

Overview

HPE Smart Array Gen10 Controllers

for HPE Synergy Compute Modules

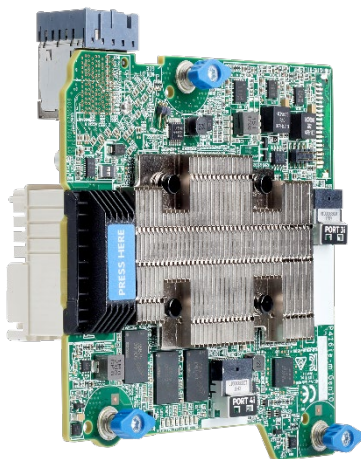
The HPE Smart Array Gen10 Controllers for the Synergy Compute Modules, supporting 12Gb/s SAS and PCIe 3.0, are ideal for maximizing performance while supporting advanced RAID levels with up to 2 GB flash-backed write cache (FBWC). These controllers operate in Mixed Mode which combines RAID and HBA operations simultaneously. The Smart Array Gen10 controller portfolio provides the ability to support the internally attached drives inside the compute module and the drives inside the HPE Synergy D3940 Compute Module. The Smart Array Gen10 Controllers also offer encryption for data-at-rest on any drive with HPE Smart Array SR Secure Encryption. The HPE controllers provide enterprise-class storage performance, reliability, security and efficiency needed to address your evolving data storage needs.



HPE Smart Array P204i-c SR Gen10 Controller (804424-B21)



HPE Smart Array P408i-c SR Gen10 Controller (823856-B21)



HPE Smart Array P416ie-m SR Gen10 Controller (804428-B21)

Microchip P416ie-m SAS Controller for HPE (P38721-B21)



HPE Smart Array E208i-c SR Gen10 Controller (823852-B21)

Overview

Models

Microchip SmartRAID P416ie-m x16 Lanes 2GB Cache SAS 12G Controller for HPE	P38721-B21
HPE Smart Array P416ie-m SR Gen10 (8 Int 8 Ext Lanes/2GB Cache) 12G SAS Mezzanine Controller	804428-B21
HPE Smart Array P408i-c SR Gen10 (8 Internal Lanes/2GB Cache) 12G SAS Modular Controller	823856-B21
HPE Smart Array P204i-c SR Gen10 (4 Internal Lanes/1GB Cache) 12G SAS Modular Controller	804424-B21
HPE Smart Array E208i-c SR Gen10 (8 Internal Lanes/No Cache) 12G SAS Modular Controller	823852-B21

Kit Contents

Includes controller, documentation information card, warranty statement, and battery required card.

Notes: The HPE Smart Storage Battery is not included in the kit and is required with Performance RAID controllers (P204i-c, P408i-c, and P416ie-m).

Notes: The HPE Smart Array E208i-c does not include battery required card

Compatibility

Server Synergy Support Table

Product	P204i-c SR	P408i-c SR	P416ie-m SR	SmartRAID P416ie-m	E208i-c SR
SKU	804424-B21	823856-B21	804428-B21	P38721-B21	823852-B21
HPE Synergy 480 Gen10 Plus	✓			✓	✓
HPE Synergy 480 Gen10	✓		✓		✓
HPE Synergy 660 Gen10		✓	✓		✓
HPE Synergy D3940 Gen10 Storage Module			✓	✓	

XXXXXX-**X21** is SKU designation formed by a common six digit part number and a -**X21** suffix that identifies a SKU that is available across multiple server family lines. Refer to the table below to find the SKU suffix that applies to the specific server product line this option can be ordered with.

-B21	-H21	-K21
COMPUTE Server Line	SPECIALIZED COMPUTE Server Line	STORAGE Line
HPE Cloudline CL2100/CL2200/CL2800/CL3100/CL4100/CL5200/CL5800 Servers HPE Composable Cloud for ProLiant DL HPE ProLiant BL460c/BL660c Servers HPE ProLiant DL20/DL160/DL180 Servers HPE ProLiant DL325/DL360/DL380/DL385/DL560/DL580 Servers HPE ProLiant DX360/DX380 Servers HPE ProLiant MicroServer HPE ProLiant for Microsoft Azure Stack HPE ProLiant ML30/ML110/ML350 Servers HPE Synergy 480/660 Systems HPE ProLiant DX170r/DX190r, DX2000 Servers HPE ProLiant DX560 Gen10 server HPE ProLiant DX4200 Gen10 server	HPE Apollo 35/40/70 Systems HPE Apollo 2000/6000 Servers HPE XL170r/XL190r/XL270d (Apollo 6500) Gen10 Server for BlueData Software HPE Converged System 300/500/700/750 HPE Edgeline Systems and Servers HPE Integrity BL860c i6/BL870c i6/BL890c i6 Server Blades HPE Integrity MC990 X Server HPE Integrity rx2800 i6 Server HPE Integrity Superdome HPE SGI 8600 System HPE Solutions for SAP HANA (TDI)	HPE Apollo 4200 Gen9/Gen10 Servers HPE Apollo 4200 Gen10 LFF Server for BlueData Software HPE Apollo 4510 Gen10 System HPE D2220sb/D2500sb Storage Blade HPE D3000/D6020/D8000 Disk Enclosures HPE Scalable Object Storage with Scality RING HPE SimpliVity 2600 HPE SimpliVity 325/380 Gen10 HPE Storage File Controllers HPE StoreEasy 1460/1560/1650/1660/1860 Disclaimer: This may not be a complete listing of applicable servers



Standard Features

Standard Features Table

Product	P204i-c SR	P408i-c SR	P416ie-m SR	SmartRAID P416ie-m	E208i-c SR
SKU	804424-B21	823856-B21	804428-B21	P38721-B21	823852-B21
Form factor: Type-c modular	✓	✓			✓
Form factor: Mezzanine PCIe plug-in controller			✓	✓	
Internal SAS lanes	4	8	8	8	8
External SAS lanes			8	8	
Cache size (FBWC)	1 GB	2 GB	2 GB	2 GB	
Read ahead caching	✓	✓	✓	✓	
Write-back caching	✓	✓	✓	✓	
Storage protocol: 12G SAS	✓	✓	✓	✓	✓
Storage protocol: 6G SATA	✓	✓	✓	✓	✓
I/O slot: PCI Express 3.0	x4 link	x8 link	x8 link	x8 link	x8 link
Maximum physical drives (up to)	238	238	238	238	238
Maximum logical drives	64	64	64	64	64
RAID: 0/1/5/10					✓
RAID: 0/1/5/6/10/50/60/ 1 ADM/10 ADM	✓	✓	✓	✓	
Mixed mode (RAID & HBA)	✓	✓	✓	✓	✓
Boot mode: UEFI	✓	✓	✓	✓	✓
Boot mode: Legacy	✓	✓	✓	✓	✓
SSD Accelerator	Smart Path	Smart Path	Smart Path	Smart Path	Smart Path
HPE Smart Array SR	Optional	Optional	Optional	Optional	Optional
Secure Encryption (license)					
SSD Caching		Optional	Optional	Optional	
		(SmartCache)	(SmartCache)	(SmartCache)	
FIPS 140-2 Level 1 Validation	✓		✓	✓	✓
HPE OneView Support	✓	✓	✓	✓	✓

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 (optional license)

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 requires an optional license (see Related Options section below for more information on the license).

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 Primary 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. 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

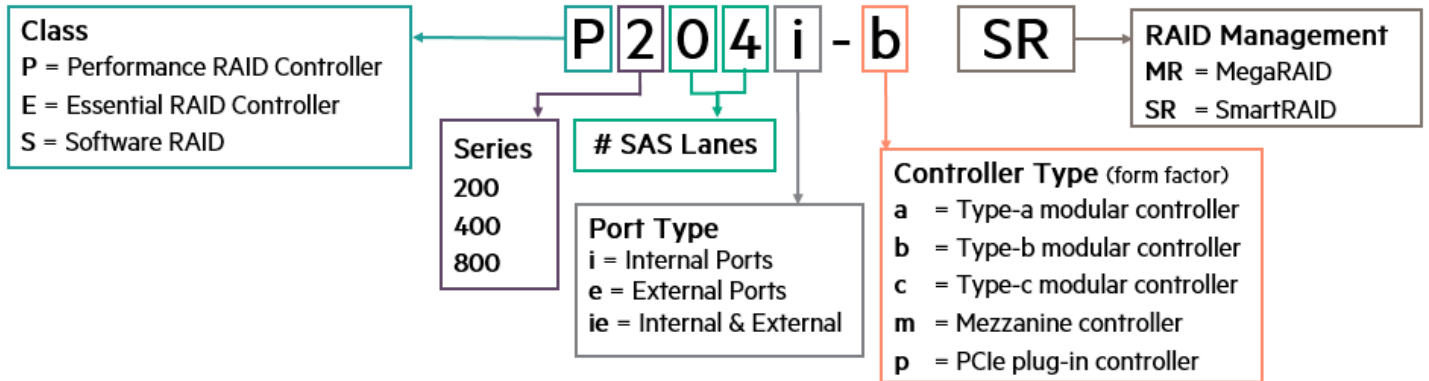


Standard Features

- 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 HPE Services operational, which are sold at the HPE System level to which this product attaches.

Naming Framework

The Gen10 controller naming framework is illustrated below to help simplify controller identification.



Compatibility

Operating System Support

- Microsoft Windows Server
- Red Hat Enterprise Linux (RHEL)
- SUSE Linux Enterprise Server (SLES)
- VMware ESXi
- Canonical Ubuntu
- CentOS
- Citrix

Notes: 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

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

Additional Information

HPE Smart Array SR Gen10 Controllers

For additional information on the features for HPE Smart Array SR Gen10 Controllers, please see the HPE Smart Array SR Gen10 User Guide, HPE Smart Array SR Gen10 Configuration Guide, and HPE Smart Array SR Secure Encryption Installation and User Guide at: <http://www.hpe.com/info/SmartArrayGen10-docs>



Service and Support

HPE Services

No matter where you are in your digital transformation journey, you can count on HPE Services to deliver the expertise you need when, where and how you need it. From planning to deployment, ongoing operations and beyond, our experts can help you realize your digital ambitions.

<https://www.hpe.com/services>

Consulting Services

No matter where you are in your journey to hybrid cloud, experts can help you map out your next steps. From determining what workloads should live where, to handling governance and compliance, to managing costs, our experts can help you optimize your operations.

<https://www.hpe.com/services/consulting>

HPE Managed Services

HPE runs your IT operations, providing services that monitor, operate, and optimize your infrastructure and applications, delivered consistently and globally to give you unified control and let you focus on innovation.

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Operational services

Optimize your entire IT environment and drive innovation. Manage day-to-day IT operational tasks while freeing up valuable time and resources. Meet service-level targets and business objectives with features designed to drive better business outcomes.

<https://www.hpe.com/services/operational>

HPE Complete Care Service

HPE Complete Care Service is a modular, edge-to-cloud IT environment service designed to help optimize your entire IT environment and achieve agreed upon IT outcomes and business goals through a personalized experience. All delivered by an assigned team of HPE Services experts. HPE Complete Care Service provides:

- A complete coverage approach -- edge to cloud
- An assigned HPE team
- Modular and fully personalized engagement
- Enhanced Incident Management experience with priority access
- Digitally enabled and AI driven customer experience

<https://www.hpe.com/services/complecare>

HPE Tech Care Service

HPE Tech Care Service is the operational support service experience for HPE products. The service goes beyond traditional support by providing access to product specific experts, an AI driven digital experience, and general technical guidance to not only reduce risk but constantly search for ways to do things better. HPE Tech Care Service delivers a customer-centric, AI driven, and digitally enabled customer experience to move your business forward. HPE Tech Care Service is available in three response levels. Basic, which provides 9x5 business hour availability and a 2-hour response time. Essential which provides a 15-minute response time 24x7 for most enterprise level customers, and Critical which includes a 6-hour repair commitment where available and outage management response for severity 1 incidents.

<https://www.hpe.com/services/techcare>



Service and Support

HPE Lifecycle Services

HPE Lifecycle Services provide a variety of options to help maintain your HPE systems and solutions at all stages of the product lifecycle. A few popular examples include:

- Lifecycle Install and Startup Services: Various levels for physical installation and power on, remote access setup, installation and startup, and enhanced installation services with the operating system.
- HPE Firmware Update Analysis Service: Recommendations for firmware revision levels for selected HPE products, taking into account the relevant revision dependencies within your IT environment.
- HPE Firmware Update Implementation Service: Implementation of firmware updates for selected HPE server, storage, and solution products, taking into account the relevant revision dependencies within your IT environment.
- Implementation assistance services: Highly trained technical service specialists to assist you with a variety of activities, ranging from design, implementation, and platform deployment to consolidation, migration, project management, and onsite technical forums.
- HPE Service Credits: Access to prepaid services for flexibility to choose from a variety of specialized service activities, including assessments, performance maintenance reviews, firmware management, professional services, and operational best practices.

Notes: To review the list of Lifecycle Services available for your product go to:

<https://www.hpe.com/services/lifecycle>

For a list of the most frequently purchased services using service credits, see the [HPE Service Credits Menu](#)

Other Related Services from HPE Services:

HPE Education Services

Training and certification designed for IT and business professionals across all industries. Broad catalogue of course offerings to expand skills and proficiencies in topics ranging from cloud and cybersecurity to AI and DevOps. Create learning paths to expand proficiency in a specific subject. Schedule training in a way that works best for your business with flexible continuous learning options.

<https://www.hpe.com/services/training>

Defective Media Retention

An option available with HPE Complete Care Service and HPE Tech Care Service and applies only to Disk or eligible SSD/Flash Drives replaced by HPE due to malfunction.

Consult your HPE Sales Representative or Authorized Channel Partner of choice for any additional questions and services options.

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.

How to Purchase Services

Services are sold by Hewlett Packard Enterprise and Hewlett Packard Enterprise Authorized Service Partners:

- Services for customers purchasing from HPE or an enterprise reseller are quoted using HPE order configuration tools.
- Customers purchasing from a commercial reseller can find services at <https://ssc.hpe.com/portal/site/ssc/>



Service and Support

AI Powered and Digitally Enabled Support Experience

Achieve faster time to resolution with access to product-specific resources and expertise through a digital and data driven customer experience

Sign into the HPE Support Center experience, featuring streamlined self-serve case creation and management capabilities with inline knowledge recommendations. You will also find personalized task alerts and powerful troubleshooting support through an intelligent virtual agent with seamless transition when needed to a live support agent.

<https://support.hpe.com/hpesc/public/home/signin>

Consume IT On Your Terms

HPE GreenLake edge-to-cloud platform brings the cloud experience directly to your apps and data wherever they are—the edge, colocations, or your data center. It delivers cloud services for on-premises IT infrastructure specifically tailored to your most demanding workloads. With a pay-per-use, scalable, point-and-click self-service experience that is managed for you, HPE GreenLake edge-to-cloud platform accelerates digital transformation in a distributed, edge-to-cloud world.

- Get faster time to market
- Save on TCO, align costs to business
- Scale quickly, meet unpredictable demand
- Simplify IT operations across your data centers and clouds

To learn more about HPE Services, please contact your Hewlett Packard Enterprise sales representative or Hewlett Packard Enterprise Authorized Channel Partner. Contact information for a representative in your area can be found at "Contact HPE"

<https://www.hpe.com/us/en/contact-hpe.html>

For more information

www.hpe.com/services



Related Options

HPE Smart Array SR SmartCache

HPE Smart Array SR SmartCache (Single Key/Single Server) LTU

D7S26A

Single-Server License

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 **delivered via physical shipment**. 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.

Flexible-Quantity License

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 **delivered via physical shipment**. 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.

Flexible-Quantity Electronic License

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 **delivered via e-mail**. 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.

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

HPE Smart Array SR Secure Encryption

HPE Smart Array SR Secure Encryption (Data at Rest Encryption/per Server Entitlement) E-LTU

Q2F26AAE

Notes: HPE Smart Array SR Secure Encryption licensing is based on the number of servers requiring encryption for direct attached storage.

- Not supported on HPE Smart Array P824i-p MR Gen10 Controller.
- For more information visit: <http://www.hpe.com/servers/secureencryption>

HPE Smart Storage Battery

HPE 96W Smart Storage Lithium-ion Battery with 260mm Cable Kit

P01367-B21

Notes: Smart Array Gen10 controllers are supported by the HPE Smart Storage Battery. This battery supports multiple devices and is sold separately.

Cables

HPE Smart Array P416ie-m SR Gen10 SAS Cable Kit

871573-B21

Notes: P416ie-m cable connects the P416ie-m controller to the Synergy Premium Backplane, allowing connection to SAS/SATA drives inside the Synergy 480 and Synergy 660 compute modules.

HPE Synergy 480 Gen10 Plus 4x for 2x Split Drive SlimSAS Cable Kit

P29010-B21

Notes: SlimSAS cable connects the SmartRAID P416ie-m controller to the Synergy SY480 Gen10 Plus Premium 4 Drive Kit, allowing connection to SAS/SATA drives inside the Synergy 480 Gen10 Plus compute module.



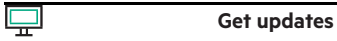
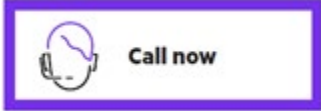
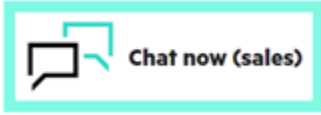
Summary of Changes

Date	Version History	Action	Description of Change
04-Dec-2023	Version 5	Changed	Service and Support Section was updated
15-Nov-2021	Version 4	Changed	Service and Support Section was updated
16-Aug-2021	Version 3	Changed	Added Microchip SmartRAID P416ie-m x16 Lanes 2GB Cache SAS 12G Controller for HPE, P38721-B21. Updated for SY480 Gen10 Plus. Updated Synergy support table.
18-Jan-2021	Version 2	Changed	Standard Features Section was updated
04-Sep-2018	Version 1	New	New QuickSpecs



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