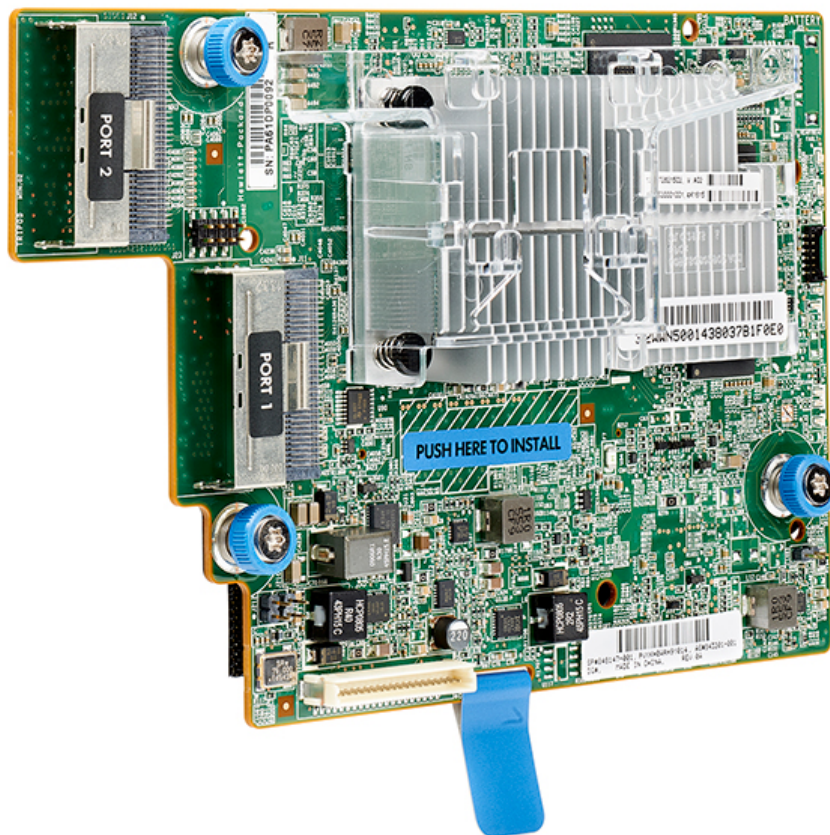## Overview

HPE Smart Array P840ar Controller

The HPE Smart Array P840ar Controller is a flexible Smart Array 12 Gb/s Serial Attached SCSI (SAS), PCI-Express (PCIe) 3.0 x8 RAID controller that provides enterprise-class storage performance, increased internal scalability, and data protection for HPE ProLiant DL360 and DL380 Gen9 rack servers. It features 16 internal physical links and delivers increased server uptime by providing advanced storage functionality, including online RAID level migration between any RAID levels with flash-backed write cache (FBWC), global online spare, and pre-failure alert. This controller supports 16 drives without need for the SAS Expander Card providing point to point connectivity to SSDs for lower latency. The HPE Smart Array P840ar Controller supports HPE Secure Encryption and also supports the HPE Smart Storage Battery, which allows multiple Smart Array controllers to be supported.

Models

HPE Smart Array P840ar Controller	HPE Smart Array P840ar/2GB FBWC 12Gb 2-port Internal SAS Controller	843199-B21
	NOTE: HPE Smart Array P840ar/2GB FBWC 12Gb 2-port Internal SAS Controller includes the HPE Smart Storage 96W Battery.	

Standard Features

Key Features	• Storage interface (SAS/SATA)
	  o 16 physical links across 2 x8 internal ports
	  o 12Gb/s SAS, 6Gb/s SATA technology
	  o Mix-and-match SAS and SATA drives to the same controller
	  o Support for SAS tape drives, SAS tape autoloaders and SAS tape libraries
	• 2 GiBytes Flash-Backed Write Cache (FBWC)
	• PCI Express Gen3 x8 link
	• RAID 0, 1, 10, 5, 50, 6, 60, 10 ADM (Advanced Data Mirroring)
	• RAID or HBA mode
	• Legacy and UEFI boot operation
	• Up to 200 physical drives
	• Up to 64 logical drives
	• HPE SmartCache (license included)
	• HPE Secure Encryption (optional license)
	• HPE SSD Smart Path
	• VMware Virtual SAN certified
	• Rapid Parity Initialization (RPI)
	• Rapid rebuild
	• Drive Erase
	• Performance Optimization-Degraded Reads and Read Coalescing
	• Power Efficiency
	• Seamless upgrades to and from other HPE Smart Array controllers
	• Recovery ROM to protect against controller ROM corruption
	• Full-height, half-length Low-profile PCI Express form factor
	  o Dimensions (excluding bracket): 6.6 in x 4.4 in x 0.6 in (16.8 cm x 11.1 cm x 1.5 cm)

Ports	• Internal: 16 SAS/SATA physical links across 2 x8 ports
Performance	• 12Gb/s SAS (1200 MB/s theoretical bandwidth per physical lane) • 6Gb/s SATA (600 MB/s theoretical bandwidth per physical lane) • PCI Express Gen3 x8 link width • 2 GiBytes 72-bit wide DDR3-1866 Flash Back Write Cache provides up to 14.9GB/s maximum cache bandwidth • Read ahead caching • Write-back caching
Online Management Features	• Online array expansion • Online capacity expansion • Online logical drive extension • Online RAID level migration • Online stripe size migration • Online mirror split, recombine, and rollback • Online active drive replacement • Online drive firmware upgrade • Online and high performance offline Rapid Parity Initialization (RPI) • Unlimited global online spares assignment • User selectable expand and rebuild priority • User selectable RAID level and stripe size • User selectable read and write cache sizes • Supports Predictive Spare Activation
Fault Prevention	The following features offer detection of possible failures before they occur, allowing preventive action to be taken:

Standard Features

- S.M.A.R.T.: Self Monitoring Analysis and Reporting Technology first developed at HPE detects possible hard disk failure before it occurs, allowing replacement of the component before failure occurs.
- Drive Parameter Tracking monitors drive operational parameters, predicting failure and notifying the administrator.
- Dynamic Sector Repairing continually performs background surface scans on the hard disk drives during inactive periods and automatically remaps bad sectors, ensuring data integrity.
- Smart Array Cache Tracking monitors integrity of controller cache, allowing pre-failure preventative maintenance.

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

- Recovery ROM: This feature provides unique redundancy that protects from a ROM image corruption. A new version of firmware can be flashed to the ROM while the controller maintains the last known working version of firmware. If the firmware becomes corrupt, the controller will revert back to the previous version of firmware and continue operating. This reduces the risk of flashing firmware to the controller.
- 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 corrects against single bit data and address corruption.

HPE SmartCache   The HPE 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 HPE SmartCache architecture is flexible and supports any HPE ProLiant Gen9 supported HDD for bulk storage and any HPE ProLiant Gen9 supported SSD as an accelerator. HPE SmartCache is deployed and managed using the HPE Smart Storage Administrator (HPE SSA). HPE SmartCache license comes standard with P840 controller.

For more information please visit: **http://www.hpe.com/servers/smartcache**.

HPE Secure Encryption   HPE Secure Encryption is a Smart Array controller-based data encryption solution for ProLiant Gen9 servers that protects sensitive, mission critical data. This is an enterprise-class encryption solution for data at rest on any bulk storage attached to the HPE Smart Array controllers including data on the cache memory of the controller. HPE Secure Encryption is an optional license per server requiring encryption enablement (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**

HPE SSD Smart Path   The HPE SSD Smart Path feature included in the Smart Array software stack improves Solid State Disk (SSD) read performance. With up to 4x better SSD read performance, HPE SSD Smart Path chooses the optimum path to the SSD and accelerates reads for all RAID levels and RAID 0 writes. HPE SSD Smart Path requires updated firmware, drivers, and configuration utility available at: **http://www.hpe.com/servers/ssa**. HPE SSD Smart Path is ideal for read intensive workloads and is included as a base feature on HPE Smart Array P-series controllers.

Warranty   The warranty for this device is 3 years parts only.
Pre-Failure Warranty: Drives attached to the Smart Array Controller and monitored under Insight Manager are supported by a Pre-Failure (replacement) Warranty. For complete details, consult the HPE

Standard Features

Support Center or refer to your HPE Server Documentation.

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
- 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.

Compatibility

Server Support	HPE ProLiant DL380 Gen9
	HPE ProLiant DL360 Gen9

Operating Systems

Microsoft Windows Server

Microsoft Windows Hyper-V Server

VMware vSphere ESXi

Red Hat Enterprise Linux (RHEL)

SUSE Linux Enterprise Server (SLES)

Oracle Solaris

Oracle Linux

Canonical Ubuntu

CentOS

Wind River

Citrix XenServer

NOTE: For a complete and up-to-date list of certified and supported OS versions for HPE Smart Array controllers, please refer to the HPE Smart Array Operating System Support Matrix at:
http://www.hpe.com/h20195/v2/GetPDF.aspx/4AA6-6550ENW.pdf

NOTE: For more information on HPE's Certified and Supported ProLiant Servers for OS and Virtualization Software, please visit our Support Matrix at: **http://www.hpe.com/info/ossupport**

Storage Management Software Suite

HPE Smart Storage Administrator (HPE SSA)

Comprehensive management for HPE Smart Storage products with advanced scripting and diagnostic features and simplified and intuitive interface and functionality. For more information please visit:
http://www.hpe.com/servers/ssa

HPE Systems Insight Manager

Powerful server and server options/storage manager tool with configuration/diagnostic utilities

HPE Storage Management Utility

Offers the simplest method for configuring the storage system via Initial System Configuration Wizard

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

*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.

*HPE Support Center Mobile App is subject to local availability

Service and Support

Parts and materials	HPE 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.

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 HPE 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: This 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**.

Recommended Option

This controller is a Recommended Option. Offering the best combination of performance, value and availability, Recommended Options have been selected by HPE experts to provide the right technology for a range of workloads and market segments. Fully integrated into the ProLiant management and security experience, Recommended Options provide the best fit with timely availability.

Additional Info

http://www.hpe.com/services

Related Options

HPE Secure Encryption	HP Secure Encryption per Svr Entitlement	Q2F26AAE

HPE Secure Encryption HP Secure Encryption per Svr Entitlement Q2F26AAE
NOTE: HPE Secure Encryption licensing is based on the number of servers requiring encryption for direct attached storage.
For more information visit: **https://www.hpe.com/us/en/product-catalog/detail/pip.6532260.html**

HPE Smart Storage Battery HP 96W Smart Storage Battery with 145mm Cable for DL/ML/SL Servers P01366-B21
NOTE: HPE 96W Smart Storage Battery provides backup power for up to 16 HPE Smart Array controllers or other devices.

HPE Cable Options **HPE ProLiant DL380 Gen9 Server Cables**

HP DL380 Gen9 12LFF SAS Cable Kit 785991-B21
HP DL380 Gen9 8SFF SAS Cable Kit 783009-B21
HP DL380 Gen9 12LFF Rear 2SFF or 3LFF P840/440 SAS Cable Kit 783007-B21
NOTE: One of cables listed above is required for connecting the HPE Smart Array P840ar Controller to the HPE ProLiant DL380 Gen9 Server.
HPE ProLiant DL360 Gen9 Server Cable
HPE DL360 Gen9 Smart Array P840ar Cable Kit 843234-B21
NOTE: The HPE 360 Gen9 Smart Array P840ar Cable Kit is required for connecting the HPE Smart Array P840ar Controller to the HPE ProLiant DL360 Gen9 Server.

Environment friendly Products and Approach - End-of life Management and Recycling

Hewlett Packard Enterprise offers end-of-life **product return, trade-in, and recycling programs**, in many geographic areas, for our products. Products returned to Hewlett Packard Enterprise will be recycled, recovered or disposed of in a responsible manner.

The EU WEEE Directive (2012/19/EU) 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 Enterprise web site**. These instructions may be used by recyclers and other WEEE treatment facilities as well as Hewlett Packard Enterprise OEM customers who integrate and re-sell Hewlett Packard Enterprise equipment.

Summary of Changes

Date	Version History	Action	Description of Change
5-Feb-2018	Version 3	Changed	Replaced Secure Encryption SKU C9A82AAE with Q2F26AAE. Updated Service and Support. Replaced HPE Smart Storage Battery SKU.
19-Aug-2016	Version 2	Changed	Overview, Standard Features, Compatibility, and Related Options were revised.
31-Mar-2016	Version 1	New	Initial version.

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