Overview

HP Z840 Workstation

1. Slimline Optical Drive Bay
2. 2 External 5.25” Bays
3. Power Button
4. HDD Activity LED
5. Front I/O: 4 USB 3.0 (Top Port has Charging Capability), 1 Headset, 1 Microphone

Overview

6. Choice of 850W, 88% or 1125W, 90% Efficient Power Supplies
7. 16 DIMM Slots for DDR4 ECC Memory
8. 2 External 5.25” Bays
9. 4 Internal 3.5” Bays
10. Rear I/O:
    Rear Power Button
    4 USB 3.0
    2 USB 2.0
    1 Serial
    PS/2 keyboard and mouse
    2 RJ-45 to integrated Gigabit LAN
    1 Audio Line-In (can be retasked as microphone)
    1 Audio Line-Out
11. 2 Intel Xeon Processors E5-2600 v3 family
12.
    - Slot 1: PCIe Gen3 x4
    - Slot 2: PCIe Gen3 x16
    - Slot 3: PCIe Gen3 x8 - Available ONLY when 2nd processor is installed
    - Slot 4: PCIe Gen3 x16 - Available ONLY when 2nd processor is installed
    - Slot 5: PCIe Gen2 x4 when 1 CPU is installed. Transforms to PCIe Gen3 x8 when 2nd CPU is installed
    - Slot 6: PCIe Gen3 x16
    - Slot 7: PCIe Gen2 x1
13. 6 SATA, 8 SAS Ports
14. 2 USB 2.0 Ports, 1 USB 3.0 Port

Overview

Overview

Form Factor Rackable Tower

Operating Systems Preinstalled:

- Windows 7 Professional 64-bit
- Windows 8.1 Pro 64-bit downgrade to Windows 7 Professional 64-bit**
- Windows 8.1 Pro 64-bit OS
- Windows 8.1 Emerging Market
- Ubuntu 14.04
- HP Installer Kit for Linux (includes drivers for 64-bit OS versions of RHEL 6 & 7, SUSE Linux Enterprise Desktop 11 and Ubuntu 14.04)
- Red Hat Enterprise Linux (RHEL) Workstation (Paper license with 1 year support; no preinstalled OS)

Supported:

- Windows 7 Enterprise 64-bit
- Windows 8/8.1 Enterprise 64-bit

NOTES: For detailed OS/hardware support information for Linux, see: http://www.hp.com/support/linux_hardware_matrix

Available Processors

Name	Clock Speed (GHz)	Cores	Cache (MB)	Memory Speed (MHz)	QPI Speed (GT/s)	Hyper Threading	Featuring Intel® vPro™ Technology	Intel® Turbo Boost Technology[1]	TDP (W)
INTEL® XEON® E5-2699 v3 processor	2.3	18	45	2133	9.6	YES	YES	5/13	145
INTEL® XEON® E5-2697 v3 processor	2.6	14	35	2133	9.6	YES	YES	5/10	145
INTEL® XEON® E5-2695 v3 processor	2.3	14	35	2133	9.6	YES	YES	5/10	120
INTEL® XEON® E5-2687W v3 processor	3.1	10	25	2133	9.6	YES	YES	1/4	160
INTEL® XEON® E5-2690 v3 processor	2.6	12	30	2133	9.6	YES	YES	5/9	135
INTEL® XEON® E5-2667 v3 processor	3.2	8	20	2133	9.6	YES	YES	2/4	135
INTEL® XEON® E5-2683 v3 processor	2.0	14	35	2133	9.6	YES	YES	5/10	120
INTEL® XEON® E5-2680 v3 processor	2.5	12	30	2133	9.6	YES	YES	4/8	120
INTEL® XEON® E5-2670 v3 processor	2.3	12	30	2133	9.6	YES	YES	3/8	120
INTEL® XEON® E5-2643 v3 processor	3.4	6	20	2133	9.6	YES	YES	2/3	135
INTEL® XEON® E5-2660 v3 processor	2.6	10	25	2133	9.6	YES	YES	3/7	105
INTEL® XEON® E5-2650 v3 processor	2.3	10	25	2133	9.6	YES	YES	3/7	105
INTEL® XEON® E5-2637 v3	3.5	4	15	2133	9.6	YES	YES	1/2	135

Overview

processor									
INTEL® XEON® E5-2640 v3 processor	2.6	8	20	1866	8.0	YES	YES	2/8	90
INTEL® XEON® E5-2630 v3 processor	2.4	8	20	1866	8.0	YES	YES	2/8	85
INTEL® XEON® E5-2623 v3 processor	3.0	4	10	1866	8.0	YES	YES	3/5	105
INTEL® XEON® E5-2620 v3 processor	2.4	6	15	1866	8.0	YES	YES	2/8	85
INTEL® XEON® E5-2609 v3 processor	1.9	6	15	1600	6.4	NO	YES	N/A	85
INTEL® XEON® E5-2603 v3 processor	1.6	6	15	1600	6.4	NO	YES	N/A	85
	[1]The specifications shown in this column represent the following: (all core maximum turbo steps, one core maximum turbo steps). Turbo boost stepping occurs in 100MHz increments. Processors that do not have turbo functionality are denoted as N/A. E5-2687Wv3, E5-2690v3, E5-2695v3, E5-2697v3 and E5-2699v3 REQUIRE the 1125W (1450W at 200V Input Voltage) Power Supply Option.								

Disclaimers

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: http://www.intel.com/products/processor_number/ for details.

Quad-Core, Six-Core, Eight-Core , 10-Core, 12-Core, 14-Core, 16-Core and 18-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.

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: http://www.intel.com/info/em64t for more information.

Intel® Xeon® processors E5-2637v3, E5-2643v3, E5-2670v3,E5-2680v3, E5-2683v3, E5-2667v3, E5-2687Wv3, E5-2690v3, E5-2695v3, E5-2697v3 and E5-2699v3 REQUIRE the 1125W (1450W at 200V Input Voltage) Power Supply Option.

Form Factor

Tower

Color

Black /Hematite

I/O Slots (see system board section for more details)

Slot 1: PCIe Gen3 x4
Slot 2: PCIe Gen3 x16
Slot 3: Gen3 x8 - Available ONLY when 2nd processor is installed
Slot 4: Gen3 x16 - Available ONLY when 2nd processor is installed
Slot 5: PCIe Gen2 x4 when 1 CPU is installed. Transforms to PCIe Gen3 x8 when 2nd CPU is installed
Slot 6: PCIe Gen3 x16
Slot 7: PCIe Gen 2x1

The PCIe x8 connectors are open ended, allowing a PCIe x16 card to be seated in the slot.

Bays (see storage section

Total Bays = 7

Overview

for more details)	4 Internal 3.5" storage bays 2 External 5.25" bays 1 External Slim-line Optical bay
Internal Bays	4 internal 3.5" bays (All 4 include acoustic dampening rail assemblies)
External Bays	2 external 5.25" bays • Top bay device depth limit: 206mm • Bottom bay device depth limit: 206mm
Front I/O	• 4 USB 3.0 • 1 Combo Headset • 1 Microphone
Rear I/O	• 4 USB 3.0 • 2 USB 2.0 • 1 Serial • PS/2 keyboard and mouse • 2 RJ-45 to integrated Gigabit LAN • 1 Audio Line-In (can be retasked as microphone) • 1 Audio Line-Out
Internal USB	• 2 USB 2.0 ports available with a single 2x5 header. • 1 USB 3.0 port available with a shrouded 20-pin connector. The 2x5 header can be converted to a standard (Type-A) USB connector through the use one HP Internal USB Port Kit (EM165AA). This port kit uses one half of the 2x5 header.
Chassis Dimensions (H x W x D)	Footprint Dimensions: H: 17.5" [444.5mm] W: 8.0" [203.2mm] D: 20.7" [525.8mm] (measured to the rear of service panel) Maximum Dimensions: H: 17.5" [444.5mm] W: 8.0" [203.2mm] D: 20.9" [530.9mm] (measured to the embossment for the rear chassis fans) Rack Dimensions: 5U
System Weight	Exact weights depend upon configuration. • Minimum config: 21.1kg (46.7lbs.) • Typical config: 22.8kg (50.4lbs.) • Maximum config: 29.2kg (64.3lbs.)
Temperature	Operating: 5° to 35°C (40° to 95°F) Non-operating: -40° to 70°C (-40° to 158°F)
Humidity	Operating: 8% to 85% Non-operating: 8% to 90% Operating: 3,000 m; 10,000 feet

Overview

	Non-operating: 9,100 m; 30,000 feet
Maximum Altitude (non-pressurized)	Operating: 3,048m (10,000feet) Non-operating: 9,100m (30,000feet)
Power Supply	Choice of: • 850W 88% Efficient wide-ranging, active Power Factor Correction • 1125W 90% Efficient wide-ranging, active Power Factor Correction **NOTE:** The 1125W (1450W at 200V Input Voltage) power supply can also supply 1275W 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 1125W. An uninterruptible power supply (UPS) is highly recommended if 1275W output power is desired. The 1125W Power Supply can also supply 1450W of output power when the input voltage is greater than 200V under all conditions. The Z820 power supply efficiency reports can be found at these links: 850W - http://www.plugloadsolutions.com/psu_reports/HEWLETT%20PACKARD_719798-001_850W_ECOS%203882_Report.pdf 1125W - http://www.plugloadsolutions.com/psu_reports/HEWLETT%20PACKARD_719799-001_1125W_ECOS%203883_Report.pdf
Interfaces Supported	• 6 channel SATA 6.0 Gb/s interface • 8-channel 6 Gb 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 • Factory integrated RAID available for SATA/SAS drives (RAID 0, 0 Data, 1, 5, and 10) • USB 3.0, USB 2.0
Hard Drive Controller Supported	SATA and SAS controllers
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
Z840 Intel Xeon E5-2600 v3 Series CPU				
Xeon E5-2603 v3 1.6 1600 6C CPU	Y	Y	J9V77AA	
Xeon E5-2609 v3 1.9 1600 6C CPU	Y	Y	J9V76AA	
Xeon E5-2620 v3 2.4 1866 6C CPU	Y	Y	J9V75AA	
Xeon E5-2623 v3 3.0 1866 4C CPU	Y	Y	J9Q18AA	
Xeon E5-2630 v3 2.4 1866 8C CPU	Y	Y	J9Q17AA	
Xeon E5-2637 v3 3.5 2133 4C CPU	Y	Y	J9Q15AA	
Xeon E5-2640 v3 2.6 1866 8C CPU	Y	Y	J9Q16AA	
Xeon E5-2643 v3 3.4 2133 6C CPU	Y	Y	J9Q12AA	
Xeon E5-2650 v3 2.3 2133 10C CPU	Y	Y	J9Q14AA	
Xeon E5-2660 v3 2.6 2133 10C CPU	Y	Y	J9Q13AA	
Xeon E5-2667 v3 3.2 2133 8C CPU	Y	Y	J9Q08AA	
Xeon E5-2670 v3 2.3 2133 12C CPU	Y	Y	J9Q11AA	
Xeon E5-2680 v3 2.5 2133 12C CPU	Y	Y	J9Q10AA	
Xeon E5-2683 v3 2.0 2133 14C CPU	Y	Y	J9Q09AA	
Xeon E5-2687Wv3 3.1 2133 10C CPU	Y	Y	J9Q06AA	
Xeon E5-2690 v3 2.6 2133 12C CPU	Y	Y	J9Q07AA	
Xeon E5-2695 v3 2.3 2133 14C CPU	Y	Y	J9Q05AA	
Xeon E5-2697 v3 2.6 2133 14C CPU	Y	Y	J9Q04AA	
Xeon E5-2699 v3 2.3 2133 18C CPU	Y	Y	J9Q03AA	

Intel® Xeon® processors E5-2637v3, E5-2643v3, E5-2670v3,E5-2680v3, E5-2683v3, E5-2667v3, E5-2687Wv3, E5-2690v3, E5-2695v3, E5-2697v3 and E5-2699v3 REQUIRE the 1125W Power Supply Option.

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.

Monitors / Displays

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP Z Display Z22i 21.5-inch IPS LED Backlit Monitor			D7Q14A8	
HP Z Display Z23i 23-inch IPS LED Backlit Monitor			D7Q13A8	
HP Z Display Z24i 24-inch IPS LED Backlit Monitor			D7P53A8	
HP Z Display Z27i 27-inch IPS LED Backlit Monitor			D7P92A8	
HP Z Display Z30i 30-inch IPS LED Backlit Monitor			D7P94A8	
HP DreamColor LP2480zx Professional Display			GV546A8	
HP DreamColor Z24x Professional Display			E9Q82A8	
HP DreamColor Z27x Professional Display			D7R00A8	

Supported Components

Storage / Hard Drives

Sub-Section Description/Notes

NOTES: 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. Up to 12 GB of hard drive (or system disk) is reserved for the system recovery software (XP and XP Pro). Up to 3 GB of system disk is reserved for system recovery software (Vista).

SAS Hard Drives	SAS Hard Drives for HP Workstations	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
	600GB* SAS 15K rpm 6Gb/s 3.5" HDD	Y	Y	VM647AA	
	300GB* SAS 15K rpm 6Gb/s 3.5" HDD	Y	Y	LU967AA	
	HP 300GB SAS 10K SFF HDD	Y	Y	A2Z20AA	
	HP 600GB SAS 10K SFF HDD	Y	Y	A2Z21AA	
	HP 1.2TB* SAS 10K SFF HDD	Y	Y	E2P04AA	
	HP 600GB* SAS 10K SFF HDD	Y	Y	A2Z21AA	
	HP 300GB* SAS 10K SFF HDD	Y	Y	A2Z20AA	
	Up to 5 3.5" SATA drives supported Up to 5 3.5" SAS drives supported				
	Up to 8 2.5" (SFF) SAS drives with the High Density Storage Option or Up to 8 2.5" (SFF) SATA 2.5" drives with the High Density Storage Option 8 port SAS Controller included on the system board				

SATA Hard Drives	SATA Hard Drives for HP Workstations	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
	4TB SATA 7200 rpm 6Gb/s 3.5" HDD	Y	Y	K4T76AA	
	3.0TB* SATA 7200 rpm 6Gb/s 3.5" HDD	Y	Y	QF298AA	
	2.0TB* SATA 7200 rpm 6Gb/s 3.5" HDD	Y	Y	QB576AA	
	1TB* SATA 7200 rpm 6Gb/s 3.5" HDD	Y	Y	LQ037AA	
	500GB* SATA 7200 rpm 6Gb/s 3.5" HDD	Y	Y	LQ036AA	
	500GB* SATA 7.2K SED SFF HDD	Y	N	(not available today as After Market Option)	
	Up to 5 3.5" SATA drives supported Up to 5 3.5" SAS drives supported				
	Up to 8 2.5" (SFF) SAS drives with the High Density Storage Option or Up to 8 2.5" (SFF) SATA 2.5" drives with the High Density Storage Option				

SATA Solid State Drives	SATA SSDs for HP Workstations	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
	HP 128GB* SATA 6Gb/s SSD	Y	Y	A3D25AA	
	HP 256GB* SATA 6Gb/s SSD	Y	Y	A3D26AA	
	HP 512GB* SATA 6Gb/s SSD	Y	Y	D8F30AA	
	HP 1TB* SATA 6Gb/s SSD	Y	Y	F3C96AA	
	Samsung Enterprise 240GB* SATA SSD	Y	Y	F0W94AA	
	Samsung Enterprise 480GB* SATA SSD	Y	Y	F0W95AA	
	Intel Pro 1500 180GB* SATA SSD	Y	Y	F5Z70AA	

Supported Components

	HP 256GB* SATA 6Gb/s SED Opal 1 SSD	Y	Y	G7U67AA	Note 1

Up to 8 SATA SSD drives supported with the High Density Storage Option

NOTE 1:
The 256GB Self-Encrypting Drive (SED) version has similar performance to the standard 256GB SSD. It is also available in Opal 1.0 and Opal 2.0 versions

PCIe Solid State Drives	PCIe SSDs for HP Workstations	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
	HP Z Turbo Drive 512GB* SSD	Y	Y	G3G89AA	
	HP Z Turbo Drive 256GB* SSD	Y	Y	G3G88AA	

*For storage drives, GB = 1 billion bytes. TB = 1 trillion bytes. Actual formatted capacity is less. Up to 30GB of system disk is reserved for system recovery software.

HP 4-Bay SAS-SATA 2.5in High Density Storage Kit		Factory Configured	Option Kit	Option Kit Part Number	Support Notes
	HP 4-Bay SAS-SATA 2.5in High Density Storage Kit		Y	K5J28AA	

This kit converts two of the native 3.5" HDD bays to enable four SFF (2.5") HDDs or SSDs. Once the kit is installed, it enables independent, tool-free access for these SFF drives. Enterprise class SAS HDDs (15mm) are also supported. Up to two modules are supported in the Z840, which enables up to 8 SFF drives to be added to the internal section of the Z840. HDDs and SSDs are supported with up to 6Gb/s bandwidth.

Notes:
For a video installation guide, please see www.hp.com/go/sml
The installation guide can also be accessed in the Maintenance and Service Guide for your workstation at www.hp.com/support/workstation_manuals

HDD Carrier	HP 4-in-1 SFF (2.5 in) HDD Carrier	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
	HP 4-in-1 SFF (2.5 in) HDD Carrier*		Y	B8K60AA	

* For the Z440, Z640, and Z840, the carrier can be installed in any of the 5.25" ODD bays.

Notes:
Additional controllers may be required to support the additional drives located in this carrier.
This kit includes an additional 4 carriers which can be mounted to drives for easy external access and transfer of data between systems.

Hard Drive Controllers	Factory integrated RAID on motherboard for SATA drives	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
	RAID 0 Configuration – Striped Array	Y	N		Note 1
	RAID 0 Data Configuration -- Boot/OS Drive + 2 Drive Striped Array	Y	N		Note 2
	RAID 1 Configuration – Mirrored Array	Y	N		Note 3
	RAID 10 Configuration - Striped/Mirrored Array	Y	N		

Supported Components

RAID 5 Configuration - Parity Array	Y	N		Note 4
HP SAS Back Panel Connector kit	Y	Y		
Must have 4 or fewer SAS hard drives to configure this option				
HP SAS Back Panel Bulkhead Connector Kit	Y	Y		
HP SAS Back Panel Connector kit required. Internal SAS HD drives are not supported				
LSI iBBU09 Battery Backup Unit	Y	Y	E0X19AA	
LSI 9270-8i SAS 6Gb/s ROC RAID Card	Y	Y	E0X21AA	
Integrated LSI SAS 2308 Controller with RAID 0/1/1E/10	Y	N		
Integrated SATA 6.0 Gb/s Controller	Y	N		

NOTE 1: Minimum of 2 hard drives needed. All hard drives must be identical (size/speed/type/bus/functional capabilities). Must have 2, 3 or 4 HD Drives.
NOTE 2: Minimum of 3 SATA hard drives needed. All hard drives must be identical (size/speed/type/bus/functional capabilities).
At least 3 HD Drives required. May have 4th and 5th HD Drives. Drives must be the same drive (size/speed/type/functional capability).
NOTE 3: 2 SATA or 2 SAS hard drives required. All hard drives must be identical (size/speed/type/bus/functional capabilities).
NOTE 4: Minimum of 3 SATA hard drives needed. All SATA hard drives must be identical (size/speed/type/bus/functional capabilities). Must have 3 or 4 HD Drives. 5 HD Drives not allowed.

NOTE: SATA hardware RAID is supported on Linux systems that have support for the Intel RSTe technology. 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://www.hp.com/support/linux_hardware_matrix for RAID capabilities with Linux.

LSI RAID Definitions:
IS: Striping of 2 or more HDDs into a single logical volume
IM: Mirroring of 2 HDDs into a single logical volume
IME: Mirroring of 3 or more HDDs into a single logical volume

NOTE: Specific user-configured hardware SAS RAID configurations are supported on this Linux system. Please visit: http://www.hp.com/support/linux_hardware_matrix for details

Graphics

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes	Supported # of cards	Supported Mixed?
Professional 2D						
NVIDIA NVS 310 512MB Graphics	Y	Y	A7U59AA	Note 1	4	
NVIDIA NVS 315 1GB Graphics (for HP Workstations)	Y	Y	E1U66AA	Note 1	4	
NVIDIA NVS 510 2GB Graphics	N	Y	C2J98AA	Note 2	2	
Entry 3D						
NVIDIA Quadro K420 1GB Graphics	Y	Y	J3G86AA		2	
NVIDIA Quadro K620 2GB Graphics	Y	Y	J3G87AA		2	
AMD FirePro W2100 2GB Graphics	Y	Y	J3G91AA		2	

Supported Components

Mid-range 3D				
AMD FirePro W5100 4GB Graphics	Y	Y	J3G92AA	2
NVIDIA Quadro K2200 4GB Graphics	Y	Y	J3G88AA	2
High End 3D				
NVIDIA Quadro K4200 4GB Graphics	Y	Y	J3G89AA	2
NVIDIA Quadro K5200 8GB Graphics	Y	Y	J3G90AA	2
NVIDIA Quadro K6000 12GB Graphics	Y	Y	C2J96AA	2
AMD FirePro W7100 8GB Graphics	Y	Y	J3G93AA	2
NVIDIA Quadro M6000 12GB Graphics	Y	Y	L2K02AA	2

For configurations not listed in this specification, please contact the factory for review

NOTE 1: 3rd and 4th graphics possible by using Option Kits.
NOTE 2: NVIDIA NVS 510 graphics available by using Option Kits only.

High Performance GPU Computing

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
NVIDIA Tesla K40 Workstation Coprocessor	Y	Y	F4A88AA	Note 1

NOTE 1:
Up to two K40 processors are supported.
Only supported with the Z840 1125W (1450W at 200V Input Voltage) Chassis.
Must have add-in graphics card in addition to the K40.
Supported Graphics cards are QK5200, QK6000, QK620, QK2200, QK4200, M6000.

Memory

CTO

DDR4-2133 ECC Registered DIMMs	Option Kit Part Number	Support Notes
4GB DDR4-2133 ECC Registered RAM	J9P81AA	
8GB DDR4-2133 ECC Registered RAM	J9P82AA	
16GB DDR4-2133 ECC Registered RAM	J9P83AA	
32GB DDR4-2133 ECC Load Reduced (LR) RAM	J9P84AA	

NOTES:
For details on the supported memory configurations on the HP Z840 Workstation, please refer to the System Technical Specifications - System Board section of this document.

DIMMs should be equally distributed across all four memory channels for optimal performance.

Each processor supports up to 4 channels of DDR4 memory. To realize full performance at least 1 DIMM must be inserted into each channel.

The CPUs determine the speed at which the memory is clocked. For example, if a 1600MT/s capable CPU is used in the system, the maximum speed the memory will run at is 1600MT/s regardless of the specified speed of the memory.

MT/s = Million Transfers per second

You cannot intermix LR DIMMs with Registered DIMMs. The system will not work.

The Z840 is designed to work ONLY with DDR4 memory. The system will not work with DDR3 memory.

Multimedia and Audio Devices

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP Thin USB Powered Speakers	N	Y	KK912AA	
Integrated IDT 92HD94 Audio	Y	N	NA	

Optical and Removable Storage

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP DX115 Removable Drive Enclosure				
HP DX115 Removable HDD Frame/Carrier	N	Y	FZ576AA	Note 1
HP DX115 Removable HDD Carrier	Y	Y	NB792AA	Note 2
HP 15-in-1 Media Card Reader				
HP 15-in-1 Media Card Reader	Y	Y	F4N90AA	
HP SlimTray Optical Drives				
HP 9.5mm Slim SuperMulti DVD Writer	Y	Y	K3R64AA	
HP 9.5mm Slim DVD-ROM Drive	Y	Y	K3R63AA	Note 3
HP 9.5mm Slim BDXL Blu-Ray Writer	Y	Y	K3R65AA	Note 4

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 DVD drives and players.

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.

NOTE1: Z840 support is for two DX115, in both of the 5.25" ODD bays.
NOTE 2: Carrier requires the workstation to have the DX115 frame installed. This part number is for the carrier only.
NOTE 3: Not supported as a 2nd Optical Drive
NOTE 4: Cannot be ordered in combination with another Blu-ray Writer drive.

Controller Cards

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP IEEE 1394b FireWire® PCIe Card	Y	Y	NK653AA	
HP Thunderbolt™-2 PCIe 1-port I/O Card*	Y	Y	F3F43AA	

Networking and Communications

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP X520 10GbE Dual Port Adapter	Y	Y	C3N52AA	

Supported Components

HP 10GbE SFP+ SR Transceiver	Y	Y	C3N53AA	
Intel Ethernet I210-T1 PCIe NIC	Y	Y	E0X95AA	
Intel 7260 802.11 a/b/g/n PCIe WLAN NIC	N	Y		
Integrated Intel I210AT PCIe GbE Controller	Y	N		Note 1
Integrated Intel I218LM PCIe GbE Controller	Y	N		Note 1
HP 361T PCIe Dual Port Gigabit NIC	Y	Y	C3N37AA	Note 1

NOTE 1: "Gigabit" or "GbE" 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.

*Wireless access point and internet service required. Availability of public wireless access points limited.

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		Standard on all systems
HP Z6/8 Adjustable Rail Rack Kit, Flush Mount	N	Y	B8S55AA	

Input Devices

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
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	WH343AA	
HP PS/2 Keyboard	Y	Y	QY774AA	
HP PS/2 Mouse	Y	Y	QY775AA	
HP USB Keyboard	Y	Y	QY776AA	
HP USB Optical Mouse	Y	Y	QY777AA	
HP USB 1000dpi Laser Mouse	Y	Y	QY778AA	

Other Hardware

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP Internal USB Port Kit	N	Y	EM165AA	Note 1
HP SAS Back Panel Connector Kit	N	Y	EM164AA	
HP eSATA PCI Cable Kit	Y	Y	GM110AA	Note 2
HP Power Cord Kit	Y	N		
HP Workstation Mouse Pad	Y	N		Japan Only
HP Optical Bay HDD Mounting Bracket	N	Y	NQ099AA	
HP ENERGY STAR® Qualified Configuration	Y	N		
HP 4-Bay SAS-SATA 2.5in High Density	Y	Y	K5J28AA	Note 3

Supported Components

Storage Kit

NOTE 1: The HP Internal USB Port kit has a single USB 2.0 type A connector.
NOTE 2: No hot plug / hot swap supported with eSATA
NOTE 3: The CTO option (J8J30AV) installs two of these kits to create room for 8 2.5" bays.

Software

	Factory Configured	Option Kit	Option Kit Part Number	Support Notes
HP Performance Advisor	Y	Y		Note 1
HP Remote Graphics Software (RGS) 6.0	Y	Y		Note 2
MS Office Home & Business 2013	Y	N		Note 3
Cyberlink PowerDVD and Power2Go	Y	N		
Foxit PhantomPDF Express	Y	N		

NOTE 1: Available as a free download here: www.hp.com/go/performanceadvisor
NOTE 2: Supports Windows 7, Windows 8.1, SLED 11, and RHEL v6.5
NOTE 3: Must be selected as a Configure to Order option. Delivered in the form of a "Drop in the Box" CD.

Operating Systems

	Support Notes
Genuine Windows® 7 Professional 64-bit	See note 1
HP Linux Installer Kit	
Red Hat Enterprise Linux (RHEL) Workstation - Paper License (1yr)	See note 2
Windows 8.1 Pro Downgrade to Windows 7 Professional 64-bit	
Windows 8.1 Pro 64-bit	
Windows 8.1 Pro Downgrade to Windows 7 Professional 64-bit (National Academic)	
Windows 8.1 Simplified Chinese Edition 64-bit	
Ubuntu 14.04	
Windows 8.1 Emerging Markets Single-Language 64-bit OS	

NOTE 1: See http://www.microsoft.com/windows/windows-7/ for support details
NOTE 2: This second OS must be ordered with the HP Linux Installer Kit as the first OS.

System Technical Specifications

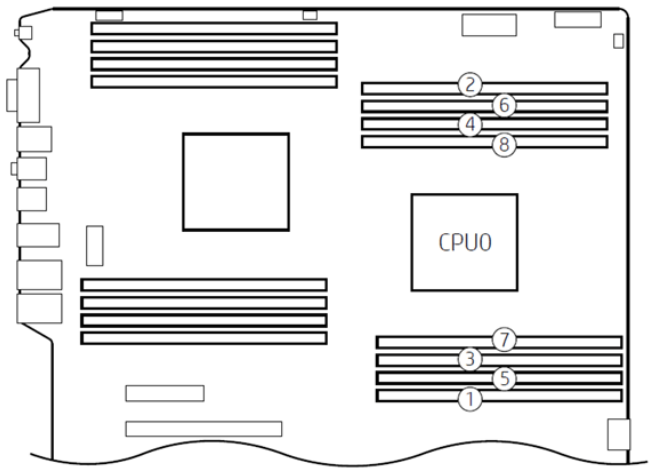
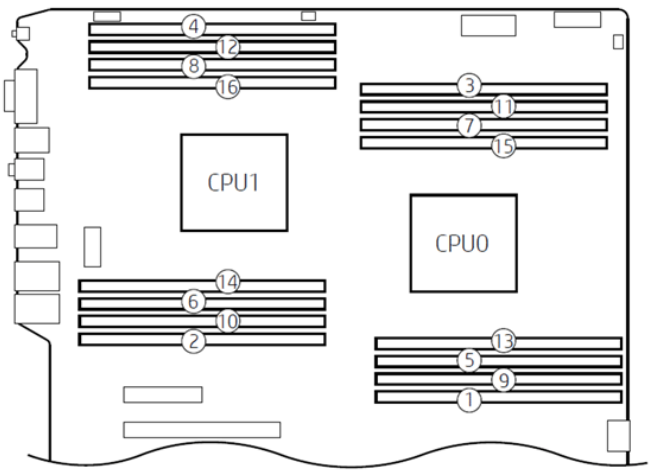
System Board

System Board Form Factor	Custom Form Factor, 13" x 14.25" (330.20mm x 361.95mm)
Processor Socket	Dual LGA2011-3
CPU Bus Speed	QPI: Up to 9.6GT/sec, dual link implementation
Chipset	Intel® C612 Chipset
Super I/O Controller	Nuvoton NPCD379H
Memory Expansion Slots	16 slots (8 slots per CPU)
Memory Type Supported	DDR4 R-DIMM (Registered), ECC: 4GB, 8GB, and 16GB DDR4 LR-DIMM (Load Reduced), ECC: 32GB (64GB and 128GB added after initial release)
Memory Modes	NUMA (Non-Uniform Memory Architecture), Memory Node Interleave
Memory Speed Supported	1600MT/s, 1866MT/s, and 2133MT/s

		Single Processor								
		CPU 0								
		Bottom Slots				Top Slots				
Capacity	**Notes**	**DIMM1**	**DIMM2**	**DIMM3**	**DIMM4**	**DIMM5**	**DIMM6**	**DIMM7**	**DIMM8**	**Rating**
4 GB	*	4 GB								Fair
8 GB		4 GB 8 GB							4 GB	Good Fair
12 GB	~	4 GB		4 GB					4 GB	Better
16 GB		4 GB 8 GB		4 GB			4 GB		4 GB 8 GB	Best Good
32 GB		4 GB 8 GB 16 GB	4GB	4 GB 8 GB	4 GB	4 GB	4 GB 8 GB	4 GB	4 GB 8 GB 16 GB	Best Best Good
48 GB	~	8 GB	4 GB	8 GB	4 GB	4 GB	8 GB	4 GB	8 GB	Best
64 GB		8 GB 16 GB	8 GB	8 GB 16 GB	8 GB	8 GB	8 GB 16 GB	8 GB	8 GB 16 GB	Best Best
96 GB	~	16 GB	8 GB	16 GB	8 GB	8 GB	16 GB	8 GB	16 GB	Best
128 GB		16 GB 32 GB	16 GB	16 GB 32 GB	16 GB	16 GB	16 GB 32 GB	16 GB	16 GB 32 GB	Best Best
256 GB	~	32 GB 64 GB	32 GB	32 GB 64 GB	32 GB	32 GB	32 GB 64 GB	32 GB	32 GB 64 GB	Best Best
512 GB	~ ~	64 GB 128 GB	64 GB	64 GB 128 GB	64 GB	64 GB	64 GB 128 GB	64 GB	64 GB 128 GB	Best Best
1 TB	~	128 GB	128 GB	128 GB	128 GB	128 GB	128 GB	128 GB	128 GB	Best
Slot Load Order		1	5	3	7	8	4	6	2	

System Technical Specifications

		Dual Processor															
		CPU 0								CPU 1							
		Bottom Slots				Top Slots				Bottom Slots				Top Slots			
Capacity	Notes	DIMM1	DIMM2	DIMM3	DIMM4	DIMM5	DIMM6	DIMM7	DIMM8	DIMM1	DIMM2	DIMM3	DIMM4	DIMM5	DIMM6	DIMM7	DIMM8	Rating
8 GB		4 GB								4 GB								Fair
16 GB		4 GB 8 GB							4 GB	4 GB 8 GB							4 GB	Good Fair
32 GB		4 GB 8 GB 16 GB		4 GB			4 GB		4 GB 8 GB	4 GB 8 GB 16 GB		4 GB			4 GB		4 GB 8 GB	Best Good Fair
64 GB		4 GB 8 GB	4 GB	4 GB 8 GB	4 GB	4 GB	4 GB 8 GB	4 GB	4 GB 8 GB	4 GB 8 GB	4 GB	4 GB 8 GB	4 GB	4 GB	4 GB 8 GB	4 GB	4 GB 8 GB	Best Best
96 GB	~	8 GB	4 GB	8 GB	4 GB	4 GB	8 GB	4 GB	8 GB	8 GB	4 GB	8 GB	4 GB	4 GB	8 GB	4 GB	8 GB	Best
128 GB	~	8 GB 16 GB 32 GB	8 GB	8 GB 16 GB	8 GB	8 GB	8 GB 16 GB	8 GB	8 GB 16 GB 32 GB	8 GB 16 GB 32 GB	8 GB	8 GB 16 GB	8 GB	8 GB	8 GB 16 GB	8 GB	8 GB 16 GB 32 GB	Best Best Good
192 GB	~	16 GB 16 GB	8 GB 16 GB	16 GB 16 GB	8 GB	8 GB	16 GB 16 GB	8 GB 16 GB	16 GB 16 GB	16 GB 16 GB	8 GB 16 GB	16 GB 16 GB	8 GB	8 GB	16 GB 16 GB	8 GB 16 GB	16 GB 16 GB	Best Better
256 GB		16 GB 32 GB	16 GB	16 GB 32 GB	16 GB	16 GB	16 GB 32 GB	16 GB	16 GB 32 GB	16 GB 32 GB	16 GB	16 GB 32 GB	16 GB	16 GB	16 GB 32 GB	16 GB	16 GB 32 GB	Best Best
512 GB	~	32 GB 64 GB	32 GB	32 GB 64 GB	32 GB	32 GB	32 GB 64 GB	32 GB	32 GB 64 GB	32 GB 64 GB	32 GB	32 GB 64 GB	32 GB	32 GB	32 GB 64 GB	32 GB	32 GB 64 GB	Best Best
1 TB	~ ~	64 GB 128 GB	64 GB	64 GB 128 GB	64 GB	64 GB	64 GB 128 GB	64 GB	64 GB 128 GB	64 GB 128 GB	64 GB	64 GB 128 GB	64 GB	64 GB	64 GB 128 GB	64 GB	64 GB 128 GB	Best Best
2 TB	~	128 GB	128 GB	128 GB	128 GB	128 GB	128 GB	128 GB	128 GB	128 GB	128 GB	128 GB	128 GB	128 GB	128 GB	128 GB	128 GB	Best
Slot Load Order		1	9	5	13	15	7	11	3	2	10	6	14	16	8	12	4	

Memory Loading Order:	
Load Order for Single Processor Configuration 	**Load Order for Dual Processor Configuration** 
Maximum Memory	Supports up to 256GB using RDIMMs Supports up to 1024GB using LRDIMMs Supports up to 2048GB using LRDIMMs
Memory Configuration (Supported)	• Not all memory configurations possible are represented. Not all memory configurations shown are available as CTO. Please check Ordering Guide for supported configurations. • Only ECC DIMMs are supported. • RDIMM (Registered) and LR DIMM (Load Reduction) memory cannot be mixed. All memory installed in the system must be either RDIMM or LR DIMM. • 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.
Notes	Please refer to the table above for details on how supported memory configurations are installed in your system. * For 32 bit operating systems, there is a memory limit of 4GB. ~ Although technically possible, these configurations are not available to order at this time. The Z840 will support up to 512GB at initial release. The Z840 will support up to 1024GB when 64GB DIMM support is added following initial Z840 release. The Z840 will support up to 2048GB when 128GB DIMM support is added following initial Z840 release.
PCI Express Connectors	Two PCIe Gen3 x16 with latch One PCIe Gen3 x16 with latch. • Enabled only with optional 2nd CPU is installed.

System Technical Specifications

	One PCIe Gen3 x8 open-ended connector. • Enabled only with optional 2nd CPU is installed. One PCIe x8 open-ended connector. • Enabled for One PCIe Gen2 x4 slot with 1 CPU • Enabled for One PCIe Gen3 x8 with optional 2nd CPU installed One PCIe Gen3 x4 open-ended connector. One PCIe Gen2 x1 open-ended connector	
Supported Drive Interfaces		
	SATA	2 SATA @6Gb/s, supports RAID 0,1 and NCQ. 4 sSATA @6Gb/s, Supports RAID 0,1,5,10 and NCQ. Factory integrated RAID is Microsoft Windows only. External SATA (eSATA)* Supported on all SATA and sSATA ports configurable with optional eSATA* After-Market Option cable kit) * hot plug / hot swap not supported with eSATA
	Serial Attached SCSI	Integrated 8-channel SAS 6.0Gb/sec controller with HW RAID 0, 1, 10
	Integrated RAID	SATA: RAID 0, 1 (Supports one RAID) SATA: RAID 0, 1, 5, 10 (Supports up to 2 RAIDs) SAS: HW RAID 0, 1, 10 (Supports up to 2 RAIDs)
	Integrated Graphics	None
	Network Controller	Integrated Intel I218LM Memory Integrated 3KB receive buffer and 3KB transmit buffer Data rates supported: 10/100/1000 Mb/s Compliance IEEE 802.1as, 802.1p, 802.1Q, 802.3, 802.3ab, 802.3az, 802.3i 802.3u, 802.3x, 802.3z Bus architecture PCIe 1.0 x1 and SMBus Power requirement 0.5 watts Boot ROM support Network transfer rates: 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 Management capabilities: WOL, auto MDI crossover, PXE, Multi-port teaming, RSS, Advanced cable diagnostics AMT 9.1 support, vPro compliant Integrated I210AT Adjustable FIFO packet buffer memory up to 24KB Tx, 16KB Rx Data rates supported 10/100/1000 Mb/s Compliance IEEE 802.1as, 802.1q, 802.1Q, 802.3, 802.3ab, 802.3ap, 802.3az, 802.3u, 802.3x, 802.3z

System Technical Specifications

		Bus architecture PCIe 1.0 x1 and SMBus Boot ROM support Network transfer rates: 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 Management capabilities: WOL, auto MDI crossover, PXE, Multi-port teaming, RSS, Advanced cable diagnostics
	PCI-X Connectors	None
	PCI Card Guide	Yes
	Wake on LAN	Yes, both ports
	Integrated Trusted Platform Module	Infineon TPM 1.2 Certified (TPM2.0 Certified, Hardware Enabled; Not Available at Initial Release)
IEEE 1394 Connector(s)	**Front**	None
	Rear	None
	Internal	None
USB Connector(s)	**Front**	4 USB 3.0
	Rear	4 USB 3.0 2 USB 2.0
	Internal	1 USB 3.0 available with a single 20-pin shrouded connector.This header supports a USB Media Card reader. 2 USB 2.0 port available with one 2x5 header. This header supports an HP Internal USB Port Kit (EM165AA) to provide a single USB Type-A connector. This port kit uses one half of the 2x5 header. Third party adapters are also available.
HD Integrated Audio	Realtek ALC221	
Flash ROM	Yes	
CPU Fan Header	One header (blind mate) for CPU fans and memory fans	
Chassis Fan Header	One Chassis Fan Header	
Front PCI Fan Header	2 Front PCI Fan Headers	
Front Control Panel/Speaker Header	Yes	
CMOS Battery Holder - Lithium	Yes	
Power Supply Headers	Yes	
Power Switch, Power LED & Hard Drive LED Header	Front power switch, front power and hard drive LED. Rear power switch and rear power LED. Drive LED header on system board.	
Clear Password Jumper	Yes	
Serial Port	Yes, on rear panel	
Parallel Port	No	
Keyboard/Mouse	Yes	
Power Supply	850W 88% Efficient, Custom PSU	1125W/1275W*/1450W*

System Technical Specifications

	(Wide-Ranging, Active PFC)		90% Efficient, Custom PSU (Wide-Ranging, Active PFC)	
Operating Voltage Range	90-269 VAC		90-269 VAC	
Rated Voltage Range	100-127 VAC 200-240 VAC	118 VAC	**Rated Voltage Range**	100 VAC 115-127 VAC 200-240 VAC
Rated Line Frequency	50-60 Hz	400 Hz	**Rated Line Frequency**	50-60 Hz
Operating Line Frequency Range	47-66 Hz	393-407 Hz	**Operating Line Frequency Range**	47-66 Hz
Rated Input Current	11A @ 100-127 VAC 5.5A @ 200-240 VAC	11A @ 118 VAC	**Rated Input Current**	11A @ 100–127 VAC 5.5A @ 200–240 VAC
Heat Dissipation (Configuration and software dependent)	Typical = 2142 btu/hr (540kg-cal/hr) Max = 3335 btu/hr (840 kg-cal/hr)		Typical = 2773 btu/hr (699 kg-cal/hr) Max-1 = 3878 btu/hr (977 kg-cal/hr) Max-2 = 5002 btu/hr (1260 kg-cal/hr) Max-3 = 5624 btu/hr (1417 kg-cal/hr)	
Power Supply Fan	(2) 80x25 mm variable speed		(2) 80x25 mm variable speed	
ENERGY STAR Qualified (Configuration dependent)	Yes		Yes	
Power Supply Efficiency	88% Efficient The Z840 850W power supply efficiency report can be found at this link: http://www.plugloadsolutions.com/psu_reports/HEWLETT%20PACKARD_719798-001_850W_ECOS%203882_Report.pdf		90% Efficient The Z840 1125W (1450W at 200V Input Voltage) power supply efficiency report can be found at this link: http://www.plugloadsolutions.com/psu_reports/HEWLETT%20PACKARD_719799-001_1125W_ECOS%203883_Report.pdf	
FEMP Standby Power Compliant @115V (<2W in S5 - Power Off)	Yes		Yes	
EuP Compliant @ 230V (<0.5 W in S5 - Power Off)	Yes		Yes	
CECP Compliant @ 220V (<4W in S3 - Suspend to RAM)	Yes; Configuration dependent		Yes; Configuration dependent	
Power Consumption in sleep mode (as defined by ENERGY STAR) - Suspend to RAM (S3) (Instantly Available PC)	<23W		<30W	
Built-in Self-Test LED	Yes		Yes	
Surge Tolerant Full Ranging Power Supply (withstands power surges up to 2000V)	Yes		Yes	
	*Input voltage restriction			
	NOTE: The 1125W (1450W at 200V Input Voltage) power supply can also supply 1275W 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 1125W. An uninterruptible power supply (UPS) is highly recommended if 1275W output power is desired. The 1125W Power Supply can also supply 1450W of output power when the input voltage is			

System Technical Specifications

	greater than 180V under all conditions.
AUX IN (audio)	No
Clear CMOS Button	Yes
Multibay Header	No
Integrated Gigabit Ethernet	Yes, dual port.
Access Panel Solenoid Lock Header	No
Access Panel Intrusion Sensor Header	Yes, as part of Front UI (Control Panel) cable header
Memory Fan Connector	Yes, blind-mate

SYSTEM CONFIGURATION

Example Configuration #1	Processor Info	1x Intel Xeon E5-2609v3 (Six-Core) 85W					
	Memory Info	16GB DDR4-2133 (2x8GB) 1CPU RegRAM					
	Graphics Info	1x NVIDIA Quadro K620					
	Disks/Optical/Floppy	1x 500GB SATA 7200/1x DVD-ROM SATA					
	Power Supply	850W 88% Custom PSU					
	Other	-					
Energy Consumption		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)	103.41 W		102.23 W		103.92 W	
	Windows Busy Typ (S0)	183.75 W		181.88 W		189.37 W	
	Windows Busy Max (S0)	204.93 W		201.28 W		206.74 W	
	Sleep (S3)	3.711 W	3.587 W	3.785 W	3.711 W	3.587 W	3.785 W
	Off (S5)	1.053 W	0.992 W	1.159 W	1.053 W	0.992 W	1.159 W
	Zero Power Mode (ErP)	0.182 W		0.298 W		0.172 W	
Heat Dissipation ** **(Btu/hr)**		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)	352.83 btu/hr		348.81 btu/hr		354.58 btu/hr	
	Windows Busy Typ (S0)	626.96 btu/hr		620.57 btu/hr		646.13 btu/hr	
	Windows Busy Max (S0)	699.22 btu/hr		686.77 btu/hr		705.40 btu/hr	
	Sleep (S3)	12.66 btu/hr	12.24 btu/hr	12.91 btu/hr	12.66 btu/hr	12.24 btu/hr	12.91 btu/hr
	Off (S5)	3.59 btu/hr	3.38 btu/hr	3.95 btu/hr	3.59 btu/hr	3.38 btu/hr	3.95 btu/hr
	Zero Power Mode (ErP)	0.621 btu/hr		1.018 btu/hr		0.586 btu/hr	

Example Configuration #2 (ENERGY STAR QUALIFIED)	Processor Info	2x Intel Xeon E5-2640v3 (Eight-Core) 90W					
	Memory Info	32GB DDR4-2133 (8x4GB) 2CPU RegRAM					
	Graphics Info	1x NVIDIA Quadro K2200					
	Disks/Optical/Floppy	3x 500GB SATA 7200/1x DVD-ROM SATA					
	Power Supply	1125W (1450W at 200V Input Voltage) 90% Custom PSU					
	Other	-					
Energy Consumption		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)	1242.17 W		141.01 W		142.47 W	

System Technical Specifications

	Windows Busy Typ (S0)	324.18 W		320.33 W		323.91 W	
	Windows Busy Max (S0)	398.27 W		396.25 W		398.75 W	
	Sleep (S3)	6.08 W	6.03 W	6.13 W	6.08 W	6.03 W	6.13 W
	Off (S5)	1.04 W	0.99 W	1.10 W	1.04 W	0.99 W	1.10 W
	Zero Power Mode (ErP)	0.181 W		0.308 W		0.172 W	
Heat Dissipation ** **(Btu/hr)**		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)	485.08 btu/hr		481.13 btu/hr		486.11 btu/hr	
	Windows Busy Typ (S0)	1106.10 btu/hr		1092.97 btu/hr		1105.18 btu/hr	
	Windows Busy Max (S0)	1358.90 btu/hr		1352.01 btu/hr		1360.54 btu/hr	
	Sleep (S3)	20.75 btu/hr	20.57 btu/hr	20.91 btu/hr	20.75 btu/hr	20.57 btu/hr	20.91 btu/hr
	Off (S5)	3.55 btu/hr	3.38 btu/hr	3.76 btu/hr	3.55 btu/hr	3.38 btu/hr	3.76 btu/hr
	Zero Power Mode (ErP)	0.619 btu/hr		1.051 btu/hr		0.587 btu/hr btu/hr	

Example Z840 Configuration #3	Processor Info	2x Intel Xeon E5-2680v3 (12-Core) 120W					
	Memory Info	64GB DDR4-2133 (8x8GB) 2CPU RegRAM					
	Graphics Info	1x NVIDIA Quadro K4200					
	Disks/Optical/Floppy	2x 300GB SAS 15K/1x SuperMulti DVDRW SATA					
	Power Supply	1125W (1450W at 200V Input Voltage) 90% Custom PSU					
	Other	-					
Energy Consumption		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)	123.26 W		121.40 W		124.07 W	
	Windows Busy Typ (S0)	413.33 W		393.34 W		412.26 W	
	Windows Busy Max (S0)	496.46 W		483.26 W		498.07 W	
	Sleep (S3)	7.114 W	7.086 W	7.148 W	7.114 W	7.086 W	7.148 W
	Off (S5)	1.054 W	0.993 W	1.161 W	1.054 W	0.993 W	1.161 W
	Zero Power Mode (ErP)	0.181 W		0.307 W		0.177 W	
Heat Dissipation ** **(Btu/hr)**		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)	420.56 btu/hr		414.22 btu/hr		423.33 btu/hr	
	Windows Busy Typ (S0)	1410.28 btu/hr		1342.08 btu/hr		1406.63 btu/hr	
	Windows Busy Max (S0)	1693.95 btu/hr		1648.88 btu/hr		1700.10 btu/hr	
	Sleep (S3)	24.27 btu/hr	24.17 btu/hr	24.39 btu/hr	24.27 btu/hr	24.17 btu/hr	24.39 btu/hr
	Off (S5)	3.597 btu/hr	3.388 btu/hr	3.962 btu/hr	3.597 btu/hr	3.388 btu/hr	3.962 btu/hr
	Zero Power Mode (ErP)	0.619 btu/hr		1.049 btu/hr		0.607 btu/hr btu/hr	

Example Z840 Configuration #4	Processor Info	2x Intel Xeon E5-2697v3 (14-Core) 145W
	Memory Info	64GB DDR4-2133 (16x4GB) 2CPU RegRAM
	Graphics Info	2x NVIDIA Quadro K5200
	Disks/Optical/Floppy	4x 300GB SAS 15K/1x SuperMulti DVDRW SATA

System Technical Specifications

	Power Supply	1125W (1450W at 200V Input Voltage) 90% Custom PSU					
	Other	-					
Energy Consumption		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)	141.75 W		140.45 W		141.63 W	
	Windows Busy Typ (S0)	510.66 W		498.90 W		510.82 W	
	Windows Busy Max (S0)	569.34 W		559.38 W		568.48 W	
	Sleep (S3)	6.454 W	3.669 W	6.497 W	6.454 W	3.669 W	6.497 W
	Off (S5)	1.105 W	0.987 W	1.165 W	1.105 W	0.987 W	1.165 W
	Zero Power Mode (ErP)	0.180 W		0.306 W		0.178 W	
Heat Dissipation (Btu/hr)**							
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	Windows Idle (S0)	483.65 btu/hr		497.22 btu/hr		483.24 btu/hr	
	Windows Busy Typ (S0)	1742.37 btu/hr		1702.25 btu/hr		1742.91 btu/hr	
	Windows Busy Max (S0)	1942.29 btu/hr		1908.60 btu/hr		1939.65 btu/hr	
	Sleep (S3)	22.02 btu/hr	21.63 btu/hr	22.16 btu/hr	22.02 btu/hr	21.63 btu/hr	22.16 btu/hr
	Off (S5)	3.77 btu/hr	3.37 btu/hr	3.97 btu/hr	3.77 btu/hr	3.37 btu/hr	3.97 btu/hr
	Zero Power Mode (ErP)	0.616 btu/hr		1.046 btu/hr		0.608 btu/hr	

Example Configuration #5 (ENERGY STAR QUALIFIED)	Processor Info	2x Intel Xeon 2687Wv3 (10-Core) 160W					
	Memory Info	512GB DDR4-2133 (16x32GB) 2CPU LR RAM					
	Graphics Info	2x NVIDIA Quadro K6000					
	Disks/Optical/Floppy	6x 300GB 10K SAS SFF/1x SuperMulti DVDRW SATA					
	Power Supply	1125W (1450W at 200V Input Voltage) 90% Custom PSU					
	Other	-					
Energy Consumption		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	On-Idle (ENERGY STAR® Idle (S0))	174.56 W		173.77 W		175.26 W	
	ENERGY STAR® PMAX Windows running Linpack and Viewperf	561.98 W		559.23 W		567.75 W	
	ENERGY STAR® "Sleep" (S3)	16.426 W	16.279 W	16.099 W	16.426 W	16.279 W	16.099 W
	ENERGY STAR® "Standby" (Off) (S5)	1.047 W	0.997 W	1.144 W	1.047 W	0.997 W	1.144 W
Heat Dissipation (Btu/hr)**		115 VAC		230 VAC		100 VAC	
		LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled	LAN Enabled	LAN Disabled
	On-Idle (ENERGY STAR® Idle (S0))	595.60 btu/hr		592.90 btu/hr		597.99 btu/hr	
	ENERGY STAR® PMAX Windows running Linpack and Viewperf	1917.48 btu/hr		1908.09 btu/hr		1937.16 btu/hr	
	ENERGY STAR® "Sleep" (S3)	56.046 btu/hr	55.545 btu/hr	54.935 btu/hr	56.046 btu/hr	55.545 btu/hr	54.935 btu/hr

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	-	-
	Hard drive Operating (random reads)	-	-
	DVD-ROM Operating (sequential reads)	-	-

System Configuration (High-end)	**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	-	-
	Hard drive Operating (random reads)	-	-
	DVD-ROM Operating (sequential reads)	-	-

ENVIRONMENTAL DATA

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 (~62 cm/sec) Non-operating: ½-sine: 160 cm/s, 2-3ms (~105g) 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, up to 0.0025 g^2/Hz Non-operating random: 2.0g (rms), 5-500 Hz, up to 0.0150 g^2/Hz **NOTE:** Values do not indicate continuous vibration.
	Cooling	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

PHYSICAL SECURITY AND SERVICEABILITY

Access Panel	Tool-less Includes system board and memory information
Optical Drive	Tool-less, no carrier or rails required
Hard Drives	Tool-less
Expansion Cards	Tool-less
Processor Socket	Tool-less
Green User Touch Points	Yes, on tool-free internal chassis components
Color-coordinated Cables and Connectors	Yes
Memory	Tool-less
System Board	Tool-less, retained by Front PCI Card Guide
Dual Color Power and HD LED on Front of Computer	Yes
Configuration Record SW	Yes
Over-Temp Warning on Screen	Yes
Restore CD/DVD Set	Restores the computer to its original factory shipping image - Can be obtained via HP Support
Dual Function Front Power Switch	Yes, causes a fail-safe power off when held for 4 seconds
Padlock Support	No
Cable Lock Support	Yes, Kensington Cable Lock (optional): Prevents entire system theft only. 3mm x 7mm slot at rear of system
Universal Chassis Clamp Lock Support	No
Solenoid Lock and Hood Sensor	No
Rear Port Control Cover	No
Serial, Parallel, USB, Audio, Network, Enable/Disable Port Control	Yes
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)	Yes

System Technical Specifications

(Green & Amber)	
CPUs and Heatsinks	A torx driver (T15) is needed to remove the CPU heatsink(s) before the CPU can be removed. CPU removal is tool-less
Power Supply Diagnostic LED	Yes
Front Power Button	Yes
Front Power LED	Yes, white (normal), red (fault)
Front Hard Drive Activity LED	Yes, white
Front ODD Activity LED	Yes
Internal Speaker	Yes
System/Emergency ROM Flash Recovery	Recovers corrupted system BIOS
Cooling Solutions	Air cooled forced convection
Power Supply Fans	2x - 80mm x 25mm
CPU Heatsink Fan	92 x 25mm 5-wire PWM for each CPU
Chassis Fan	Rear: 2x - 92mm x 25mm Front (850W config): 1x - 92mm x 25mm (upper position) Front (1125W (1450W at 200V Input Voltage) config): 2x - 92mm x 25mm
Memory Heatsink Fan	3x - 75 x 90 x 35mm memory blowers 80 x 25 mm 4-wire PW fan
HP Vision Diagnostics Offline Edition	HP Vision Diagnostics Offline Edition The diagnostics utility enables you to perform testing and to view critical computer hardware and software configuration information from various sources. This utility enables you to: • Run diagnostics • View the hardware configuration of the system Key features and benefits 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 Vision into potential system issues, is the configuration of the system. Vision Diagnostics helps provide higher system availability. Typical uses of the Vision Diagnostics are: • Testing and diagnosing apparent hardware failures • Documenting system configurations for upgrade planning, standardization, inventory tracking, disaster recovery, and maintenance • Sending configuration information to another location for more in-depth analysis
Access Panel Key Lock	Yes, prevents removal of the access panel and all internal components including optical and floppy drives
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 Technical Specifications

	system
Trusted Platform Module Chip	Yes
Integrated Chassis Handles	Yes, front and rear
Power Supply	Tool-less, direct-connect (blind-mate)
PCIe Card Retention	Yes, rear (all), middle (full-height cards), front (full-length with extender cards)
Flash ROM	Yes. SPI ROM
Diagnostic Power Switch LED on board	Yes
Clear Password Jumper	Yes
Clear CMOS Button	Yes
CMOS Battery Holder	Yes
DIMM Connectors	Yes

BIOS

BIOS 32-bit Services	Standard BIOS 32-Bit Service Directory Proposal v0.4. BIOS supports 32 and 64-bit Operating systems.
PCI 3.0 Support	Full BIOS support for PCI Express through industry standard interfaces.
ATAPI	ATAPI Removable Media Device BIOS Specification Version 1.0.
BBS	BIOS Boot Specification v1.01
WMI Support	WMI is Microsoft's implementation of Web-Based Enterprise Management (WBEM) for Windows. WMI is fully compliant with the Distributed Management Task Force (DMTF) Common Information Model (CIM) and WBEM specifications.
BIOS Boot Spec 1.01+	Provides more control over how and from what devices the workstation will boot.
BIOS Power On	Users can define a specific date and time for the system to power on.
ROM Based Computer Setup Utility (F10)	Review and customize system settings controlled by the BIOS.
System/Emergency ROM Flash Recovery with Video	Recovers system BIOS in corrupted Flash ROM.
Replicated Setup	Saves BIOS settings to diskette or USB flash drive 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, 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.

System Technical Specifications

ACPI (Advanced Configuration and Power Management Interface)	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 4.0 for full compatibility with 64-Bit operating systems.
Ownership Tag	A user-defined string stored in non-volatile memory that is displayed in the BIOS splash screen.
Remote Wakeup/Remote Shutdown	System administrators can power on, restart, and power off a client computer from a remote location.
Instantly Available PC (Suspend to RAM - ACPI sleep state S3)	Allows for very low power consumption with quick resume time.
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 the 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	Allows 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	Fan control parameters are set according to detected hardware configuration for optimal acoustics.
Pre-boot Diagnostics	Early (pre-video) critical errors are reported via beeps and blinks on the power LED.
Industry Standard Specification Support	
Industry Standard	Revision Supported by the BIOS
UEFI Specification Revision	2.3.1
ACPI	Advanced Configuration and Power Management Interface, Version 4.0
ATA (IDE)	AT Attachment 6 with Packet Interface (ATA/ATAPI-6), Revision 3b
CD Boot	"El Torito" Bootable CD-ROM Format Specification Version 1.0
EDD	- Enhanced Disk Drive Specification Version 1.1 - BIOS Enhanced Disk Drive Specification Version 3.0
EHCI	Enhanced Host Controller Interface for Universal Serial Bus, Revision 1.0
PCI	- PCI Local Bus Specification, Revision 2.3 - PCI Power Management Specification, Revision 1.1 - PCI Firmware Specification, Revision 3.0, Draft .7
PCI Express	PCI Express Base Specification, Revision 2.0 PCI Express Base Specification, Revision 3.0

System Technical Specifications

PMM	POST Memory Manager Specification, Version 1.01
SATA	Serial ATA Specification, Revision 1.0a Serial ATA 3 Gb/s: Serial ATA Specification, Revision 2.5 Serial ATA 6 Gb/s: Serial ATA Specification, Revision 3.0
SPD	PC SDRAM Serial Presence Detect (SPD) Specification, Revision 1.2B
TPM	Trusted Computing Group TPM Specification Version 1.2
UHCI	Universal Host Controller Interface Design Guide, Revision 1.1
USB	Universal Serial Bus Revision 1.1 Specification Universal Serial Bus Revision 2.0 Specification Universal Serial Bus Revision 3.0 Specification
SMBIOS	System Management BIOS Reference Specification, Version 2.7
	External BIOS Simulator found at: http://h20464.www2.hp.com/index.html

External BIOS Simulator found at: http://h20464.www2.hp.com/index.html

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 may be labeled with one or more of these marks: • ENERGY STAR® (energy-saving features available on selected configurations-Windows only) • US Federal Energy Management Program (FEMP) • China Energy Conservation Program • *The ECO Declaration (TED)*
Batteries	The battery in this product complies with EU Directive 2006/66/EC Battery size: CR2032 (coin cell) Battery type: Lithium Metal The battery in this product does 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/qse.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 Directive on a worldwide basis.
Low Halogen Statement	This product is low halogen except for power cords, cables and peripherals, as well as the following customer-configurable internal components: 3 ½" SAS HDDs, LSI 9260-8i SAS 6Gb/s ROC RAID Card, Creative Recon3D PCIe Audio Card, Liquid Cooling Solution and Broadcom 5761 Gigabit PCIe NIC are not Low Halogen. Service parts obtained after purchase may not be Low Halogen.
End-of-Life Management and Recycling	Hewlett-Packard offers end-of-life HP product return and recycling programs in many geographic areas. To recycle your product, please go to: http://www.hp.com/recycle or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner. This product is greater than 90% recyclable by weight when properly disposed of at end of life.

System Technical Specifications

Hewlett-Packard Corporate Environmental Information	For more information about HP's commitment to the environment: Global Citizenship Report http://www.hp.com/hpinfo/globalcitizenship/gcreport/index.html Eco-label certifications http://www.hp.com/hpinfo/globalcitizenship/environment/productdesign/ecolabels.html ISO 14001 certificates: http://www.hp.com/hpinfo/globalcitizenship/environment/operations/envmanagement.html
Additional Information	• This HP product is designed to comply with the Waste Electrical and Electronic Equipment (WEEE) Directive – 2002/96/EC. • Plastic parts weighing over 25 grams used in the product are marked per ISO 11469 and ISO1043. • This product is >90% recycle-able when properly disposed of at end of life. EPEAT Gold - ENERGY STAR qualified configurations of this product are in compliance with the IEEE 1680 (EPEAT) standard at the Gold level where HP registers workstation products. See http://ww2.epeat.net/CompanyDetail.aspx?CompanyID=24 for registration status in your country.
Packaging	HP Workstation product packaging meets the HP General Specification for the Environment at http://www.hp.com/hpinfo/globalcitizenship/society/gen_specifications.html • Does not contain restricted substances listed in HP Standard 011-1 General Specification for the Environment • Does not contain ozone-depleting substances (ODS) • Does not contain heavy metals (lead, mercury, cadmium or hexavalent chromium) in excess of 100 ppm sum total for all heavy metals listed • Maximizes 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 • Reduced size and weight of packages to improve transportation fuel efficiency • Plastic packaging materials are marked according to ISO 11469 and DIN 6120 standards formatting
Packaging Materials	
Internal	Cushions and plastic bags made of low density polyethylene (LDPE).
External	Outer carton, accessories carton, and insert made of corrugated paper board.

MANAGEABILITY

Industry Standard Specifications	This product meets the following industry standard specifications for manageability functionality: • DASH 1.1 (via Intel LAN on motherboard)
Intel Active Management Technology (AMT)	Intel® Active Management Technology (AMT) 9.1 An advanced set of remote management features and functionality providing IT administrators the latest and most effective tools to remotely discover, heal, and protect networked client systems regardless of the system's health or power state. AMT 9.1 includes the following advanced management functions: • Power Management (on, off, reset, graceful shutdown, sleep and hibernate) • Support in Max Power Savings (Shutdown and Hibernate Modes) • Hardware Inventory (includes BIOS and firmware revisions)

System Technical Specifications

	• Hardware Alerting • Agent Presence • System Defense Filters • Serial Over LAN (SOL) • IDE Redirect • ME Wake-on-LAN (WOL) • 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 • Remote Scheduled Maintenance - pre-schedule when the system connects to the IT or service provider console for maintenance. • Remote Alerts - automatically alert IT or service provider if issues arise • Access Monitor - Provides oversight into Intel® AMT actions to support security requirements • PC Alarm Clock • Microsoft NAP Support • Host Base set-up and configuration • Management Engine (ME) firmware roll back • Local Time Sync to UTC Remote Memory Dump Command – Creates memory dump for debug
Intel® vPro™ Technology	The HP Z840 Workstation supports Intel vPro technology when configured as outlined below: • Intel® Xeon® processor E5-1600 v3 product family or E5-2600 v3 product family featuring Intel® vPro™ Technology • Intel® C610 chipset • Intel® I218LM GbE LAN
Remote Manageability Software Solutions	The HP Z840 Workstation is supported on the following remote manageability software consoles: • LANDesk Management Suite (HP 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 support (Note 3) 8am - 5pm. Global coverage (Note 2) ensures that any product purchased in one country and transferred to another, non-restricted country will remain fully covered under the original warranty and service offering. **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 are extended service contracts that go beyond the standard limited 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

System Technical Specifications

	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. HP services are governed by the applicable HP terms and conditions of service provided or indicated to Customer at the time of purchase. Customer may have additional statutory rights according to applicable local laws, and such rights are not in any way affected by the HP terms and conditions of service or the HP Limited Warranty provided with your HP Product.
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.

Stable & Consistent Offerings

Global Series SKUs

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
J6F75AV	Intel Xeon E5-2620v3 2.4 1866 6C 1stCPU
J6F73AV	Intel Xeon E5-2630v3 2.4 1866 8C 1stCPU
J6F71AV	Intel Xeon E5-2637v3 3.5 2133 4C 1stCPU
J6F94AV	Intel Xeon E5-2620v3 2.4 1866 6C 2ndCPU
J6F92AV	Intel Xeon E5-2630v3 2.4 1866 8C 2ndCPU
J6F90AV	Intel Xeon E5-2637v3 3.5 2133 4C 2ndCPU

Hard Drives

Product #	Offering
J3K71AV	500GB 7200 RPM SATA 1st HDD
J3K72AV	1TB 7200 RPM SATA 1st HDD
J3K92AV	500GB 7200 RPM SATA 2nd HDD
J3K93AV	1TB 7200 RPM SATA 2nd HDD
J3L13AV	500GB 7200 RPM SATA 3rd HDD
J3L14AV	1TB 7200 RPM SATA 3rd HDD
J3L36AV	500GB 7200 RPM SATA 4th HDD
J3L37AV	1TB 7200 RPM SATA 4th HDD
J3L54AV	500GB 7200 RPM SATA 5th HDD
J3L55AV	1TB 7200 RPM SATA 5th HDD

Graphics

Product #	Offering
J1Q20AV	NVIDIA Quadro K2200 4GB 1st GFX
J1Q24AV	AMD FirePro W2100 2GB 1st GFX
J1Q30AV	NVIDIA Quadro K620 2GB 2nd GFX
J1Q31AV	NVIDIA Quadro K2200 4GB 2nd GFX
J1Q35AV	AMD FirePro W2100 2GB 2nd GFX
J1Q38AV	NVIDIA Quadro K2200 4GB 3rd GFX

Memory

Product #	Offering
G8X58AV	8GB DDR4-2133 (1x8GB) 1CPU RegRAM
G8X61AV	16GB DDR4-2133 (2x8GB) 1CPU RegRAM
G8X63AV	32GB DDR4-2133 (4x8GB) 1CPU RegRAM
G8X64AV	64GB DDR4-2133 (8x8GB) 1CPU RegRAM

Stable & Consistent Offerings

	G8X74AV	32GB DDR4-2133 (4x8GB) 2CPU RegRAM
	G8X77AV	64GB DDR4-2133 (8x8GB) 2CPU RegRAM
	G8X78AV	128GB DDR4-2133 (16x8GB) 2CPU RegRAM
	G8X65AV	64GB DDR4-2133 (4x16GB) 1CPU RegRAM
	G8X66AV	128GB DDR4-2133 (8x16GB) 1CPU RegRAM
	G8X79AV	128GB DDR4-2133 (8x16GB) 2CPU RegRAM
	G8X80AV	256GB DDR4-2133 (16x16GB) 2CPU RegRAM

Optical and Removable Storage	**Product #**	**Offering**
	F5G79AV	Slim SuperMulti DVDRW SATA 1st ODD
	G8U90AV	Slim SuperMulti DVDRW SATA 2nd ODD

Input Devices	**Product #**	**Offering**
	G8U76AV	HP USB Keyboard
	G8U87AV	HP USB Optical Mouse

PROCESSORS

Xeon E5-2603 v3 1.6 1600 6C CPU	J9V77AA
Xeon E5-2609 v3 1.9 1600 6C CPU	J9V76AA
Xeon E5-2620 v3 2.4 1866 6C CPU	J9V75AA
Xeon E5-2623 v3 3.0 1866 4C CPU	J9Q18AA
Xeon E5-2630 v3 2.4 1866 8C CPU	J9Q17AA
Xeon E5-2640 v3 2.6 1866 8C CPU	J9Q16AA
Xeon E5-2637 v3 3.5 2133 4C CPU	J9Q15AA
Xeon E5-2650 v3 2.3 2133 10C CPU	J9Q14AA
Xeon E5-2660 v3 2.6 2133 10C CPU	J9Q13AA
Xeon E5-2643 v3 3.4 2133 6C CPU	J9Q12AA
Xeon E5-2670 v3 2.3 2133 12C CPU	J9Q11AA
Xeon E5-2680 v3 2.5 2133 12C CPU	J9Q10AA
Xeon E5-2683 v3 2.0 2133 14C CPU	J9Q09AA
Xeon E5-2667 v3 3.2 2133 8C CPU	J9Q08AA
Xeon E5-2690 v3 2.6 2133 12C CPU	J9Q07AA
Xeon E5-2687Wv3 3.1 2133 10C CPU	J9Q06AA
Xeon E5-2695 v3 2.3 2133 14C CPU	J9Q05AA
Xeon E5-2697 v3 2.6 2133 14C CPU	J9Q04AA
Xeon E5-2699 v3 2.3 2133 18C CPU	J9Q03AA

HARD DRIVES

HP SAS (Serial Attached SCSI) Hard Drives for HP Workstations	**600GB SAS 15K rpm 6Gb/s 3.5" HDD**	**Capacity**	600GB	
		Height	1 in; 2.54 cm	
		Width	**Media Diameter**	3.5 in; 8.9 cm
			Physical Size	4 in; 10.17 cm
		Interface	SAS	
		Synchronous Transfer Rate (Maximum)	6.0 Gb/s	
		Buffer	16 MB	
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.2 ms
			Average	3.4 ms
			Full Stroke	6.6 ms
		Rotational Speed	15,000 rpm	
		Logical Blocks	1,172,123,568 - 512 byte blocks	
		Operating Temperature	50° to 95° F (10° to 35° C)	
	300GB SAS 15K rpm 6Gb/s 3.5" HDD	**Capacity**	300GB	
		Height	1 in; 2.54 cm	
		Width	**Media Diameter**	3.5 in; 8.9 cm
			Physical Size	4 in; 10.17 cm
		Interface	SAS	
		Synchronous Transfer Rate (Maximum)	6Gb/s	
		Buffer	16MB	
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.2 ms
			Average	3.4 ms
			Full Stroke	6.6 ms
		Rotational Speed	15,000 rpm	
		Operating Temperature	50° to 95° F (10° to 35° C)	
	600GB SAS 15K SFF HDD	**Capacity**	600GB	
		Height	5.9 in; 15 cm	
		Width	**Media Diameter**	**Media Diameter**
		Interface	12Gb/s SAS	
		Synchronous Transfer Rate (Maximum)	up to 1200 MB/s (SAS single port)	
		Cache	128MB	
		Seek Time (typical reads, includes controller overhead, including settling)	Average	2.0ms
		Rotational Speed	15K rpm	

Technical Specifications – Storage Hard Drives

	Operating Temperature	41° to 131° F (5° to 55° C)	
300GB SAS 15K SFF HDD	**Capacity**	300GB	
	Height	5.9 in; 15 cm	
	Width	**Media Diameter**	2.5 in; 6.36 cm
	Interface	12Gb/s SAS	
	Synchronous Transfer Rate (Maximum)	up to 1200 MB/s (SAS single port)	
	Cache	128MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Average**	**2.0ms**
	Rotational Speed	15K rpm	
	Operating Temperature	41° to 131° F (5° to 55° C)	
HP 300GB SAS 10K SFF HDD	**Capacity**	300GB	
	Height	0.6 in; 1.53 cm	
	Width	**Media Diameter**	2.5 in; 6.36 cm
		Physical Size	2.75 in; 6.99 cm
	Interface	SAS 6Gb/s	
	Synchronous Transfer Rate (Maximum)	Up to 600MB/s	
	Buffer	64MB	
	Cache	multi-segmentable cache buffer	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.4 ms (max)
		Average	3.6 ms
		Full Stroke	7.3 ms
	Rotational Speed	10,000 rpm	
	Logical Blocks	585,937,500	
	Operating Temperature	41° to 131° F (5° to 55° C)	
HP 600GB SAS 10K SFF HDD	**Capacity**	600GB	
	Height	0.6 in; 1.53 cm	
	Width	**Media Diameter**	2.5 in; 6.36 cm
		Physical Size	2.75 in; 6.99 cm
	Interface	SAS 6Gb/s	
	Synchronous Transfer Rate (Maximum)	Up to 600MB/s	
	Buffer	64MB	
	Cache	multi-segmentable cache buffer	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.4 ms (max)
		Average	3.6 ms
		Full Stroke	7.3 ms
	Rotational Speed	10,000 rpm	

Technical Specifications – Storage Hard Drives

		Logical Blocks	1,172,123,568	
		Operating Temperature	41° to 131° F (5° to 55° C)	
	HP 1.2TB SAS 10K SFF HDD	**Capacity**	1.2TB	
		Height	0.6 in; 1.53 cm	
		Width	**Media Diameter**	2.5 in; 6.36 cm
			Physical Size	2.75 in; 6.99 cm
		Interface	SAS 6Gb/s	
		Synchronous Transfer Rate (Maximum)	Up to 600MB/s	
		Buffer	64MB	
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.18ms (max)
			Average	3.5ms
			Full Stroke	7.17ms
		Rotational Speed	10,000 rpm	
		Logical Blocks	2,344,225,968	
		Operating Temperature	41° to 131° F (5° to 55° C)	
SATA Hard Drives for HP Workstations	**500GB SATA 10K rpm SFF HDD**	**Capacity**	500GB	
		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 (6Gb/s)	
		Synchronous Transfer Rate (Maximum)	Up to 600MB/s	
		Buffer	64MB	
		Cache	Adaptive	
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	1.2ms (typical)
			Average	3.6ms
			Full Stroke	9.0ms (typical)
		Rotational Speed	10K rpm	
		Operating Temperature	41° to 131° F (5° to 55° C)	
	1TB SATA 7200 rpm 6Gb/s 3.5" HDD	**Capacity**	1TB	
		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 (6Gb/s)	
		Synchronous Transfer Rate (Maximum)	Up to 600 MB/s	
		Buffer	64MB	
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	1.2ms (typical)
			Average	11ms
			Full Stroke	21ms (typical)
		Rotational Speed	7,200 rpm	

Technical Specifications – Storage Hard Drives

	Logical Blocks	1,953,525,168	
	Operating Temperature	41° to 131° F (5° to 55° C)	
2.0TB SATA 7200 rpm 6Gb/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 (6.0 Gb/s), NCQ Enabled	
	Synchronous Transfer Rate (Maximum)	Up to 600 MB/s	
	Buffer	64MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	1.0 ms
		Average	11 ms
		Full Stroke	18 ms
	Rotational Speed	7,200 rpm	
	Logical Blocks	3,907,029,168	
	Operating Temperature	41° to 131° F (5° to 55° C)	
3.0TB SATA 7200 rpm 6Gb/s 3.5" HDD	**Capacity**	3.0TB	
	Height	1 in; 2.54 cm	
	Width	**Media Diameter**	3.5 in; 8.9 cm
		Physical Size	4.0 in; 10.17 cm
	Interface	Serial ATA (6.0Gb/s), NCQ enabled	
	Synchronous Transfer Rate (Maximum)	Up to 6.0 Gb/s	
	Buffer	64MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.6 ms
		Average	11 ms
		Full Stroke	Not Specified
	Rotational Speed	7,200 rpm	
	Operating Temperature	41° to 140° F (5° to 60° C)	
4TB SATA 7200 rpm 6Gb/s 3.5" HDD	**Capacity**	4TB	
	Height	1 in; 2.54 cm	
	Width	**Media Diameter**	2.5 in; 6.36 cm
		Physical Size	2.75 in; 6.99 cm
	Interface	Serial ATA (6Gb/s), NCQ enabled	
	Synchronous Transfer Rate (Maximum)	Up to 600MB/s	
	Buffer	128MB	
	Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	0.7ms
		Average	8.5ms
		Full Stroke	15.7ms
	Rotational Speed	7,200 rpm	

Technical Specifications – Storage Hard Drives

		Operating Temperature	41° to 131° F (5° to 55° C)	
	500GB SATA 7.2K SED SFF HDD	**Capacity**	500GB	
		Height	0.275 in; 0.7 cm	
		Width	**Media Diameter**	2.5 in; 6.36 cm
			Physical Size	2.75 in; 6.99 cm
		Interface	Serial ATA (6Gb/s)	
		Synchronous Transfer Rate (Maximum)	Up to 600MB/s	
		Buffer	32MB	
		Seek Time (typical reads, includes controller overhead, including settling)	**Single Track**	1ms
			Average	4.2ms
			Full Stroke	25ms (typical)
		Rotational Speed	7,200 rpm	
		Operating Temperature	32° to 140° F (0° to 60° C)	
HP Solid State Drives (SSDs) for Workstations	**HP 128GB SATA 6Gb/s SSD**	**Capacity**	128GB	
		Height	0.28 in; 0.7 cm	
		Width	**Physical Size**	2.5 in; 6.36 cm
		Interface	SATA 6Gb/s	
		Synchronous Transfer Rate (Maximum)	Up to 500MB/s (Sequential Read)	
		Operating Temperature	32° to 158° F (0° to 70° C)	
	HP 256GB SATA 6Gb/s SSD	**Capacity**	256GB	
		Height	0.28 in; 0.7 cm	
		Interface	SATA 6Gb/s	
		Synchronous Transfer Rate (Maximum)	Up to 500MB/s (Sequential Read)	
		Operating Temperature	32° to 158° F (0° to 70° C)	
	HP 256GB SATA 6Gb/s SED Opal 1SSD	**Capacity**	256GB	
		Height	0.28 in; 0.7 cm	
		Width	**Physical Size**	2.5 in; 6.36 cm
		Interface	6Gb/s SATA	
		Synchronous Transfer Rate (Maximum)	Up to 500MB/s (Sequential Read)	
		Operating Temperature	32° to 158° F (0° to 70° C)	
	HP 512GB SATA 6Gb/s SSD	**Capacity**	512GB	
		Height	0.28 in; 0.7 cm	
		Width	**Physical Size**	2.5 in; 6.36 cm
		Interface	6Gb/s SATA	
		Synchronous Transfer Rate (Maximum)	Up to 500MB/s (Sequential Read)	

Technical Specifications – Storage Hard Drives

		Operating Temperature	32° to 158° F (0° to 70° C)	
	HP 1TB SATA 6Gb/s SSD	**Capacity**	1TB	
		Height	0.28 in; 0.7 cm	
		Width	**Physical Size**	2.5 in; 6.36 cm
		Interface	6Gb/s SATA	
		Synchronous Transfer Rate (Maximum)	Up to 550MB/s (Sequential Read)	
		Operating Temperature	32° to 158° F (0° to 70° C)	
	Samsung Enterprise 240GB SATA SSD	**Capacity**	240GB	
		Width	**Physical Size**	2.5 in; 6.36 cm
		Interface	SATA 6Gb/s	
		Synchronous Transfer Rate (Maximum)	600 Mb/s	
	Samsung Enterprise 480GB SATA SSD	**Capacity**	480GB	
		Width	**Physical Size**	2.5 in; 6.36 cm
		Interface	SATA 6Gb/s	
		Synchronous Transfer Rate (Maximum)	600 Mb/s	
	Intel Pro 1500 180GB SATA SSD	**Capacity**	180GB	
		Width	**Physical Size**	2.5 in; 6.36 cm
		Interface	6Gb/s SATA	
		Synchronous Transfer Rate (Maximum)	600 Mb/s	
		Operating Temperature	32° to 158° F (0° to 70° C)	
PCIe SSDs for HP Workstations	**HP Z Turbo Drive 256GB SSD**	**Capacity**	256GB	
		Interface	PCI Express 2.0 x4 electrical x4 physical	
		Operating Temperature	32° to 158° F (0° to 70° C)	
	HP Z Turbo Drive 512GB SSD	**Capacity**	512GB	
		Interface	PCI Express 2.0 x4 electrical x4 physical	
		Operating Temperature	32° to 158° F (0° to 70° C)	
HDD Carrier	**HP 4-in-1 SFF (2.5in) HDD Carrier**	**Dimensions (L x W x H)**	6.70 x 5.75 x 1.63 in	
		Kit Contents	Drive Carrier, Drive trays (4), Power adapter	
		Weight	1.77 lbs	

Technical Specifications - Hard Drive Controllers

LSI 9270-8i SAS 6Gb/s ROC RAID Card and iBBU9 Battery Backup Unit	**PCI Bus**	x8 lane PCIe 3.0 compliant
	RAID Levels	RAID 0, 1, 5, and 6 RAID spans 10, 50 and 60
	PCI Card Type	Low profile, single PCIe slot design with full height bracket.
	PCI Voltage	+3.3V Add-in Card
	PCI Power	+3.3V, +12V
	Certification Level	PCI-Express 3.0
	IO Bus	Eight 6Gb/s and 3Gb/s compatible SAS/SATA ports
	SAS Processor	LSISAS2208 Dual-Core RAID on Chip (ROC)
	Internal Connectors	Two SAS SFF8087 x4 (Mini-SAS)
	External Connectors	None
	Maximum Number of SCSI Devices	Up to 128 SAS and/or SATA hard drives and SSDs Note: HP Workstations do not support this many internal drives.
	LED Indicators	Heartbeat LED on card

Technical Specifications – Graphics

GRAPHICS

NVIDIA NVS 310 512MB Graphics	**Form Factor**	Low Profile: 2.7 inches (H) x 5.7 inches (L), Half-Height
	Weight:	~142 grams
	Graphics Controller	NVIDIA NVS 310 GPU: GF119-825
	Bus Type	PCI Express x16, 2.0 compliant
	Memory	Size: 512MB DDR3 Clock: 875MHz Memory Bandwidth: 14GB/s
	Connectors	2 x DisplayPort
	Maximum Resolution	Up to 2560 x 1600 (digital display) per display.
	Image Quality Features	The following video formats are supported: - MPEG2 - MPEG4 Part 2 Advanced Simple Profile - H.264 SVC codec support - Support for 3D Blu Ray - VC1 - DivX version 3.11 and later - MVC A full range of video resolutions are supported including 1080p, 1080i, 720p, 480p and 480i. The NVS 310 GPU provides hardware acceleration for the computationally intensive parts of video processing, as well as provides improved video playback speeds via faster decode and transcode.
	Display Output	Up to 2 displays in the following configurations: DisplayPort output: • Drives two DisplayPort enabled digital display at resolutions up to 2560 × 1600 at 60 Hz with reduced blanking, when connected natively using the 2 DisplayPort connectors on the NVS 310 graphics card • Supports 2 monitors up to resolution of 1920 × 1200 at 60 Hz with reduced blanking using DisplayPort 1.2 multi stream topology technology. DVI-D output: • Drives two digital display at resolutions up to 1920 × 1200 at 60 Hz with reduced blanking using DisplayPort to DVI-D single-link cable adaptors • Drives two digital display at resolutions up to 2560× 1600 at 60 Hz with reduced blanking using DisplayPort to DVI-D dual-link cable adaptors HDMI output: • NVS 310 is capable of driving two high definition (HD) panels up to resolutions of 1920 × 1080P at 60 Hz using DisplayPort to HDMI cable adaptors

		VGA display output: • Drives two analog display at resolutions up to 1920 × 1200 at 60 Hz using DisplayPort to VGA cable adaptors
	Shading Architecture	Shader Model 5.0
	Supported Graphics APIs	DX11, OpenGL 4.1
	Available Graphics Drivers	Windows 8 Genuine Windows 7 Professional (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) HP qualified drivers may be preloaded or the latest HP qualified drivers are 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: ftp://download.nvidia.com/novell or http://www.nvidia.com **NOTES:** 1. The thermal solution used on this card is an active fan heatsink. 2. Factory configured NVS 310 graphics card have no cable adapters included. Adapters must be ordered separately. 3. Option kit NVS 310 includes 2 DP to DVI-D cable adapters.
NVIDIA NVS 315 512MB Graphics	**Form Factor**	Low Profile: 2.713 inches in height × 5.7 inches in length Weight: ~142 grams
	Graphics Controller	NVIDIA NVS 315 (using GF119-825 GPU) Number of Cores: 48 CUDA cores Max. Power: 19.3W Cooling Solution: Active fan heatsink
	Bus Type	PCI Express x16, 2.0 compliant
	Memory	Size: 1GB DDR3 Clock: 875MHz Memory Bandwidth: 14GB/s
	Connectors	DMS-59 output Cables included: - For CTO: DMS-59 to DVI cable - For AMO: DMS-59 to DVI cable and DMS-59 to VGA cable
	Maximum Resolution	Maximum number of displays supported: 2 Maximum Resolution Support: - DMS-59 to VGA: 2048 x 1536 @ 85Hz - DMS-59 to DVI: 1980 x 1200 @ 60Hz - DMS-59 to DP: 2560 x 1600 @ 60Hz
	Image Quality Features	See Display Output section. The following video formats are supported:

- MPEG2
- MPEG4 Part 2 Advanced Simple Profile
- H.264 SVC codec support
- Support for 3D Blu Ray
- VC1
- DivX version 3.11 or later

A full range of video resolutions are supported including 1080p, 1080i, 720p, 480p and 480i. The NVS 315 GPU provides hardware acceleration for the computationally intensive parts of video processing, as well as provides improved video playback speeds via faster decode and transcode.

Display Output

Up to 2 displays using one of the following DMS-59 cables:
- DMS-59 to DVI
- DMS-59 to VGA
- DMS-59 to DP

DisplayPort output:

- Drives two DisplayPort enabled digital displays at resolutions up to 2560 × 1600 at 60 Hz with reduced blanking, when connected via the DMS-59 to DP adapter.

DVI-D output:

- Drives two digital displays at resolutions up to 1920 × 1200 at 60 Hz with reduced blanking using DMS-59 to DVI-D single-link cable adaptor

VGA display output:

- Drives two analog displays at resolutions up to 2048 × 1536 at 85 Hz using DMS-59 to VGA cable adaptor.

Shading Architecture

Shader Model 5.0

Supported Graphics APIs

DX11, OpenGL 4.3

Available Graphics Drivers

Windows 8
Microsoft Windows 7 Professional (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)

HP qualified drivers may be preloaded or the latest HP qualified drivers are 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:
ftp://download.nvidia.com/novell or http://www.nvidia.com

NOTES:

1. The thermal solution used on this card is an active fan heatsink.
2. Factory configured graphics card includes DMS-59 to DVI cable.
3. Option kit graphics card includes DMS-59 to DVI and DMS-59 to VGA cables (one each).

NVIDIA NVS 510 2GB Graphics	**Form Factor**	Low Profile, 2.713 inches × 6.3 inches, single slot
	Graphics Controller	NVS 510 GPU Core Clock: 797 MHz Memory Clock: 891 MHz CUDA Cores: 192
	Bus Type	PCI Express x16, Generation 2.0
	Memory	2GB DDR3
	Connectors	Four mini-DisplayPort. Four mini-DisplayPort to DisplayPort adapters included. (DisplayPort to DVI-D, DisplayPort to VGA, DisplayPort to HDMI, and DisplayPort to Dual-Link DVI adapters available as separate accessories)
	Maximum Resolution	Mini-DisplayPort connectors support ultra-high-resolution panels (up to 3840 x 2160 @ 60Hz) **NOTE:** This card supports up to four displays. For Windows XP, only 2 active displays are supported.
	Image Quality Features	10-bit internal display processing, including hardware support for 10-bit scan-out
	Display Output	DisplayPort with Multi-Stream Technology (MST) and High Bit Rate 2 (HBR2) support. Digital Display Support 1. DisplayPort Output • Drives four DisplayPort enabled digital display at resolutions up to 3840 × 2160 at 60 Hz with reduced blanking, when connected natively using the 4 DisplayPort connectors on the NVS 510 graphics card. • DisplayPort Multi-Stream Topology (MST) Technology: Supports various combinations of display resolutions and number of displays when using DisplayPort multi stream topology technology – up to a maximum of 4 monitors at a resolution of 1920 × 1200 at 60 Hz with reduced blanking. 2. DVI-D Output • Drives four digital displays at resolutions up to 1920 × 1200 at 60 Hz with reduced blanking using DisplayPort to DVI-D single-link cable adaptors. • Drives four digital displays at resolutions up to 2560× 1600 at 60 Hz with reduced blanking using DisplayPort to DVI-D dual-link cable adaptors. HDMI Output • The NVS 510 graphics board is capable of driving four high definition (HD) panels up to resolutions of 1920 × 1080P at 60 Hz using DisplayPort to HDMI cable adaptors. Analog Display Support 1. VGA display output • Drives four analog displays at resolutions up to 1920 × 1200 at 60 Hz using DisplayPort to VGA cable adaptors.

Technical Specifications – Graphics

	Supported Graphics APIs	Full Microsoft DirectX 11, Shader Model 5.0 support Full OpenGL 4.3 support
	Available Graphics Drivers	Genuine Windows 7 Professional (64-bit and 32-bit) Microsoft Windows XP Professional (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 **NOTE**: Heatsink cooler design is active.
Graphics Cable Adapters		Graphics Cable Adapter option choice is available starting Feb 1 2013 for the following graphics cards: NVS 310, Quadro 410, Quadro K5000, FirePro V3900, FirePro W7000 New Graphics Cards introduced after Feb 1 2013 will be eligible for choosing Graphics Cable Adapters, unless otherwise specified. No cable choice for NVS 300, NVS 510. Maximum number of cables allowed is 8.
NVIDIA Quadro K420 1GB Graphics	**Form Factor**	Low Profile: 2.713 inches × 6.3 inches, single slot
	Graphics Controller	NVIDIA Quadro K420 GPU: GK107
	Bus Type	PCI Express x16, 2.0 compliant
	Memory	Size: 1GB DDR3 Clock: 891MHz Memory Bandwidth: 29GB/s
	Connectors	One dual-link DVI-I connector One DisplayPort connector
	Maximum Resolution	VGA (via adapter cable): • 2048 × 1536 × 32 bpp at 85 Hz Dual-link DVI • 2560 × 1600 × 32 bpp at 60 Hz (reduced blanking) Single-link DVI • 920 × 1200 × 32 bpp at 60 Hz (reduced blanking) DisplayPort 1.2 • 3840 × 2160 × 30 bpp at 60 Hz
	RAMDAC	400 MHz integrated RAMDAC
	Display Output	Maximum number of displays supported: 2
	Shading Architecture	Shader Model 5.0
	Supported Graphics APIs	DX11, OpenGL 4.4

		Programming support for CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Python, and Fortran
	Available Graphics Drivers	Microsoft Windows 8.1 Microsoft Windows 8 Microsoft Windows 7 Linux

1. Factory configured Quadro K420 does not include any video adapters. Adapters must be ordered separately.
2. Option kit Quadro K420 includes one DP to DVI-D adapter.

NVIDIA Quadro K620 2GB Graphics	**Form Factor**	2.713" H x 6.3" L Single Slot, Low Profile Full Height Profile bracket installed Low Profile bracket included Weight: 133 grams
	Graphics Controller	NVIDIA Quadro K620 Graphics Card GM107 GPU 384 CUDA cores Max Power: 45 Watts
	Bus Type	PCI Express 2.0 x16
	Memory	2 GB GDDR3, 900 MHz 128-bit memory I/O path 29 GB/s memory bandwidth
	Connectors	1 DL-DVI(I) output, 1 DisplayPort output Factory Configured: No video cable adapter included Option Kit: One DP-to-DVI adapter included with card Additional DVI-to-VGA, DisplayPort-to-VGA or DisplayPort-to-DVI adapters are available as Factory Configuration or Option Kit accessories.
	Maximum Resolution	DisplayPort 1.2: - up to 4096x2160 x 30 bpp @ 60Hz - supports High Bit Rate 2 (HBR2) and Multi-Stream Transport (MST) Dual Link DVI(I) output: - up to 2560 x 1600 x 32 bpp @ 60Hz Single Link-DVI(I) output: - up to 1920 x 1200 x 32 bpp @ 60Hz
	Image Quality Features	10-bit internal display processing pipeline 10-bit scan-out support
	Display Output	1 Dual-link DVI-I connector 1 Display Port connector
	Shading Architecture	Full Microsoft DirectX 11.1 Shader Model 5.0
	Supported Graphics APIs	OpenGL 4.4 DirectX 11.1 API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran
	Available Graphics Drivers	Microsoft Windows 8.1 Microsoft Windows 8 Microsoft Windows 7

		Linux HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html 1. Factory configured Quadro K620 does not include a video cable adapter. Video cable adapters must be ordered separately. 2. Quadro K620 offered as an Option Kit (AMO) includes one DP-to-DVI video cable adapter. Additional cables must be ordered separately.
AMD FirePro W2100 2GB Graphics	**Form Factor**	Low Profile, half length (full-height bracket included)
	Graphics Controller	AMD FirePro™ W2100 professional graphics based on Oland GPU. GPU: 320 Stream Processors organized into 5 Compute Units GPU Frequency: 630MHz Power: 35W Cooling: Active
	Bus Type	PCI Express® x8, Generation 3.0
	Memory	2GB DDR3 memory Memory Bandwidth: 28.8 GB/s Memory Width:128bit
	Connectors	2x Display Port 1.2 connectors Factory Configured: No video cable adapter included Option Kit: One DP-to-DVI adapter included with card Additional DisplayPort-to-VGA or DisplayPort-to-DVI adapters are available as Factory Configuration or Option Kit accessories.
	Maximum Resolution	DisplayPort 1.2: up to 4096x2160 x 30 bpp @ 60Hz Dual Link DVI(I) (requires adapter cable): up to 2560 x 1600 x 32 bpp @ 60Hz Single Link-DVI(I)(requires adapter): up to 1920 x 1200 x 32 bpp @ 60Hz VGA(requires adapter): up to 1920 x 1200 x 32 bpp @ 60Hz
	Image Quality Features	Advanced support for 8-bit, 10-bit, and 16-bit per RGB color component. High bandwidth scaler for high quality up and downscaling.
	Display Output	2 x DisplayPort® 1.2 Maximum number of displays: 2
	Shading Architecture	Shader Model 5.0
	Supported Graphics APIs	OpenCL™ 2.0, DirectX® 11.2/12 and OpenGL 4.4
	Available Graphics Drivers	Windows 8.1 (64-bit and 32-bit) Windows 7 (64-bit and 32-bit) Linux

		HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html **NOTE:** 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 http://www.amd.com/firepro for details
AMD FirePro W5100 4GB Graphics	**Form Factor**	Full height, single slot (6.75" X 4.376")
	Graphics Controller	AMD FirePro W5100 graphics GPU Frequency: 930Mhz GPU: 768 Stream Processors organized into 12 Compute Units Power: <75 Watts Cooling: Active
	Bus Type	PCI Express® x16, Generation 3.0
	Memory	4GB GDDR5 memory Memory Bandwidth: up to 96 GB/s Memory Width: 128 bit
	Connectors	4x Display Port 1.2 connectors with HBR2 and MST support. Factory Configured: No video cable adapter included After market option kit: No video cable adapter included Additional DisplayPort-to-VGA or DisplayPort-to-DVI adapters are available as Factory Configuration or Option Kit accessories.
	Maximum Resolution	DisplayPort: - 4096x2160 @24bpp 60Hz Dual Link DVI: - 2560x1600 (requires DP to DL-DVI adapter) Single Link DVI: - 1920x1200 (requires DP to DVI adapter) VGA: - 1920x1200 (requires DP to VGA adapter)
	Image Quality Features	Advanced support for 8-bit, 10-bit, and 16-bit per RGB color component. High bandwidth scaler for high quality up and downscaling
	Display Output	Max number of monitors supported using DisplayPort 1.2a: - 4 direct attached monitors - 6 using DP 1.2a with MST and HBR2 enabled monitors Monitor chaining from a single DisplayPort (subject to a max of 6 total monitors across all outputs, requires use of DisplayPort enabled monitors supporting MST and HBR2): - one 4096x2160 display

		- two 2560x1600 displays - four 1920x1200 displays
	Shading Architecture	Shader Model 5.0
	Supported Graphics APIs	OpenGL 4.4 OpenCL 1.2 and 2.0 DirectX 11.2 / 12 AMD Mantle
	Available Graphics Drivers	Windows 8.1 / 8 (64-bit and 32-bit) Windows® 7 (64-bit and 32-bit) Linux HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
	Notes	1. AMD Eyefinity technology supports up to six DisplayPort™ monitors on an enabled graphics card. Supported display quantity, type and resolution vary by model and board design; confirm specifications with manufacturer before purchase. To enable more than two displays, or multiple displays from a single output, additional hardware such as DisplayPort-ready monitors or DisplayPort 1.2 MST-enabled hubs may be required. A maximum of two active adapters is recommended for consumer systems. See www.amd.com/eyefinityfaq for full details.
NVIDIA Quadro K2200 2GB Graphics	**Form Factor**	4.38" H x 7.97" L Single Slot, Full Height
	Weight:	240 grams
	Graphics Controller	NVIDIA Quadro K2200 Graphics Card GM107 GPU 640 CUDA cores Max Power: 67.7 Watts
	Bus Type	PCI Express 2.0 x16
	Memory	4 GB GDDR5, 2500 MHz 128-bit memory I/O path 80 GB/s memory bandwidth
	Connectors	1 DL-DVI(I) output, 2 DisplayPort outputs Factory Configured Option: No video cable adapter included Option Kit: One DP-to-DVI adapter included with card Additional DVI-to-VGA, DisplayPort-to-VGA or DisplayPort-to-DVI adapters are available as accessories
	Maximum Resolution	DisplayPort: - up to 4096 x 2160 x 30 bpp @ 60Hz - supports High Bit Rate 2 (HBR2) and Multi-Stream Transport (MST) DL-DVI(I) output: - up to 2560 x 1600 x 32 bpp @ 60Hz Single Link-DVI(I) output: - up to 1920 x 1200 x 32 bpp @ 60Hz

	VGA (via adapter cable): - 2048 × 1536 × 32 bpp at 85 Hz
Image Quality Features	12-bit internal display pipeline (hardware support for 12-bit scan-out on supported panels, applications and connection) Stereoscopic 3D display support including NVIDIA® 3D Vision™ technology, 3D DLP, Interleaved, and passive stereo
Display Output	Maximum number of displays - 3 direct attached monitors - 4 using DP 1.2a with MST and HBR2 enabled monitors Maximum number of DisplayPort displays possible (may require MST and/or HBR2): - 4 1920x1200 - 4 2560x1600 - 2 4096x2160 Maximum number of monitors across all available Quadro K2200 outputs is 4.
Shading Architecture	Full Microsoft DirectX 11.1 Shader Model 5.0
Supported Graphics APIs	OpenGL 4.4 DirectX 11.1 API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran
Available Graphics Drivers	Microsoft Windows 8.1 Microsoft Windows 8 Microsoft Windows 7 Linux HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html

1. Quadro K2200 offered as Factory Configured Option does not include a video cable adapter. Video cable adapters must be ordered separately.
2. Quadro K2200 offered as an Option Kit includes one DP-to-DVI video cable adapter. Additional cables must be ordered separately.
3. A total maximum of 4 active monitors are supported across all display output types. This may be accomplished by using daisy chained DisplayPort 1.2 displays or a DisplayPort 1.2 hub device.
4. A DisplayPort hub device may be used to connect multiple DisplayPort monitors to a single Quadro K2200 DisplayPort output.

NVIDIA Quadro K4200 4GB Graphics	**Form Factor**
	4.376” H x 9.5” L Single Slot, Full Height Weight: ~461 grams (without extender)

Technical Specifications – Graphics

Graphics Controller	NVIDIA Quadro K4200 Graphics Card Kepler GK104 GPU 1344 CUDA cores Max Power: 108 Watts
Bus Type	PCI Express 2.0 x16
Memory	4 GB GDDR5, 2700 MHz 256-bit memory I/O path 173 GB/s memory bandwidth
Connectors	1 DL-DVI(I) 2 DisplayPort 1.2a CTO: No video cable adapter included AMO: One DP-to-DVI adapter included with card Additional DVI-to-VGA, DisplayPort-to-VGA or DisplayPort-to-DVI adapters are available as accessories
Maximum Resolution	DisplayPort: - up to 3840 x 2160 x 30 bpp @ 60Hz - supports High Bit Rate 2 (HBR2) and Multi-Stream Transport (MST) DL-DVI(I) output: - up to 2560 x 1600 x 32 bpp @ 60Hz Single Link-DVI(I) output: - up to 1920 x 1200 x 32 bpp @ 60Hz VGA (via adapter cable): - 2048 × 1536 × 32 bpp at 85 Hz
Image Quality Features	10-bit internal display processing (hardware support for 10-bit scanout for both windowed desktop and full screen, only available on Windows with Aero disabled and Linux) NVIDIA® 3D Vision™ technology, 3D DLP, Interleaved, and other 3D stereo format support Full OpenGL quad buffered stereo support Support for large-scale, ultra-high resolution visualization using the NVIDIA® SVS platform which includes NVIDIA® Mosaic, NVIDIA® Sync and NVIDIA® Warp/Blend technologies
Display Output	Maximum number of displays - 3 direct attached monitors - 4 using DP 1.2a with MST and HBR2 enabled monitors Maximum number of DisplayPort displays possible (may require MST and/or HBR2): - 4 1920x1200 - 4 2560x1600 - 2 3840x2160 Maximum number of monitors across all available Quadro K4200 outputs is 4.

Technical Specifications – Graphics

	Shading Architecture	Shader Model 5.0
	Supported Graphics APIs	OpenGL 4.4 DirectX 11.1 API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran
	Available Graphics Drivers	Microsoft Windows 8.1 Microsoft Windows 8 Microsoft Windows 7 Linux HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html **NOTES:** Quadro K4200 offered as CTO does not include a video cable adapter. Video cable adapters must be ordered separately. Quadro K4200 offered as AMO includes one DP-to-DVI video cable adapter. Additional cables must be ordered separately. A total maximum of 4 active monitors are supported across all display output types. This may be accomplished by using daisy chained DisplayPort 1.2 displays or a DisplayPort 1.2 hub device. A DisplayPort hub device may be used to connect multiple DisplayPort monitors to a single Quadro K4200 DisplayPort output.
NVIDIA Quadro K5200 8GB Graphics	**Dimensions**	4.376” H x 10.5” L Dual Slot
	Weight:	~880 grams (without extender)
	Graphics Controller	NVIDIA Quadro K5200 GPU: GK110-850-B1 with 2304 CUDA cores Power: 150 Watts
	Bus Type	PCI Express 3.0 x16
	Memory	Size: 8GB GDDR5 Memory bandwidth: 192GB/s Memory Width: 256-bit
	Connectors	DVI-I (1), DVI-D (1), DP (2), Optional 3D Stereo bracket with 3-pin mini-DIN connector. Factory configured option: No adapter included with card. Option Kit: No adaptor included with card. DVI to VGA, DisplayPort to VGA, DisplayPort to DVI, and DisplayPort to Dual-Link DVI adapters available as accessories.
	Maximum Resolution	DisplayPort: - up to 4096 x 2160 x 30 bpp @ 60Hz - supports High Bit Rate 2 (HBR2) and Multi-Stream Transport (MST) DL-DVI(I) output:

	- up to 2560 x 1600 x 32 bpp @ 60Hz Single Link-DVI(I) output: - up to 1920 x 1200 x 32 bpp @ 60Hz VGA (via adapter cable): - 2048 × 1536 × 32 bpp at 85 Hz
Image Quality Features	10-bit internal display processing (hardware support for 10-bit scanout for both windowed desktop and full screen, only available on Windows with Aero disabled and Linux). NVIDIA® 3D Vision™ technology, 3D DLP, Interleaved, and other 3D stereo format support. Full OpenGL quad buffered stereo support. Support for NVIDIA® Quadro® Mosaic, NVIDIA® nView® multi-display technology, NVIDIA® Enterprise Management Tools. Support for large-scale, ultra-high resolution visualization using the NVIDIA® SVS platform which includes NVIDIA® Mosaic, NVIDIA® Sync and NVIDIA® Warp/Blend technologies.
Display Output	Maximum number of displays - 4 direct attached monitors - 4 using DP 1.2a with MST and HBR2 enabled monitors Maximum number of DisplayPort displays possible (may require MST and/or HBR2): - 4 1920x1200 - 4 2560x1600 - 2 4096x2160 Maximum number of monitors across all available Quadro K5200 outputs is 4.
Shading Architecture	Shader Model 5.0
Supported Graphics APIs	OpenGL 4.4 DirectX 11 API support for NVIDIA's CUDA™ C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, Fortran
Available Graphics Drivers	Windows 8.1 Windows 8 Windows 7 Linux - Full OpenGL implementation, complete with NVIDIA and ARB extensions HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html

NOTES:

1. Factory configured Quadro K5200 does not include a video cable adapter. Video cable adapters must be ordered separately.
2. A total maximum of 4 active monitors are supported across all display output types. This may be accomplished by using daisy chained DisplayPort 1.2 displays (displays must support MST and HBR2).

NVIDIA Quadro K6000 12GB Graphics	**Form Factor**	4.376" H x 10.5" L Dual Slot Power: 234 Watts
	Weight:	~880 grams
	Graphics Controller	NVIDIA Quadro K6000 Graphics Card based on the GK180 GPU Core Count: 2880 Base Clock: 797 MHz Boost Clock: 902 MHz
	Bus Type	PCI Express 3.0 x16
	Memory	12GB GDDR5 384-bit memory I/O path 288 GB/s memory bandwidth ECC Memory
	Connectors	DVI-I (1), DVI-D (1), DP (2), Optional 3D Stereo bracket with 3-pin mini-DIN connector. Factory configured option: No adapter included with card. Option Kit: No adaptor included with card. DVI to VGA, DisplayPort to VGA, DisplayPort to DVI, and DisplayPort to Dual-Link DVI adapters available as accessories.
	Image Quality Features	• DisplayPort with Multi-Stream Technology (MST) and High Bit Rate 2 (HBR2), HDMI 1.4, and HDCP support • NVIDIA 3D Vision™ technology • NVIDIA Premium Mosaic and nView
	Display Output	400 MHz integrated RAMDAC • Maximum resolution over VGA (through DVI to VGA cable): 2048 × 1536 × 32 bpp at 85 Hz Dual-link internal TMDS (DVI 1.0) • Maximum resolution over digital port (single GPU and SLI mode): 2560 × 1600 × 32 bpp at 60 Hz (reduced blanking) Single-link internal TMDS (DVI 1.0) • Maximum resolution over digital port (single GPU and SLI mode):1920 × 1200 × 32 bpp at 60 Hz (reduced blanking)

		DisplayPort with MST and HBR2. • Maximum resolution: 3840 × 2160 × 36 bpp at 60Hz HDMI • Maximum resolution: 1920 × 1080 × 32 bpp at 60Hz
	Shading Architecture	Shader Model 5.0 Full IEEE 764-2008 32-bit and 64-bit precision
	Supported Graphics APIs	Full OpenGL 4.3 Full DirectX 11 CUDA API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran
	Available Graphics Drivers	Windows 8 Windows 7 Professional (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 **NOTES:** NVIDIA GRID VGX Pass Through feature supported on NVIDIA Quadro K6000 to enable direct mapping of GPU to Virtual Machine. No display output adapter included.
AMD FirePro W7100 8GB Graphics	**Form Factor**	Full height, single slot (9.5” X 4.376”)
	Graphics Controller	AMD FirePro W7100 graphics GPU: 1792 Stream Processors organized into 28 Compute Units Power: <75 Watts Cooling: Active
	Bus Type	PCI Express® x16, Generation 3.0
	Memory	8GB GDDR5 memory Memory Bandwidth: up to 176 GB/s Memory Width: 256 bit
	Connectors	4x Display Port 1.2a connectors with HBR2 and MST support. Factory Configured: No video cable adapter included After market option kit: No video cable adapter included

	Additional DisplayPort-to-VGA or DisplayPort-to-DVI adapters are available as Factory Configuration or Option Kit accessories.
Maximum Resolution	DisplayPort: - 4096x2160 @24bpp 60Hz Dual Link DVI: - 2560x1600 (requires DP to DL-DVI adapter) Single Link DVI: - 1920x1200 (requires DP to DVI adapter) VGA: - 1920x1200 (requires DP to VGA adapter)
Image Quality Features	Advanced support for 8-bit, 10-bit, and 16-bit per RGB color component. High bandwidth scaler for high quality up and downscaling
Display Output	Max number of monitors supported using DisplayPort 1.2a: - 4 direct attached monitors - 6 using DP 1.2a with MST and HBR2 enabled monitors Monitor chaining from a single DisplayPort (subject to a max of 6 total monitors across all outputs, requires use of DisplayPort enabled monitors supporting MST and HBR2): - one 4096x2160 display - two 2560x1600 displays - four 1920x1200 displays
Shading Architecture	Shader Model 5.0
Supported Graphics APIs	OpenGL 4.4 OpenCL 1.2 and 2.0 DirectX 11.2 / 12 AMD Mantle
Available Graphics Drivers	Windows 8.1 / 8 (64-bit and 32-bit) Windows® 7 (64-bit and 32-bit) Linux HP qualified drivers may be preloaded or available from the HP support Web site: http://welcome.hp.com/country/us/en/support.html
Notes	1. AMD Eyefinity technology supports up to six DisplayPort™ monitors on an enabled graphics card. Supported display quantity, type and resolution vary by model and board design; confirm specifications with manufacturer before purchase. To enable more than two displays, or multiple displays from a single output, additional hardware such as DisplayPort-ready monitors or DisplayPort 1.2 MST-enabled hubs may be required. See www.amd.com/eyefinityfaq for full details. 2. OpenGL 4.4 support available with driver 14.301.xxx or later. 3. OpenCL 2.0 support planned in driver updates for early 2015. 4. For HP Z440 Workstation configurations, the HP Z4 Fan and Front Card

Guide Kit, which is available both CTO (G8T99AV) and AMO (J9P80AA), is required.

NVIDIA Quadro M6000 12GB Graphics	**Form Factor**	4.42” H x 10.5” L Dual Slot Power: 250 Watts Weight: ~1030 grams
	Graphics Controller	NVIDIA Quadro M6000 Graphics Card based on the GM200 GPU Core Count: 3072 Base Clock: 1026 MHz Boost Clock: 1152 MHz Idle Clock: 324 MHz
	Bus Type	PCI Express 3.0 x16
	Memory	12GB GDDR5 384-bit memory I/O path 317 GB/s memory bandwidth ECC Memory (disabled by default)
	Connectors	DP (x4) DL-DVI(I) 3-pin mini-DIN connector SLI connector Quadro Sync connector One 8-pin auxiliary power connector Factory configured option: No adapter included with card. Option Kit: No adaptor included with card. DVI to VGA, DisplayPort to VGA, DisplayPort to DVI, and DisplayPort to Dual-Link DVI adapters available as accessories.
	Image Quality Features	• DisplayPort with Multi-Stream Technology (MST) and High Bit Rate 2 (HBR2), HDMI 1.4, and HDCP 1.3 support • NVIDIA 3D Vision™ technology • NVIDIA Premium Mosaic and nView
	Display Output	400 MHz integrated RAMDAC ● Maximum resolution over VGA (through DVI to VGA cable): 2048 × 1536 × 32 bpp at 85 Hz Dual-link internal TMDS (DVI 1.0) ● Maximum resolution over digital port (single GPU and SLI mode): 2560 × 1600 × 32 bpp at 60 Hz (reduced blanking) Single-link internal TMDS (DVI 1.0) ● Maximum resolution over digital port (single GPU and SLI mode):1920 × 1200 × 32 bpp at 60 Hz (reduced blanking) DisplayPort 1.2 with MST and HBR2. ● Maximum pixel clock: 592 MPixel/s

Technical Specifications – Graphics

	● Maximum bandwidth: 17.2 Gbps ● Example maximum resolution: 4096 × 2160 × 30 bpp at 60Hz HDMI ● Maximum resolution: 4096 × 2160 × 8 bpp at 60Hz
Shading Architecture	Shader Model 5.0
Supported Graphics APIs	Full OpenGL 4.4 Full DirectX 12 API support includes: CUDA C, CUDA C++, DirectCompute 5.0, OpenCL, Java, Python, and Fortran
Available Graphics Drivers	Windows 8.1 Windows 8 Windows 7 Professional Linux HP qualified drivers may be preloaded or available from the HP support Web site: http://www8.hp.com/us/en/drivers.html
Notes	1. NVIDIA GRID VGX Pass Through feature supported on NVIDIA Quadro M6000 to enable direct mapping of GPU to Virtual Machine. 2. No display output adapter included. 3. For HP Z840 Workstation configurations, the 1125W power supply option must be used.

HIGH PERFORMANCE GPU COMPUTING

NVIDIA Tesla K40 Workstation Compute Processor	**Form Factor**	Size: 4.376 inches by 10.5 inches Slots: Dual Slot Power Connectors: One 6-pin and one 8-pin Weight: ~826 grams
	System Interface	PCI Express Gen3 ×16
	Video Outputs	None.
	Memory	12GB GDDR5, memory path: 384-bit memory clock: 3Ghz
	Peak Memory Bandwidth	288 GB/s
	Supported APIs	CUDA, OpenACC, OpenCL 1.2 API support includes: C, C++, Java, Python, and Fortran
	Supported Operating Systems	Windows 8 (64-bit) Genuine Windows 7 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: 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
	Processor Cores	GK110B GPU Base Clock: 745 MHz Boost Clock: up to 875 Mhz 2888 CUDA cores
	Power Consumption	~235 Watts Note 1: A 1125W PSU is required for any K40 configuration on the Z820

Technical Specifications - Optical and Removable Storage

OPTICAL AND REMOVABLE STORAGE

HP 9.5mm Slim SuperMulti DVD Writer	**Description**	9.5mm height, tray-load	
	Mounting Orientation	Either horizontal or vertical	
	Interface Type	SATA/ATAPI	
	Dimensions (WxHxD)	128 x 9.5 x 127mm	
	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	8.5 GB DL or 4.7 GB standard
		Full Stroke DVD	< 200 ms (seek)
		Full Stroke CD	< 200 ms (seek)
	Maximum Data Transfer Rates	CD ROM Read	CD-ROM, CD-R Up to 24X CD-RW Up to 24X
		DVD ROM Read	DVD-RAM Up to 8X 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 8X DVD-ROM DL Up to 8X DVD+R Up to 8X DVD-R Up to 8X
	Power	Source	SATA DC power receptacle
		DC Power Requirements	5 VDC ± 5%-100 mV ripple p-p
		DC Current	5 VDC -< 800 mA typical, <1600 mA maximum
	Operating Environmental (all conditions non-condensing)	Temperature	41° to 122° F (5° to 50° C)
		Relative Humidity	10% to 80%
		Maximum Wet Bulb Temperature	84° F (29° C)
	Operating Systems Supported	Windows 8.1, Windows 8 32-bit and 64-bit, 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 No driver is required for this device. Native support is provided by the operating system.	

Technical Specifications - Optical and Removable Storage

	Kit Contents	9.5mm Slim SuperMulti DVD Writer, 5.25" ODD Bay adapter/carrier, slim SATA data/power cable, installation guide	
HP 9.5mm Slim DVD-ROM Drive	**Description**	9.5mm height, tray-load	
	Mounting Orientation	Either horizontal or vertical	
	Interface Type	SATA / ATAPI	
	Dimensions (WxHxD)	128 x 9.5 x 127mm	
	Disc Capacity	DVD-ROM	Single layer: Up to 4.7 GB Double layer: Up to 8.5 GB
	Access Times	DVD-ROM Single Layer	< 110 ms (typical)
		CD-ROM Mode 1	< 110 ms (typical)
		Full Stroke DVD	< 230 ms (typical)
		Full Stroke CD	< 220 ms (typical)
	Power	Source	SATA DC power receptacle
		DC Power Requirements	5 VDC ± 5%-100 mV ripple p-p
		DC Current	5 VDC – <800mA typical, < 1600 mA maximum
	Operating Environmental (all conditions non-condensing)	Temperature	41° to 122° F (5° to 50° C)
		Relative Humidity	10% to 80%
		Maximum Wet Bulb Temperature	84° F (29° C)
	Operating Systems Supported	Windows 8.1, Windows 8 32-bit and 64-bit, 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 No driver is required for this device. Native support is provided by the operating system.	
	Kit Contents	9.5mm Slim DVD-ROM Drive, 5.25" ODD Bay adapter/carrier, slim SATA data/power cable, installation guide	
HP 9.5mm Slim BDXL Blu-Ray Writer	**Description**	9.5mm height, tray-load	
	Mounting Orientation	Either horizontal or vertical	
	Interface Type	SATA/ATAPI	
	Dimensions (WxHxD)	128 x 9.5 x 127mm	
	Supported Media Types	BD-ROM BD-R BD-RE DVD-RAM DVD+R DVD+RW DVD+R DL DVD-R DL	

Technical Specifications - Optical and Removable Storage

	DVD-R DVD-RW CD-R CD-RW	
Disc Capacity	DVD-ROM	8.5 GB DL or 4.7 GB standard
	Blu-ray	25 GB (single-layer) 50 GB (dual-layer) 100/128 GB (BDXL)
	Full Stroke DVD	< 230 ms (seek)
	Full Stroke CD	< 220 ms (seek)
	Blu-ray	< 230 ms (seek) (Full Stroke 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 15S
Maximum Data Transfer Rates	CD ROM Read	CD-ROM, CD-R Up to 24X CD-RW Up to 24X
	DVD ROM Read	DVD-RAM Up to 8X 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 8X DVD-ROM DL Up to 8X DVD+R Up to 8X DVD-R Up to 8X
	Blu-ray	BD-ROM Up to 6X BD-ROM DL Up to 6X BD-R Up to 6X BD-R DL Up to 6X BD-R Up to 6X BD-RE SL/DL Up to 6X
Power	Source	SATA DC power receptacle
	DC Power Requirements	5 VDC ± 5%-100 mV ripple p-p
	DC Current	5 VDC -900 mA typical, 2000mA maximum
Operating Environmental (all conditions non-condensing)	Temperature	41° to 122° F (5° to 50° C)
	Relative Humidity	10% to 80%
	Maximum Wet Bulb Temperature	84° F (29° C)
Operating Systems	Windows 8.1, Windows 8 32-bit and 64-bit, Windows 7 Professional 32-bit	

Technical Specifications - Optical and Removable Storage

	Supported	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 No driver is required for this device. Native support is provided by the operating system.
	Kit Contents	9.5mm Slim BDXL Blu-Ray Writer, 5.25" ODD Bay adapter/carrier, slim SATA data/power cable, installation guide As Blu-ray is a new format containing new technologies, certain disc, digital connection, compatibility and/or performance issues may arise, and do not constitute defects in the product. Flawless playback on all systems is not guaranteed. In order for some Blu-ray titles to play, they may require a DVI or HDMI digital connection and your display may require HDCP support. HD-DVD movies cannot be played on this workstation.
HP DX115 Removable Drive Enclosure	**Interface Type**	Compatible with SAS or SATA controllers. Offers 6Gb/s performance when used with 6Gb/s HDDs.
	Dimensions (WxHxD)	147.6 x 41.1 x 205 mm (5.81 x 1.62 x 8.08 in)
	Weight	Frame and Carrier: 1.73 kg (3.8 lbs.) Carrier: 0.45 kg (1 lbs.)
HP 15-in-1 Media Card Reader	**Description**	Supports hardware ECC (Error Correction Code) function Supports hardware CRC (Cyclic Redundancy Check) function Supports MS 4-bit parallel transfer mode Supports MS-PRO 4-bit parallel transfer mode Supports MS PRO-HG Duo 4-bit parallel transfer mode Supports SD 4-bit parallel transfer mode Supports UHS-104 SD 4-bit card (version 3.0) Supports CF v6.0 with PIO mode 6 and Ultra DMA 7 mode
	Interface Type	USB 3.0 High-speed interface **NOTE**: If there is a USB2 connection, USB2 transfer speeds are supported.
	Dimensions (WxHxD)	4.9 x 4 x 1 in (124.5 x 101.6 x 25.4 mm) Fits conveniently in the 5.25" drive bay.
	Supported Media Types	CompactFlash Type I CompactFlash Type II Microdrive Secure Digital Card (SD) Secure Digital High Capacity (SDHC) SD Extended Capacity Memory Card (SDXC) SD Ultra High Speed II(SD UHSII) Memory Stick 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 MagicGate Memory Stick (MG)

Technical Specifications - Optical and Removable Storage

	MagicGate Memory Stick Duo These additional media types are supported with a card adapter. Memory Stick Micro (M2) miniSD miniSD High Capacity Micro SD Memory Card (MicroSD) Micro SD High Capacity Memory Card (MicroSDHC) Test Parameters/Conditions - Power applied, unit operating on system ±5%
Operating Systems Supported	Windows 8 Pro (64-bit)* Windows 8.1 (64-bit)* Windows 8 (64-bit)* Windows 7 Professional (32-bit)** Windows 7 Professional (64-bit)** Windows Vista Business 64 Windows Vista Business 32 Windows Vista Home Basic 32 Windows XP Professional Windows XP Home 32 No driver is required for this device. Native support is provided by the operating system. Not all features are available in all editions of Windows 8. Systems may require upgraded and/or separately purchased hardware, drivers and/or software to take full advantage of Windows 8 functionality. See http://www.microsoft.com. Not all features are available in all editions of Windows 7. This system may require upgraded and/or separately purchased hardware to take full advantage of Windows 7 functionality. Seehttp://www.microsoft.com/windows/windows-7/ for details.
Kit Contents	Media card reader, 5.25" bracket/rails/bezel, Install Guide, IO & Security Software and Documentation CD
Approvals	USB-IF, WHQL, Compliant with USB Mass Storage Class Bulk only Transport Specification Rev. 1.0, Compliant Intel Front Panel I/O Connectivity Design Guide V. 1.3, FCC, CE, BSMI, C-Tick, VCCI, MIC, cUL, TUVT
Weight	0.35 lbs. (0.16 kg)

Technical Specifications - Controller Cards

CONTROLLER CARDS

HP IEEE 1394b FireWire PCIe Card	**Data Transfer Rate**	Supports up to 800 Mb/s
	Devices Supported	IEEE-1394 compliant devices
	Bus Type	PCIe card full height PCIe slots
	Ports	Two IEEE-1394b external 9-Pin connectors (Rear)
	Internal Connectors	One 10-Pin header connector
	System Requirements	Windows 8.1 64-bit, Windows 7 Professional 32-bit and 64-bit, SLED 11 and RHEL 6. Intel i5 series or higher processor, min 2GB of RAM, 20GB Hard Drive, CD-ROM drive, built in sound system, Available PCIe slot.
	Temperature – Operating	50° to 131° F (10° to 55° C)
	Temperature – Storage	-22° to 140° F (-30° to 60° C)
	Relative Humidity – Operating	20% to 80%
	Compliances	FCC Part 15B, cULus 60950, CE Mark EN55022B(1995)/EN55024-1998 STD, Taiwan BSMI CNS13438, Korea MIC
	Operating Systems Supported	Windows 8.1 64-bit, Windows 7 Professional 32-bit and 64-bit
HP Thunderbolt-2 PCIe 1-port I/O Card	**Data Transfer Rate**	Supports up to 20 Gb/s (20,000 Mb/s)
	Devices Supported	Thunderbolt™ certified devices
	Bus Type	PCIe card, full or half height PCIe slots
	Ports	One Thunderbolt™ 2 external 20-Pin output connectors (Rear) One full size DisplayPort input connector (Rear)
	Internal Connectors	One 5-Pin header connector
	System Requirements	Genuine Windows 7 Professional 64-bit, Genuine Windows 8.1 64-bit, Intel i5 series or higher processor, 4-GB RAM, 20-GB Hard Drive, available PCIe slot.
	Temperature - Operating	50° to 131° F (10° to 55° C)
	Temperature - Storage	-22° to 140° F (-30° to 60° C)
	Relative Humidity - Operating	20% to 80%
	Compliances	FCC Part 15B, cULus 60950, CE Mark EN55022B(1995)/EN55024-1998 STD, Taiwan BSMI CNS13438, Korea MIC
	Operating Systems Supported	Genuine Windows 7 Professional 64-bit, Genuine Windows 8.1 64-bit.
	Kit Contents	HP Thunderbolt™ 2 PCIe 1-port I/O Card, full height and half height bracket, DisplayPort to DisplayPort cable, internal header cables (2), user documentation and warranty card.

NETWORKING AND COMMUNICATIONS

HP X520 10GbE Dual Port Adapter	**Hardware Certifications**	FCC B, UL, CE, VCCI, BSMI, CTICK, KCC
HP 10GbE SFP+ SR Transceiver	**Operating Temperature**	0C to 45C (32F to 113F)
	Operating Humidity	0% to 85%, noncondensing
	Dimensions (H x W x D)	0.47(h) x 0.54(w) x 2.19(d)inches (1.19 x 1.38 x 5.57 cm)
Intel 7260 802.11 a/b/g/n PCIe WLAN NIC	**Operating Humidity**	Operating 10% to 90% (non-condensing) Non-operating 5% to 95% (non-condensing)
	Dimensions (H x W x D)	Native HMC: 26.8 x 30.0 x 2.4 mm Carrier Card Assembly 3.3 x 4.7 in (84 x 119 mm)
	Kit Contents	PCIe x1 card with full height bracket, rf antenna, antenna cable, separate low profile bracket, software CD and warranty.

NOTES:

1. WLAN supplier's client utility is required for Cisco Compatible Extensions support with Microsoft Windows XP. WLAN may also be compatible with certain third-party software supplicants. WLAN supplier IHV extensions required for Cisco Compatible Extensions support for Microsoft Windows Vista.
2. Check latest software/driver release for updates on supported security features.
3. Maximum output power may vary by country according to local regulations.
4. In Power Save Polling mode and on battery power.
5. Receiver sensitivity is measured at a packet error rate of 8% for 802.11b (CCK modulation) and a packet error rate of 10% for
6. 802.11a/g (OFDM modulation).

Integrated Intel I210AT PCIe GbE Controller	**Connector**	RJ-45 (motherboard integration)
	Controller	Intel I210 GbE platform LAN connect networking controller
	Memory	Programmable FIFO packet buffer memory Tx 24KB default Rx up to 16KB
	Data Rates Supported	10/100/1000 Mbps
	Compliance	802.1as, 802.1q, 802.1Q, 802.3, 802.3ab, 802.3ap, 802.3az, 802.3u, 802.3x, 802.3z
	Bus Architecture	PCI Express 2.1 (x1) 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)
	Power Requirement	Requires 3.3V only (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

Technical Specifications - Networking and Communications

		1000BASE-T (full-duplex) 2000 Mbps
	Management Capabilities	WOL, auto MDI crossover, PXE, Multi-port teaming, RSS, Advanced cable diagnostics
Integrated Intel I218LM PCIe GbE Controller	**Connector**	RJ-45 (motherboard integration)
	Controller	Intel I218LM GbE platform LAN connect networking controller
	Memory	3 KB FIFO packet buffer memory (both Tx and Rx)
	Data Rates Supported	10/100/1000 Mbps
	Compliance	802.1as, 802.1p, 802.1Q, 802.3, 802.3ab, 802.3az, 802.3i, 802.3u, 802.3x, 802.3z
	Bus Architecture	PCI Express 1.1 (x1) 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)
	Power Requirement	Requires 3.3V only (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, Multi-port teaming, RSS, Advanced cable diagnostics AMT 9.1 support, vPro compliant
HP 361T PCIe Dual Port Gigabit NIC	**Connector**	Two RJ-45
	Controller	Intel® Ethernet I350 Controller
	Data Rates Supported	10/100/1000 Mbps, Half- and full-duplex
	Compliance	802.3, 802.3u, 802.3x, 802.3ab, 802.3ad, 802.1p, 802.1Q, 802.3az, IEEE 1588 PCIe v2.0 standard RoHS (6 of 6) FCC (U.S. only) Class B DOC (Canada) Class B CE EN 55024, EN55022 Class B VCCI Class II UL 1950 CSA 950 EN 60950 CE ACPI 1.1a Microsoft WHQL (Windows Hardware Quality Labs)
	Data Path Width	Four lane (x4) PCI Express compatible with x4, x8, and x16 PCI Express slots
	Power Requirement	4.1W idle without EEE link partner 3.2W idle with EEE link partner 4.2W maximum
	Network Transfer Rate	10BASE-T (half-duplex) 10 Mb/s 10BASE-T (full-duplex) 20 Mb/s 100BASE-TX (half-duplex) 100 Mb/s

Technical Specifications - Networking and Communications

		100BASE-TX (full-duplex) 200 Mb/s 1000BASE-T (full-duplex) 2000 Mb/s
	Operating Temperature	32° to 131° F (0° to 55° C)
	Operating Humidity	10% to 95% non-condensing
	Dimensions (H x W x D)	5.3 x 2.5 in (13.50cm x 6.4 cm) (without brackets)
	Operating System Driver Support	Windows 7 Professional 32-bit and 64-bit. Red Hat Enterprise Linux(RHEL) WS4, 5, 6 Desktop/Workstation Novell SLED 10 & SLED 11
	Kit Contents	HP 361T PCIe Dual Port Gigabit NIC PCA with a standard height bracket attached to it (the low profile bracket is included in the clamshell that the PCA ships in) Product Warranty statement and the Quick Install Card (QIC).
Intel X540-T2 10GbE Dual Port Adapter	**Operating Temperature**	32° to 131° F (0° to 55° C)
	Operating Humidity	5% to 95% non-condensing
	Dimensions (H x W x D)	Standard PCIe with full height bracket installed, half height bracket included. 0.7 x 2.7 x 6.0 in
	Operating System Driver Support	The HP driver drop is a unified package that includes the X540-T2 driver. It is the same driver as is used for the 561T. Currently, it includes drivers for Win7-32, Win7-x64, Win8-x64, and Win81-x64.
	Kit Contents	Intel X540 10Gb Ethernet Dual port adapter, Installation guide, Warranty card.
		Windows Server 2012 R2, Windows Server 2012, Windows 8, Windows Server 2008 R2, Windows 7, Windows Server 2008 SP2, Windows Vista SP2, Windows Server 2003 R2, Windows Server 2003 SP2, Linux Stable Kernel version 3.x, 2.6,x, Red Hat Enterprise Linux 5, 6, SUSE Linux Enterprise Server 10, 11, FreeBSD 9, VMware ESX/ESXi. Note: Not all OS's supported on all HP Z Workstations.

SUMMARY OF CHANGES

Date of change:	Version History:		Description of change:
August 21, 2014	v1	Added	Style and technical specifications
October 24, 2014	From v1 to v2	Added	note to supported components: memory, Foxit PhantomPDF Express and Cyberlink Power2Go: software, Optical drives: DVD, BD-XL specs
November 1, 2014	From v2 to v3	Added	Note for Internal USB connector conversion, Overview,
		Changed	Internal USB statement in Overview and System Board sections
December 1, 2014	From v3 to v4	Added	Intel X540-T2 10GbE Dual Port Adapter, HP 4-in-1 SFF (2.5in) HDD Carrier
January 1, 2015	From v4 to v5	Added	RHEL for Preinstalled OS, AMD FirePro W7100, Tesla K40 to GPU and High Performance Computing; Ubuntu 14.04 for Supported Components
		Changed	Memory Load Order, High Performance Computing for K40
February 1, 2015	From v5 to v6	Added	Windows 8.1 Pro 64-bit OS, Red Hat Enterprise Linux (RHEL), HP DX115 Removable HDD Carrier, and notes, 4-Bay SAS-SATA and notes, HP 4-Bay SAS-SATA 2.5in High Density Storage Kit
		Changed	Overview OS, Processors table Power Supply table, Hard Drives Notes, Optical and Removable Storage order, Power Consumption and Chassis Fan
		Removed	Windows 7 Professional 64-bit (National Academic)
March 1, 2015	From v6 to v7	Added	Overview: RAID support. Supported Components, Hard Drives: New SAS SFF 15 HDD line and notes, 4TB SATA HDD
		Changed	SAS, and SATAHDD Description Notes. System Board: Memory section.
April 1, 2015	From v7 to v8	Added	NVIDIA Quadro M6000 12GB Graphics, Memory notes
		Changed	Memory from Supported Components, Memory Speed Supported from System Board, ACPI version updated in BIOS section.

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