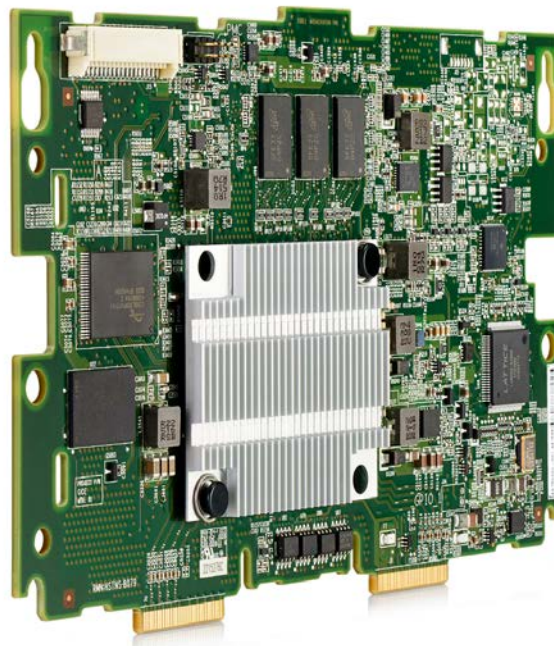


### Overview

### HPE Smart Array P240nr Controller

The HPE Smart Array P240nr Controller is a flexible Smart Array 12 Gb/s Serial Attached SCSI (SAS), PCI Express (PCIe) 3.0 RAID controller that provides enterprise-class storage performance and data protection for the HPE Synergy Compute Modules. It features four internal physical links and delivers increased compute module uptime by providing advanced storage functionality; including 1 GB Flash-Backed Write Cache (FBWC), pre-failure alert, and optional Secure Encryption. Data compatibility between HPE Smart Array Controllers means customers can easily upgrade to future Smart Array Controllers.



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### Model

#### HPE Smart Array P240nr Controller

HPE Smart Array P240nr/1GB FBWC 12Gb 1-port Internal SAS Controller

758801-B21

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### Kit Contents

- HPE Smart Array P240nr Controller
- HPE Smart Storage Battery

**NOTE:** HPE Smart Array P240nr Controller option kit includes the HPE Smart Storage Battery, the backup power source necessary to protect the data on the Flash-Backed Write Cache. Multiple HPE Smart Array Controllers are supported with a single HPE Smart Storage Battery without needing additional backup power source for each controller, resulting in a simple upgrade process at a reduced cost.

## Standard Features

### Key Features

- Storage interface (SAS/SATA)
  - 4 physical links across 1 x4 internal port
  - 12Gb/s SAS, 6Gb/s SATA technology
  - Mix-and-match SAS and SATA drives to the same controller
- 1 GiBytes Flash-Backed Write Cache (FBWC)
- PCI Express Gen3 x4 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 (optional license)
- HPE Secure Encryption (optional license)
- FIPS 140-2 validation complete
- HPE SSD Smart Path
- 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
- Flexible Smart Array controller (daughter card)
  - Dimensions: 7.03 x 4.12 x 0.6 in (17.86 x 10.46 x 1.52 cm)

### Ports

- Internal: 4 SAS/SATA physical links across 1 x4 port

### 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
- 1 GiBytes 40-bit DDR3-1866MHz Flash-Backed Write Cache provides up to 7.5GB/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:

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## Standard Features

- S.M.A.R.T. (Self Monitoring Analysis and Reporting Technology) was first developed by HPE which 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 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
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### 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 is an optional license (see Related Options for more information on the license).

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

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### 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.

#### FIPS 140-2 Cryptographic Module Validation

FIPS provides a security assurance level validation for cryptographic modules. HPE Smart Array P240nr controller has completed FIPS 140-2 Level 1 validation. The National Institute of Standards and Technology (NIST) issued the FIPS 140-2 requirements and standards for cryptography modules that include both hardware and software components.

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

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### 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:

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## Standard Features

<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.

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### 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 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

<b>Compute Module Support</b>	HPE Synergy 480 Gen9 Compute Modules HPE Synergy 620 Gen9 Compute Modules HPE Synergy 660 Gen9 Compute Modules HPE Synergy 680 Gen9 Compute Modules
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<b>Operating Systems</b>	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
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**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>

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<b>Storage Management Software Suite</b>	<b>HPE Smart Storage Administrator</b> (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: <a href="http://www.hpe.com/servers/ssa">http://www.hpe.com/servers/ssa</a> <b>HPE Systems Insight Manager</b> Powerful server and server options/storage manager tool with configuration/diagnostic utilities <b>HPE Storage Management Utility</b> Offers the simplest method for configuring the storage system via Initial System Configuration Wizard
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## Service and Support

### Service and Support

**NOTE:** This option is covered under the HPE Support Service(s) applied to the main product. No separate HPE Support Service(s) need to be purchased.

HPE Technology Services offers you a rich portfolio of consulting and support services designed to add value to our core products and solutions. We have the know-how and experience to put technology to work for you. We work closely with you, as your strategic partner, leveraging our full services portfolio to make sure that everything works to help optimize your enterprise.

Choose from services aligned to our product offerings and lifecycle. From proactive onsite services to innovative support when your products are connected to Hewlett Packard Enterprise, you choose the precise level of attention and support your business demands.

#### **HPE Technology Services for HPE Synergy**

HPE Technology Services delivers confidence, reduces risk and helps customers realize agility and stability. Connect to Hewlett Packard Enterprise to help prevent problems and solve issues faster. Our support technology lets you to tap into the knowledge of millions of devices and thousands of experts to stay informed and in control, anywhere, any time.

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

HPE support services offer complete care and support expertise with committed response choices that are designed to meet your IT and business needs.

**HPE Foundation Care services** offer scalable reactive support-packages for HPE Synergy and software. You choose the type and level of service that is most suitable for your IT and business needs.

**HPE Proactive Care** keeps your system stable and reliable helping to prevent problems and reduce outages through proactive service management and enhanced technical response.

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### **Advise, transform, integrate, support, automate, and flex**

**HPE Technology Services** helps you get the most out of what you have today and transition to HPE Synergy, a composable infrastructure, at your pace and from wherever you are on the journey.

**Start with the HPE Transformation Workshop** to ensure that your business and IT organizations collaborate, define the topline strategy for composable, software-defined, cloud-ready infrastructure and kick-start your projects confidently. This workshop clarifies your business requirements and the issues that IT and operations teams must resolve in order to meet these requirements. A detailed executive briefing or high-level report summarizes the strategies, high-level plan and functional requirements.

**HPE Modernization and Migration Services** helps you choose the right platform for the right workload at the right cost and evolve your IT infrastructure, processes and organization taking advantage of “on-hybrid infrastructure” innovations such as composable, converged, software-defined, technologies. Hewlett Packard Enterprise experts advise, transform, integrate and implement for platform refresh, datacenter consolidation virtualization, migration and automation projects.

**HPE Flexible Capacity** is a pay per use model for on premise infrastructure. This offers needed HPE Synergy capacity in the datacenter, plus a buffer of additional capacity. As HPE Synergy will be a dynamic environment, this provides enough room to grow your environment, but only pay for actual metered use. Technology transitions and refresh can be built in, infrastructure and services are billed monthly, enabling you to align costs to business use.

**HPE Datacenter Care-Infrastructure Automation (DC-IA)** is an extension to HPE Datacenter Care

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## Service and Support

and delivers enterprise-grade support, advice, guidance and best practices for infrastructure automation. The DC-IA Center of Excellence (CoE) is staffed with highly trained experts who have specific expertise on integrating Chef with HPE OneView.

Choose the right support to maximize uptime, free up your resources, and achieve improved value—as you get the most out of the existing IT assets while accelerating time-to-revenue.

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### Deploy and integrate

**HPE Synergy First Frame Installation and Startup** - Provides for hardware installation (HPE Synergy Compute Modules, Storage Modules, Virtual Connect modules, Interconnect Link Modules, Frame Link Modules, and HPE Synergy D3940 Storage Modules) and software startup for the first frame of your HPE Synergy deployment. Additional frames can be added using the HPE Synergy Additional Frame Installation and Startup Service.

**HPE Synergy Additional Frame Installation and Startup Service** - Add additional frames to your HPE Synergy First Frame Startup service or expand your existing HPE Synergy Infrastructure.

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### HPE Education Services

Training your IT staff is critical to help drive the value of HPE Synergy with increased efficiencies and better business outcomes. Training is key to the transformation and management of HPE Synergy.

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### Parts and materials

Hewlett Packard Enterprise will provide Hewlett Packard Enterprise-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 QuickSpecs, 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 HDD or SSD drives replaced by Hewlett Packard Enterprise due to malfunction.

## Related Options

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<b>HPE SmartCache</b>	HPE SmartCache No Media 24x7 Technical Support 1-server LTU <b>Single-Server License</b> Used to purchase a license for one server. Contains one license per server, a printed license entitlement certificate, end user license agreement, and license key installation card <b>delivered via physical shipment</b> . The license entitlement certificate must be redeemed online or via fax in order to obtain the license activation key(s). Include one year of 24x7 HPE Software Technical Support Services.	D7S26A
	HPE SmartCache No Media 24x7 Technical Support Flexible LTU <b>Flexible-Quantity License</b> Used to purchase multiple licenses with a single activation key. Contains license(s) for a customer defined quantity of servers, a license entitlement certificate for the quantity of licenses purchased, end user license agreement, and license key installation card <b>delivered via physical shipment</b> . The license entitlement certificate must be redeemed online or via fax in order to obtain the license activation key(s). Include one year of 24x7 HPE Software Technical Support Services.	D7S27A
	HPE SmartCache No Media 24x7 Technical Support E-LTU <b>Flexible-Quantity Electronic License</b> Used to purchase multiple licenses with a single activation key. Contains license(s) for a customer defined quantity of servers, a license entitlement certificate for the quantity of licenses purchased, end user license agreement, and license key installation information <b>delivered via e-mail</b> . The license entitlement certificate must be redeemed online or via fax in order to obtain the license activation key(s). Include one year of 24x7 HPE Software Technical Support Services. For more information please visit: <a href="http://www.hpe.com/servers/smartcache">http://www.hpe.com/servers/smartcache</a>	D7S27AAE
<b>HPE Secure Encryption</b>	HP Secure Encryption per Svr Entitlement <b>NOTE: HPE Secure Encryption licensing is based on the number of servers requiring encryption for direct attached storage.</b> For more information visit: <a href="http://www.hpe.com/servers/secureencryption">http://www.hpe.com/servers/secureencryption</a>	C9A82AAE

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## Summary of Changes

Date	Version History	Action	Description of Change
13-Feb-2017	From Version 3 to 4	Changed	HPE Datacenter Care-Infrastructure Automation (DC-IA) content was revised.
19-Aug-2016	From Version 2 to 3	Changed	Overview, Standard Features, Compatibility, and Related Options were revised.
31-Mar-2016	From Version 1 to 2	Changed	Key Features and Compatibility were revised.



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