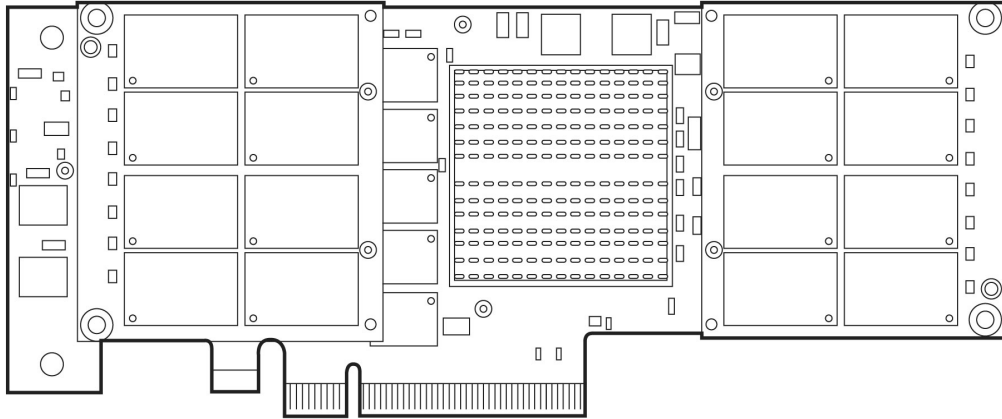## Overview

Could your data center benefit from PCIe workload acceleration based on NAND Flash solid-state storage technology?

HP PCIe Workload Accelerators for ProLiant ML/DL/SL Servers are PCIe card-based direct-attach solutions offering amazing performance with low latency and enterprise reliability.

PCIe Workload Accelerators HH/HL

What's New

- HP 1.4TB and 700GB Mainstream Endurance (ME) PCIe Workload Accelerators

Models

HP PCIe Workload Accelerator Options	Mainstream Endurance (ME) PCIe Workload Accelerators	
	HP 1.4TB HH/HL Mainstream Endurance (ME) PCIe Workload Accelerator	729307-B21
	HP 700GB HH/HL Mainstream Endurance (ME) PCIe Workload Accelerator	729305-B21
	High Endurance (HE) PCIe Workload Accelerators	
	HP 700GB HH/HL High Endurance (HE) PCIe Workload Accelerator	708090-B21
	HP 350GB HH/HL High Endurance (HE) PCIe Workload Accelerator	708088-B21

Compatibility

Server Compatibility

ProLiant DL (rack-optimized):

- HP ProLiant DL360p Gen8
- HP ProLiant DL380p Gen8
- HP ProLiant DL385p Gen8
- HP ProLiant DL560 Gen8
- HP ProLiant DL580 G7
- HP ProLiant DL585 G7

ProLiant ML (expansion-optimized):

- HP ProLiant ML350p Gen8

ProLiant SL (scalable line):

- HP ProLiant SL230s Gen8
- HP ProLiant SL250s Gen8
- HP ProLiant SL270s Gen8
- HP ProLiant SL4540 Gen8
- HP ProLiant SL4545 G7

NOTE: This is a list of supported servers. Some may be discontinued.

Standard Features

What is a PCIe Workload Accelerator?	The HP PCIe Workload Accelerators are PCIe card-based, advanced storage devices that use solid state storage technology directly on the PCI bus, assuring high read and write data rates and accelerated application performance. The associated application performance improvements will have a positive impact on business results and the ability to accelerate IO-bound workloads like databases, virtualization and data analytics, resulting in significant cost and time savings.
Single Level Cell and Multilevel Cell	NAND technology uses flash memory cells to store data. Single level Cell (SLC) stores one bit per cell, while Multi-level Cell (MLC) uses two bits per cell. While MLC can store more data within each device, it has lower endurance characteristics than SLC.
IO and Read/Write Performance	HP PCIe Workload Accelerators offer superior IO performance up to 715,000 READ IOPS and 95,000 WRITE IOPS, and high throughput up to 3.0 GB/s READ and up to 2.5 GB/s WRITE.
Latency	HP PCIe Workload Accelerators offer very low latency access to data, as low as 250 microseconds to write a 4K block and as low as 100 microseconds to read a 4K block. In other words, a virtually zero seek time compared to rotating magnetic media.

RAM Requirements

The amount of free RAM required by the driver depends on the size of the blocks used when writing to the drive. The smaller the blocks, the more RAM required. Here are the guidelines for each 100GB of storage:

Average Block Size (bytes)	System RAM usage (Megabytes) per 100GB of storage for Driver version 2.x and 3.x
8,192	280MB
4,096 (most common)	530MB
2,048	1030MB
1,024	2,000MB
512	3,970MB

Manageability	Command Line (CLI) tools for both Linux and Windows to configure, monitor, and upgrade firmware. RealSSD Manager GUI for Windows and Linux.
PCI IDs	Vendor & Device IDs 1344:5150, 1344:5160 Subsystem Vendor & Device IDs 1590:D082, 1590:D083, 1590:0097, 1590:D098
Upgradeability	The controller for the HP PCIe Workload Accelerators can be upgraded in the future with new firmware. Online firmware update tools are available for all supported operating systems.
Wear-leveling	NAND Flash devices use semiconductor technology that has a finite amount of data that can be written to the device, defined as the Maximum Usage Limit. Projected lifetime of the NAND storage due to wear-out varies with type of NAND and amount of writes to the device.

Standard Features

Maximum usage	**HP Mainstream Endurance (ME) PCIe Workload Accelerators**

HP 700GB ME PCIe Workload Accelerator	HP 1.4TB ME PCIe Workload Accelerator
700 GB	1.4TB
3.9 Drive Writes/Day	3.9 Drive Writes/Day
5 PB written	10 PB written

HP High Endurance (HE) PCIe Workload Accelerators

HP 350GB HE PCIe Workload Accelerator	HP 700GB HE PCIe Workload Accelerator
350 GB	700 GB
39 Drive Writes/Day	39 Drive Writes/Day
25 PB written	50 PB written

NOTE: Subject to Maximum Usage Limit - This is the maximum amount of data that can be written to the device before write burn-out. Drive writes per day (DWPD) is the maximum number of 4K host writes to the entire drive capacity per day over a five year period.

Data Integrity

Using advanced ECC techniques, the HP PCIe Workload Accelerators can correct up to 16 bits out of every 1024 bytes, with a design target of 1 sector in 10 to the 17th Power bits read probability of uncorrectable data.

OS Support

RHEL 4,5,6 (64-bit support only)
SLES 11 (64-bit support only)
Windows Server, 2008 R2 , 2012(64-bit support only)
VMware ESX 5.x
Ubuntu 12
NOTE: The HP PCIe Workload Accelerators are currently not supported as boot devices.

Configurations

Mixing of capacities is allowed, OS RAID

Warranty

3/0/0 warranty; Customer Self Repair (CSR) Subject to maximum usage limitations (Please see note under Additional Services Information).

Service and Support

Service and Support	**HP Technology Services for Industry Standard Servers** Capitalizing on HP ProLiant server capabilities requires a service partner who understands your increasingly complex business technology environment. That's why it makes sense to team up with the people who know HP infrastructure hardware and software best - the experienced professionals at HP Services. **Protect your business beyond warranty with HP Care Pack Services** HP Care Pack services offer complete care and support expertise with committed response choices designed to meet your IT and business needs. HP Foundation Care services offer scalable reactive support-packages for HP industry-standard servers and software. You can choose the type and level of service that is most suitable for your IT and business needs. HP Proactive Care delivers high levels of system availability through proactive service management and advanced technical response.
Optimized Care	**Supports maintaining your HP PCIe Workload Accelerator at optimum performance availability** **3-Year HP 6 hour Call to Repair Response, Proactive Care for HP PCIe Workload Accelerators*** Combined reactive and proactive support for hardware and software to help optimize your systems and deliver high levels of availability through proactive service management and advanced technical response. Hardware problem resolution to return the hardware in operating condition within 6 hours of the initial service request. A Technical Account Manager, as your single point of contact, will own your call or issue end to end until resolved. http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA3-8855EEE.pdf **HP Installation of ProLiant Add On Options Service** This easy-to-buy, easy-to-use HP Care Pack service helps ensure that your new HP hardware or software is installed smoothly, efficiently, and with minimal disruption of your IT and business operations
Standard Care	**Supports maintaining high level of HP PCIe Workload Accelerator availability** **3-Year HP 24x7 4 hour response, Proactive Care Service for HP PCIe Workload Accelerators *** This service gives you combined reactive and proactive support including rapid access to our Advanced Solution Center to manage and prevent problems, and a Technical Support Specialist with a broad level of technical knowledge that will engage with additional technical expertise as needed from HP's vast global resources. http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA3-8855EEE.pdf This easy-to-buy, easy-to-use HP Care Pack service helps ensure that your new HP hardware or software is installed smoothly, efficiently, and with minimal disruption of your IT and business operations.
Basic Care	**Delivers minimum recommended HP PCIe Workload Accelerator support service level** **3-Year HP 24x7 Collaborative Support for HP PCIe Workload Accelerators** This service gives you hardware break/fix plus software diagnosis support with collaborative call management for a broad spectrum of 3rd Party software products including O/S and hypervisors. http://h20195.www2.hp.com/v2/GetPDF.aspx/4AA3-8232ENW.pdf **HP Installation of ProLiant Add On Options Service** This easy-to-buy, easy-to-use HP Care Pack service helps ensure that your new HP hardware or software is installed smoothly, efficiently, and with minimal disruption of your IT and business operations.

QuickSpecs

Service and Support

Related Services	**HP Proactive Care Personalized Support - Environmental Option** The Personalized Support option provides an assigned Account Support Manager who can bring best practices from across the industry plus extra technical skills to your IT team. This option is only available as an add-on to HP Proactive Care Support. **HP Proactive Select Service** Provides a flexible way to purchase HP best-in-class consultancy and technical services. You can buy Proactive Select Service Credits when you purchase your hardware and then use the credits over the next 12 months. http://h20195.www2.hp.com/V2/GetPDF.aspx/4AA2-3842ENN.pdf Additional HP Care Pack services for the HP PCIe Workload Accelerators can be found at: http://www.hp.com/go/cpc
Insight Online/Insight Remote Support	HP Insight Remote Support provides 24 X 7 remote monitoring, proactive notifications, and problem resolution. This comes at no additional cost with your HP solution*. Learn more about Insight Remote Support http://www.hp.com/go/insightremotesupport and Insight Online http://www.hp.com/go/insightonline * Insight Remote Support is a prerequisite for Proactive Care. All components within a single HP ProLiant server must be at the same service level.
HP Support Center	Personalized online support portal with access to information, tools and experts to support HP business products. Submit support cases online, chat with HP experts, access support resources or collaborate with peers. Learn more http://www.hp.com/go/hpsc HP's Support Center Mobile App** allows you to resolve issues yourself or quickly connect to an agent for live support. Now, you can get access to personalized IT support anywhere, anytime. HP Insight Remote Support and HP Support Center are available at no additional cost with a HP warranty, HP Care Pack or HP contractual support agreement. ** HP Support Center Mobile App is subject to local availability
Parts and materials	HP will provide HP-supported replacement parts and materials necessary to maintain the covered hardware product in operating condition, including parts and materials for available and recommended engineering improvements. Parts and components that have reached their maximum usage limitations as set forth in the manufacturer's operating manual, product quick-specs, or the technical product data sheet will not be provided, repaired, or replaced as part of these services. The defective media retention service feature option applies only to HP PCIe Workload Accelerators replaced by HP due to malfunction.
For more information	To learn more on HP ProLiant servers, please contact your HP sales representative or HP Authorized Channel Partner. Or visit: http://www.hp.com/services/proliant

Technical Specifications

HP 1.4TB Mainstream Endurance (ME) PCIe Workload Accelerator
729307-B21

Usable Capacity	1.4 TB
Technology	NAND Flash
Max Sequential Throughput	Reads 3.3 GiB/s, Writes 615 MiB/s
Access Latency (4KiB,Q1)	Reads 130 microseconds, Writes 15 microseconds
IOPS (4KiB,Q16)	Read 120,000 IOPS, Write 99,000 IOPS
Form factor	Half Height/Half length Low profile PCI Express X8 slot (spec 2.0)
Bus Interface	PCI Express 2.0 x 8
Power (Nominal)	PCI Express x 8 (power spec 2.0) **NOTE:** The HP 1.4TB Mainstream Endurance PCIe Workload Accelerator can draw up to 30W power under peak workloads if power limiting is off. If power limiting is enabled on the 1.4TB drive, the maximum power consumed will be less than 25W.
Operating Temperature	0-50°C (Operational)/-40-55°C (non-operational)/at max TBW -40C-+40C (non-operational)
Supported Driver Version	SP138

HP 700GB Mainstream Endurance (ME) PCIe Workload Accelerator
729305-B21

Usable Capacity	700 GB
Technology	NAND Flash
Max Sequential Throughput	Reads 3.3 GiB/s, Writes 570 MiB/s
Access Latency (4KiB,Q1)	Reads 110 microseoconds, Writes 15 microseconds
IOPS (4KiB,Q16)	Read 120,000 IOPS, Write 53,000 IOPS
Form factor	Half Height/Half length Low profile PCI Express X8 slot (spec 2.0)
Bus Interface	PCI Express 2.0 x 8
Power (Nominal)	PCI Express x 8 (power spec 2.0)
Operating Temperature	0-50°C (Operational)/-40-55°C (non-operational)/at max TBW -40C-+40C (non-operational)
Supported Driver Version	SP138

QuickSpecs

Technical Specifications

HP 700GB High Endurance (HE) PCIe Workload Accelerator 708090-B21		
	Usable Capacity	700 GB
	Technology	NAND Flash
	Max Sequential Throughput	Reads 3.2 GiB/s, Writes 1.8 GiB/s
	Access Latency (4KiB,Q1)	Reads 100 microseconds, Writes 285 microseconds
	IOPS (4KiB,Q16)	Read 160,000 IOPS, Write 49,000 IOPS
	Form factor	Half Height/Half length Low profile PCI Express X8 slot (spec 2.0)
	Bus Interface	PCI Express 2.0 x 8
	Power (Nominal)	PCI Express x 8 (power spec 2.0)
	Operating Temperature	0-50°C (Operational)/-40-55°C (non-operational)/at max TBW -40C-+40C (non-operational)
	Supported Driver Version	SP134 or later

HP 350GB High Endurance (HE) PCIe Workload Accelerator 708088-B21		
	Usable Capacity	350 GB
	Technology	NAND Flash
	Max Sequential Throughput	Reads 3.2 GiB/s, Writes 1.8 GiB/s
	Access Latency (4KiB,Q1)	Reads 100 microseconds, Writes 285 microseconds
	IOPS (4KiB,Q16)	Read 160,000 IOPS, Write 45,000 IOPS
	Form factor	Half Height/Half length Low profile PCI Express X8 slot (spec 2.0)
	Bus Interface	PCI Express 2.0 x 8
	Power (Nominal)	PCI Express 2.0 x 8
	Operating Temperature	0-50°C (Operational)/-40-55°C (non-operational)/at max TBW -40C - +40C (non-operational)
	Supported Driver Version	SP134 or later

Environment-friendly Products and Approach	**End-of-life Management and Recycling**	Hewlett-Packard offers end-of-life HP product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to: http://www.hp.com/go/green. To recycle your product, please go to: http://www.hp.com/go/green or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner. The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: http://www.hp.com/go/green. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

Technical Specifications