

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

**NOTE:** 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.



## 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](#).

### Note:

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                                                             |

## Compatibility

| Smart Array Controller support                       | Description                             | Part Number |
|------------------------------------------------------|-----------------------------------------|-------------|
| Supports up to 3 HPE Smart Array P-class Controllers | HPE Smart Array P824i-p MR Gen10 Ctrlr  | 870658-B21  |
|                                                      | HPE Smart Array P816i-a SR G10 LH Ctrlr | 869083-B21  |
|                                                      | HPE Smart Array P408i-a SR G10 LH Ctrlr | 869081-B21  |
|                                                      | HPE Smart Array P408i-p SR Gen10 Ctrlr  | 830824-B21  |
|                                                      | HPE Smart Array P408e-p SR Gen10 Ctrlr  | 804405-B21  |
|                                                      | HPE Smart Array P816i-a SR Gen10 Ctrlr  | 804338-B21  |
|                                                      | HPE Smart Array P408i-a SR Gen10 Ctrlr  | 804331-B21  |
|                                                      | HPE Smart Array P408i-c SR Gen10 Ctrlr  | 823856-B21  |
|                                                      | HPE Smart Array P416ie-m SR Gen10 Ctrlr | 804428-B21  |

| Server support            | Family            | Gen | Module cable | Description                                         |
|---------------------------|-------------------|-----|--------------|-----------------------------------------------------|
| For up to (3) controllers | <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 |

### 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             |

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>).

## 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>Note:</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) |
| <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.                                                                                                                                                       |              |

---

## Service and Support

### HPE Support Services

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

HPE Pointnext provides a comprehensive portfolio including Advisory and Transformational, Professional, and Operational Services to help accelerate your digital transformation. From the onset of your transformation journey, Advisory and Transformational Services focus on designing the transformation and creating a solution roadmap. Professional Services specializes in creative configurations with flawless and on-time implementation, and on-budget execution. Finally, operational services provides innovative new approaches like Flexible Capacity and Datacenter Care, to keep your business at peak performance. HPE is ready to bring together all the pieces of the puzzle for you, with an eye on the future, and make the complex simple.

---

### Recommended Support

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

HPE Proactive Care gives customers an enhanced call experience. When your products are connected to HPE, Proactive Care helps prevent problems and maintains IT stability by utilizing personalized proactive reports with recommendations and advice. This Service combines three years proactive reporting and advice with our 24x7 coverage, four hour hardware response time when there is a problem. This service also includes collaborative software support for Independent Software Vendors (ISVs), (Red Hat, VMWare, Microsoft, etc.) running on your HPE servers.

<https://www.hpe.com/h20195/v2/GetPDF.aspx/4AA3-8855ENW.pdf>

#### HPE Proactive Care\* with 6 hour call-to-repair commitment, three year Support Service

HPE Proactive Care gives customers an enhanced call experience. When your products are connected to HPE, Proactive Care helps prevent problems and maintains IT stability by utilizing personalized proactive reports with recommendations and advice. This Service combines three years' proactive reporting and advice with our highest level of hardware support - HPE's 24x7, six hour hardware call-to-repair. HPE is the only leading manufacturer who makes this level of coverage available as a standard service offering for your most valuable servers. This service also includes collaborative software support for Independent Software Vendors (ISVs), (Red Hat, VMWare, Microsoft, etc.) running on your HPE servers.

<https://www.hpe.com/h20195/v2/GetPDF.aspx/4AA3-8855ENW.pdf>

**NOTE: \*HPE Proactive Care and HPE Proactive Care Advanced require that the customer connect their devices to make the most of these services and receive all the deliverables.**

---

### HPE Education Services

Keep your IT staff trained making sure they have the right skills to deliver on your business outcomes. Book on a class today and learn how to get the most from your technology investment.

<http://www.hpe.com/ww/learn>

---

### HPE Support Center

The HPE Support Center is a personalized online support portal with access to information, tools and experts to support HPE business products. Submit support cases online, chat with HPE experts, access support resources or collaborate with peers.

Learn more <http://www.hpe.com/support/hpesc>

HPE's Support Center Mobile App\* allows you to resolve issues yourself or quickly connect to an agent for live support. Now, you can get access to personalized IT support anywhere, anytime. HPE Insight Remote Support and HPE Support Center are available at no additional cost with a HPE warranty, HPE Support Service or HPE contractual support agreement.

**\*HPE Support Center Mobile App is subject to local availability**

## Service and Support

### Parts and Materials

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 quick-specs, or the technical product data sheet will not be provided, repaired, or replaced as part of these services.

The defective media retention service feature option applies only to Disk or eligible SSD/Flash Drives replaced by Hewlett Packard Enterprise due to malfunction.

### Related Services

#### HPE Server Hardware Installation

Provides for the basic hardware installation of HPE branded servers, storage devices and networking options to assist you in bringing your new hardware into operation in a timely and professional manner.

<https://www.hpe.com/h20195/V2/GetPDF.aspx/5981-9356EN.pdf>

**HPE Installation and Startup Service** provides for the installation and startup of HPE technology including BladeSystems, C-Class enclosure, HPE ProLiant c-Class and Integrity server blades, storage blades, SAN switch blades, HPE Virtual Connect modules (Ethernet and Fibre Channel), Ethernet network interconnects, and InfiniBand, as well as the installation of one supported operating system type (Windows® or Linux).

**NOTE:** 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](#).**

### For more information

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

### HPE Smart Array Supporting Documents

For additional support documents, including and configuration guide and user guides, please visit: <http://www.hpe.com/info/SmartArrayGen10-docs>

### 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..

## Related Options

### HPE Smart Storage Battery

HPE 96W Smart Storage Battery (up to 20 Devices) with 145mm Cable Kit

P01366-B21

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

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

**NOTE:** 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 Battery (up to 20 Devices) with 260mm Cable Kit

P01367-B21

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

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

**NOTE:** 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.

**NOTE:** 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

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

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

---

Summary of Changes

| Date        | Version History | Action | Description of Change |
|-------------|-----------------|--------|-----------------------|
| 02-Apr-2019 | Version 1       | New    | New QuickSpecs        |



Sign up for updates



© Copyright 2019 Hewlett Packard Enterprise Development LP. The information contained herein is subject to change without notice. The only warranties for Hewlett Packard Enterprise products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. Hewlett Packard Enterprise shall not be liable for technical or editorial errors or omissions contained herein.

a00061623enw - 16368 - Worldwide - V1 - 02-April-2019