

### Overview

#### HPE Smart Array Hybrid Capacitors

The HPE Smart Storage Hybrid Capacitor is a battery-free technology for power storage that provides data protection for cached data while eliminating costs and environmental impact of lithium-ion batteries.

For those running HPE Gen10 servers, the HPE Smart Hybrid Capacitor is a centralized backup power source supporting multiple controllers where the NAND flash memory on HPE Smart Array Performance Class controllers and the HPE Smart Hybrid Capacitor work together to save cached data in the event of unplanned server power loss.

When the hybrid capacitor module detects power loss it keeps critical parts of the controller active long enough to allow data to be copied from the onboard controller cache to the flash memory.

Please note, although the hybrid capacitor module is mechanically compatible with the 96W Smart Storage Battery (P01366-B21 and P01367-B21), the module cannot be used in combination with the Smart Storage Battery. In most cases, only a single Smart Storage Battery or a single Smart Hybrid Capacitor can be used per system. Please check your server platform QuickSpecs for details.

#### Models

HPE Smart Storage Hybrid Capacitor with 145mm Cable Kit	P02377-B21
HPE Smart Storage Hybrid Capacitor with 260mm Cable Kit	P02381-B21

**Notes:** The HPE Smart Storage Hybrid Capacitor is only supported on Gen10 servers or later. Before installing the HPE Smart Storage Hybrid Capacitor, verify that the system BIOS meets the minimum firmware requirements to support the hybrid capacitor 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

## Overview

### COMPUTE Server 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

### SPECIALIZED COMPUTE Server Line

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)

### STORAGE Line

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

### Ideal for

The HPE Smart Storage Hybrid Capacitor is ideal for:

- Environments with higher operating temperatures.
- Customers who have a “no battery” requirement or applications/environments such as ASHRAE, NEBs, Telco and certain data center or system environments where elevated internal system temperatures are experienced.

### Key Features

- High reliability, even in higher temperature environments
- No batteries, not a Class 9 Dangerous Good product (no hazardous material disposal, no battery shipping requirements)
- A single module supports up to three (3) Smart Array Controllers
- Charges to full capacity in ~3 minutes after discharge
- Capable of operating in higher temperatures with no impact to service life

The HPE Smart Storage Hybrid Capacitor is used to provide backup power to the HPE storage array controller in the event of power loss. The hybrid capacitor module starts up automatically and charges the capacitors when charge is required. In the event of a power loss, the capacitor pack will switch to discharge mode and supply energy to write the cache contents to NAND memory. For more information on best practices see [HPE Smart Array Controller User Guide](#).

### Notes:

The HPE Smart Storage Hybrid Capacitor is only supported on Gen10 servers or newer. Before installing the hybrid capacitor module, verify that the system BIOS meets the minimum firmware requirements to support the capacitor pack. Not for use with Server that use NVDIMMs.

For more information on updating firmware, see the Intelligent Provisioning User Guide on the Hewlett Packard Enterprise website (<http://www.hpe.com/info/intelligentprovisioning/docs>).

To get the latest firmware and software updates, download the Service Pack for ProLiant (SPP) from the Hewlett Packard Enterprise website (<http://www.hpe.com/servers/spp/download>).

## HPE 96W Smart Storage Battery or Smart Storage Hybrid Capacitor?

	96W Battery	Smart Storage Hybrid Capacitor
Gen 10 or newer	Yes	Yes
Controller Support	Yes	Yes
NVDIMM Support	Yes	No
Max. Device Support	Up to 24 NVDIMM and/or Smart Array Controllers	Up to 3 HPE Smart Array Controllers
Discharge to > Charge	Hours	Minutes
Operating Environments	Climate controlled environments	Higher temperature environments such as NEBs, ASHRAE, or Telco
Class 9 Dangerous Goods	Yes	No



## Configuration Information

Smart Array Controller support	Description	Part Number
Supports up to 3 HPE Smart Array P-class Controllers	HPE Smart Array P824i-p MR Gen10 (24 Internal Lanes/4GB Cache/CacheCade) 12G SAS PCIe Controller	870658-B21
	HPE Smart Array P816i-a SR Gen10 (16 Int Lanes/4GB Cache/SmartCache) 12G SAS Modular LH Controller	869083-B21
	HPE Smart Array P408i-a SR Gen10 (8 Internal Lanes/2GB Cache) 12G SAS Modular LH Controller	869081-B21
	HPE Smart Array P408i-p SR Gen10 (8 Internal Lanes/2GB Cache) 12G SAS PCIe Plug-in Controller	830824-B21
	HPE Smart Array P408e-p SR Gen10 (8 External Lanes/4GB Cache) 12G SAS PCIe Plug-in Controller	804405-B21
	HPE Smart Array P816i-a SR Gen10 (16 Internal Lanes/4GB Cache/SmartCache) 12G SAS Modular Controller	804338-B21
	HPE Smart Array P408i-a SR Gen10 (8 Internal Lanes/2GB Cache) 12G SAS Modular Controller	804331-B21
	HPE Smart Array P408i-c SR Gen10 (8 Internal Lanes/2GB Cache) 12G SAS Modular Controller	823856-B21
	HPE Smart Array P416ie-m SR Gen10 (8 Int 8 Ext Lanes/2GB Cache) 12G SAS Mezzanine Controller	804428-B21

Server support For up to (3) controllers	Family	Gen	Module cable	Description
	<b>P02377-B21</b>			
	DL360	G10	145mm	HPE Smart Storage Hybrid Capacitor with 145mm Cable
	DL380	G10	145mm	HPE Smart Storage Hybrid Capacitor with 145mm Cable
	DL560	G10	145mm	HPE Smart Storage Hybrid Capacitor with 145mm Cable
	DL385	G10	145mm	HPE Smart Storage Hybrid Capacitor with 145mm Cable
	DL325	G10	145mm	HPE Smart Storage Hybrid Capacitor with 145mm Cable
	ML30	G10	145mm	HPE Smart Storage Hybrid Capacitor with 145mm Cable
	DL160	G10	145mm	HPE Smart Storage Hybrid Capacitor with 145mm Cable
	DL180	G10	145mm	HPE Smart Storage Hybrid Capacitor with 145mm Cable
<b>P02381-B21</b>				
	ML110	G10	260mm	HPE Smart Storage Hybrid Capacitor with 260mm Cable
	ML350	G10	260mm	HPE Smart Storage Hybrid Capacitor with 260mm Cable
	Synergy 480	G10	260mm	HPE Smart Storage Hybrid Capacitor with 260mm Cable
	Synergy 660	G10	260mm	HPE Smart Storage Hybrid Capacitor with 260mm Cable



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## Configuration Information

### Firmware Support

Minimum requirements for your HPE Server.	Product	Minimum firmware version
	HPE servers with Intel processors (BIOS)	2.00
	HPE servers with AMD processors (BIOS)	1.40
	HPE Smart Array SR controllers (firmware)	1.90
	HPE Smart Array MR controllers (firmware)	24.23.0-0041

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For more information on updating firmware, see the Intelligent Provisioning User Guide on the Hewlett Packard Enterprise website (<http://www.hpe.com/info/intelligentprovisioning/docs>).

To get the latest firmware and software updates, download the Service Pack for ProLiant (SPP) from the Hewlett Packard Enterprise website (<http://www.hpe.com/servers/spp/download>).

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## Technical Specifications

<b>Storage element</b>	Hybrid capacitor	
<b>Voltage</b>	2.5-3.6v	
<b>Discharge/charge</b>	Full capacity in aprox. 3 minutes after discharge	
<b>Maintenance</b>	Maintenance-free	
<b>Operating Temperature</b>	10° to 60°C environment	
<b>Storage Temperature</b>	10° C to 35 °C, less than 65% relative humidity	
	<b>Notes:</b> Sudden temperature change or high humidity may cause deterioration of its characteristics.	
<b>Shelf Life</b>	When stored at 10 ~ 35°C and less than 65% relative humidity, shelf life is 20 months minimum. (100% State of Charge)	
<b>Relative Humidity</b>	65% or less (non-condensing) for storage	
<b>Operating Altitude</b>	from sea level, of 1.0°C per every 304.8 m (1.8°F per every 1000 ft) above sea level to a maximum of 3048 m (10,000 ft).	
<b>Non-operating Altitude</b>	Up to 15,240m (50,000 feet) above sea level	
<b>Leakage Current</b>	<2.0 uA in Ship/Storage mode	
<b>Safety Conformance or Certifications</b>	UL, CB, KCC, CE	
<b>EMC (Class A)</b>	FCC 47 CFR Part 15 Subpart B and AS/NZS CISPR 32	
<b>Unit Dimensions (WxDxH)</b>	5.46”(138.65mm)x1.13”(28.8mm)x0.76”(19.36mm)	
<b>Unit Weight</b>	P02377-B21	85g (+5/-10)
	P02381-B21	90g (+5/-10)

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<b>Warranty</b>	3 years parts only	
<b>Warranty Upgrade Options</b>	<ul style="list-style-type: none"> <li>• Response - Upgrade on-site response from next business day to same day 4 hours.</li> <li>• Coverage - Extend hours of coverage from 9 hours x 5 days to 24 hours x 7 days.</li> <li>• Duration - Select duration of coverage for a period of 1, 3, or 5 years.</li> </ul>	

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

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## Service and Support

### HPE Pointnext - Service and Support

**Get the most from your HPE Products.** Get the expertise you need at every step of your IT journey with **HPE Pointnext Services**. We help you lower your risks and overall costs using automation and methodologies that have been tested and refined by HPE experts through thousands of deployments globally. HPE Pointnext **Advisory Services** focus on your business outcomes and goals, partnering with you to design your transformation and build a roadmap tuned to your unique challenges. Our **Professional** and **Operational Services** can be leveraged to speed up time-to-production, boost performance and accelerate your business. HPE Pointnext specializes in flawless and on-time implementation, on-budget execution, and creative configurations that get the most out of software and hardware alike.

### Consume IT on your terms

**HPE GreenLake** 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 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

### Managed services to run your IT operations

**HPE GreenLake Management Services** provides 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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## Recommended Services

### HPE Pointnext Tech Care.

HPE Pointnext Tech Care is the new operational service experience for HPE products. Tech Care 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 Pointnext Tech Care has been reimagined from the ground up to support a customer-centric, AI driven, and digitally enabled customer experience to move your business forward. HPE Pointnext Tech Care 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>

### HPE Pointnext Complete Care

HPE Pointnext Complete Care is a modular, edge-to-cloud IT environment service that provides a holistic approach to optimizing your entire IT environment and achieving agreed upon IT outcomes and business goals through a personalized and customer-centric experience. All delivered by an assigned team of HPE Pointnext Services experts. HPE Pointnext Complete Care 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/completecure>

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## HPE Education Services



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## Service and Support

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>

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### 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

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### Parts and Materials

Hewlett Packard Enterprise will provide HPE-supported replacement parts and materials necessary to maintain the covered hardware product in operating condition, including parts and materials for available and recommended engineering improvements.

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 Disk or eligible SSD/Flash Drives replaced by Hewlett Packard Enterprise due to malfunction.

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### 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).

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

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

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**For more information**

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

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### HPE Smart Array Supporting Documents





## Service and Support

For additional support documents, including and configuration guide and user guides, please visit:

<http://www.hpe.com/info/SmartArrayGen10-docs>

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## 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.

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## Related Options

### HPE Smart Storage Battery

HPE 96W Smart Storage Lithium-ion Battery with 145mm Cable Kit P01366-B21

**Notes:** 96W Battery with 145mm cable is for ProLiant Gen10 DL servers and the ProLiant XL170r and XL190r Gen10 servers.

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

**Notes:** Although the hybrid capacitor module is mechanically compatible with the 96W Smart Storage Battery (P01366-B21 and P01367-B21), it cannot be used together in the same configuration.

HPE 96W Smart Storage Lithium-ion Battery with 260mm Cable Kit P01367-B21

**Notes:** 96W Battery with 260mm cable is for ML110 and ML350 Gen10 servers

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

**Notes:** Although the hybrid capacitor module is mechanically compatible with the 96W Smart Storage Battery (P01366-B21 and P01367-B21), it cannot be used together in the same configuration.

### 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.

HPE Smart Array SR SmartCache (Single Key/Multiple Servers) LTU D7S27A

#### 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.

HPE Smart Array SR SmartCache (Single Key/Multiple Servers) E-LTU D7S27AAE

#### 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

For use with SmartRAID SR controllers only

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

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



## Summary of Changes

<b>Date</b>	<b>Version History</b>	<b>Action</b>	<b>Description of Change</b>
15-Nov-2021	Version 2	Changed	Service and Support Section was updated
02-Apr-2019	Version 1	New	New QuickSpecs



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