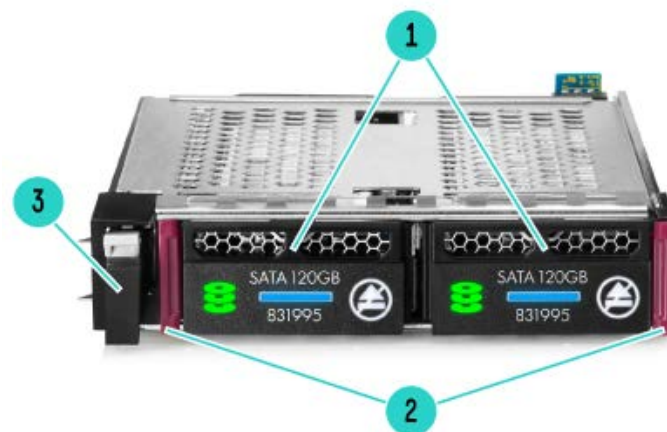## Overview

HPE SFF Flash Adapter with Dual Micro Form Factor uFF SSDs

The HPE Small Form Factor (SFF) Flash Adapter packages two 6G SATA Micro Form Factor (uFF) SATA Solid State Drives (SSDs) in a Dual Domain SFF Smart Drive bay which enables customers to install twice as many drives in an HPE Synergy compute module when compared to standard SFF Smart Drive bays.

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.

The HPE SFF Flash Adapter with Dual uFF SSDs increases flexibility, availability and serviceability for storage resources inside the compute module. The HPE SFF Flash Adapter with Dual uFF SSD option increases the composability of the compute module by enabling configurations that support a broader range of applications and workloads by providing up to 4 drives (2 x HPE SFF Dual uFF SSD options) within 2 drive bays, for example for higher drive performance, or when an on-line spare drive is needed. When higher application availability is required, customers can separate RAID1 mirror boot drives from the application. DATA availability is increased by being able to configure a RAID5 set, which also means more usable capacity.

HPE SSDs deliver exceptional performance and endurance for customers with applications requiring high random IOP performance. These drives deliver higher performance, lower latency, and more power-efficient solutions when compared with traditional rotating media.

Item   Description
1)   uFF SATA Drive Modules (hot pluggable)
2)   uFF Drive Ejection Latches
3)   Adapter Ejection Release Latch

Overview
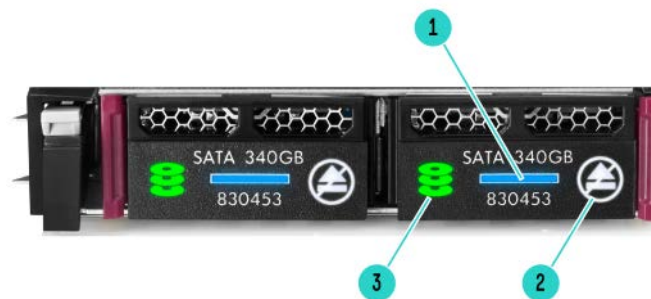
Item	LED	Status	Definition
1)	Locate	Solid blue	The drive is being identified by a host application.
		Flashing blue (1Hz)	The drive firmware is being updated.
2)	Do not remove	Solid white	Do not remove the drive. Removing the drive causes one or more of the logical drives to fail.
		Off	Removing the drive does not cause a logical drive to fail.
3)	Drive status	Solid green	The drive is a member of one or more logical drives.
		Flashing green (4Hz)	The drive is operating normally and has activity.
		Flashing green (1Hz)	The drive is rebuilding or performing a RAID migration, stripe size migration, capacity expansion, logical drive extension, or is erasing.
		Flashing amber/green (1Hz)	The drive is a member of one or more logical drives and predicts the drive will fail.
		Flashing amber (1Hz)	The drive is not configured and predicts the drive will fail.
		Solid amber	The drive has failed.
		Off	The drive is not configured by a RAID controller.

Overview

At A Glance

- Two SATA Micro Form Factor (uFF) SSDs in a Small Form Factor (SFF) Flash Adapter
- Doubles the number of drives supported per drive bay compared to standard drive offerings
- Supports Power Loss Protection (PLP)
- Hot Pluggable
- Supports B140i, P240nr, H240nr, and P542D controllers (consult HPE Synergy 480 and Synergy 660 Gen9 Compute Module QuickSpecs for details)

Models

HPE 2x340GB 6G SATA Read Intensive uFF Solid State Drives with SFF Flash Adapter (815605-B21)

Total Capacity	680GB (2x 340GB uFF SSDs)	
Height	15mm	
Length x Width	Standard SFF	
Interface	Dual SATA	
Transfer Rate Synchronous (Maximum)	6Gbps	
Performance	Rotational Speed	N/A
	Random Reads	142K IOP/s (2x 71K IOP/s uFF SSDs)
	Random Writes	30,000 IOP/s (2x 15K I IOP/s uFF SSDs)
	Sequential Reads	900 MiB/s (2x 455 MiB/s uFF SSDs)
	Sequential Writes	640 MiB/s (2x 320 MiB/s uFF SSDs)
Physical Configuration	Logical Blocks	1024 bytes (2x 512 Bytes uFF SSDs)
Power	18W (2x 9W uFF SSDs)	
Operating Temperature	0-60°C	

HPE 340GB 6G SATA Read Intensive uFF Solid State Drive (815606-B21)

Total Capacity	340GB (1 x Read Intensive 1.0in Ultra Form Factor [UFF] M.2 2280 SSDs)	
Height	15mm	
Length x Width	Standard SuFF	
Interface	SATA	
Transfer Rate Synchronous (Maximum)	6Gbps	
Performance	Rotational Speed	N/A
	Random Reads	71,000 IOP/s
	Random Writes	15,000 IOP/s
	Sequential Reads	455 MiB/s
	Sequential Writes	320 MiB/s
Physical Configuration	Logical Blocks	512 bytes
Power	9W	
Operating Temperature	0-60°C	

HPE 2x120GB 6G | **Total Capacity** | 240GB (2x 120GB uFF SSDs)

Models

SATA Read Intensive uFF Solid State Drives with SFF Flash Adapter (822593-B21)			
	Height	15mm	
	Length x Width	Standard SFF	
	Interface	Dual SATA	
	Transfer Rate Synchronous (Maximum)	6Gbps	
	Performance	Rotational Speed	N/A
		Random Reads	138,000 IOP/s (2x 69K IOP/s uFF SSDs)
		Random Writes	24,000 IOP/s (2x 12K IOP/s uFF SSDs)
		Sequential Reads	900 MiB/s (2x 450 MiB/s uFF SSDs)
		Sequential Writes	300 MiB/s (2x 150 MiB/s uFF SSDs)
	Physical Configuration	Logical Blocks	1024 bytes (2x 512 bytes uFF SSDs)
	Power	18W (2x 9W uFF SSDs)	
	Operating Temperature	0-60°C	

HPE 120GB 6G SATA Read Intensive uFF Solid State Drive (822594-B21)			
	Total Capacity	120GB	
	Height	15mm	
	Length x Width	uFF	
	Interface	SATA	
	Transfer Rate Synchronous (Maximum)	6Gbps	
	Performance	Rotational Speed	N/A
		Random Reads	69,000 IOP/s
		Random Writes	12,000 IOP/s
		Sequential Reads	450 MiB/s
		Sequential Writes	150 MiB/s
	Physical Configuration	Logical Blocks	512 bytes
	Power	9W	
	Operating Temperature	0-60°C	

Standard Features

Configuration Rules   HPE SFF Flash Adapters with Dual Micro Form Factor(uFF) SSDs are only supported in HPE Synergy Compute Modules:

- HPE Synergy 480 Gen9 Compute Module – The HPE Synergy 480 Gen9 has two Small Form Factor (SFF) drive bays and supports up to two (2) HPE SFF Flash Adapters. HPE SFF Flash Adapters are supported on the B140i integrated controller, the optional P240nr controller, optional H240nr controller, or optional P542D Smart Array controller.
- HPE Synergy 660 Gen9 Compute Module – The HPE Synergy 660 Gen9 has four Small Form Factor (SFF) drive bays and supports up to four (4) HPE SFF Flash Adapters. HPE SFF Flash Adapters are supported on the B140i integrated controller or optional P542D Smart Array controller.
- HPE SFF Flash Adapters may be mixed within an HPE Synergy Compute Module.

HPE single 6G SATA RI uFF SSDs are only supported in HPE SFF Flash Adapters (815605-B21 and 822593-B21).

- Different capacity drives may not be mixed within an HPE SFF Flash Adapter.
- Single HPE SFF Flash Adapters are only available as replacements after warranty has run out.

What is SSD?   An enduring data storage device using semiconductor technology to store and access data which is non-volatile without the aid of an auxiliary power source.

SSD Quality   Today's distributed enterprise is seeing larger, more complex applications, an increase of mission-critical data moving to the server, increasing demand for transaction processing and critical server consolidation. In this environment, storage has become a critical component of the information system, significantly defining both the systems reliability and performance. This is why HPE drives undergo an intense qualification process that eliminates firmware and O/S incompatibilities. All drive firmware is specific to our drives and is designed to maximize both functionality and compatibility. All of our drives are proven to be reliable and tuned for optimum performance in the Hewlett Packard Enterprise equipment for which they were designed.

Integration   Many issues customers have with third party drives are "simple" integration issues. When buying from another supplier, there is no guarantee that a drive has been correctly set for proper operation with ProLiant servers and storage systems. These incompatibilities can create problems in configuration, can rob your system of performance, or at their worst, can cause you to lose data. HPE drives are specifically designed and tested for flawless operation in your Hewlett Packard Enterprise equipment. The integration of solid state drives in HPE systems means that associated components are right for your ProLiant server.

Product Category   HPE Enterprise SSDs are available in three categories based on workload level: Read Intensive (RI), Mixed Use (MU), and Write Intensive (WI). The categories indicate the number of drive writes per day (DWPD1) that you can expect from the drive. (DWPD is the maximum number of 4K host writes to the entire drive capacity of the SSD per day over a five-year period.)

Write Performance Driven Workloads: OLTP, Business Intelligence, Big Data Analytics, VDI, etc.		Read Performance Driven Workloads: Read caching, Web Servers, Social Media, Boot/Swap, etc.
HPE Enterprise SSDs		
12/6 Gb SAS	12/6 Gb SAS 6 Gb SATA	12/6 Gb SAS6 Gb SATA M.2

Standard Features

• High Write Performance • Endurance >=10 DWPD	• Balanced R/W Performance • Endurance >1 and <10 DWPD	• Focused on Read Performance • Endurance <=1 DWPD
Write Intensive	**Mixed Use**	**Read Intensive**

Maximum Usage Limitations

NAND Flash devices use semiconductor technology that has a finite number of data that can be written to the device, defined as the Maximum Usage Limit, commonly called write endurance.

Write Endurance – Write endurance is measured while running 100% random 4KiB writes across the entire SSD

Drive Writes Per Day – Workload environment is based on 100% random 4KiB writes for five (5) years

Drive	Write endurance specifications for Read Intensive (RI) M.2	
	Lifetime Writes	**Drive Writes Per Day for Five (5) Years**
340GB 6G SATA Read Intensive uFF SSD	180TB	0.3
120GB 6G SATA Read Intensive uFF SSD	170TB	0.3

HPE Solid State Drives are equipped with tools that can report the amount of lifetime remaining. Introducing HPE SMARTSSD Wear Gauge™. In order to take advantage of SMARTSSD Wear Gauge™, HPE Smart Storage Administrator (HPSSA) must be running.

SNMP Storage Agents for both Microsoft® Windows® and Linux provide status and condition updates through traps, OS event logs and the HPE System Management Homepage
http://h18013.www1.hp.com/products/servers/management/agents/index.html

NOTE: Subject to maximum usage/maximum supported lifetime limitations. Maximum Supported Lifetime is the period in years set to equal the warranty for the device. Maximum usage limit is the maximum amount of data that can be written to the device before reaching the device's write endurance limit.

Data Retention is the period of time for retaining the data in the NAND once the maximum rated endurance level has occurred. These SSD's are rated for 3 months if no power is applied once the SSD has reached maximum rated write endurance.

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3/0/0 warranty; Customer Self Repair (CSR) subject to maximum usage limitations. Maximum usage limit: This is the maximum amount of data that can be written to the drive. Drives that have reached this limit will not be eligible for warranty coverage.

Service and Support

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

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

HPE Proactive Care keeps your system stable and reliable helping to prevent problems and reduce outages through proactive service management and enhanced technical response.
NOTE: This option is covered under the HPE Support Service(s) applied to the compute module. No separate HPE Support Service(s) need to be purchased.

Advise, transform, integrate, support, automate, and flex   **HPE Technology Services** helps you get the most out of what you have today and transition to HPE Synergy, a composabe infrastructure, at your pace and from wherever you are on the journey.

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

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

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

HPE Datacenter Care Infrastructure Automation: 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

Service and Support

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.

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.

Deploy and integrate	**HPE Synergy First Frame Installation and Startup -** Provides for hardware installation (HPE Synergy compute modules, Storage Modules, Virtual Connect modules, Interconnect Link Modules, Frame Link Modules, and HPE Synergy D3940 Storage Modules) and software startup for the first frame of your HPE Synergy deployment. Additional frames can be added using the HPE Synergy Additional Frame Installation and Startup Service. **HPE Synergy Additional Frame Installation and Startup Service -** Add additional frames to your HPE Synergy First Frame Startup service or expand your existing HPE Synergy Infrastructure.
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	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.
For more information	Additional Support Services can be found at HPE Support Services Central **http://ssc.hpe.com**

Summary of Changes

Date	Version History	Action	Description of Change
18-Nov-2016	From Version 3 to 4	Changed	Service and Support section was updated.
07-Oct-2016	From Version 2 to 3	Changed	Images were updated
31-Mar-2016	From Version 1 to 2	Changed	Overview and Models sections were updated.
		Added	SKUs added in Models section: 815605-B21, 815606-B21, 822593-B21, 822594-B21.
1-Dec-2015	Version 1	Created	New QuickSpecs

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