

### Overview

#### HPE D3940 Storage Module

The HPE Synergy D3940 Storage Module is a directed attached storage module with 40 Small Form Factor (SFF) drive bays designed for use in HPE 12000 Synergy frames. Through the HPE Synergy 12Gb SAS Connection Module it provides composable storage for up to 10 compute modules in a single frame. Synergy storage is optimized for use as either a direct attached storage array or as software-defined storage using HPE StoreVirtual VSA or similar solutions.

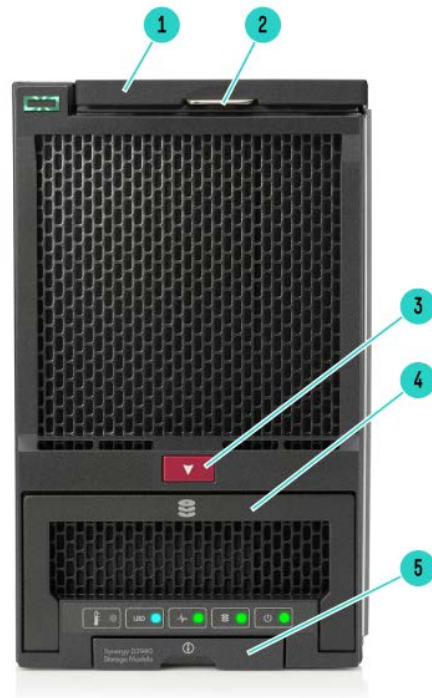
HPE Synergy is a single infrastructure of physical and virtual pools of compute, storage, and fabric resources, and a single management interface that allows IT to instantly assemble and re-assemble resources in any configuration. As the foundation for the New Style of Business infrastructure, HPE Synergy eliminates hardware and operational complexity so IT can precisely deliver infrastructure to applications faster and with greater flexibility.

Synergy storage enables a variety of workloads by permitting multiple drive types to be configured in the same storage module. HPE Synergy D3940 Storage Modules support a family of 12G SAS or 6G SATA HDD and SSD Smart Drives. Storage modules connect to compute modules within a frame through the Synergy 12 Gb SAS Connection Module. Any number of drive bays in a storage module can be composed with any compute module containing a Smart Array controller connected to the SAS fabric, allowing for efficient utilization of available drives. Synergy storage can scale to 200 SFF drives with five storage modules in a single HPE Synergy 12000 Frame. Adding a second I/O adapter and second SAS connection module provides a redundant path to SAS drives inside the Storage Module, ensuring high availability. The modular design of the Synergy D3940 Storage Module allows it to slide out from the frame to service drives or I/O adapters without interrupting operation of other drives within the module. Additionally, the Synergy D3940 Storage Module is optimized for solid state drives using a high performance SAS connection with sixteen 12 Gb/s SAS lanes. This allows a single Synergy storage module to deliver as much as 8 times the bandwidth of other JBOD options reaching up to 2M IOPs\*.

The HPE Synergy D3940 Storage Module provides a large, efficient pool of storage resources which can be allocated to meet changing server workloads and business needs. Synergy Storage enables industry leading bandwidths and performance. Within the frame, an administrator is able to create virtual JBODs or virtual drives for any compute module, remap connections, or change personalities; all done with stored profiles. Together, the D3940 Storage Module and 12Gb SAS Connection Module fully integrate with other HPE Synergy hardware and software components and are managed and configured with HPE Synergy Composer. The D3940 Storage Module provides leading storage density and flexibility to configure storage to meet business needs. A modular design simplifies serviceability and can be configured with dual HPE Synergy 12Gb SAS Flexible Storage I/O Adapters for high availability.

HPE StoreVirtual VSA software provides advanced data services giving you the benefits and resiliency of shared storage within the enclosure without purchasing additional storage hardware. The Synergy storage module provides a flexible, large capacity platform to support multiple clustered VSA nodes and creates a virtual array which scales as storage needs evolve while its built-in high availability and disaster recovery features ensure business continuity for the entire virtual environment. Optimized for virtualized VMware, Microsoft Hyper-V, and Linux KVM environments, HPE StoreVirtual VSA transforms your direct-attached storage into a scalable, composable, shared storage array without the cost and complexity traditionally associated with dedicated storage networks. The convergence of HPE StoreVirtual VSA software and HPE Synergy provides a great value to any type or size of business by focusing on cost optimization and maximum flexibility within the data center.

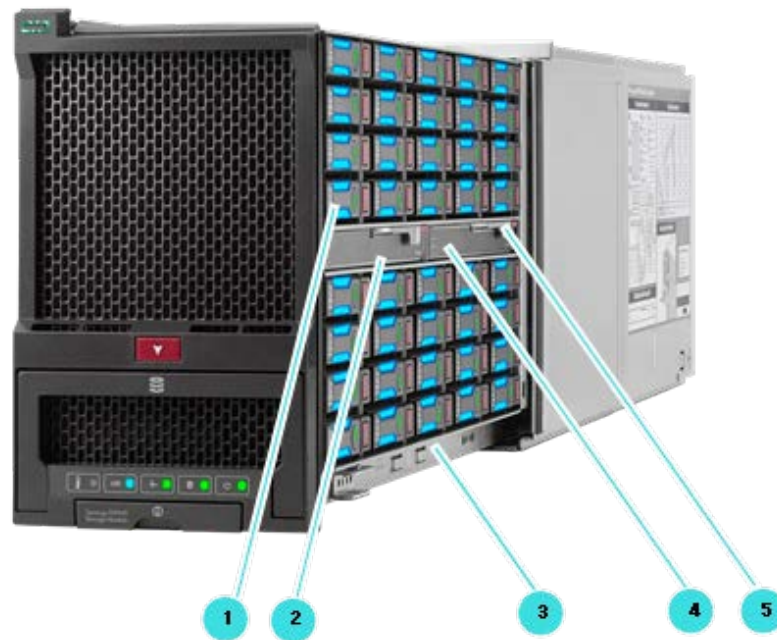
## Standard Features



### Synergy D3940 Storage Module Components

- |  |                            |
|--|----------------------------|
| 1. Storage Module Handle               | 4. Drive Drawer Handle     |
| 2. Storage Module Handle Release Latch | 5. Product Information Tag |
| 3. Drive Drawer Handle Release Latch   |                            |

## Standard Features



### Storage Module Internal Elements

- |  |                               |
|--|-------------------------------|
| 1. Small Form Factor (SFF) drive carrier | 4. D3940 I/O Adapter 2        |
| 2. D3940 I/O Adapter 1                   | 5. I/O Adapter release handle |
| 3. Cable management rail                 |                               |

## Standard Features



### Synergy D3940 Storage Module LED Panel Information

- |   |   |
|---|---|
| <ol style="list-style-type: none"><li>1. Drawer Status<ol style="list-style-type: none"><li>a. Solid Green – Drawer is closed</li><li>b. Flashing Green – Drawer is open</li><li>c. Flashing Amber – Thermal warning, close the drive drawer</li></ol></li><li>2. UID<ol style="list-style-type: none"><li>a. Solid Blue – One or more drives are being located.</li><li>b. Flashing Blue – Firmware flash is in progress</li><li>c. Off – No drives are being located</li></ol></li><li>3. Health Status</li></ol> | <ol style="list-style-type: none"><li>4. Drive Status<ol style="list-style-type: none"><li>a. Solid Amber – One or more drives failed</li><li>b. Flashing Amber – One or more drives are predicted to fail</li><li>c. Flashing Green – One or more drives are rebuilding or transforming</li><li>d. Solid Green – One or more drives are members of a logical drive</li><li>e. Off – No drives are configured by a RAID controller.</li></ol></li><li>5. Drawer Power</li></ol> |
|---|---|

## Standard Features

<b>Key Features</b>	<p><b>Features of the D3940 include:</b></p> <ul style="list-style-type: none"> <li>• Holds up to forty (40) hot plug small form factor (SFF) drives. in a half-height double-width storage module designed for HPE Synergy frames</li> <li>• Support for 12G and 6G SAS and SATA hard disk drives (HDDs) and solid state drives (SSDs)</li> <li>• Simple configuration and setup with HPE Synergy Composer</li> <li>• Easy to maintain and troubleshoot with industry standard management tools including HPE System Insight Manager</li> <li>• Optimized for use with HPE StoreVirtual VSA software to create a robust shared storage environment inside and across Synergy Frames</li> <li>• Protected by Hewlett Packard Enterprise Services and a worldwide network of Hewlett Packard Enterprise Authorized Channel Partners. Three-year parts limited global warranty. Certain restrictions and exclusions apply</li> </ul>
<b>Mix and Match of Hard Drive Types</b>	<p>HPE Synergy D3940 Storage Module supports mixing of different drive types (SAS/SATA, SSD/HDD) and sizes in a single enclosure.</p> <p><b>NOTE:</b> A composed logical array can be created across only one drive type.</p>
<b>Universal hot plug Hard Drive</b>	<p>Small Form Factor (SFF) drives in Smart Carriers are for use across multiple HPE ProLiant servers, disk enclosures and storage systems. With compatibility across many enterprise platforms, you are free to deploy and re-deploy these drives to quickly deliver increased storage capacity, migrate data between systems, and easily manage spare drives.</p>
<b>LED Indicators</b>	<p>Front panel LEDs indicate drive activity and system health status.</p> <p><b>NOTE:</b> See diagram above for LED indicator locations and codes</p>
<b>Density</b>	<p>The HPE Synergy D3940 Storage Module can hold up to forty SFF drives and occupies two half height bays in the HPE Synergy 12000 Frame, with each frame supporting up to five D3940 Storage Modules. Not including local drives in compute modules, this offers a potential storage density of up to 20 SFF drives per RU.</p>
<b>Fault Tolerance</b>	<p>The HPE Synergy D3940 Storage Module can be configured with two I/O adapters per module along with dual HPE Synergy 12Gb SAS Connection Modules in the frame for failover. The HPE Synergy 12000 Frame includes hot-swappable redundant power and cooling components to ensure the availability of the operating environment.</p>
<b>Manageability</b>	<p>The HPE Synergy D3940 Storage Module delivers fluid pools of storage resources to be composed, deployed and provisioned simply and quickly within a composable infrastructure environment. Deployment via templates and profiles and ongoing management is done through the Synergy Composer and HPE OneView version 3.0 and later.</p>
<b>Operating Systems</b>	<p>As supported by HPE Synergy Compute Modules</p> <p><b>NOTE:</b> For more information on The Hewlett Packard Enterprise Certified and Supported ProLiant Servers and Compute Modules for OS and Virtualization Software and latest listing of software drivers available for your server, please visit our Support Matrix at: <a href="http://www.hpe.com/info/ossupport">http://www.hpe.com/info/ossupport</a></p>
<b>Optional:</b>	<p>Simplify and lower the cost of storage virtualization. Create a virtual array within your Synergy Frame, manage</p>

## Standard Features

**Software-Defined Storage** it as a single pool of shared storage capacity, and easily scale it in-frame or between Synergy frames to match your evolving needs. <http://www.hpe.com/storage/sds>

For HPE StoreVirtual VSA QuickSpecs please visit:

<https://www.hpe.com/h20195/v2/GetPDF.aspx%2Fc04111621.pdf>

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**Optional:  
HPE Secure  
Encryption**

HPE Secure Encryption is a Smart Array controller-based data encryption solution for Synergy Compute Modules that protects sensitive, mission critical data. This is an enterprise-class encryption solution for data at rest on any bulk storage attached (with the exception of tape or external arrays such as the MSA2040 or P2000sa G3) to the supported HPE Smart Array P-family of controllers including data on the cache memory of the controller. The solution is available for both local and remote key management mode deployments.

Local Key Management Mode is focused on single compute module deployment where there is one Master key per controller that is managed by the user. All volumes still have their own unique key(s) for data encryption.

Remote Key Management Mode is for enterprise wide deployments and requires HPE Integrated Lights Out (iLO) Advanced or Scale Out editions v 1.40 or later and HPE Enterprise Secure Key Manager (ESKM) 3.1 or any later release. The HPE ESKM manages all the encryption deployments from just a few compute modules to thousands of compute modules and 2 million keys per HPE ESKM 3.1 cluster.

**NOTE:** Secure Encryption is an optional feature of HPE Smart Array Controllers requiring a separate license. For more information please visit: <http://www.hpe.com/servers/secureencryption>

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**Optional:  
HPE SmartCache**

The optional 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 Synergy supported HDD for bulk storage and any HPE Synergy supported SSD as an accelerator.

HPE SmartCache is deployed and managed using the HPE Smart Storage Administrator (HPE SSA). The basic HPE SmartCache architecture is comprised of the following three elements:

- Bulk storage: The first element is the bulk storage device, which is any supported HDD attached to the HPE Smart Array controller.
- Accelerator: The second element, the accelerator, is a faster/lower latency SSD device that caches data.
- Metadata: The final element is metadata, information held in the FBWC that maps the location of information residing on the accelerator and bulk storage devices.

**NOTE:** SmartCache is an optional feature of HPE Smart Array controllers requiring a separate license. For more information please visit: <http://www.hpe.com/servers/smartcache>

## Service and Support

### HPE Services and Warranty Information

#### Warranty

Protected by HPE Services and a worldwide network of Hewlett Packard Enterprise Authorized Channel Partners. The D3940 Storage Module has three-year limited global warranty (3-3-3). Certain restrictions and exclusions apply. Drives installed in the D3940 are under separate warranty.

**Hard drive Pre-Failure Warranty:** When used with any one of the Smart Array Family controllers and monitored under HPE Systems Insight Manager (v4.20 or later), Hewlett Packard Enterprise hard drives are supported by a Pre-Failure (replacement) Warranty.

**NOTE:** Some HPE hard drives have a one year warranty.

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#### Service and Support

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**

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

**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.

## Service and Support

**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:** HPE Synergy with OneView embedded helps enable infrastructure automation and is integrated with tools such as those from Chef, Puppet, and Docker, to enable rapid bare metal provisioning. With DC-IA, HPE service experts provide advice, support, best practices, for these tools that work with OneView to help create a fast, agile, and reliable automated IT environment. With this approach, customers can deploy faster. DC-IA delivers support to customers to enable infrastructure as code and agile processes as part of the service. Customers schedule quarterly reviews and reports with HPE Center of Expertise, as well as having access to these experts when needed, for automation development and code coaching.

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### Deploy and integrate

#### **HPE Factory Express Initial Frame Service for Synergy**

Factory Express allows a customers' configurations to be pre-configured in the HPE Integration center with an implementation project manager to manage the deployment end to end. The project manager will act as a single point of contact to coordinate the build, delivery and onsite installation and commissioning of the solution. In addition to the configuration and deployment activities, your HPE Synergy configuration goes through comprehensive testing and a detailed documentation package on the configuration and settings of the delivered solution will be provided.

#### **HPE Factory Express Synergy Additional Frame Service for Synergy**

Add additional frames to your HPE Synergy Factory Express service or expand your existing HPE Synergy Infrastructure.

**HPE Synergy First Frame Installation and Startup** – Provides for hardware installation (HPE Synergy compute modules, Storage Modules, Virtual Connect modules, Interconnect Link Modules, Fibre Channel 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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**Optimized Support** 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.

#### **HPE Proactive Care Advanced – 24x7 coverage, three year Support Service**

Builds and incorporates on Proactive Care and also gives customers personalized technical and operational advice from an assigned, local Account Support Manager for personalized technical collaboration, flexible access to specialist skills to help optimize business critical IT, and Critical Incident Management to help so the business is not affected if there is a system or device outage. This recommendation provides 24x7 coverage with four-hour response for hardware and Basic Software Support and Collaborative Call Management for selected non-HPE software that offers two-hour callback for supported software issues.

<https://www.hpe.com/h20195/v2/GetPDF.aspx/4AA5-3259ENW.pdf>

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

Hardware and software support services designed specifically for your technology with rapid access to Advanced Solution Center specialists for start to finish case management plus proactive reports and



Service and Support

recommendations for firmware and software management and best practice advice. This recommendation provides 24x7 coverage with four-hour response for hardware and Basic Software Support and Collaborative Call Management for selected non-HPE software that offers two-hour callback for supported software issues. <https://www.hpe.com/h20195/v2/getpdf.aspx/4aa3-8855enw.pdf>

HPE Education	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.
Parts and Materials	<p>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.</p> <p>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.</p> <p>The defective media retention service feature option applies only to Disk or eligible SSD/Flash Drives replaced by Hewlett Packard Enterprise due to malfunction.</p>

## Configuration Information - Factory Integrated Models (North America Only)

### HPE Synergy D3940 Storage Module Configuration

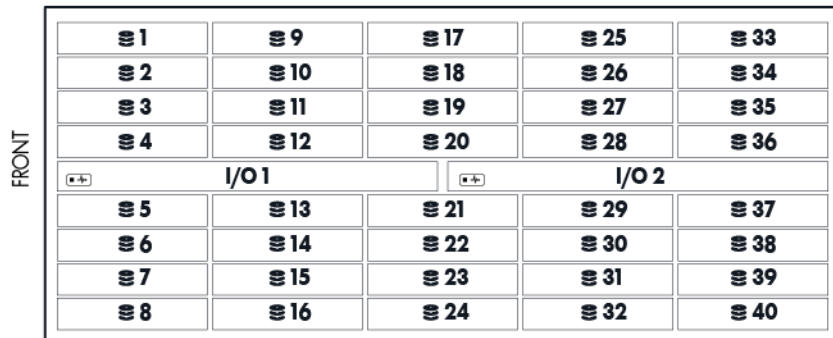
<b>Models</b>	HPE Synergy D3940 12Gb SAS CTO Drive Enclosure with 40 SFF (2.5in) Drive Bays	835386-B21
	HPE Synergy D3940 12Gb SAS Drive Enclosure with 40 SFF (2.5in) Drive Bays	755984-B21

<b>Storage Module Options</b>	HPE Synergy D3940 Redundant I/O Adapter	757323-B21
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**NOTE:** A single I/O adapter is included with each Synergy D3940 Storage Module. This option is for a second I/O adapter for redundancy.

**NOTE:** When configuring a storage module with SAS drives it is recommended that dual I/O modules also be configured for high availability.

<b>HPE Hard Drives</b>	HPE Synergy D3940 Storage Modules support all small form factor (SFF) SAS and SATA HDDs and SSDs currently certified in HPE Smart Carriers.
	Drive types and sizes may be mixed within the D3940 Storage Module, but logical grouping of drives must be across identical drive types.
	Maximum storage capacity will vary depending upon drive size and RAID type (if any) applied.
	<p><b>NOTE:</b> For Technical Specifications and additional information on SAS drives:  <a href="https://www.hpe.com/h20195/v2/GetHTML.aspx?docname=c04111744">https://www.hpe.com/h20195/v2/GetHTML.aspx?docname=c04111744</a></p> <p><b>NOTE:</b> Using hard drives in unsupported configurations will result in voiding the warranty and could result in damage to the drive and/or loss of data.</p>



Drive Quantity Supported	Position Supported	Controller
1 - 40	1 - 40	Smart Array P542D Controller

## Related Options

Other Components	HPE Smart Array P542D/2GB FBWC 12Gb Mezzanine SAS Controller	759557-B21
	HPE Smart Array P416ie-m SR Gen10 (8 Int 8 Ext Lanes/2GB Cache) 12G SAS Mezzanine Controller	804428-B21
	<b>NOTE:</b> Each Gen9 compute module which is to access the D3940 Storage Module must include a Smart Array P542D controller populated in mezzanine slot 1.	
	<b>NOTE:</b> Each Gen10 compute module which is to access the D3940 Storage Module must include a Smart Array P416ie-m controller populated in mezzanine slot 1.	
	HPE Synergy 12Gb SAS Connection Module with 12 Internal Ports	755985-B21
	<b>NOTE:</b> When configuring a Synergy frame with one or more Synergy D3940 storage modules at least one SAS Connection Module must be populated per Synergy 12000 Frame in either ICM bay 1 or ICM bay 4 to provide connection between the storage modules and compute modules in that frame	
	<b>NOTE:</b> When configuring a frame with dual SAS connection modules, dual I/O adapters are required in each HPE Synergy D3940 Storage Module.	
	<b>NOTE:</b> The HPE Synergy 12Gb SAS Connection Module is TAA compliant	
	<b>NOTE:</b> A maximum of four storage modules may be populated in a single HPE Synergy 12000 frame when using Gen9 compute modules only. When using Gen10 only or a combination of Gen10 and Gen9 compute modules, up to five storage modules are supported per frame.	
	<b>NOTE:</b> When configuring a frame with an HPE Synergy D3940 Storage Module in it, at least one compute module with a Smart Array controller configured in mezzanine slot 1 must be included.	
Other Configuration Rules	<b>NOTE:</b> The HPE Synergy D3940 Storage Module does not support NVME drives or SFF dual flash adapters.	
	<b>NOTE:</b> Any configurations with either dual I/O adapters in a single storage module or greater than three (3) HPE Synergy D3940 Storage Modules in a single frame must include dual 12Gb SAS Connection modules.	
	<b>NOTE:</b> The threshold for for requiring a second SAS Connection Module drops to two storage modules in configurations with three or more full height compute modules in the same frame.	
HPE Synergy Services	<b>NOTE:</b> See HPE Support Services Central for additional services at <a href="http://ssc.hpe.com/portal/site/ssc/">http://ssc.hpe.com/portal/site/ssc/</a>	
	<b>HPE Synergy Proactive Care Services</b>	
	HPE 3 Year Proactive Care 24x7 Synergy D3940 Storage Module Service	HOWN6E
	HPE 3 Year Proactive Care 24x7 with DMR Synergy D3940 Storage Module Service	HOWN7E
	HPE 3 Year Proactive Care Advanced 24x7 Synergy D3940 Storage Module Service	HOWN9E
	HPE 3 Year Proactive Care Advanced 24x7 with DMR Synergy D3940 Storage Module Service	HOWPOE
	<b>Deployment/Installation &amp; Start-up Services</b>	
	HPE Factory Express Synergy Initial Frame Package 4 Service	HA454A1-300
	HPE Factory Express Synergy Add-on Frame Package 4 Service	HA454A1-301
	HPE Synergy First Frame Startup Service	U8JM3E
	HPE Synergy Additional Frame Startup Service	U8JM4E

## Technical Specifications

<b>HPE Synergy D3940 Storage Module</b>	<b>Dimensions</b> (DxWxH)	D3940: 60.96 cm x 12.7 cm x 21.59 cm (24 in. x 5 in. x 8.5 in.) I/O Adapter: 20.32 cm x 11.43 cm x 1.91 cm (8 in. x 4.5 in. x .75 in.)	
	<b>Weight</b> (unloaded)	D3940:	9.39 kg (20.7 lbs)
		I/O Adapter:	0.59 kg (1.3 lbs)
	<b>Weight</b> (loaded)	D3940:	21.18 kg (46.7 lbs) – using .29 kg (.65 lb) average weight for SFF HDD with Smart Carrier. Actual fully populated weight may vary depending on SFF drives used.
		Dual I/O Adapters	1.18 kg (2.6 lbs)
	<b>Protocol Support</b>	12 Gb/s SAS 6 Gb/s SAS	
	<b>O/S Support</b>	Defined by specific HPE array controller or SAS/ adapter used; please refer to the QuickSpecs and/or User Guide of the specific array controller or adapter as well as the O/S support information for the compute modules with which the storage module will be composed.	
	<b>LED Indicators</b>	UID Health Status LED Drawer Open / Temperature LED Drive Status LED Drawer Power LED	
	<b>Drive LED Indicators</b> (on drive trays)	Drive LED (top) - On-line/Activity	
		Drive Failure LED (bottom) - Drive Fault/Locate	
<b>P542D Smart Array Controller with HPE Synergy Storage I/O adapter (single or pair)</b>	<b>Relative Humidity</b> (non-condensing)	Operating	10 to 90% relative humidity (Rh), 28°C (82.4°F) maximum wet bulb temperature, non-condensing
		Non-operating	5 to 95% relative humidity (Rh), 38.7°C (101.7°F) maximum wet bulb temperature, non-condensing
	<b>Temperature Range</b>	Operating	10° to 35°C (50° to 95°F)
		Non-operating	-30° to 60°C (-22° to 140°F)
	<b>Power Consumption</b>	26 Watts (Minimum with dual I/O Adapters) 500 Watts (Maximum)	
	<b>Disk Drive and Enclosure Interface</b>	12 Gb SAS (Serial Attached SCSI)	
	<b>SAS Connectors</b>	Sixteen (16) 12 Gb/s SAS physical links distributed equally across 2 x4 internal ports and 2 x4 external ports	
	<b>Cache Memory Speed</b>	DDR3-1866 MHz, 72-bit wide bus at 14.92 GB/s (2 GB cache module).	

## Technical Specifications

<b>SAS Speed</b>	x16 12 Gb SAS
<b>Cache Memory</b>	2 GB embedded flash-backed write cache; ECC protection, battery-backed, and transportable
<b>Logical Drives Supported</b>	Up to 64 logical drives
<b>Maximum Logical Drive Capacity</b>	404 TB SAS/SATA
<b>Host Memory Addressing</b>	64-bit, supporting compute module memory space greater than 4 GB (4.4 GB)
<b>RAID Support</b>	RAID 6, 60 (Advanced Data Guarding) RAID 5, 50 (Distributed Data Guarding) RAID 1, 10 (Drive Mirroring) RAID 1 ADM, 10 ADM (Advanced Data Mirroring) RAID 0 (Striping)
<b>Licensable Features</b>	<p><b>HPE SmartCache</b></p> <p>The optional 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 Synergy supported HDD for bulk storage and any HPE Synergy supported SSD as an accelerator.</p> <p>HPE SmartCache is deployed and managed using the HPE Smart Storage Administrator (HPE SSA).</p> <p>The basic HPE SmartCache architecture is comprised of the following three elements:</p> <ul style="list-style-type: none"> <li>• Bulk storage: The first element is the bulk storage device, which is any supported HDD attached to the HPE Smart Array controller.</li> <li>• Accelerator: The second element, the accelerator, is a faster/lower latency SSD device that caches data.</li> <li>• Metadata: The final element is metadata, information held in the FBWC that maps the location of information residing on the accelerator and bulk storage devices.</li> </ul> <p><b>HPE Secure Encryption</b></p> <p>HPE Secure Encryption is a Smart Array controller-based data encryption solution for Synergy Compute Modules that protects sensitive, mission critical data. This is an enterprise-class encryption solution for data at rest on any bulk storage attached (with the exception of tape or external arrays such as the MSA2040 or P2000sa G3) to the supported HPE Smart Array Px4x family of controllers including data on the cache memory of the controller.</p> <p>The solution is available for both local and remote key management mode deployments. Local Key Management Mode is focused on single compute module deployment where there is one Master key per controller that is managed by the user. All volumes still have their own unique key(s) for data encryption. Remote Key Management Mode is for enterprise wide deployments and requires HPE Integrated</p>

## Technical Specifications

Lights Out (iLO) Advanced or Scale Out editions v 1.40 or later and HPE Enterprise Secure Key Manager (ESKM) 3.1 or any later release. The HPE ESKM manages all the encryption deployments from just a few compute modules to thousands of compute modules and 2 million keys per HPE ESKM 3.1 cluster.

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

### **Upgradeable Firmware**

Upgradeable Firmware with recovery ROM feature

## Summary of Changes

Date	Version History	Action	Description of Change
07-Aug-2017	From Version 6 to 7	Changed	Overview, Standard Features, and Related Options sections were updated.
		Added	SKU added: 804428-B21.
24-Feb-2017	From Version 5 to 6	Changed	Upgrade version to match NA QS per edits only applicable to it.
16-Dec-2016	From Version 4 to 5	Changed	Overview, Standard Features, and Service and Support sections were updated.
28-Nov-2016	From Version 3 to 4	Changed	Service and Support section was updated.
05 Aug-2016	From Version 2 to 3	Changed	Updated to include clarification of Smart Array licensing features, configuration rules, fix broken links
31-Mar-2016	From Version 1 to 2	Changed	Overview, Standard Features, Service and Support, Technical Specifications sections were updated.
		Added	SKUs were added in Configuration Information and Related Options sections: 835386-B21, 755984-B21, 757323-B21, 759557-B21, 755985-B21, H0WN6E, H0WN7E, H0WN9E, H0WP0E, HA454A1-300, HA454A1-301, U8JM3E, U8JM4E.
1-Dec-2015	Version 1	Created	New QuickSpecs



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c04815141 - 15422 - Worldwide - V7 - 7-August-2017