-1600 ECC RAM
	A2H30AV	HP 8GB (4x2GB) DDR3-1600 ECC RAM
	A2H32AV	HP 16GB (4x4GB) DDR3-1600 ECC RAM

Optical and Removable Storage	Product #	Offering
	A2H18AV	HP 8X DVD RW SuperMulti Slot Load Drive

Input Devices	Product #	Offering
	A2H09AV	HP USB Standard Keyboard
	A2H10AV	HP USB Optical Scroll Mouse
	A6T05AV	HP Wireless Keyboard and Mouse

Operating Systems	Product #	Offering
	A2H12AV	MS Windows 7 Professional 32-Bit OS
	A2H13AV	MS Windows 7 Professional 64-bit OS

Processors	Intel Xeon processor E3-1280, 3.50 GHz, 95W, 8 MB cache, 1333 MHz memory, Quad-Core, HT, featuring Intel vPro Technology
	Intel Xeon processor E3-1245, 3.30 GHz, 95W, 8 MB cache, 1333 MHz memory, Quad-Core, HT, HD Graphics P3000, featuring Intel vPro Technology
	Intel Core i3-2120 processor, 3.30 GHz, 65W, 3 MB cache, 1333 MHz memory, Dual-Core, HT, Intel HD Graphics 2000

SATA (Serial ATA) Hard Drives for HP Workstations	**600GB SATA 10K rpm SFF HDD**	**Capacity**	600GB	
		Height	0.6 in; 1.53 cm	
		Width	**Media Diameter**	2.5 in; 6.36 cm
			Physical Size	2.75 in; 6.99 cm
		Interface	Serial ATA (3.0Gb/s)	
		Synchronous Transfer Rate (Maximum)	Up to 300MB/s	
		Buffer	32MB	
		Cache	Segmentable	
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.4 ms (max)
			Average	3.6 ms
			Full Stroke	9.0 ms
		Rotational Speed	10,000 rpm	
		Logical Blocks	1,172,123,568	
		Operating Temperature	41° to 131° F (5° to 55° C)	
	300GB SATA 10K rpm SFF HDD	**Capacity**	300,069,052,416 bytes	
		Height		
		Width	**Media Diameter**	2.5 in; 6.36 cm
			Physical Size	2.75 in; 6.99 cm
		Interface	Serial ATA (3.0 Gb/s), Native Command Queuing enabled	
		Synchronous Transfer Rate (Maximum)	Up to 300 MB/s	
		Buffer	16 MB	
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.7 ms (maximum)
			Average	4.4 ms
			Full Stroke	9.5 ms
		Rotational Speed	10,000 rpm	
		Logical Blocks	586,072,368	
		Operating Temperature	41° to 131° F (5° to 55° C)	
	2.0TB SATA 7200 rpm 3Gb/s 3.5" HDD	**Capacity**	2.0TB	
		Height	1 in; 2.54 cm	
		Width	**Media Diameter**	3.5 in; 8.9 cm
			Physical Size	4 in; 10.17 cm
		Interface	Serial ATA (3.0 Gb/s), Native Command Queuing Enabled	
		Synchronous Transfer Rate (Maximum)	Up to 300MB/s	
		Buffer	64MB	
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	1.0 ms
			Average	10 ms
			Full Stroke	Not Specified
		Rotational Speed	7,200 rpm	
		Logical Blocks	3,907,029,168	

	Operating Temperature	41° to 131° F (5° to 55° C)	
1TB SATA 7200 rpm 6Gb/s 3.5" HDD	**Capacity**	1 Terabyte (1000 GB)	
	Height	1 in; 2.54 cm	
	Width	**Media Diameter**	3.5 in; 8.9 cm
		Physical Size	4.0 in; 10.17 cm
	Interface	Serial ATA (6.0Gb/s), NCQ enabled	
	Synchronous Transfer Rate (Maximum)	Up to 600MB/s	
	Buffer	32MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	2 ms
		Average	11 ms
		Full Stroke	21 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	1,953,525,168	
	Operating Temperature	41° to 131° F (5° to 55° C)	
500GB SATA 7200 rpm 6Gb/s 3.5" HDD	**Capacity**	**500GB**	
	Height	**1 in; 2.54 cm**	
	Width	**Media Diameter**	**3.5 in; 8.9 cm**
		Physical Size	**4.0 in; 10.17 cm**
	Interface	**Serial ATA (6.0Gb/s), NCQ enabled**	
	Synchronous Transfer Rate (Maximum)	**Up to 600MB/s**	
	Buffer	**16MB**	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	**2 ms**
		Average	**11 ms**
		Full Stroke	**21 ms**
	Rotational Speed	**7,200 rpm**	
	Logical Blocks	**976,773,168**	
	Operating Temperature	**41° to 131° F (5° to 55° C)**	
250GB SATA 7200 rpm 6Gb/s 3.5" HDD	**Capacity**	**250 GB**	
	Height	**1 in; 2.54 cm**	
	Width	**Media Diameter**	**3.5 in; 8.9 cm**
		Physical Size	**4.0 in; 10.17 cm**
	Interface	**Serial ATA (6.0Gb/s), NCQ enabled**	
	Synchronous Transfer Rate (Maximum)	**Up to 600MB/s**	
	Buffer	**8 MB**	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	**2 ms**
		Average	**11 ms**
		Full Stroke	**21 ms**
	Rotational Speed	**7,200 rpm**	
	Logical Blocks	**488,397,168**	
	Operating Temperature	**41° to 131° F (5° to 55° C)**	

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

Integrated Intel HD Graphics Media Accelerators	**Form Factor**	Integrated
	Graphics Controller	Intel Integrated Graphics Media Accelerator HD
	Memory	Unified Memory Architecture (UMA) frame buffer. Graphics memory is shared with system memory. Size selectable between 64 MB to 512 M via BIOS setting. Default size is 64 MB. Additional memory is allocate for graphics as needed using Intel's Dynamic Video Memory Technolo (Intel DVMT 5.0), to provide an optimal balance between graphics and system memory use.
	Connectors	1 Embedded DisplayPort to LCD panel, 1 DisplayPort on rear IO Graphics adapters are orderable as an accessory as necessary.
	Maximum Resolution	Display Port: 2560 x 1600
	RAMDAC	Integrated, 350 MHz
	Display Output	Integrated dual independent monitor support facilitated via one embedded DP and one DisplayPort integrated on the rear IO. VGA support via optional DisplyPort to VGA adapter.
	Supported Graphics APIs	Intel HD Graphics 2000: Microsoft DirectX 10, OpenGL 2.1 Intel HD Graphics P3000: Microsoft DirectX 10.1, OpenGL 3.0
NVIDIA Quadro 500M 1GB Graphics	**Form Factor**	MXM v3.0 Type A (82mm x 70mm)
	Graphics Controller	N12M-Q3, 560MHz core clock
	Bus Type	PCI Express x16 (part of MXM v3.0 connector)
	Memory	1GB DDR3, 128 bit wide interface, 800MHz
	Connectors	One MXM v3.0 connector (285-pin)
	Maximum Resolution	2 x 2560x1600 @ 60Hz digital displays In Z1 application: - Internal Display: 2560x1440 - External Display via DP connector: 2560x1600
	RAMDAC	Not Applicable
	Image Quality Features	Capable of 10-bit per channel (3 channels) internal display processing, including hardware support for 10-bit per channel scan-out 64-bit texture filtering and blending Advanced vertex and pixel shaders, antialiasing, 16x anisotropic filterin MPEG-2 HD and WMV HD video playback (1920x1080p) H.264 hardware decode acceleration AES-128 CTR/CBC/ECB decryption modes supported Advanced video algorithms NVIDIA Digital Vibrance Control 3.0
	Shading Architecture	Shader Model 5.0 support 96 processor cores
	Supported Graphics APIs	Full IEEE 764-2008 32-bit or 64-bit precision DirectX 11.0 Shader Model 5.0 OpenGL 4.0 Compute API support for NVIDIA CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python and Fortran
	Available Graphics Drivers	Windows 7 32-bit and 64-bit SUSE Linux Enterprise Desktop 11 HP Linux Installer Kit See www.hp.com/go/support for HP supported NVIDIA graphics drivers
	Power Consumption	<35W

Technical Specifications - Graphics

NVIDA Quadro 1000M 2GB Graphics	**Form Factor**	MXM v3.0 Type A (82mm x 70mm)
	Graphics Controller	N12P-Q1, 700MHz core clock
	Bus Type	PCI Express x16 (part of MXM v3.0 connector)
	Memory	2GB DDR3, 128-bit wide interface, 900MHz
	Connectors	One MXM v3.0 connector (285-pin)
	Maximum Resolution	2 x 2560x1600 @ 60Hz digital displays In Z1 application: - Internal Display: 2560x1440 - External Display via DP connector: 2560x1600
	RAMDAC	Not Applicable
	Image Quality Features	Capable of 10-bit per channel (3 channels) internal display processing, including hardware support for 10-bit per channel scan-out 64-bit texture filtering and blending Advanced vertex and pixel shaders, antialiasing, 16x anisotropic filterin MPEG-2 HD and WMV HD video playback (1920x1080p) H.264 hardware decode acceleration AES-128 CTR/CBC/ECB decryption modes supported Advanced video algorithms NVIDIA Digital Vibrance Control 3.0
	Shading Architecture	Shader Model 5.0 support 96 processor cores
	Supported Graphics APIs	Full IEEE 764-2008 32-bit or 64-bit precision DirectX 11.0 Shader Model 5.0 OpenGL 4.0 Compute API support for NVIDIA CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python and Fortran
	Available Graphics Drivers	Windows 7 32-bit and 64-bit SUSE Linux Enterprise Desktop 11 HP Linux Installer Kit See www.hp.com/go/support for HP supported NVIDIA graphics drivers
	Power Consumption	42W

NVIDIA Quadro 3000M 2GB Graphics	**Form Factor**	MXM v3.0 Type B (82mm x 105mm)
	Graphics Controller	N12E-Q1, 450MHz core clock
	Bus Type	PCI Express x16 (part of MXM v3.0 connector)
	Memory	2GB GDDR5, 256-bit wide interface, 1250MHz
	Connectors	One MXM v3.0 connector (285-pin)
	Maximum Resolution	2 x 2560x1600 @ 60Hz digital displays In Z1 application: - Internal Display: 2560x1440 - External Display via DP connector: 2560x1600
	RAMDAC	Not Applicable
	Image Quality Features	Capable of 10-bit per channel (3 channels) internal display processing, including hardware support for 10-bit per channel scan-out 64-bit texture filtering and blending Advanced vertex and pixel shaders, antialiasing, 16x anisotropic filterin MPEG-2 HD and WMV HD video playback (1920x1080p) H.264 hardware decode acceleration AES-128 CTR/CBC/ECB decryption modes supported Advanced video algorithms NVIDIA Digital Vibrance Control 3.0

Technical Specifications - Graphics

	Shading Architecture	Shader Model 5.0 support 240 processor cores
	Supported Graphics APIs	Full IEEE 764-2008 32-bit or 64-bit precision DirectX 11.0 Shader Model 5.0 OpenGL 4.0 Compute API support for NVIDIA CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python and Fortran
	Available Graphics Drivers	Windows 7 32-bit and 64-bit SUSE Linux Enterprise Desktop 11 HP Linux Installer Kit See www.hp.com/go/support for HP supported NVIDIA graphics drivers
	Power Consumption	75W
NVIDIA Quadro 4000M 2GB Graphics	**Form Factor**	MXM v3.0 Type B (82mm x 105mm)
	Graphics Controller	N12E-Q3, 475MHz core clock
	Bus Type	MXM v3.0
	Memory	2GB GDDR5, 256-bit wide interface, 1250MHz
	Connectors	One MXM v3.0 connector (285-pin)
	Maximum Resolution	2 x 2560x1600 @ 60Hz digital displays In Z1 application: - Internal Display: 2560x1440 - External Display via DP connector: 2560x1600
	RAMDAC	Not Applicable
	Image Quality Features	Capable of 10-bit per channel (3 channels) internal display processing, including hardware support for 10-bit per channel scan-out 64-bit texture filtering and blending Advanced vertex and pixel shaders, antialiasing, 16x anisotropic filterin MPEG-2 HD and WMV HD video playback (1920x1080p) H.264 hardware decode acceleration AES-128 CTR/CBC/ECB decryption modes supported Advanced video algorithms NVIDIA Digital Vibrance Control 3.0
	Shading Architecture	Shader Model 5.0 support 336 processor cores
	Supported Graphics APIs	Full IEEE 764-2008 32-bit or 64-bit precision DirectX 11.0 Shader Model 5.0 OpenGL 4.0 Compute API support for NVIDIA CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python and Fortran
	Available Graphics Drivers	Windows 7 32-bit and 64-bit SUSE Linux Enterprise Desktop 11 HP Linux Installer Kit See www.hp.com/go/support for HP supported NVIDIA graphics drivers
	Power Consumption	100W

Technical Specifications - Optical and Removable Storage

HP Slot Load DVD+/-RW Drive	**Description**	Slim-Line, Slot-load	
	Mounting Orientation	Either horizontal or vertical	
	Interface Type	SATA	
	Dimensions (WxHxD)	12.7 x 1.2 x 12.9 cm (5 x 0.5 x 5 in)	
	Supported Media Types	DVD-RAM DVD+R DVD+RW DVD+R DL DVD-R DL DVD-R DVD-RW CD-R CD-RW	
	Disc Capacity	**DVD-ROM**	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)
		CD-ROM	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 (Rea & Write) 700/650MB Ultra & Ultra+ Speed CD-Rewritable (Read & Write)
	Access Times	**Full Stroke DVD**	< 270 ms (seek)
		Full Stroke CD	< 250 ms (seek)
	Maximum Data Transfer Rates	**CD ROM Read**	CD-ROM, CD-R and CD-RW Up to 24X
		DVD ROM Read	DVD-RAM Up to 5X DVD Single layer Up to 8X DVD Dual Layer Up to 6X
	Power	**Source**	SATA DC power receptacle
		DC Power Requirements	5 VDC ± 5%-100 mV ripple p-p
		DC Current	5 VDC 40 mA typical, 800 mA maximum
	Operating Environmental (all conditions non-condensing)	**Temperature**	41° to 122° F (5° to 50° C)
		Relative Humidity	10% to 90%
		Operating Systems Supported	Windows Vista Business 64*, Windows Vist 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.
		Kit Contents	Factory integrated only. Not available as a k

HP Blu-ray Writer Slot Load	**Description**	Slim-line, Slot-load
	Interface Type	SATA
	Dimensions (WxHxD)	12.7 x 1.2 x 12.9 cm (5 x 0.5 x 5 in)
	Disc Formats	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	
Disc Capacity	**DVD-ROM**	8.5 GB DL or 4.7 GB standard	
	Blu-ray	50 GB DL or 25 GB standard	
Access Times	**Full Stroke DVD**	< 250 ms (seek)	
	Full Stroke CD	< 210 ms (seek)	
	Blu-ray	Blu-ray	
	Startup Time (Time to drive ready from tray loading)	BD-ROM (SL/DL)	25S / 28S
		BD-R (SL/DL)	25S / 28S
		BD-RE (SL/DL)	25S / 28S
		DVD-ROM (SL/DL)	18S / 18S
		DVD-R (SL/DL)	25S / 25S
		DVD-RW	25S
		DVD+R (SL/DL)	25S / 25S
		DVD+RW	25S
		DVD-RAM	45S
		CD-ROM	45S
Maximum Data Transfer Rates	**CD ROM Read**	CD-ROM CD-R CD-RW	Up to 40X Up to 40X Up to 40X
	DVD ROM Read	DVD-RAM	Up to 5X
		DVD+RW	Up to 10X
		DVD-RW	Up to 10X
		DVD+R DL	Up to 8X
		DVD-R DL	Up to 8X
		DVD-ROM	Up to 16X
		DVD-ROM DL	Up to 8X
		DVD+R	Up to 12X
		DVD-R	Up to 12X
	Blu-Ray	BD-ROM	Up to 6X
		BD-ROM DL	Up to 4.8X
		BD-R	Up to 6X
		BD-R DL	Up to 4.8X
		BD-R	Up to 6X
		BD-RE SL/DL	Up to 4.8X
Power	**Source**	SATA DC power receptacle	
	DC Power Requirements	5 VDC ± 5%-100 mV ripple p-p 12 VDC ± 10%-100 mV ripple p-p	
	DC Current	5 VDC -900 mA typical, 1200 mA maximum 12 VDC -1000 mA typical, 1600 mA maximu	
Operating Environmental (all	**Temperature**	5° to 50° C (41° to 122° F)	
	Relative Humidity	15% to 80%	

conditions non-condensing)	**Maximum Wet Bulb Temperature**	30° C (86° F)
	Operating Systems Supported	Windows 7 Professional 32-bit and 64-bit, Windows Vista Business 64*, Windows Vist 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 * No driver is required for this device. Native support is provided by the operating system.
	Kit Contents	HP Blue Laser RW Drive, Roxio Easy Media Creator software, Intervideo WinDVD Software, installation guide.
Disclaimer	As Blu-Ray is a new format containing new technologies, certain disc, digital connection, compatibility and/or performance issues may arise, and do not constitute defects in the product. Flawless playback on all systems is not guaranteed. In order for some Blu-Ray titles to play, th may require a DVI or HDMI digital connection and your display may require HDCP support. HD-DVD movies cannot be played on this workstation.	

Integrated Intel 82579LM PCIe GbE Controller	**Connector**	RJ-45
	Controller	Intel 82579LM GbE platform LAN connect networking controller
	Memory	24 KB FIFO packet buffer memory
	Data Rates Supported	10/100/1000 Mbps
	Compliance	802.1P, 802.1Q, 802.2, 802.3, 802.3ab, 802.3az, 802.3u
	Bus Architecture	PCI Express and SMBus
	Data Transfer Mode	PCIe-based interface for active state operation (S0 state) and SMBus for host and management traffic (Sx low power state)
	Hardware Certifications	FCC class B, Canada and US NRTL Mark, C-Tick for Australia, BSMI for Taiwan, VCCI for Japan, MIC for Korea, GOST for Russia, UL listed (E212044), European Union Notice (CE 0682)
	Power Requirement	Requires 3.3V and 1.05V or just 3.3V with integrated regulators
	Boot ROM Support	Yes
	Network Transfer Mode	Full-duplex; Half-duplex (not supported for the 1000BASE-T transceiver)
	Network Transfer Rate	10BASE-T (half-duplex) 10 Mbps 10BASE-T (full-duplex) 20 Mbps 100BASE-TX (half-duplex) 100 Mbps 100BASE-TX (full-duplex) 200 Mbps 1000BASE-T (full-duplex) 2000 Mbps
	Management Capabilities	WOL, auto MDI crossover, PXE, Muti-port teaming, RSS, Advanced cable diagnostic. AMT 7.0 support

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