

Overview

****For latest information on this product please use [HPE Smart Array Gen10 Controllers for HPE ProLiant DL, ML and Apollo Servers QuickSpecs](#)****

HPE Smart Array P816i-a SR Gen10 Controller

The HPE Smart Array P816i-a SR Gen10 Controller, supporting 12Gb/s SAS and PCIe 3.0, is ideal for maximizing performance while supporting advanced RAID levels with 4 GB flash-backed write cache (FBWC). This controller operates in Mixed Mode which combines RAID and HBA operations simultaneously. It has 16 internal SAS lanes, allowing connection of up to 16 SAS or SATA drives without need for the SAS Expander Card providing point to point connectivity to SSDs for lower latency. It also offers encryption for data-at-rest on any drive with HPE Smart Array SR Secure Encryption and accelerates access to data on HDDs with HPE Smart Array SR SmartCache which comes enabled on this controller. This type-a flexible/modular controller occupies a dedicated storage slot without occupying a PCIe expansion slot and provides enterprise-class storage performance, reliability, security and efficiency needed to address your evolving data storage needs.



Models

HPE Smart Array P816i-a SR Gen10 (16 Internal Lanes/4GB Cache/SmartCache) Controller 804338-B21

NOTE: Kit contents include P816i-a controller

HPE Smart Array P816i-a SR Gen10 (16 Int Lanes/4GB Cache/SmartCache) LH Controller 869083-B21

NOTE: Kit contents include P816i-a LH Controller (low-profile heatsink (LH) required in certain servers)

Options Sold Separately

HPE 96W Smart Storage Battery (up to 20 Devices) with 145mm Cable Kit P01366-B21

HPE 96W Smart Storage Battery (up to 20 Devices) with 260mm Cable Kit P01367-B21

NOTE: The P816i-a controller and P816i-a LH controller require the HPE Smart Storage Battery, which supports multiple devices and is sold separately.

NOTE: The P01367-B21 (96W with 260mm Cable) is only used with the ML350 Gen10, all other Gen10 servers use the P01366-B21 (96W with 145mm Cable).

Standard Features

Key Features

Storage interface (SAS/SATA)
 16 SAS lanes across 4 x4 internal Mini-SAS ports
 12Gb/s SAS, 6Gb/s SATA technology
 Mix-and-match SAS and SATA drives to the same controller
 Support for SAS tape drives
 4 GB Flash-Backed Write Cache (FBWC)
 PCI Express 3.0 x8 link
 RAID 0, 1, 5, 6, 10, 50, 60, 1 ADM, 10 ADM (Advanced Data Mirroring)
 Mixed Mode (RAID logic drives and HBA physical drives simultaneously)
 Windows Storage Spaces Direct validated
 VMware Virtual SAN certified
 Legacy and UEFI boot operation
 UEFI System Utilities (storage configuration)
 Up to 238 physical drives
 Up to 64 logical drives
 HPE Smart Array SR SmartCache (enabled)
 HPE Smart Array SR Secure Encryption (optional license)
 HPE SSD Smart Path
 Rapid Parity Initialization (RPI)
 Rapid rebuild
 Drive Sanitize
 Performance Optimization-Degraded Reads and Read Coalescing
 Power efficiency
 Seamless upgrades from HPE Smart Array S-class and E-class controllers
 FIPS 140-2 Level 1 Implementation Under Test (expected validation complete in 2018)

Ports

Internal: 16 SAS/SATA lanes across 4 x4 Mini-SAS ports

Form Factor

Type-a Flexible/Modular Controller (does not occupy a PCIe Expansion Slot)

Performance

12Gb/s SAS (1200 MB/s theoretical bandwidth per SAS lane)
 6Gb/s SATA (600 MB/s theoretical bandwidth per SAS lane)
 PCI Express 3.0 x8 link width
 4 GB 72-bit wide DDR4-2100 Flash-Backed Write Cache provides up to 16.8 GB/s maximum cache bandwidth
 Read ahead caching
 Write-back caching

Array Configuration Features

Expand Array
 Heal Array
 Move Drives
 Re-Mirror Array
 Shrink Array
 Spare Management
 Split Mirrored Array

Logical Drive Configuration Features

Extend Logical Drive
 Instant Secure Erase

Standard Features

Migrate RAID/Stripe Size
Modifying Cache Write Policy
Move Logical Drive
Re-enable Failed Logical Drive

Fault Prevention

The following features offer detection of possible failures before they occur, allowing preventive action to be taken:

Predictive drive failure detects possible drive failure before it occurs, allowing replacement of the component before failure occurs.

Background surface scan checks drives during inactive periods and automatically remaps bad sectors, ensuring data integrity.

HPE SmartSSD Wear Gauge reports the amount of lifetime remaining on your SSDs.

Fault Recovery

Minimizes downtime, reconstructs data, and facilitates a quick recovery from drive failure

Recovery ROM: This feature protects the user from a firmware image corruption by storing a redundant copy of the firmware image. If the active firmware image becomes corrupt, the controller will use the redundant firmware image and continue operating.

On-Line Spares: There is no limit to the number of spare drives that can be installed prior to drive failure. If a failure occurs, recovery begins with an On-Line Spare and data is reconstructed automatically.

DRAM ECC detects and corrects data bit errors.

HPE SSD Smart Path

The HPE SSD Smart Path feature included in the Smart Array software stack improves Solid State Disk (SSD) read performance by up to 4x. HPE SSD Smart Path chooses the optimum path to the SSD and accelerates reads for all RAID levels and RAID 0 writes.

HPE Smart Array SR SmartCache

The HPE Smart Array SR SmartCache feature is a controller-based read and write caching solution in a DAS environment that caches the most frequently accessed data ("hot" data) onto lower latency SSDs to dynamically accelerate application workloads. The SmartCache architecture is flexible and supports any HPE ProLiant Gen10 HDD for bulk storage and SSD as an accelerator. SmartCache is deployed and managed using the HPE Smart Storage Administrator (HPE SSA). SmartCache is enabled on this controller and no license is required.

For additional information please visit: <http://www.hpe.com/servers/smartcache>.

HPE Smart Array SR Secure Encryption (optional license)

HPE Smart Array SR Secure Encryption is a Smart Array controller-based data encryption solution that protects sensitive, mission critical data. This is an enterprise-class encryption solution for data-at-rest on any drives attached to the HPE Smart Array controllers including data on the controller cache. Secure Encryption requires an optional license per server (see Related Options for more information on the license).

The solution is available for both local and remote key management mode deployments. Local Key Management Mode is focused on single server deployment where there is one Master key per controller that is managed by the user. Remote Key Management Mode is for enterprise wide deployments from just a few servers to thousands of servers.

For more information on please visit: <http://www.hpe.com/servers/secureencryption>

FIPS 140-2 Cryptographic Module Validation

FIPS provides a security assurance level validation for cryptographic modules. This HPE Smart Array SR Gen10 Controller is a cryptographic module that is currently on the Validation Program FIPS 140-2 Implementation Under Test List. The National Institute of Standards and Technology (NIST) issue the FIPS 140-2 requirements and standards for cryptography modules that include both hardware and software components.

Warranty

The warranty for this device is 3 years parts only.

Warranty Upgrade Options

Response - Upgrade on-site response from next business day to same day 4 hours.

Coverage - Extend hours of coverage from 9 hours x 5 days to 24 hours x 7 days.

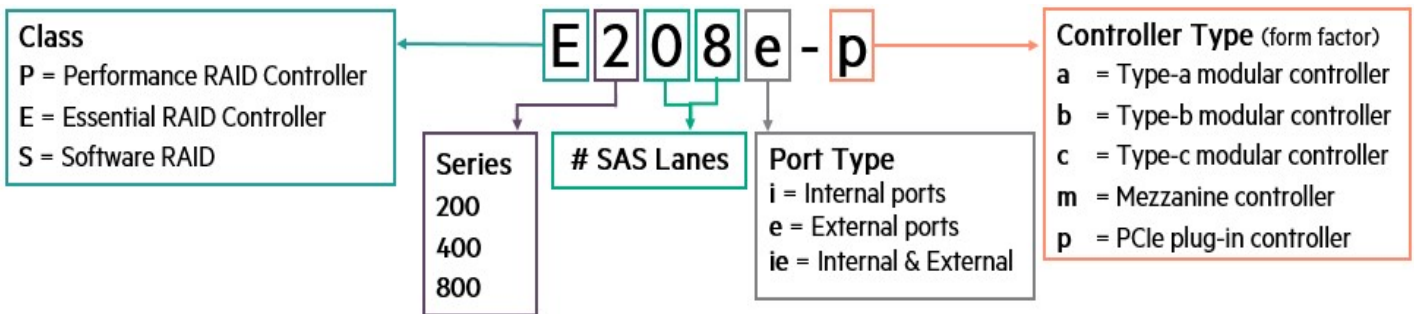
Standard Features

Duration - Select duration of coverage for a period of 1, 3, or 5 years.

Warranty upgrade options can come in the form of Care Packs, which are sold at the HPE System level to which this product attaches.

Naming Framework

The Gen10 controller naming framework has been updated to simplify identification as depicted below. For a more detailed breakout of the available Gen10 Smart Array controllers visit the [HPE Smart Array Gen10 Controllers Data Sheet](#).



Compatibility

Server Support	HPE Smart Array P816i-a SR Gen10 (16 Internal Lanes/4GB Cache/SmartCache) 12G SAS Modular Controller	804338-B21
	HPE ProLiant DL360 Gen10 HPE ProLiant DL380 Gen10 HPE ProLiant DL385 Gen10 HPE ProLiant DL350 Gen10	
	HPE Smart Array P816i-a SR Gen10 (16 Int Lanes/4GB Cache/SmartCache) 12G SAS Modular LH Controller	869083-B21
	HPE ProLiant DL385 Gen10 HPE ProLiant DL350 Gen10	

NOTE: When GPUs are used in the HPE ProLiant DL360 Gen10 the HPE Smart Array P816i-a SR Gen10 LH Controller (869083-B21) should be used in place of the HPE Smart Array P816i-a SR Gen10 Controller (804338-B21).

Operating Systems	Microsoft Windows Server
	Microsoft Windows Hyper-V Server
	VMware vSphere
	Red Hat Enterprise Linux (RHEL)
	SUSE Linux Enterprise Server (SLES)
	CentOS
	ClearOS

NOTE: HPE Smart Array controllers are supported by the server operating system. For more information on HPE's server operating systems and virtualization software, please visit: <http://www.hpe.com/info/ossupport>

Storage Management Software Suite	HPE Smart Storage Administrator (SSA) GUI
	HPE Smart Storage Administrator (SSA) CLI
	HPE Smart Storage Administrator (SSA) Scripting
	HPE Intelligent Provisioning
	UEFI System Utilities (storage configuration)
	UEFI Storage RESTful

NOTE: For additional information see the HPE Smart Array SR Gen10 Configuration Guide at: <http://www.hpe.com/info/SmartArrayGen10-docs>

Service and Support

HPE Support Services **Protect your business beyond warranty with HPE Support Services**

HPE Pointnext provides a comprehensive portfolio including Advisory and Transformational, Professional, and Operational Services to help accelerate your digital transformation. From the onset of your transformation journey, Advisory and Transformational Services focus on designing the transformation and creating a solution roadmap. Professional Services specializes in creative configurations with flawless and on-time implementation, and on-budget execution. Finally, operational services provides innovative new approaches like Flexible Capacity and Datacenter Care, to keep your business at peak performance. HPE is ready to bring together all the pieces of the puzzle for you, with an eye on the future, and make the complex simple.

Recommended Support **HPE Proactive Care* with 24x7 coverage, three year Support Service**

HPE Proactive Care gives customers an enhanced call experience. When your products are connected to HPE, Proactive Care helps prevent problems and maintains IT stability by utilizing personalized proactive reports with recommendations and advice. This Service combines three years proactive reporting and advice with our 24x7 coverage, four hour hardware response time when there is a problem. This service also includes collaborative software support for Independent Software Vendors (ISVs), (Red Hat, VMWare, Microsoft, etc.) running on your HPE servers.

<https://www.hpe.com/h20195/v2/GetPDF.aspx/4AA3-8855ENW.pdf>

HPE Proactive Care* with 6 hour call-to-repair commitment, three year Support Service

HPE Proactive Care gives customers an enhanced call experience. When your products are connected to HPE, Proactive Care helps prevent problems and maintains IT stability by utilizing personalized proactive reports with recommendations and advice. This Service combines three years' proactive reporting and advice with our highest level of hardware support - HPE's 24x7, six hour hardware call-to-repair. HPE is the only leading manufacturer who makes this level of coverage available as a standard service offering for your most valuable servers. This service also includes collaborative software support for Independent Software Vendors (ISVs), (Red Hat, VMWare, Microsoft, etc.) running on your HPE servers.

<https://www.hpe.com/h20195/v2/GetPDF.aspx/4AA3-8855ENW.pdf>

NOTE: *HPE Proactive Care and HPE Proactive Care Advanced require that the customer connect their devices to make the most of these services and receive all the deliverables.

HPE Education Services Keep your IT staff trained making sure they have the right skills to deliver on your business outcomes. Book on a class today and learn how to get the most from your technology investment.

<http://www.hpe.com/ww/learn>

HPE Support Center The HPE Support Center is a personalized online support portal with access to information, tools and experts to support HPE business products. Submit support cases online, chat with HPE experts, access support resources or collaborate with peers.

Learn more <http://www.hpe.com/support/hpesc>

HPE'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.

HPE Insight Remote Support and HPE Support Center are available at no additional cost with a HPE warranty, HPE Support Service or HPE contractual support agreement.

NOTE: *HPE Support Center Mobile App is subject to local availability

Parts and Materials Hewlett Packard Enterprise will provide HPE-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.

Service and Support

Parts and components that have reached their maximum supported lifetime and/or the 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 Disk or eligible SSD/Flash Drives replaced by Hewlett Packard Enterprise due to malfunction.

Related Services

HPE Server Hardware Installation

Provides for the basic hardware installation of HPE branded servers, storage devices and networking options to assist you in bringing your new hardware into operation in a timely and professional manner.

<https://www.hpe.com/h20195/V2/GetPDF.aspx/5981-9356EN.pdf>

HPE Installation and Startup Service provides for the installation and startup of HPE technology including BladeSystems, C-Class enclosure, HPE ProLiant c-Class and Integrity server blades, storage blades, SAN switch blades, HPE Virtual Connect modules (Ethernet and Fibre Channel), Ethernet network interconnects, and InfiniBand, as well as the installation of one supported operating system type (Windows® or Linux).

NOTE: The Smart Array controller is covered under the HPE Service Contract applied to the HPE ProLiant Server. No separate HPE support services need to be purchased.

Warranty and Support Services will extend to include HPE options configured with your server or storage device. The price of support service is not impacted by configuration details. HPE sourced options that are compatible with your product will be covered under your server support at the same level of coverage allowing you to upgrade freely. Installation for HPE options is available as needed. To keep support costs low for everyone, some high value options will require additional support. Additional support is only required on select high value workload accelerators, fibre switches, InfiniBand and UPS batteries over 12KVA. See the specific high value options that require additional support [HERE](#).

For more information

Visit the Hewlett Packard Enterprise Service and Support [website](#).

HPE Smart Array Supporting Documents

For additional support documents, including the Smart Array Configuration Guide and User Guide, please visit: <http://www.hpe.com/info/SmartArrayGen10-docs>.

Related Options

HPE Smart Storage Battery	HPE 96W Smart Storage Battery (up to 20 Devices) with 145mm Cable Kit	P01366-B21
	NOTE: 96W Battery with 145mm cable is for ProLiant Gen10 DL servers and the ProLiant XL170r and XL190r Gen10 servers.	
HPE Smart Array SR Secure Encryption	HPE 96W Smart Storage Battery (up to 20 Devices) with 260mm Cable Kit	P01367-B21
	NOTE: 96W Battery with 260mm cable is for ML110 and ML350 Gen10 servers	
	NOTE: Smart Array Gen10 controllers are supported by the HPE Smart Storage Battery, which supports multiple devices and is sold separately.	
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	HPE Smart Array SR Secure Encryption (Data at Rest Encryption/per Server Entitlement) E-LTU	Q2F26AAE
	NOTE: HPE Smart Array SR Secure Encryption licensing is based on the number of servers requiring encryption for direct attached storage.	
	NOTE: For more information visit: http://www.hpe.com/servers/secureencryption	

Summary of Changes

Date	Version History	Action	Description of Change
15-Oct-2018	Version 7	Changed	Overview and Related Options were updated.
04-Jun-2018	Version 6	Changed	SKU description and Service and Support were updated.
07-May-2018	Version 5	Changed	Overview, Standard Features and Service and Support were updated.
05-Mar-2018	Version 4	Changed	Overview and Standard Features were updated.
05-Feb-2018	Version 3	Changed	Added support for HPE ProLiant DL385 Gen10; 875241-B21 replaced with P01366-B21 and 875242-B21 replaced with P01367-B21.
25-Sep-2017	Version 2	Added	Compatible with ML350 Gen10; Smart Storage Battery (260mm cable) as related option; VMware Virtual SAN certified; Windows Storage Spaces Direct validated; naming framework.
11-Jul-2017	Version 1	Added	New QuickSpecs.



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