

### Overview

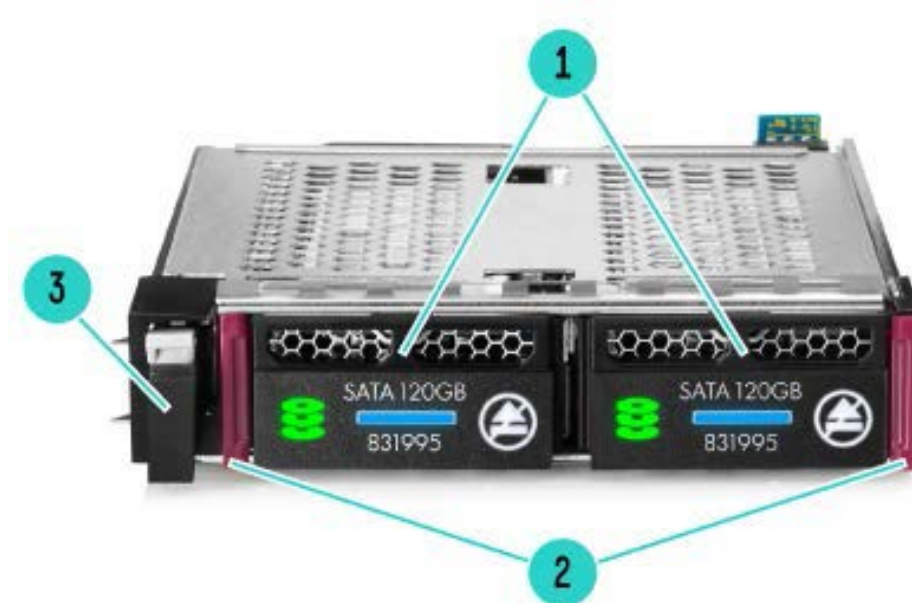
#### HPE Solid State Disk Drives (SSD, AICs, M.2s and M.2 EKits)

HPE Solid State Drives (SSDs), Add-In-Cards, M.2s and M.2 Enablement Kits (EKits) are based upon industry leading NAND Flash technology, which delivers exceptional performance and endurance to support a growing broad spectrum of demanding applications with varying workload performance requirements.

These storage devices offer better I/O latency & more power efficient solutions when compared with traditional rotating (HDD) media, while also fitting seamlessly into existing HPE server & storage infrastructures, and are available in a number of form factors including: Small Form Factor (SFF), Large Form Factor (LFF), M.2, and PCIe/NVME Add-In-Cards (AIC).



## Overview



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



## HPE M.2 Enablement Kits

### M.2 Enablement Kit with Small Form Factor Flash Adapter with Dual uFF SSDs

The HPE M.2 Enablement Kit is a Small Form Factor (SFF) Flash Adapter that packages two 6G SATA M.2 Micro Form Factor (uFF) Sleds in a Dual Domain SFF Smart Drive bay which enables customers to install twice as many drives in an HPE server module when compared to standard SFF Smart Drive bays.

The HPE M.2 Enablement Kit with Small Form Factor Flash Adapter with Dual uFF SSDs increases flexibility, availability and serviceability for storage resources inside the server. The M.2 Enablement Kit with Small Form Factor Flash Adapter with Dual uFF SSDs option increases the composability of the server by enabling configurations that support a broader range of applications and workloads by providing up to 2 drives (2 x HPE SFF Dual uFF SSD options) within 1 drive bay, 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.

## Overview

### What's New?

#### New Solid State Drives & Drive Option Kit(s):

- P19888-**X21** HPE 240GB SATA 6G Read Intensive M.2 2280 3yr Wty SSD
- P19890-**X21** HPE 480GB SATA 6G Read Intensive M.2 2280 3yr Wty SSD
- P19892-**X21** HPE 960GB SATA 6G Read Intensive M.2 2280 3yr Wty SSD
- P19894-**X21** HPE Dual 240GB SATA 6G Read Intensive M.2 - UFF to SFF SCM 3yr Wty SSD
- P19896-**X21** HPE Dual 480GB SATA 6G Read Intensive M.2 - UFF to SFF SCM 3yr Wty SSD
- P19935-**X21** HPE 240GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty SSD
- P19937-**X21** HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty SSD
- P19939-**X21** HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty SSD
- P19941-**X21** HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty SSD
- P19943-**X21** HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty SSD
- P19945-**X21** HPE 7.68TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty SSD
- P19947-**X21** HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty SSD
- P19949-**X21** HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty SSD
- P19951-**X21** HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty SSD
- P19953-**X21** HPE 3.84TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty SSD
- P19974-**X21** HPE 480GB SATA 6G Read Intensive LFF (3.5in) LPC 3yr Wty SSD
- P19976-**X21** HPE 1.92TB SATA 6G Read Intensive LFF (3.5in) LPC 3yr Wty SSD
- P19978-**X21** HPE 480GB SATA 6G Mixed Use LFF (3.5in) SCC 3yr Wty SSD
- P19980-**X21** HPE 960GB SATA 6G Mixed Use LFF (3.5in) LPC 3yr Wty SSD
- P19982-**X21** HPE 1.92TB SATA 6G Mixed Use LFF (3.5in) SCC 3yr Wty SSD
- P19984-**X21** HPE 1.92TB SATA 6G Mixed Use LFF (3.5in) LPC 3yr Wty SSD
- P19986-**X21** HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) RW 3yr Wty SSD
- P23487-**X21** HPE 1.92TB SATA 6G Very Read Optimized SFF (2.5in) SC 3yr Wty SSD
- P23489-**X21** HPE 3.84TB SATA 6G Very Read Optimized SFF (2.5in) SC 3yr Wty SSD
- P23491-**X21** HPE 3.84TB SATA 6G Very Read Optimized LFF (3.5in) LPC 3yr Wty SSD
- P23493-**X21** HPE 7.68TB SATA 6G Very Read Optimized SFF (2.5in) SC 3yr Wty SSD
- P23495-**X21** HPE 7.68TB SATA 6G Very Read Optimized LFF (3.5in) LPC 3yr Wty SSD
- P24190-**X21** HPE 960GB SATA 6G Very Read Optimized SFF (2.5in) SC 3yr Wty SSD

**HPE Solid State Drive Selector Tool** – a web-based tool that dramatically reduces the time and complexity of selecting the right SSD for your demanding workloads. <http://ssd.hpe.com>.

Dramatically reduces the time to select the right SSD for your HPE Server

- Recommends the most appropriate SSDs for specific customer workloads
- Reduces selection time and eliminates complexity; sort by server model, price, & performance
- Ideal for customers, HPE Sales, and HPE channel partners
- Simple, web-based tool; user-friendly interface



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## Overview

### Firmware Updates:

HPE Digitally Signed Firmware Prevents unauthorized access to your data by providing the security and assurance that drive firmware comes from a trusted source and protects against malicious attacks. Digitally Signed Firmware is indicated by “DS” in the SKU description of older SKUs. All SDDs in the HPE main portfolio of SKU have digitally signed firmware unless otherwise noted, particularly in newer released SKU (even if DS does not appear in the description) Digitally Signed Firmware can be confirmed in the capacity/workload tables by SKU number.

For advanced data protection and encryption, customers should consider HPE Smart Array Controllers with HPE Smart Array Secure SR Encryption. It is a controller-based data encryption solution for HPE servers that protects data-at-rest on all SAS and SATA drives connected directly to the controller. This solution meets stringent compliance regulations such as HIPAA, FIPS, and Sarbanes-Oxley.

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### Minimally Supported Operating Systems for all SATA and SAS SSDs:

- Windows Server 2019
  - Microsoft Windows Server 2008 (x86 and x64) SP2 and R2 w/SP1
    - Standard Edition
    - Datacenter
    - Enterprise Edition
    - Web Server
    - Embedded
  - Microsoft Windows 2012 Server (x64) R2
  - Microsoft Windows 2016 (RTM)
  - Red Hat Enterprise Linux 6 (EM64T/AMD64)
  - Red Hat Enterprise Linux 7 (EM64T/AMD64)
  - SLES 11 (EM64T/AMD64) (includes XEN)
  - SLES 12 (EM64T/AMD64) (includes XEN)
  - VMware ESXi 5.5
  - VMware ESXi 6.0
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## Overview

### Our Solid State product categories include Solid State Drives, or SSDs.

We define enterprise-class as products that include full data path error detection and surprise power loss protection. In addition, our SSDs have HPE SmartSSD Wear Gauge support, which provides diagnostic information and reports on the health of any given drive.

HPE Enterprise SSDs are available in three categories based on the customer's application and workload level: Read Intensive (RI), Mixed Use (MU), and Write Intensive (WI). These categories indicate the number of drive writes per day (DWPD) 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).

Workloads such as Read caching, Web Servers, Social Media, and Boot are more Read Performance driven. Workloads such as Business Intelligence, Big Data Analytics, Virtualization tend to be more Write Performance driven.

Our Read Intensive SSDs are typically focused on Read Performance with an Endurance less than or equal to 1 full drive write per day. Our Write Intensive SSDs are focused on Write Performance with an Endurance of  $\geq 10$  full drive writes per day (DWPD). As an example, if we have an 800GB Write Intensive SSD with an endurance of 10 Drive Writes per Day, it means that customers can write to the entire 800GB capacity of that SSD 10 times per day, and the drive will last for 5 years. Positioned in-between RI and WI, we have products with Balanced Read and Write Performance that we call Mixed Use (MU), with an Endurance of typically  $\sim 3$  DWPD.

HPE SATA SSDs deliver enterprise features at an affordable price in HPE servers. Entry-level pricing is fueling the rapid adoption of SSDs for read-intensive workloads, with the cost per IOPS comparing favorably to HDDs.

For best access to SATA SSDs, HPE has enhanced its extensive SSD portfolio with a multi-vendor offering that allows for shorter lead times to immediately available supply and extended SKU lifecycles on preferably priced HPE certified SATA SSDs, ensuring the SSDs included in the multi-vendor options deliver the minimum performance published or better. HPE's multi-vendor SSD offering helps customers simplify their purchasing decisions by providing immediate availability, preferable pricing and SKU longevity on HPE certified SSDs.

HPE multi-vendor portfolio utilizes specific vendor SSDs which are HPE qualified and released as single sourced SATA SSD SKUs and are bundled into a multi-sourced SKU per capacity. Identified by Multi Vendor (MV) in the SKU description, these multi-vendor SKUs provide the shortest lead time of SATA SSDs, preferable pricing to single sourced SKUs and are assured to meet or exceed the minimum performance specifications and power requirements published in this HPE QuickSpecs document per capacity SKU number. For customers looking to step up from SATA SSDs, HPE single-port Value SAS SSDs offer a significant performance boost over SATA SSDs with roughly twice the IOPS, and are typically lower in cost than traditional SAS SSD drives.

HPE full-performance SAS SSDs allow greater I/O bandwidth for superior performance over Value SAS SSDs, providing high write performance and endurance. They are best suited for mission-critical enterprise environments with workloads high in read and writes.

For customers looking for even more performance, High Performance Low Latency NVMe SSDs are a category of drives that offers a combination of high throughput, low latency, and ultra-high endurance. The first HPE SSDs using 3D XPoint technology\*, these SSDs are optimized to break through data access bottlenecks by providing a new data storage tier. High Performance Low Latency NVMe SSDs accelerate applications for fast caching and fast storage to increase scale per server and reduce transaction costs for latency sensitive workloads.

Using the above information along with our **HPE SSD Selector Tool** at <http://ssd.hpe.com> you can quickly determine what SSD solution might best meet your needs. You can also compare specific capacity, performance attributes, and server compatibility.

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Overview

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.

<b>-B21</b>	<b>-H21</b>	<b>-K21</b>
<b>COMPUTE</b>	<b>SPECIALIZED COMPUTE</b>	<b>STORAGE</b>
HPE Cloudline CL2100/CL2200/CL2800/CL3100/CL4100/CL5200/CL5800 Servers HPE Composable Cloud for ProLiant DL HPE Converged System 700/750 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 DX170r/DX190r/DX200/DX560/DX4200 Servers HPE ProLiant MicroServer HPE ProLiant for Microsoft Azure Stack HPE ProLiant ML30/ML110/ML350 Servers HPE Synergy 480/660 Systems HPE Synergy D3940 Storage Module	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 HPE Edgeline Systems and Servers HPE Integrity BL860c i6/BL870c i6/BL890c i6 Server Blades HPE Integrity MC990 X Server HPE Integrity rx2800 i6 Server HPE Integrity Superdome HPE SGI 8600 System HPE Solutions for SAP HANA (TDI) HPE Apollo Systems for BlueData Software	HPE Apollo 4200 Gen9/Gen10 Servers HPE Apollo 4200 Gen10 LFF Server for BlueData Software HPE Apollo 4510 Gen10 System HPE D3000/D6020/D8000 Disk Enclosures HPE D2220sb/D2500sb Storage Blade 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

### What is SSD?

An enduring data storage device utilizing NAND (negative-AND) semiconductor technology to store and access data which is volatile without the aid of an auxiliary power source.

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### SSD Quality

Today's businesses are seeing larger, more complex applications, coupled with an increasing amount of mission-critical and transaction processing data demand. In this environment, storage has become a critical component, significantly defining requirements for both systems reliability and performance. This is why HPE drives undergo a rigorous qualification process to ensure functionality and eliminate firmware and O/S incompatibilities.

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### 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 HPE equipment. The integration of solid state drives in HPE systems means that associated components are right for your ProLiant server.

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### Support Matrix

Please see the following URL for the latest list of supported servers and enclosures:

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

**Notes:** Non-hot plug devices are 15mm Z-height, which restricts them to those servers that can accept a 15mm device.

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### 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.

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### 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 - is measured while running 100% random 4KiB writes across the entire SSD.

Drive Writes Per Day (DWPD) - Workload environment is based on 100% random 4KiB writes for five (5) years, which is the maximum amount of data that can be written to the device before reaching the device's write endurance limit.

HPE Solid State Drives (SSDs) are equipped with tools that can report the amount of lifetime remaining. Introducing HPE SMARTSSD Wear Gauge™. To take advantage of SMARTSSD Wear Gauge™, Smart Array Firmware version 5.0 or greater is required and HPE Array Configuration Utility (ACU) or HPE Diagnostic Utility (ADU) must be running.

Simple Network Management Protocol (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:** <https://www.hpe.com/us/en/product-catalog/detail/pip.hp-system-management-homepage-software.344313.html>

The HPE SMARTSSD Wear Gauge™ requires a Smart Array or Smart HBA controller listed below.

### Standard Features

- HPE Smart Array PX1X Controller Series or newer
- HPE Smart HBA PX4X Controller Series
- HPE Dynamic Smart Array BX2Xi Controller Series or newer
- HPE Dynamic Smart Array B320i Controller

**Notes:** HPE Direct Connect to the HPE Smart Array B110i SATA RAID Controller is not currently supported by the above noted tool.



## Standard Features

### Data Retention

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.

### Warranty

SSD & AIC Standard 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.

**Notes:** In cases where an M.2 SSD is used in conjunction with a Server Cartridge the Warranty includes 3-Year Parts, 3-Year Labor, 3-Year (3/3/3) Onsite support for that option only.

### HPE SATA Very Read Optimized Solid State Drives Endurance

“Very Read Optimized” is an HPE term used to differentiate new QLC NAND based SSDs that will have variable endurance levels or DWPDP (Drive Writes Per Day) depending on how a customer writes data to them. Using QLC NAND requires that the workload write percentage and block size be understood as the endurance can be very different than other SSDs in the market. HPE VRO SSDs are designed for targeted workloads that drive a typical mix of >80% random reads and <20% sequential large block writes. Today it is standard for all SSDs to use a 100% 4K random write workload to generate the specified endurance (DWPDP) that is listed in the technical specifications. However, as VRO SSDs are not targeted at that 100% 4K random write workload, it's important to consider the actual targeted workload.

The VRO targeted workloads would typically have all write operations that are sequential and in 128K blocks which would allow all VRO capacities to support 0.8 DWPDP endurance. However, if the VRO SSD is used differently than targeted, the DWPDP will vary based upon how the drive is written to. If used incorrectly, such as the industry standard 4K random write workload the DWPDP endurance drops to: 0.2 on the 1.92TB; 0.09 on the 3.84TB and 0.05 on the 7.68TB VRO SSDs.

**Table 1. Endurance by workload**

Capacity	Drive Writes Per Day (DWPDP)			Total Bytes Written (TBW)		
	1.92TB	3.84TB	7.68TB	1.92TB	3.84TB	7.68TB
100% 128K sequential writes	0.8	0.8	0.8	2800 TB	5600 TB	11210 TB
90% 128K sequential writes*	0.72	0.62	0.56	2505 TB	4370 TB	7880 TB
10% 4K random writes						
80% 128K sequential writes*	0.66	0.56	0.39	2295 TB	3900 TB	5510 TB
20% 4K random writes						
70% 128K sequential writes*	0.56	0.41	0.27	1970 TB	2870 TB	3800 TB
30% 4K random writes						
50% 128K sequential writes*	0.44	0.25	0.16	1530 TB	1760 TB	2175 TB
50% 4K random writes						
100% 16K random writes	0.2	0.2	0.2	700 TB	1366 TB	2733 TB
100% 8K random writes	0.2	0.18	0.1	700 TB	1260 TB	1400 TB
100% 4K random writes	0.2	0.09	0.05	700 TB	630 TB	700 TB

**Note:** \*Based on 100% 4K random writes; Larger block sizes and sequential writes provide greater endurance, as listed in the table in the Endurance section





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## Service and Support

### Service and Support

#### HPE Technology Services for Industry Standard Servers

HPE Technology Services delivers confidence, reduces risk and helps customers realize agility and stability powered by a rich portfolio of consulting and support services designed to add value to our core products and solutions 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.

**Notes:** HPE Solid State Drives are supported as a part of the HPE Server Infrastructure. No separate Support Services are needed to be purchased.

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#### Connect your devices to HPE

Unlock all of the benefits of your technology investment by connecting your products to Hewlett Packard Enterprise. Achieve up to 77%<sup>1</sup> reduction in down time, near 100%<sup>2</sup> diagnostic accuracy and a single consolidated view of your environment. By connecting, you will receive 24x7 monitoring, pre-failure alerts, automatic call logging, and automatic parts dispatch. HPE Proactive Care Service and HPE Datacenter Care Service customers will also benefit from proactive activities to help prevent issues and increase optimization.

All of these benefits are already available to you with your server storage and networking products, securely connected to HPE support.

**Notes:**

- 1.-IDC Whitepaper
  - 2.-HPE CSC Reports 2014-2015
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#### HPE Support Center

Personalized online support portal with access to information, tools and experts to support HPE business products. Submit support cases online, chat with Hewlett Packard Enterprise experts, access support resources or collaborate with peers. Learn more [HPE Support Center](#)

HPE 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 Hewlett Packard Enterprise warranty, HPE Support Services or HPE contractual support agreement.

**Notes:** HPE Support Center Mobile App above 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 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.

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## Service and Support

### Warranty / Service Coverage

For ProLiant servers and storage systems, the service on the main product covers HPE-branded hardware options not designated by Hewlett Packard Enterprise as requiring separate coverage, that are qualified for the server, purchased at the same time or afterward and internal to the enclosure. These items will be covered at the same service level and for the same coverage period as the server unless the maximum supported lifetime and/or the maximum usage limitation has been reached.

The defective media retention service feature option applies only to Disk or eligible SSD/Flash Drives replaced by Hewlett Packard Enterprise due to malfunction. It does not apply Disk or SSD/Flash Drives that have not failed. SSD/Flash Drives that are specified by Hewlett Packard Enterprise as consumable parts and/or that have reached maximum supported lifetime and/or the maximum usage limits as set forth in the manufacturer's operating manual, the product QuickSpecs, or the technical data sheet are not eligible for the defective media retention service feature option.

Subject to: Maximum supported lifetime: This is a period in years set to equal the warranty for the specific drive. After this period no further service coverage will be available for the drive. 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 services coverage.

### Additional Notes Regarding Usage and Wear:

- DWPD (Drive-Writes-Per Day) ->Full drive writes per day for 5 years. Based on 100% Random Writes (KiB).
- HPE Enterprise SSDs deliver: Full data path error detection, surprise power loss protection and Smart SSD Wear Gauge support.

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### For more information

To learn more on services for HPE ESSN Options, please contact your Hewlett Packard Enterprise sales representative or Hewlett Packard Enterprise Authorized Channel Partner. Or visit:

- <https://www.hpe.com/us/en/product-catalog/servers/proliant-servers.html> or
- <https://www.hpe.com/us/en/integrated-systems/bladesystem.html>

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### Supporting Helpful Links

- <http://www.hpe.com/info/rackandpower>
- <http://www.hpe.com/info/poweradvisor>
- <https://www.hpe.com/us/en/storage/entry-level.html>

### Also:

Take control of your data - A guide to understanding storage technologies.

- <http://www.hpe.com/h20195/V2/getpdf.aspx/4AA4-7667ENW.pdf?ver=1.0>
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## Technical Specifications

### SATA Capacity, Workload and Carrier Specifications

SATA Interface– (Capacity, Workload, Carrier...)												
HPE Option Kit SKU	Long Description	Capacity	Workload Type	Interface Type	Form Factor	Plug Type	Carrier Type	Digitally Signed Firmware (DS)	Flash Type	Port	Server Gen Supported (Select Platforms)	
875470- <b>X21</b>	HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	480	MU	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10	
875474- <b>X21</b>	HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	960	MU	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10	
875488- <b>X21</b>	HPE 240GB SATA 6G Mixed Use M.2 2280 3yr Wty Digitally Signed Firmware SSD	240	MU	SATA	M.2	N/A	N/A	Yes	TLC	Single	Gen9, Gen10	
875490- <b>X21</b>	HPE 480GB SATA 6G Mixed Use M.2 2280 3yr Wty Digitally Signed Firmware SSD	480	MU	SATA	M.2	N/A	N/A	Yes	TLC	Single	Gen9, Gen10	
875492- <b>X21</b>	HPE 960GB SATA 6G Mixed Use M.2 2280 3yr Wty Digitally Signed Firmware SSD	960	MU	SATA	M.2	N/A	N/A	Yes	TLC	Single	Gen9, Gen10	
P00896- <b>X21</b>	HPE 3.84TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	3,840	MU	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10	
P05976- <b>X21</b>	HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	480	MU	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen10	
P05980- <b>X21</b>	HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	960	MU	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen10	
P05986- <b>X21</b>	HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1,920	MU	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen10	
P05994- <b>X21</b>	HPE 3.84TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	3,840	MU	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen10	
P06607- <b>X21</b>	HPE Dual 240GB SATA 6G Mixed Use M.2 - UFF to SFF SCM 3yr Wty Digitally Signed Firmware SSD	240	MU	SATA	SFF	Hot Plug	SCM	Yes	MLC	Single	Gen9, Gen10	
P07922- <b>X21</b>	HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	480	MU	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10	
P07924- <b>X21</b>	HPE 480GB SATA 6G Mixed Use LFF (3.5in) SCC 3yr Wty Digitally Signed Firmware SSD	480	MU	SATA	LFF	Hot Plug	SCC	Yes	TLC	Single	Gen9, Gen10	
P07926- <b>X21</b>	HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	960	MU	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10	

## Technical Specifications

SATA Interface– (Capacity, Workload, Carrier...)												
HPE Option Kit SKU	Long Description	Capacity	Workload Type	Interface Type	Form Factor	Plug Type	Carrier Type	Digitally Signed Firmware (DS)	Flash Type	Port	Server Gen Supported (Select Platforms)	
P07928-X21	HPE 960GB SATA 6G Mixed Use LFF (3.5in) SCC 3yr Wty Digitally Signed Firmware SSD	960	MU	SATA	LFF	Hot Plug	SCC	Yes	TLC	Single	Gen9, Gen10	
P07930-X21	HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1,920	MU	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10	
P07932-X21	HPE 1.92TB SATA 6G Mixed Use LFF (3.5in) SCC 3yr Wty Digitally Signed Firmware SSD	1,920	MU	SATA	LFF	Hot Plug	SCC	Yes	TLC	Single	Gen9, Gen10	
P07934-X21	HPE 1.92TB SATA 6G Mixed Use LFF (3.5in) LPC 3yr Wty Digitally Signed Firmware SSD	1,920	MU	SATA	LFF	Hot Plug	LPC	Yes	TLC	Single	Gen9, Gen10	
P07936-X21	HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) RW 3yr Wty Digitally Signed Firmware SSD	1,920	MU	SATA	SFF	Non-Hot Plug	RW	Yes	TLC	Single	Gen9, Gen10	
P09712-X21	HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	480	MU	SATA	SFF	Hot Plug	SC	Yes	MLC	Single	Gen9, Gen10	
P09716-X21	HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	960	MU	SATA	SFF	Hot Plug	SC	Yes	MLC	Single	Gen9, Gen10	
P09718-X21	HPE 960GB SATA 6G Mixed Use LFF (3.5in) SCC 3yr Wty Digitally Signed Firmware SSD	960	MU	SATA	LFF	Hot Plug	SCC	Yes	MLC	Single	Gen9, Gen10	
P09722-X21	HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1,920	MU	SATA	SFF	Hot Plug	SC	Yes	MLC	Single	Gen9, Gen10	
P09724-X21	HPE 1.92TB SATA 6G Mixed Use LFF (3.5in) SCC 3yr Wty Digitally Signed Firmware SSD	1,920	MU	SATA	LFF	Hot Plug	SCC	Yes	MLC	Single	Gen9, Gen10	
P09726-X21	HPE 1.92TB SATA 6G Mixed Use LFF (3.5in) LPC 3yr Wty Digitally Signed Firmware SSD	1,960	MU	SATA	LFF	Hot Plug	LPC	Yes	MLC	Single	Gen9, Gen10	
P13658-X21	HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	480	MU	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10	
P13660-X21	HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	960	MU	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10	
P13662-X21	HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1,920	MU	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10	
P13664-X21	HPE 3.84TB SATA 6G Mixed Use SFF (2.5in) RW 3yr Wty Digitally Signed Firmware SSD	3,840	MU	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10	

## Technical Specifications

### SATA Interface– (Capacity, Workload, Carrier...)

HPE Option Kit SKU	Long Description	Capacity	Workload Type	Interface Type	Form Factor	Plug Type	Carrier Type	Digitally Signed Firmware (DS)	Flash Type	Port	Server Gen Supported (Select Platforms)
P18432- <b>X21</b>	HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Multi Vendor SSD	480	MU	SATA	SFF	Hot Plug	SC	Yes	MLC	Single	Gen9, Gen10
P18434- <b>X21</b>	HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Multi Vendor SSD	960	MU	SATA	SFF	Hot Plug	SC	Yes	MLC	Single	Gen9, Gen10
P18436- <b>X21</b>	HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Multi Vendor SSD	1,920	MU	SATA	SFF	Hot Plug	SC	Yes	MLC	Single	Gen9, Gen10
P18438- <b>X21</b>	HPE 3.84TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Multi Vendor SSD	3,840	MU	SATA	SFF	Hot Plug	SC	Yes	MLC	Single	Gen9, Gen10
P19947- <b>X21</b>	HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty SSD	480	MU	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen10, Gen10.5
P19949- <b>X21</b>	HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty SSD	960	MU	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen10, Gen10.5
P19951- <b>X21</b>	HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty SSD	1,920	MU	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen10, Gen10.5
P19953- <b>X21</b>	HPE 3.84TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty SSD	3,840	MU	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen10, Gen10.5
P19978- <b>X21</b>	HPE 480GB SATA 6G Mixed Use LFF (3.5in) SCC 3yr Wty SSD	480	MU	SATA	LFF	Hot Plug	SCC	Yes	TLC	Single	Gen10, Gen10.5
P19980- <b>X21</b>	HPE 960GB SATA 6G Mixed Use LFF (3.5in) LPC 3yr Wty SSD	960	MU	SATA	LFF	Hot Plug	LPC	Yes	TLC	Single	Gen10, Gen10.5
P19982- <b>X21</b>	HPE 1.92TB SATA 6G Mixed Use LFF (3.5in) SCC 3yr Wty SSD	1,920	MU	SATA	LFF	Hot Plug	SCC	Yes	TLC	Single	Gen10, Gen10.5
P19984- <b>X21</b>	HPE 1.92TB SATA 6G Mixed Use LFF (3.5in) LPC 3yr Wty SSD	1,920	MU	SATA	LFF	Hot Plug	LPC	Yes	TLC	Single	Gen10, Gen10.5
P19986- <b>X21</b>	HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) RW 3yr Wty SSD	1,920	MU	SATA	SFF	Hot Plug	RW	Yes	TLC	Single	Gen10, Gen10.5
P21517- <b>X21</b>	HPE 3.84TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty SSD	1,920	MU	SATA	SFF	Hot Plug	SC	Yes	MLC	Single	Gen 10
875498- <b>X21</b>	HPE 480GB SATA 6G Read Intensive M.2 2280 3yr Wty Digitally Signed Firmware SSD	480	RI	SATA	M.2	N/A	N/A	Yes	TLC	Single	Gen9, Gen10

## Technical Specifications

SATA Interface– (Capacity, Workload, Carrier...)												
HPE Option Kit SKU	Long Description	Capacity	Workload Type	Interface Type	Form Factor	Plug Type	Carrier Type	Digitally Signed Firmware (DS)	Flash Type	Port	Server Gen Supported (Select Platforms)	
875500- <b>X21</b>	HPE 960GB SATA 6G Read Intensive M.2 2280 3yr Wty Digitally Signed Firmware SSD	960	RI	SATA	M.2	N/A	N/A	Yes	TLC	Single	Gen9, Gen10	
875503- <b>X21</b>	HPE 240GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	240	RI	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10	
875509- <b>X21</b>	HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	480	RI	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10	
875511- <b>X21</b>	HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	960	RI	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10	
P04474- <b>X21</b>	HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	480	RI	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10	
P04476- <b>X21</b>	HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	960	RI	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10	
P04478- <b>X21</b>	HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1,920	RI	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10	
P04480- <b>X21</b>	HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	3,840	RI	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10	
P04482- <b>X21</b>	HPE 7.68TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	7,680	RI	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10	
P04499- <b>X21</b>	HPE 480GB SATA 6G Read Intensive LFF (3.5in) LPC 3yr Wty Digitally Signed Firmware SSD	480	RI	SATA	LFF	Hot Plug	LPC	Yes	TLC	Single	Gen9, Gen10	
P04501- <b>X21</b>	HPE 1.92TB SATA 6G Read Intensive LFF (3.5in) LPC 3yr Wty Digitally Signed Firmware SSD	1,920	RI	SATA	LFF	Hot Plug	LPC	Yes	TLC	Single	Gen9, Gen10	



## Technical Specifications

### SATA Interface– (Capacity, Workload, Carrier...)

HPE Option Kit SKU	Long Description	Capacity	Workload Type	Interface Type	Form Factor	Plug Type	Carrier Type	Digitally Signed Firmware (DS)	Flash Type	Port	Server Gen Supported (Select Platforms)
P04556- <b>X21</b>	HPE 240GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	240	RI	SATA	SFF	Hot Plug	SC	Yes	MLC	Single	Gen10
P04560- <b>X21</b>	HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	480	RI	SATA	SFF	Hot Plug	SC	Yes	MLC	Single	Gen10
P04564- <b>X21</b>	HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	960	RI	SATA	SFF	Hot Plug	SC	Yes	MLC	Single	Gen10
P04566- <b>X21</b>	HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1,920	RI	SATA	SFF	Hot Plug	SC	Yes	MLC	Single	Gen10
P04570- <b>X21</b>	HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	3,840	RI	SATA	SFF	Hot Plug	SC	Yes	MLC	Single	Gen10
P05924- <b>X21</b>	HPE 240GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	240	RI	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen10
P05928- <b>X21</b>	HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	480	RI	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen10
P05932- <b>X21</b>	HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	960	RI	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen10
P05938- <b>X21</b>	HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1,920	RI	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen10
P05946- <b>X21</b>	HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	3,840	RI	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen10
P06194- <b>X21</b>	HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	480	RI	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10



## Technical Specifications

### SATA Interface– (Capacity, Workload, Carrier...)

HPE Option Kit SKU	Long Description	Capacity	Workload Type	Interface Type	Form Factor	Plug Type	Carrier Type	Digitally Signed Firmware (DS)	Flash Type	Port	Server Gen Supported (Select Platforms)
P06196- <b>X21</b>	HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	960	RI	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10
P06198- <b>X21</b>	HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1,920	RI	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10
P06200- <b>X21</b>	HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	3,840	RI	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10
P06609- <b>X21</b>	HPE Dual 480GB SATA 6G Read Intensive M.2 - UFF to SFF SCM 3yr Wty Digitally Signed Firmware SSD	480	RI	SATA	SFF	Hot Plug	SCM	Yes	MLC	Single	Gen9, Gen10
P09685- <b>X21</b>	HPE 240GB SATA 6G Read Intensive SFF (2.5in) RW 3yr Wty Digitally Signed Firmware SSD	240	RI	SATA	SFF	Non-Hot Plug	RW	Yes	MLC	Single	Gen9, Gen10
P09687- <b>X21</b>	HPE 480GB SATA 6G Read Intensive LFF (3.5in) SCC 3yr Wty Digitally Signed Firmware SSD	480	RI	SATA	LFF	Hot Plug	SCC	Yes	MLC	Single	Gen9, Gen10
P09689- <b>X21</b>	HPE 960GB SATA 6G Read Intensive LFF (3.5in) SCC 3yr Wty Digitally Signed Firmware SSD	960	RI	SATA	LFF	Hot Plug	SCC	Yes	MLC	Single	Gen9, Gen10
P09691- <b>X21</b>	HPE 960GB SATA 6G Read Intensive LFF (3.5in) LPC 3yr Wty Digitally Signed Firmware SSD	960	RI	SATA	LFF	Hot Plug	LPC	Yes	MLC	Single	Gen9, Gen10
P09693- <b>X21</b>	HPE 1.92TB SATA 6G Read Intensive LFF (3.5in) SCC 3yr Wty Digitally Signed Firmware SSD	1,920	RI	SATA	LFF	Hot Plug	SCC	Yes	MLC	Single	Gen9, Gen10
P09697- <b>X21</b>	HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) RW 3yr Wty Digitally Signed Firmware SSD	3,840	RI	SATA	SFF	Non-Hot Plug	RW	Yes	MLC	Single	Gen9, Gen10
P18420- <b>X21</b>	HPE 240GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	240	RI	SATA	SFF	Hot Plug	SC	Yes	MLC	Single	Gen9, Gen10
P18422- <b>X21</b>	HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	480	RI	SATA	SFF	Hot Plug	SC	Yes	MLC	Single	Gen9, Gen10





## Technical Specifications

### SATA Interface– (Capacity, Workload, Carrier...)

HPE Option Kit SKU	Long Description	Capacity	Workload Type	Interface Type	Form Factor	Plug Type	Carrier Type	Digitally Signed Firmware (DS)	Flash Type	Port	Server Gen Supported (Select Platforms)
P18424-X21	HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	960	RI	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10
P18426-X21	HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	1,920	RI	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10
P18428-X21	HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	3,840	RI	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10
P18430-X21	HPE 7.68TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	7,680	RI	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10
P19888-X21	HPE 240GB SATA 6G Read Intensive M.2 2280 3yr Wty SSD	240	RI	SATA	M.2	Non Hot Plug	N/A	Yes	TLC	Single	Gen10, Gen10.5
P19890-X21	HPE 480GB SATA 6G Read Intensive M.2 2280 3yr Wty SSD	480	RI	SATA	M.2	Non Hot Plug	N/A	Yes	TLC	Single	Gen10, Gen10.5
P19892-X21	HPE 960GB SATA 6G Read Intensive M.2 2280 3yr Wty SSD	960	RI	SATA	M.2	Non Hot Plug	N/A	Yes	TLC	Single	Gen10, Gen10.5
P19894-X21	HPE Dual 240GB SATA 6G Read Intensive M.2 - UFF to SFF SCM 3yr Wty SSD	240	RI	SATA	SFF	Hot Plug	SCM	Yes	TLC	Single	Gen10, Gen10.5
P19896-X21	HPE Dual 480GB SATA 6G Read Intensive M.2 - UFF to SFF SCM 3yr Wty SSD	480	RI	SATA	SFF	Hot Plug	SCM	Yes	TLC	Single	Gen10, Gen10.5
P19935-X21	HPE 240GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty SSD	240	RI	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen10, Gen10.5
P19937-X21	HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty SSD	480	RI	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen10, Gen10.5
P19939-X21	HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty SSD	960	RI	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen10, Gen10.5
P19941-X21	HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty SSD	1,920	RI	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen10, Gen10.5
P19943-X21	HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty SSD	3,840	RI	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen10, Gen10.5
P19945-X21	HPE 7.68TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty SSD	7,680	RI	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen10, Gen10.5



## Technical Specifications

### SATA Interface– (Capacity, Workload, Carrier...)

HPE Option Kit SKU	Long Description	Capacity	Workload Type	Interface Type	Form Factor	Plug Type	Carrier Type	Digitally Signed Firmware (DS)	Flash Type	Port	Server Gen Supported (Select Platforms)
P19974- <b>X21</b>	HPE 480GB SATA 6G Read Intensive LFF (3.5in) LPC 3yr Wty SSD	480	RI	SATA	LFF	Hot Plug	LPC	Yes	TLC	Single	Gen10, Gen10.5
P19976- <b>X21</b>	HPE 1.92TB SATA 6G Read Intensive LFF (3.5in) LPC 3yr Wty SSD	1,920	RI	SATA	LFF	Hot Plug	LPC	Yes	TLC	Single	Gen10, Gen10.5
P23487- <b>X21</b>	HPE 1.92TB SATA 6G Very Read Optimized SFF (2.5in) SC 3yr Wty SSD	1,920	VRO	SATA	SFF	Hot Plug	SC	Yes	QLC	Single	Gen10, Gen10.5
P23489- <b>X21</b>	HPE 3.84TB SATA 6G Very Read Optimized SFF (2.5in) SC 3yr Wty SSD	3,840	VRO	SATA	SFF	Hot Plug	SC	Yes	QLC	Single	Gen10, Gen10.5
P23491- <b>X21</b>	HPE 3.84TB SATA 6G Very Read Optimized LFF (3.5in) LPC 3yr Wty SSD	3,840	VRO	SATA	LFF	Hot Plug	LPC	Yes	QLC	Single	Gen10, Gen10.5
P23493- <b>X21</b>	HPE 7.68TB SATA 6G Very Read Optimized SFF (2.5in) SC 3yr Wty SSD	7,680	VRO	SATA	SFF	Hot Plug	SC	Yes	QLC	Single	Gen10, Gen10.5
P23495- <b>X21</b>	HPE 7.68TB SATA 6G Very Read Optimized LFF (3.5in) LPC 3yr Wty SSD	7,680	VRO	SATA	LFF	Hot Plug	LPC	Yes	QLC	Single	Gen10, Gen10.5
P24190- <b>X21</b>	HPE 960GB SATA 6G Very Read Optimized SFF (2.5in) SC 3yr Wty SSD	960	VRO	SATA	SFF	Hot Plug	SC	Yes	QLC	Single	Gen10, Gen10.5
<b>Universal SATA M.2 Enablement Kit</b>											
878783- <b>X21</b>	HPE Universal SATA HHHH 3yr Wty M.2 Kit	NA	NA	SATA	M.2e	Non-Hot Plug	AIC	Yes	NA		Gen9, Gen10

**Notes:** Please use HPE Selector Tool <http://ssd.hpe.com/> to determine server compatibility.



## Technical Specifications

### SATA Speeds and Feeds Specifications

SATA Interface – (Speeds & Feeds)							
HPE Option Kit SKU	Long Description	Lifetime Writes (TB)	Endurance DWPD	MAX Seq Reads / Max Seq Writes Throughput (MiB/s)	Random Read Avg. / Random Write Avg. Latency uSec (4KiB,Q1)	Random Read / Random Writes IOPS (4KiB, Q=16)	MAX Random Read / MAX Random Write IOPS (4KiB)
875470- <b>X21</b>	HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	4,400	5.0	510 / 455	125 / 40	62,000 / 52,500	68,500@Q32 / 52,500@Q16
875474- <b>X21</b>	HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	8,800	5.0	510 / 480	130 / 40	60,000 / 52,500	67,500@Q32 / 52,500@Q16
875488- <b>X21</b>	HPE 240GB SATA 6G Mixed Use M.2 2280 3yr Wty Digitally Signed Firmware SSD	650	1.5	500 / 260	135 / 40	60,000 / 34,000	66,000@Q32 / 34,000@Q4
875490- <b>X21</b>	HPE 480GB SATA 6G Mixed Use M.2 2280 3yr Wty Digitally Signed Firmware SSD	1,300	1.5	500 / 400	130 / 40	60,000 / 34,000	68,000@Q32 / 34,000@Q4
875492- <b>X21</b>	HPE 960GB SATA 6G Mixed Use M.2 2280 3yr Wty Digitally Signed Firmware SSD	4,400	2.6	500 / 465	130 / 40	60,000 / 30,000	68,000@Q32 / 30,000@Q4
P00896- <b>X21</b>	HPE 3.84TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	17,600	2.6	510 / 490	125 / 40	56,000 / 28,000	60,000@Q32 / 28,000@Q4
P05976- <b>X21</b>	HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	3,000	3.5	530 / 480	110 / 52	68,000 / 40,000	76,000@Q32 / 42,000@Q32
P05980- <b>X21</b>	HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	6,000	3.4	530 / 480	110 / 50	68,000 / 41,000	76,000@Q32 / 43,000@Q32
P05986- <b>X21</b>	HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	10,000	3.1	525 / 480	110 / 52	69,000 / 38,000	76,000@Q32 / 41,000@Q32
P05994- <b>X21</b>	HPE 3.84TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	22,000	3.1	525 / 480	110 / 55	69,000 / 36,000	76,000@Q32 / 38,000@Q32
P06607- <b>X21</b>	HPE Dual 240GB SATA 6G Mixed Use M.2 - UFF to SFF SCM 3yr Wty Digitally Signed Firmware SSD	N/A	N/A	N/A	N/A	N/A	N/A
P07922- <b>X21</b>	HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	4,380	5.0	520 / 445	125 / 36	66,000 / 52,500	73,500@Q32 / 52,500@Q16
P07924- <b>X21</b>	HPE 480GB SATA 6G Mixed Use LFF (3.5in) SCC 3yr Wty Digitally Signed Firmware SSD	4,380	5.0	520 / 445	125 / 36	66,000 / 52,500	73,500@Q32 / 52,500@Q16
P07926- <b>X21</b>	HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	8,760	5.0	520 / 495	125 / 36	63,000 / 52,500	64,500@Q32 / 52,500@Q16

## Technical Specifications

SATA Interface – (Speeds & Feeds)							
HPE Option Kit SKU	Long Description	Lifetime Writes (TB)	Endurance DWPD	MAX Seq Reads / Max Seq Writes Throughput (MiB/s)	Random Read Avg. / Random Write Avg. Latency uSec (4KiB,Q1)	Random Read / Random Writes IOPS (4KiB, Q=16)	MAX Random Read / MAX Random Write IOPS (4KiB)
P07928- <b>X21</b>	HPE 960GB SATA 6G Mixed Use LFF (3.5in) SCC 3yr Wty Digitally Signed Firmware SSD	8,760	5.0	520 / 495	125 / 36	63,000 / 52,500	64,500@Q32 / 52,500@Q16
P07930- <b>X21</b>	HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	17,500	5.0	520 / 495	125 / 36	59,000 / 52,500	62,000@Q32 / 52,500@Q16
P07932- <b>X21</b>	HPE 1.92TB SATA 6G Mixed Use LFF (3.5in) SCC 3yr Wty Digitally Signed Firmware SSD	17,500	5.0	520 / 495	125 / 36	59,000 / 52,500	62,000@Q32 / 52,500@Q16
P07934- <b>X21</b>	HPE 1.92TB SATA 6G Mixed Use LFF (3.5in) LPC 3yr Wty Digitally Signed Firmware SSD	17,500	5.0	520 / 495	125 / 36	59,000 / 52,500	62,000@Q32 / 52,500@Q16
P07936- <b>X21</b>	HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) RW 3yr Wty Digitally Signed Firmware SSD	17,500	5.0	520 / 495	125 / 36	59,000 / 52,500	62,000@Q32 / 52,500@Q16
P09712- <b>X21</b>	HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	3,000	3.5	535 / 495	91 / 36	70,000 / 29,000	80,000@Q32 / 29,000@Q4
P09716- <b>X21</b>	HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	6,000	3.5	535 / 495	91 / 36	70,000 / 31,000	80,000@Q32 / 31,000@Q4
P09718- <b>X21</b>	HPE 960GB SATA 6G Mixed Use LFF (3.5in) SCC 3yr Wty Digitally Signed Firmware SSD	6,000	3.5	535 / 495	91 / 36	70,000 / 31,000	80,000@Q32 / 31,000@Q4
P09722- <b>X21</b>	HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	12,100	3.5	535 / 495	91 / 36	70,000 / 31,000	80,000@Q32 / 31,000@Q4
P09724- <b>X21</b>	HPE 1.92TB SATA 6G Mixed Use LFF (3.5in) SCC 3yr Wty Digitally Signed Firmware SSD	12,100	3.5	535 / 495	91 / 36	70,000 / 31,000	80,000@Q32 / 31,000@Q4
P09726- <b>X21</b>	HPE 1.92TB SATA 6G Mixed Use LFF (3.5in) LPC 3yr Wty Digitally Signed Firmware SSD	12,100	3.5	535 / 495	91 / 36	70,000 / 31,000	80,000@Q32 / 31,000@Q4
P13658- <b>X21</b>	HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	6,480	7.40	510 / 430	120 / 38	62,000 / 50,000	72,000@Q32 / 50,000@Q4
P13660- <b>X21</b>	HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	7,000	4.00	530 / 500	120 / 38	61,000 / 53,000	72,000@Q32 / 53,000@Q4
P13662- <b>X21</b>	HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	10,600	3.05	530 / 500	125 / 38	59,000 / 53,000	71,000@Q32 / 53,000@Q4
P13664- <b>X21</b>	HPE 3.84TB SATA 6G Mixed Use SFF (2.5in) RW 3yr Wty Digitally Signed Firmware SSD	29,000	4.20	530 / 500	125 / 38	59,000 / 53,000	70,000@Q32 / 53,000@Q4

## Technical Specifications

SATA Interface – (Speeds & Feeds)							
HPE Option Kit SKU	Long Description	Lifetime Writes (TB)	Endurance DWPD	MAX Seq Reads / Max Seq Writes Throughput (MiB/s)	Random Read Avg. / Random Write Avg. Latency uSec (4KiB,Q1)	Random Read / Random Writes IOPS (4KiB, Q=16)	MAX Random Read / MAX Random Write IOPS (4KiB)
P18432- <b>X21</b>	HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Multi Vendor SSD	3,000	3.5	510 / 430	120 / 52	62,000 / 29,000	72,000@Q32 / 29,000@Q4
P18434- <b>X21</b>	HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Multi Vendor SSD	6,000	3.4	520 / 480	125 / 125 / 50	63,000 / 31,000	64,500@Q32 / 31,000@Q4
P18436- <b>X21</b>	HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Multi Vendor SSD	10,000	3.1	520 / 480	125 / 52	59,000 / 31,000	62,000@Q32 / 31,000@Q4
P18438- <b>X21</b>	HPE 3.84TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Multi Vendor SSD	17,600	2.6	510 / 480	125 / 55	56,000 / 28,000	60,000@Q32 / 28,000@Q4
P19947- <b>X21</b>	HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty SSD	4,380	5.00	520 / 450	125 / 37	67,000 / 52,000	76,000@Q64 / 53,000@Q4
P19949- <b>X21</b>	HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty SSD	8,760	5.00	520 / 490	125 / 37	67,000 / 52,000	76,000@Q256 / 52,000@Q4
P19951- <b>X21</b>	HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty SSD	17,520	5.00	520 / 490	125 / 37	67,000 / 52,000	75,000@Q256 / 52,000@Q4
P19953- <b>X21</b>	HPE 3.84TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty SSD	24,531	3.50	510 / 490	125 / 39	67,000 / 34,000	77,000@Q32 / 35,000@Q4
P19978- <b>X21</b>	HPE 480GB SATA 6G Mixed Use LFF (3.5in) SCC 3yr Wty SSD	4,380	5.00	520 / 450	125 / 37	67,000 / 52,000	76,000@Q64 / 53,000@Q4
P19980- <b>X21</b>	HPE 960GB SATA 6G Mixed Use LFF (3.5in) LPC 3yr Wty SSD	8,760	5.00	520 / 490	125 / 37	67,000 / 52,000	76,000@Q256 / 52,000@Q4
P19982- <b>X21</b>	HPE 1.92TB SATA 6G Mixed Use LFF (3.5in) SCC 3yr Wty SSD	17,520	5.00	520 / 490	125 / 37	67,000 / 52,000	75,000@Q256 / 52,000@Q4
P19984- <b>X21</b>	HPE 1.92TB SATA 6G Mixed Use LFF (3.5in) LPC 3yr Wty SSD	17,520	5.00	520 / 490	125 / 37	67,000 / 52,000	75,000@Q256 / 52,000@Q4
P19986- <b>X21</b>	HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) RW 3yr Wty SSD	17,520	5.00	520 / 490	125 / 37	67,000 / 52,000	75,000@Q256 / 52,000@Q4
P21517- <b>X21</b>	HPE 3.84TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty SSD	24,200	3	525 / 480	140 / 76	61,000 / 32,000	69,000@Q32 / 32,500@Q32
875498- <b>X21</b>	HPE 480GB SATA 6G Read Intensive M.2 2280 3yr Wty Digitally Signed Firmware SSD	450	0.5	500 / 425	130 / 40	61,000 / 46,000	67,000@Q32 / 46,000@Q64
875500- <b>X21</b>	HPE 960GB SATA 6G Read Intensive M.2 2280 3yr Wty Digitally Signed Firmware SSD	900	0.5	500 / 465	130 / 40	61,000 / 41,000	67,000@Q32 / 41,000@Q4

## Technical Specifications

SATA Interface – (Speeds & Feeds)							
HPE Option Kit SKU	Long Description	Lifetime Writes (TB)	Endurance DWPD	MAX Seq Reads / Max Seq Writes Throughput (MiB/s)	Random Read Avg. / Random Write Avg. Latency uSec (4KiB,Q1)	Random Read / Random Writes IOPS (4KiB, Q=16)	MAX Random Read / MAX Random Write IOPS (4KiB)
875503- <b>X21</b>	HPE 240GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	650	1.5	505 / 260	125 / 40	62,500 / 33,000	69,500@Q32 / 33,000@Q4
875509- <b>X21</b>	HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	450	0.5	505 / 380	125 / 40	61,000 / 34,000	67,000@Q32 / 34,000@Q4
875511- <b>X21</b>	HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	900	0.5	505 / 475	125 / 40	61,000 / 31,000	67,000@Q32 / 31,000@Q4
P04474- <b>X21</b>	HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	870	0.5	520 / 370	125 / 37	65,000 / 34,000	76,000@Q32 / 35,000@Q32
P04476- <b>X21</b>	HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1,750	1.0	520 / 490	125 / 40	65,000 / 29,000	69,000@Q32 / 32,000@Q32
P04478- <b>X21</b>	HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	3,500	1.0	520 / 495	125 / 41	60,000 / 24,000	62,000@Q32 / 25,000@Q32
P04480- <b>X21</b>	HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	7,700	1.1	520 / 495	125 / 45	55,000 / 21,000	58,000@Q32 / 22,000@Q4
P04482- <b>X21</b>	HPE 7.68TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	8,400	0.6	520 / 495	125 / 100	54,000 / 10,000	57,000@Q32 / 10,000@Q1
P04499- <b>X21</b>	HPE 480GB SATA 6G Read Intensive LFF (3.5in) LPC 3yr Wty Digitally Signed Firmware SSD	870	0.5	520 / 370	125 / 37	65,000 / 34,000	76,000@Q32 / 35,000@Q32
P04501- <b>X21</b>	HPE 1.92TB SATA 6G Read Intensive LFF (3.5in) LPC 3yr Wty Digitally Signed Firmware SSD	3,500	1.0	520 / 495	125 / 41	60,000 / 24,000	62,000@Q32 / 25,000@Q32
P04556- <b>X21</b>	HPE 240GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	350	0.8	535 / 315	105 / 70	70,000 / 14,000	79,000@Q32 / 14,000@Q1
P04560- <b>X21</b>	HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	700	0.8	535 / 495	105 / 40	68,000 / 25,000	77,000@Q32 / 25,000@Q1
P04564- <b>X21</b>	HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1,400	0.8	535 / 495	105 / 36	65,000 / 29,000	76,000@Q32 / 29,000@Q4
P04566- <b>X21</b>	HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	2,800	0.8	535 / 495	120 / 36	64,000 / 30,000	73,000@Q32 / 30,000@Q4

## Technical Specifications

SATA Interface – (Speeds & Feeds)							
HPE Option Kit SKU	Long Description	Lifetime Writes (TB)	Endurance DWPD	MAX Seq Reads / Max Seq Writes Throughput (MiB/s)	Random Read Avg. / Random Write Avg. Latency uSec (4KiB,Q1)	Random Read / Random Writes IOPS (4KiB, Q=16)	MAX Random Read / MAX Random Write IOPS (4KiB)
P04570- <b>X21</b>	HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	5,600	0.8	535 / 495	120 / 36	63,000 / 30,000	72,000@Q32 / 30,000@Q4
P05924- <b>X21</b>	HPE 240GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	900	1.9	530 / 255	110 / 65	66,000 / 16,000	76,000@Q32 / 16,500@Q4
P05928- <b>X21</b>	HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1,200	1.3	530 / 465	110 / 75	68,000 / 17,500	76,000@Q32 / 19,000@Q4
P05932- <b>X21</b>	HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	3,400	1.9	525 / 480	110 / 60	68,000 / 33,000	76,000@Q32 / 35,000@Q32
P05938- <b>X21</b>	HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	7,100	2.0	530 / 480	110 / 60	69,000 / 33,000	76,000@Q32 / 34,000@Q32
P05946- <b>X21</b>	HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	13,100	1.9	525 / 480	110 / 65	69,000 / 28,000	76,000@Q32 / 30,500@Q32
P06194- <b>X21</b>	HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	430	0.5	530 / 300	120 / 65	65,000 / 15,000	65,500@Q32 / 15,400@Q1
P06196- <b>X21</b>	HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1,710	1.0	530 / 480	120 / 42	58,500 / 36,500	58,500@Q32 / 38,200@Q16
P06198- <b>X21</b>	HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	3,100	0.9	530 / 470	120 / 42	55,500 / 31,000	56,000@Q32 / 32,500@Q4
P06200- <b>X21</b>	HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	3,400	0.5	530 / 480	120 / 42	54,000 / 26,000	56,000@Q32 / 25,000@Q4
P06609- <b>X21</b>	HPE Dual 480GB SATA 6G Read Intensive M.2 - UFF to SFF SCM 3yr Wty Digitally Signed Firmware SSD	N/A	N/A	N/A	N/A	N/A	N/A
P09685- <b>X21</b>	HPE 240GB SATA 6G Read Intensive SFF (2.5in) RW 3yr Wty Digitally Signed Firmware SSD	250	0.8	535 / 315	105 / 70	70,000 / 14,000	79,000@Q32 / 14,000@Q1
P09687- <b>X21</b>	HPE 480GB SATA 6G Read Intensive LFF (3.5in) SCC 3yr Wty Digitally Signed Firmware SSD	700	0.8	535 / 495	105 / 40	68,000 / 25,000	77,000@Q32 / 25,000@Q1
P09689- <b>X21</b>	HPE 960GB SATA 6G Read Intensive LFF (3.5in) SCC 3yr Wty Digitally Signed Firmware SSD	1,400	0.8	535 / 495	105 / 36	65,000 / 29,000	76,000@Q32 / 29,000@Q4



## Technical Specifications

SATA Interface – (Speeds & Feeds)							
HPE Option Kit SKU	Long Description	Lifetime Writes (TB)	Endurance DWPD	MAX Seq Reads / Max Seq Writes Throughput (MiB/s)	Random Read Avg. / Random Write Avg. Latency uSec (4KiB,Q1)	Random Read / Random Writes IOPS (4KiB, Q=16)	MAX Random Read / MAX Random Write IOPS (4KiB)
P09691- <b>X21</b>	HPE 960GB SATA 6G Read Intensive LFF (3.5in) LPC 3yr Wty Digitally Signed Firmware SSD	1,400	0.8	535 / 495	105 / 36	65,000 / 29,000	76,000@Q32 / 29,000@Q4
P09693- <b>X21</b>	HPE 1.92TB SATA 6G Read Intensive LFF (3.5in) SCC 3yr Wty Digitally Signed Firmware SSD	2,400	0.8	535 / 495	120 / 36	64,000 / 30,000	73,000@Q32 / 30,000@Q4
P09697- <b>X21</b>	HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) RW 3yr Wty Digitally Signed Firmware SSD	5,600	0.8	535 / 495	120 / 36	63,000 / 30,000	72,000@Q32 / 30,000@Q4
P18420- <b>X21</b>	HPE 240GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	350	0.8	505 / 255	125 / 70	62,500 / 14,000	69,500@Q32 / 14,000@Q1
P18422- <b>X21</b>	HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	430	0.5	520 / 300	125 / 75	65,000 / 15,000	65,500@Q32 / 15,400@Q1
P18424- <b>X21</b>	HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	1,400	0.8	520 / 480	125 / 60	58,500 / 29,000	58,500@Q32 / 29,000@Q4
P18426- <b>X21</b>	HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	2,800	0.8	520 / 470	125 / 60	55,500 / 24,000	56,000@Q32 / 25,000@Q32
P18428- <b>X21</b>	HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	3,400	0.5	520 / 480	125 / 65	54,000 / 21,000	56,000@Q32 / 22,000@Q4
P18430- <b>X21</b>	HPE 7.68TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	8,400	0.6	520 / 495	125 / 100	54,000 / 10,000	57,000@Q32 / 10,000@Q1
P19888- <b>X21</b>	HPE 240GB SATA 6G Read Intensive M.2 2280 3yr Wty SSD	438	1.00	520 / 210	125 / 85	48,000 / 11,500	50,500@Q128 / 11,800@Q16
P19890- <b>X21</b>	HPE 480GB SATA 6G Read Intensive M.2 2280 3yr Wty SSD	1,324	1.50	510 / 400	125 / 37	65,000 / 38,000	76,000@Q64 / 39,500@Q256
P19892- <b>X21</b>	HPE 960GB SATA 6G Read Intensive M.2 2280 3yr Wty SSD	2,628	1.50	510 / 490	125 / 38	67,000 / 37,000	76,000@Q32 / 38,000@Q4
P19894- <b>X21</b>	HPE Dual 240GB SATA 6G Read Intensive M.2 - UFF to SFF SCM 3yr Wty SSD	N/A	N/A	520 / 210	125 / 85	48,000 / 11,500	50,500@Q128 / 11,800@Q16
P19896- <b>X21</b>	HPE Dual 480GB SATA 6G Read Intensive M.2 - UFF to SFF SCM 3yr Wty SSD	N/A	N/A	510 / 400	125 / 37	65,000 / 38,000	76,000@Q64 / 39,500@Q256



## Technical Specifications

SATA Interface – (Speeds & Feeds)							
HPE Option Kit SKU	Long Description	Lifetime Writes (TB)	Endurance DWPD	MAX Seq Reads / Max Seq Writes Through-put (MiB/s)	Random Read Avg. / Random Write Avg. Latency uSec (4KiB,Q1)	Random Read / Random Writes IOPS (4KiB, Q=16)	MAX Random Read / MAX Random Write IOPS (4KiB)
P19935- <b>X21</b>	HPE 240GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty SSD	657	1.50	520 / 300	203 / 121	57,000 / 43,000	65,000@Q64 / 44,000@Q32
P19937- <b>X21</b>	HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty SSD	1,324	1.50	510 / 395	125 / 38	65,000 / 38,500	75,000@Q256 / 4,000@Q4
P19939- <b>X21</b>	HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty SSD	2,628	1.50	515 / 495	125 / 38	66,000 / 36,000	76,000@Q64 / 37,000@Q4
P19941- <b>X21</b>	HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty SSD	5,256	1.50	520 / 495	125 / 38	67,000 / 31,000	76,000@Q32 / 33,000@Q32
P19943- <b>X21</b>	HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty SSD	8,410	1.20	510 / 490	125 / 43	67,000 / 22,500	76,000@Q256 / 23,000@Q1
P19945- <b>X21</b>	HPE 7.68TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty SSD	9,111	0.65	505 / 495	126 / 87	67,000 / 11,500	76,000@Q32 / 11,800@Q64
P19974- <b>X21</b>	HPE 480GB SATA 6G Read Intensive LFF (3.5in) LPC 3yr Wty SSD	1,324	1.50	510 / 395	125 / 38	65,000 / 38,500	75,000@Q256 / 40,000@Q4
P19976- <b>X21</b>	HPE 1.92TB SATA 6G Read Intensive LFF (3.5in) LPC 3yr Wty SSD	5,256	1.50	520 / 495	125 / 38	67,000 / 31,000	76,000@Q32 / 33,000@Q32
P23487- <b>X21</b>	HPE 1.92TB SATA 6G Very Read Optimized SFF (2.5in) SC 3yr Wty SSD	700	0.20	490 / 250	170 / 76	51,000 / 12,600	63,000@Q64 / 13,000@Q1
P23489- <b>X21</b>	HPE 3.84TB SATA 6G Very Read Optimized SFF (2.5in) SC 3yr Wty SSD	630	0.09	490 / 330	175 / 141	53,000 / 7,000	65,000@Q32 / 7,100@Q1
P23491- <b>X21</b>	HPE 3.84TB SATA 6G Very Read Optimized LFF (3.5in) LPC 3yr Wty SSD	630	0.09	490 / 330	175 / 141	53,000 / 7,000	65,000@Q32 / 7,100@Q1
P23493- <b>X21</b>	HPE 7.68TB SATA 6G Very Read Optimized SFF (2.5in) SC 3yr Wty SSD	700	0.05	500 / 340	175 / 225	54,000 / 4,500	62,000@Q64 / 4,500@Q128
P23495- <b>X21</b>	HPE 7.68TB SATA 6G Very Read Optimized LFF (3.5in) LPC 3yr Wty SSD	700	0.05	500 / 340	175 / 225	54,000 / 4,500	62,000@Q64 / 4,500@Q128
P24190- <b>X21</b>	HPE 960GB SATA 6G Very Read Optimized SFF (2.5in) SC 3yr Wty SSD	350	0.20	500 / 135	170 / 505	43,000 / 1,950	49,000@Q128 / 1,950@Q4
Universal SATA M.2 Enablement Kit							
878783- <b>X21</b>	HPE Universal SATA HHLH 3yr Wty M.2 Kit	NA	NA	N/A	N/A	N/A	N/A

**Notes:** Please use HPE Selector Tool <http://ssd.hpe.com/> to determine server compatibility.



## Technical Specifications

### SATA Power and Height Specifications

SATA Interface – (Power & Height)									
HPE Option Kit SKU	Long Description	Power Idle Time (Watts)	Power Random Read (Watts)	Power Random Write (Watts)	Power Sequential Read (Watts)	Power Sequential Write (Watts)	Power Random R/W (Watts)	Power MAX (Watts)	z- Height
875470- <b>X21</b>	HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	3.22	3.43	7.85	5.70	7.71	5.88	8.00	7mm
875474- <b>X21</b>	HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	3.22	5.31	11.56	5.22	11.04	6.53	12.00	7mm
875488- <b>X21</b>	HPE 240GB SATA 6G Mixed Use M.2 2280 3yr Wty Digitally Signed Firmware SSD	1.07	3.00	3.00	3.21	3.90	2.95	4.00	2280 M.2
875490- <b>X21</b>	HPE 480GB SATA 6G Mixed Use M.2 2280 3yr Wty Digitally Signed Firmware SSD	1.07	3.02	3.02	3.42	4.03	3.00	5.00	2280 M.2
875492- <b>X21</b>	HPE 960GB SATA 6G Mixed Use M.2 2280 3yr Wty Digitally Signed Firmware SSD	1.07	3.17	3.17	3.82	5.62	3.10	6.00	2280 M.2
P00896- <b>X21</b>	HPE 3.84TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	0.50	3.07	3.07	1.23	3.92	3.07	4.00	7mm
P05976- <b>X21</b>	HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1.31	2.94	2.94	2.32	3.33	2.94	4.00	7mm
P05980- <b>X21</b>	HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1.37	2.79	2.79	2.36	3.23	2.79	4.00	7mm
P05986- <b>X21</b>	HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1.37	3.04	3.04	2.32	3.30	3.04	4.00	7mm
P05994- <b>X21</b>	HPE 3.84TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1.36	3.11	3.11	2.36	3.74	3.11	4.00	7mm
P06607- <b>X21</b>	HPE Dual 240GB SATA 6G Mixed Use M.2 - UFF to SFF SCM 3yr Wty Digitally Signed Firmware SSD	2.00	2.84	2.84	3.90	5.74	2.84	6.00	7mm
P07922- <b>X21</b>	HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1.50	2.00	2.00	4.00	6.00	2.00	6.00	7mm
P07924- <b>X21</b>	HPE 480GB SATA 6G Mixed Use LFF (3.5in) SCC 3yr Wty Digitally Signed Firmware SSD	1.50	2.00	2.00	4.00	6.00	2.00	6.00	7mm
P07926- <b>X21</b>	HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1.50	2.30	2.30	4.20	6.30	2.30	6.30	7mm



## Technical Specifications

SATA Interface – (Power & Height)									
HPE Option Kit SKU	Long Description	Power Idle Time (Watts)	Power Random Read (Watts)	Power Random Write (Watts)	Power Sequential Read (Watts)	Power Sequential Write (Watts)	Power Random R/W (Watts)	Power MAX (Watts)	z-Height
P07928- <b>X21</b>	HPE 960GB SATA 6G Mixed Use LFF (3.5in) SCC 3yr Wty Digitally Signed Firmware SSD	1.50	2.30	2.30	4.20	6.30	2.30	6.30	7mm
P07930- <b>X21</b>	HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1.50	3.10	3.10	5.40	6.80	3.10	6.80	7mm
P07932- <b>X21</b>	HPE 1.92TB SATA 6G Mixed Use LFF (3.5in) SCC 3yr Wty Digitally Signed Firmware SSD	1.50	3.10	3.10	5.40	6.80	3.10	6.80	7mm
P07934- <b>X21</b>	HPE 1.92TB SATA 6G Mixed Use LFF (3.5in) LPC 3yr Wty Digitally Signed Firmware SSD	1.50	3.10	3.10	5.40	6.80	3.10	6.80	7mm
P07936- <b>X21</b>	HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) RW 3yr Wty Digitally Signed Firmware SSD	1.50	3.10	3.10	5.40	6.80	3.10	6.80	7mm
P09712- <b>X21</b>	HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1.12	2.55	2.55	1.86	2.16	2.55	2.16	7mm
P09716- <b>X21</b>	HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1.12	2.57	2.57	1.86	2.18	2.57	2.18	7mm
P09718- <b>X21</b>	HPE 960GB SATA 6G Mixed Use LFF (3.5in) SCC 3yr Wty Digitally Signed Firmware SSD	1.12	2.57	2.57	1.86	2.18	2.57	2.18	7mm
P09722- <b>X21</b>	HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1.12	2.60	2.60	1.89	2.22	2.60	1.89	7mm
P09724- <b>X21</b>	HPE 1.92TB SATA 6G Mixed Use LFF (3.5in) SCC 3yr Wty Digitally Signed Firmware SSD	1.12	2.60	2.60	1.89	2.22	2.60	1.89	7mm
P09726- <b>X21</b>	HPE 1.92TB SATA 6G Mixed Use LFF (3.5in) LPC 3yr Wty Digitally Signed Firmware SSD	1.12	2.60	2.60	1.89	2.22	2.60	1.89	7mm
P13658- <b>X21</b>	HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1.14	2.34	2.34	3.56	3.44	2.34	3.56	7mm
P13660- <b>X21</b>	HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1.15	2.81	2.81	3.09	3.93	2.81	3.93	7mm
P13662- <b>X21</b>	HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1.20	2.91	2.91	3.20	4.10	2.91	4.10	7mm
P13664- <b>X21</b>	HPE 3.84TB SATA 6G Mixed Use SFF (2.5in) RW 3yr Wty Digitally Signed Firmware SSD	1.26	3.17	3.17	3.66	4.39	3.17	4.39	7mm



## Technical Specifications

SATA Interface – (Power & Height)									
HPE Option Kit SKU	Long Description	Power Idle Time (Watts)	Power Random Read (Watts)	Power Random Write (Watts)	Power Sequential Read (Watts)	Power Sequential Write (Watts)	Power Random R/W (Watts)	Power MAX (Watts)	z-Height
P18432- <b>X21</b>	HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Multi Vendor SSD	1.50	2.94	2.94	4.00	6.00	2.94	6.00	7mm
P18434- <b>X21</b>	HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Multi Vendor SSD	1.37	2.79	2.79	2.36	3.23	2.79	6.30	7mm
P18436- <b>X21</b>	HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Multi Vendor SSD	1.50	3.10	3.10	5.40	6.80	3.10	6.80	7mm
P18438- <b>X21</b>	HPE 3.84TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Multi Vendor SSD	1.36	3.11	3.11	2.36	3.92	3.11	4.00	7mm
P19947- <b>X21</b>	HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty SSD	1.18	1.44	1.44	2.05	2.76	1.44	2.76	7mm
P19949- <b>X21</b>	HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty SSD	1.17	1.47	1.47	2.29	2.97	1.47	2.97	7mm
P19951- <b>X21</b>	HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty SSD	1.20	1.39	1.39	2.24	3.23	1.39	3.23	7mm
P19953- <b>X21</b>	HPE 3.84TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty SSD	1.21	1.59	1.59	2.45	2.98	1.59	2.98	7mm
P19978- <b>X21</b>	HPE 480GB SATA 6G Mixed Use LFF (3.5in) SCC 3yr Wty SSD	1.18	1.44	1.44	2.05	2.76	1.44	2.76	7mm
P19980- <b>X21</b>	HPE 960GB SATA 6G Mixed Use LFF (3.5in) LPC 3yr Wty SSD	1.17	1.47	1.47	2.29	2.97	1.47	2.97	7mm
P19982- <b>X21</b>	HPE 1.92TB SATA 6G Mixed Use LFF (3.5in) SCC 3yr Wty SSD	1.20	1.39	1.39	2.24	3.23	1.39	3.23	7mm
P19984- <b>X21</b>	HPE 1.92TB SATA 6G Mixed Use LFF (3.5in) LPC 3yr Wty SSD	1.20	1.39	1.39	2.24	3.23	1.39	3.23	7mm
P19986- <b>X21</b>	HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) RW 3yr Wty SSD	1.20	1.39	1.39	2.24	3.23	1.39	3.23	7mm
P21517- <b>X21</b>	HPE 3.84TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty SSD	1.11	2.44	2.44	1.85	2.14	2.44	2.44	7mm
875498- <b>X21</b>	HPE 480GB SATA 6G Read Intensive M.2 2280 3yr Wty Digitally Signed Firmware SSD	1.07	3.02	3.02	3.42	4.03	3.00	5.00	2280 M.2
875500- <b>X21</b>	HPE 960GB SATA 6G Read Intensive M.2 2280 3yr Wty Digitally Signed Firmware SSD	1.07	3.17	3.17	3.82	5.62	3.10	6.00	2280 M.2



## Technical Specifications

SATA Interface – (Power & Height)									
HPE Option Kit SKU	Long Description	Power Idle Time (Watts)	Power Random Read (Watts)	Power Random Write (Watts)	Power Sequential Read (Watts)	Power Sequential Write (Watts)	Power Random R/W (Watts)	Power MAX (Watts)	z-Height
875503- <b>X21</b>	HPE 240GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1.07	3.00	3.00	3.21	3.90	2.95	4.00	7mm
875509- <b>X21</b>	HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1.07	3.17	3.17	3.82	5.62	3.10	6.00	7mm
875511- <b>X21</b>	HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1.07	3.17	3.17	3.82	5.62	3.10	6.00	7mm
P04474- <b>X21</b>	HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1.50	2.00	2.00	4.00	6.00	2.00	6.00	7mm
P04476- <b>X21</b>	HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1.50	2.00	2.00	4.00	6.00	2.00	6.00	7mm
P04478- <b>X21</b>	HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1.50	2.30	2.30	4.20	6.30	2.30	6.30	7mm
P04480- <b>X21</b>	HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1.50	2.30	2.30	4.20	6.30	2.30	6.30	7mm
P04482- <b>X21</b>	HPE 7.68TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1.38	2.19	2.19	2.63	3.21	2.19	6.80	7mm
P04499- <b>X21</b>	HPE 480GB SATA 6G Read Intensive LFF (3.5in) LPC 3yr Wty Digitally Signed Firmware SSD	1.50	3.10	3.10	5.40	6.80	3.10	6.80	7mm
P04501- <b>X21</b>	HPE 1.92TB SATA 6G Read Intensive LFF (3.5in) LPC 3yr Wty Digitally Signed Firmware SSD	1.50	3.10	3.10	5.40	6.80	3.10	6.80	7mm
P04556- <b>X21</b>	HPE 240GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1.12	2.11	2.11	1.84	1.84	2.11	3.00	7mm
P04560- <b>X21</b>	HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1.12	2.29	2.29	1.89	2.50	2.29	3.00	7mm
P04564- <b>X21</b>	HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1.12	2.33	2.33	1.93	2.63	2.33	3.00	7mm
P04566- <b>X21</b>	HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1.12	2.35	2.35	1.78	2.65	2.35	3.00	7mm



## Technical Specifications

SATA Interface – (Power & Height)									
HPE Option Kit SKU	Long Description	Power Idle Time (Watts)	Power Random Read (Watts)	Power Random Write (Watts)	Power Sequential Read (Watts)	Power Sequential Write (Watts)	Power Random R/W (Watts)	Power MAX (Watts)	z- Height
P04570- <b>X21</b>	HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1.12	2.21	2.21	1.78	2.65	2.21	3.00	7mm
P05924- <b>X21</b>	HPE 240GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1.23	2.48	2.48	2.21	2.44	2.48	3.00	7mm
P05928- <b>X21</b>	HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1.27	2.92	2.92	2.26	3.15	2.92	4.00	7mm
P05932- <b>X21</b>	HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1.35	3.02	3.02	2.30	3.18	3.02	4.00	7mm
P05938- <b>X21</b>	HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1.35	3.15	3.15	2.36	3.31	3.15	4.00	7mm
P05946- <b>X21</b>	HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1.11	3.46	3.46	2.47	3.88	3.46	4.00	7mm
P06194- <b>X21</b>	HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	0.78	1.61	1.61	1.68	1.90	1.61	2.00	7mm
P06196- <b>X21</b>	HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	0.78	1.61	1.61	1.69	2.35	1.61	3.00	7mm
P06198- <b>X21</b>	HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	0.81	1.67	1.67	1.77	2.41	1.67	3.00	7mm
P06200- <b>X21</b>	HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	0.90	1.87	1.87	2.08	2.68	1.87	3.00	7mm
P06609- <b>X21</b>	HPE Dual 480GB SATA 6G Read Intensive M.2 - UFF to SFF SCM 3yr Wty Digitally Signed Firmware SSD	2.00	2.84	2.84	3.90	5.74	2.84	6.00	7mm
P09685- <b>X21</b>	HPE 240GB SATA 6G Read Intensive SFF (2.5in) RW 3yr Wty Digitally Signed Firmware SSD	1.23	2.11	2.11	1.84	2.23	2.11	2.23	7mm
P09687- <b>X21</b>	HPE 480GB SATA 6G Read Intensive LFF (3.5in) SCC 3yr Wty Digitally Signed Firmware SSD	1.23	2.29	2.29	1.89	2.50	2.29	2.50	7mm
P09689- <b>X21</b>	HPE 960GB SATA 6G Read Intensive LFF (3.5in) SCC 3yr Wty Digitally Signed Firmware SSD	1.23	2.33	2.33	1.93	2.63	2.33	2.63	7mm



## Technical Specifications

SATA Interface – (Power & Height)									
HPE Option Kit SKU	Long Description	Power Idle Time (Watts)	Power Random Read (Watts)	Power Random Write (Watts)	Power Sequential Read (Watts)	Power Sequential Write (Watts)	Power Random R/W (Watts)	Power MAX (Watts)	z- Height
P09691- <b>X21</b>	HPE 960GB SATA 6G Read Intensive LFF (3.5in) LPC 3yr Wty Digitally Signed Firmware SSD	1.23	2.33	2.33	1.93	2.63	2.33	2.63	7mm
P09693- <b>X21</b>	HPE 1.92TB SATA 6G Read Intensive LFF (3.5in) SCC 3yr Wty Digitally Signed Firmware SSD	1.23	2.22	2.22	1.78	2.65	2.22	2.65	7mm
P09697- <b>X21</b>	HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) RW 3yr Wty Digitally Signed Firmware SSD	1.23	2.21	2.21	1.78	2.65	2.21	2.65	7mm
P18420- <b>X21</b>	HPE 240GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	1.23	3.00	3.00	3.21	3.90	2.95	4.00	7mm
P18422- <b>X21</b>	HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	1.50	2.92	2.92	4.00	6.00	2.92	6.00	7mm
P18424- <b>X21</b>	HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	1.50	3.02	3.02	4.00	6.00	3.02	6.00	7mm
P18426- <b>X21</b>	HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	1.50	3.15	3.15	4.20	6.30	3.15	6.30	7mm
P18428- <b>X21</b>	HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	1.50	3.46	3.46	4.20	6.30	3.46	6.30	7mm
P18430- <b>X21</b>	HPE 7.68TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	1.50	3.10	3.10	5.40	6.80	3.10	6.80	7mm
P19888- <b>X21</b>	HPE 240GB SATA 6G Read Intensive M.2 2280 3yr Wty SSD	1.03	1.26	1.26	1.89	2.22	1.26	2.22	3.8mm
P19890- <b>X21</b>	HPE 480GB SATA 6G Read Intensive M.2 2280 3yr Wty SSD	1.03	1.23	1.23	1.89	2.50	1.23	2.50	3.8mm
P19892- <b>X21</b>	HPE 960GB SATA 6G Read Intensive M.2 2280 3yr Wty SSD	1.04	1.27	1.27	2.10	2.80	1.27	2.80	3.8mm
P19894- <b>X21</b>	HPE Dual 240GB SATA 6G Read Intensive M.2 - UFF to SFF SCM 3yr Wty SSD	1.03	1.26	1.26	1.89	2.22	1.26	2.22	3.8mm
P19896- <b>X21</b>	HPE Dual 480GB SATA 6G Read Intensive M.2 - UFF to SFF SCM 3yr Wty SSD	1.03	1.23	1.23	1.89	2.50	1.23	2.50	3.8mm



## Technical Specifications

SATA Interface – (Power & Height)									
HPE Option Kit SKU	Long Description	Power Idle Time (Watts)	Power Random Read (Watts)	Power Random Write (Watts)	Power Sequential Read (Watts)	Power Sequential Write (Watts)	Power Random R/W (Watts)	Power MAX (Watts)	z- Height
P19935- <b>X21</b>	HPE 240GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty SSD	1.16	1.41	1.41	2.00	2.43	1.41	2.43	7mm
P19937- <b>X21</b>	HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty SSD	1.16	1.45	1.45	1.91	2.61	1.45	2.61	7mm
P19939- <b>X21</b>	HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty SSD	1.17	1.48	1.48	1.91	2.85	1.48	2.85	7mm
P19941- <b>X21</b>	HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty SSD	1.21	1.51	1.51	2.20	2.88	1.51	2.88	7mm
P19943- <b>X21</b>	HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty SSD	1.23	1.80	1.80	2.19	2.89	1.80	2.89	7mm
P19945- <b>X21</b>	HPE 7.68TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty SSD	1.25	2.01	2.01	2.26	2.76	2.01	2.76	7mm
P19974- <b>X21</b>	HPE 480GB SATA 6G Read Intensive LFF (3.5in) LPC 3yr Wty SSD	1.16	1.45	1.45	1.91	2.61	1.45	2.61	7mm
P19976- <b>X21</b>	HPE 1.92TB SATA 6G Read Intensive LFF (3.5in) LPC 3yr Wty SSD	1.21	1.51	1.51	2.20	2.88	1.51	2.88	7mm
P23487- <b>X21</b>	HPE 1.92TB SATA 6G Very Read Optimized SFF (2.5in) SC 3yr Wty SSD	1.71	2.18	2.18	3.14	4.36	2.18	4.36	7mm
P23489- <b>X21</b>	HPE 3.84TB SATA 6G Very Read Optimized SFF (2.5in) SC 3yr Wty SSD	1.70	2.20	2.20	3.29	5.30	2.20	5.30	7mm
P23491- <b>X21</b>	HPE 3.84TB SATA 6G Very Read Optimized LFF (3.5in) LPC 3yr Wty SSD	1.70	2.20	2.20	3.29	5.30	2.20	5.30	7mm
P23493- <b>X21</b>	HPE 7.68TB SATA 6G Very Read Optimized SFF (2.5in) SC 3yr Wty SSD	1.78	2.43	2.43	3.36	5.52	2.43	5.52	7mm
P23495- <b>X21</b>	HPE 7.68TB SATA 6G Very Read Optimized LFF (3.5in) LPC 3yr Wty SSD	1.78	2.43	2.43	3.36	5.52	2.43	5.52	7mm
P24190- <b>X21</b>	HPE 960GB SATA 6G Very Read Optimized SFF (2.5in) SC 3yr Wty SSD	1.71	2.18	2.18	3.14	4.36	2.18	4.36	7mm





## Technical Specifications

Universal SATA M.2 Enablement Kit										
878783- <b>X21</b>	HPE Universal SATA HHHL 3yr Wty M.2 Kit	N/A	N/A	N/A	N/A	N/A	N/A	N/A	0.00	Half Height/ Half Length

**Notes:** Please use HPE Selector Tool <http://ssd.hpe.com/> to determine server compatibility

## SATA Certifications

SATA Interface – (Certifications)						
HPE Option Kit SKU	Long Description	VMWare / vSAN HCL Certification (Watts)	Microsoft Windows Server 2016 Certification	Software Defined Data Center (SDDC) Premium AQ Certification	Microsoft Windows Server 2019 Certification	WS 2019 Software Defined Data Center (SDDC)
875470- <b>X21</b>	HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
875474- <b>X21</b>	HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
875488- <b>X21</b>	HPE 240GB SATA 6G Mixed Use M.2 2280 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
875490- <b>X21</b>	HPE 480GB SATA 6G Mixed Use M.2 2280 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
875492- <b>X21</b>	HPE 960GB SATA 6G Mixed Use M.2 2280 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P00896- <b>X21</b>	HPE 3.84TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P05976- <b>X21</b>	HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P05980- <b>X21</b>	HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P05986- <b>X21</b>	HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P05994- <b>X21</b>	HPE 3.84TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P06607- <b>X21</b>	HPE Dual 240GB SATA 6G Mixed Use M.2 - UFF to SFF SCM 3yr Wty Digitally Signed Firmware SSD	N/A	Certified	Certified	Certified	Certified



## Technical Specifications

### SATA Interface – (Certifications)

HPE Option Kit SKU	Long Description	VMware / vSAN HCL Certification (Watts)	Microsoft Windows Server 2016 Certification	Software Defined Data Center (SDDC) Premium AQ Certification	Microsoft Windows Server 2019 Certification	WS 2019 Software Defined Data Center (SDDC)
P07922-X21	HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P07924-X21	HPE 480GB SATA 6G Mixed Use LFF (3.5in) SCC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P07926-X21	HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P07928-X21	HPE 960GB SATA 6G Mixed Use LFF (3.5in) SCC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P07930-X21	HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P07932-X21	HPE 1.92TB SATA 6G Mixed Use LFF (3.5in) SCC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P07934-X21	HPE 1.92TB SATA 6G Mixed Use LFF (3.5in) LPC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P07936-X21	HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) RW 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P09712-X21	HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P09716-X21	HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P09718-X21	HPE 960GB SATA 6G Mixed Use LFF (3.5in) SCC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P09722-X21	HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P09724-X21	HPE 1.92TB SATA 6G Mixed Use LFF (3.5in) SCC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P09726-X21	HPE 1.92TB SATA 6G Mixed Use LFF (3.5in) LPC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P13658-X21	HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	N/A	Certified	Certified	Certified	Certified

## Technical Specifications

### SATA Interface – (Certifications)

HPE Option Kit SKU	Long Description	VMWare / vSAN HCL Certification (Watts)	Microsoft Windows Server 2016 Certification	Software Defined Data Center (SDDC) Premium AQ Certification	Microsoft Windows Server 2019 Certification	WS 2019 Software Defined Data Center (SDDC)
P13660-X21	HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	N/A	Certified	Certified	Certified	Certified
P13662-X21	HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	N/A	Certified	Certified	Certified	Certified
P13664-X21	HPE 3.84TB SATA 6G Mixed Use SFF (2.5in) RW 3yr Wty Digitally Signed Firmware SSD	N/A	Certified	Certified	Certified	Certified
P18432-X21	HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Multi Vendor SSD	Pending	Certified	Certified	Certified	Certified
P18434-X21	HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Multi Vendor SSD	Certified	Certified	Certified	Certified	Certified
P18436-X21	HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Multi Vendor SSD	Certified	Certified	Certified	Certified	Certified
P18438-X21	HPE 3.84TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Multi Vendor SSD	Certified	Certified	Certified	Certified	Certified
P19947-X21	HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty SSD	Certified	Certified	Certified	Certified	Certified
P19949-X21	HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty SSD	Certified	Certified	Certified	Certified	Certified
P19951-X21	HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty SSD	Certified	Certified	Certified	Certified	Certified
P19953-X21	HPE 3.84TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty SSD	Certified	Certified	Certified	Certified	Certified
P19978-X21	HPE 480GB SATA 6G Mixed Use LFF (3.5in) SCC 3yr Wty SSD	Certified	Certified	Certified	Certified	Certified
P19980-X21	HPE 960GB SATA 6G Mixed Use LFF (3.5in) LPC 3yr Wty SSD	Certified	Certified	Certified	Certified	Certified
P19982-X21	HPE 1.92TB SATA 6G Mixed Use LFF (3.5in) SCC 3yr Wty SSD	Certified	Certified	Certified	Certified	Certified
P19984-X21	HPE 1.92TB SATA 6G Mixed Use LFF (3.5in) LPC 3yr Wty SSD	Certified	Certified	Certified	Certified	Certified
P19986-X21	HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) RW 3yr Wty SSD	Certified	Certified	Certified	Certified	Certified



## Technical Specifications

### SATA Interface – (Certifications)

HPE Option Kit SKU	Long Description	VMware / vSAN HCL Certification (Watts)	Microsoft Windows Server 2016 Certification	Software Defined Data Center (SDDC) Premium AQ Certification	Microsoft Windows Server 2019 Certification	WS 2019 Software Defined Data Center (SDDC)
P21517-X21	HPE 3.84TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty SSD	Certified	Certified	Certified	Certified	Certified
875498-X21	HPE 480GB SATA 6G Read Intensive M.2 2280 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
875500-X21	HPE 960GB SATA 6G Read Intensive M.2 2280 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
875503-X21	HPE 240GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
875509-X21	HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
875511-X21	HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P04474-X21	HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P04476-X21	HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P04478-X21	HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P04480-X21	HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P04482-X21	HPE 7.68TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P04499-X21	HPE 480GB SATA 6G Read Intensive LFF (3.5in) LPC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	N/A	N/A
P04501-X21	HPE 1.92TB SATA 6G Read Intensive LFF (3.5in) LPC 3yr Wty Digitally Signed Firmware SSD	Certified	certified	Certified	N/A	N/A
P04556-X21	HPE 240GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	N/A	Certified	Certified	Certified	Certified

## Technical Specifications

### SATA Interface – (Certifications)

HPE Option Kit SKU	Long Description	VMware / vSAN HCL Certification (Watts)	Microsoft Windows Server 2016 Certification	Software Defined Data Center (SDDC) Premium AQ Certification	Microsoft Windows Server 2019 Certification	WS 2019 Software Defined Data Center (SDDC)
P04560-X21	HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P04564-X21	HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P04566-X21	HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P04570-X21	HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P05924-X21	HPE 240GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P05928-X21	HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P05932-X21	HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P05938-X21	HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P05946-X21	HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P06194-X21	HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P06196-X21	HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P06198-X21	HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P06200-X21	HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P06609-X21	HPE Dual 480GB SATA 6G Read Intensive M.2 - UFF to SFF SCM 3yr Wty Digitally Signed Firmware SSD	N/A	Certified	Certified	Certified	Certified



## Technical Specifications

### SATA Interface – (Certifications)

HPE Option Kit SKU	Long Description	VMWare / vSAN HCL Certification (Watts)	Microsoft Windows Server 2016 Certification	Software Defined Data Center (SDDC) Premium AQ Certification	Microsoft Windows Server 2019 Certification	WS 2019 Software Defined Data Center (SDDC)
P09685-X21	HPE 240GB SATA 6G Read Intensive SFF (2.5in) RW 3yr Wty Digitally Signed Firmware SSD	N/A	Certified	Certified	Certified	Certified
P09687-X21	HPE 480GB SATA 6G Read Intensive LFF (3.5in) SCC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P09689-X21	HPE 960GB SATA 6G Read Intensive LFF (3.5in) SCC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P09691-X21	HPE 960GB SATA 6G Read Intensive LFF (3.5in) LPC 3yr Wty Digitally Signed Firmware SSD	Certified	certified	Certified	Certified	Certified
P09693-X21	HPE 1.92TB SATA 6G Read Intensive LFF (3.5in) SCC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P09697-X21	HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) RW 3yr Wty Digitally Signed Firmware SSD	N/A	N/A	N/A	N/A	N/A
P18420-X21	HPE 240GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	N/A	Certified	Certified	Certified	Certified
P18422-X21	HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	Certified	Certified	Certified	Certified	Certified
P18424-X21	HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	Certified	Certified	Certified	Certified	Certified
P18426-X21	HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	Certified	Certified	Certified	Certified	Certified
P18428-X21	HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	Certified	Certified	Certified	Certified	Certified
P18430-X21	HPE 7.68TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	Certified	Certified	Certified	Certified	Certified
P19888-X21	HPE 240GB SATA 6G Read Intensive M.2 2280 3yr Wty SSD	Pending	Pending	Pending	Pending	Pending



## Technical Specifications

### SATA Interface – (Certifications)

HPE Option Kit SKU	Long Description	VMware / vSAN HCL Certification (Watts)	Microsoft Windows Server 2016 Certification	Software Defined Data Center (SDDC) Premium AQ Certification	Microsoft Windows Server 2019 Certification	WS 2019 Software Defined Data Center (SDDC)
P19890-X21	HPE 480GB SATA 6G Read Intensive M.2 2280 3yr Wty SSD	Pending	Pending	Pending	Pending	Pending
P19892-X21	HPE 960GB SATA 6G Read Intensive M.2 2280 3yr Wty SSD	Pending	Pending	Pending	Pending	Pending
P19894-X21	HPE Dual 240GB SATA 6G Read Intensive M.2 - UFF to SFF SCM 3yr Wty SSD	Pending	Pending	Pending	Pending	Pending
P19896-X21	HPE Dual 480GB SATA 6G Read Intensive M.2 - UFF to SFF SCM 3yr Wty SSD	Pending	Pending	Pending	Pending	Pending
P19935-X21	HPE 240GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty SSD	Pending	Pending	Pending	Pending	Pending
P19937-X21	HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty SSD	Pending	Pending	Pending	Pending	Pending
P19939-X21	HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty SSD	Pending	Pending	Pending	Pending	Pending
P19941-X21	HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty SSD	Pending	Pending	Pending	Pending	Pending
P19943-X21	HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty SSD	Pending	Pending	Pending	Pending	Pending
P19945-X21	HPE 7.68TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty SSD	Pending	Pending	Pending	Pending	Pending
P19974-X21	HPE 480GB SATA 6G Read Intensive LFF (3.5in) LPC 3yr Wty SSD	Pending	Pending	Pending	Pending	Pending
P19976-X21	HPE 1.92TB SATA 6G Read Intensive LFF (3.5in) LPC 3yr Wty SSD	Pending	Pending	Pending	Pending	Pending
P23487-X21	HPE 1.92TB SATA 6G Very Read Optimized SFF (2.5in) SC 3yr Wty SSD	Pending	Pending	Pending	Pending	Pending
P23489-X21	HPE 3.84TB SATA 6G Very Read Optimized SFF (2.5in) SC 3yr Wty SSD	Pending	Pending	Pending	Pending	Pending
P23491-X21	HPE 3.84TB SATA 6G Very Read Optimized LFF (3.5in) LPC 3yr Wty SSD	Pending	Pending	Pending	Pending	Pending



## Technical Specifications

P23493- <b>X21</b>	HPE 7.68TB SATA 6G Very Read Optimized SFF (2.5in) SC 3yr Wty SSD	Pending	Pending	Pending	Pending	Pending
P23495- <b>X21</b>	HPE 7.68TB SATA 6G Very Read Optimized LFF (3.5in) LPC 3yr Wty SSD	Pending	Pending	Pending	Pending	Pending
P24190- <b>X21</b>	HPE 960GB SATA 6G Very Read Optimized SFF (2.5in) SC 3yr Wty SSD	Pending	Pending	Pending	Pending	Pending
<b>Universal SATA M.2 Enablement Kit</b>						
878783- <b>X21</b>	HPE Universal SATA HHHL 3yr Wty M.2 Kit	NA	NA	NA	NA	NA

**Notes:** Please use HPE Selector Tool <http://ssd.hpe.com/> to determine server compatibility.

## SATA Capacity, Workload, Carrier Specifications MULTI VENDOR

### SATA Interface– (Capacity, Workload, Carrier...) MULTI VENDOR

HPE Option Kit SKU	Long Description	Capacity	Workload Type	Interface Type	Form Factor	Plug Type	Carrier Type	Digitally Signed Firmware (DS)	Flash Type	Port	Server Gen Supported (Select Platforms)
<b>*Mixed Use Multi Vendor SATA Drives</b>											
P18436- <b>X21</b>	HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Multi Vendor SSD	1,920	MU	SATA	SFF	Hot Plug	SC	Yes	MLC	Single	Gen9, Gen10
P18438- <b>X21</b>	HPE 3.84TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Multi Vendor SSD	3,840	MU	SATA	SFF	Hot Plug	SC	Yes	MLC	Single	Gen9, Gen10
P18432- <b>X21</b>	HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Multi Vendor SSD	480	MU	SATA	SFF	Hot Plug	SC	Yes	MLC	Single	Gen9, Gen10
P18434- <b>X21</b>	HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Multi Vendor SSD	960	MU	SATA	SFF	Hot Plug	SC	Yes	MLC	Single	Gen9, Gen10
<b>*Read Intensive Multi Vendor SATA Drives</b>											
P18420- <b>X21</b>	HPE 240GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	240	RI	SATA	SFF	Hot Plug	SC	Yes	MLC	Single	Gen9, Gen10
P18422- <b>X21</b>	HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	480	RI	SATA	SFF	Hot Plug	SC	Yes	MLC	Single	Gen9, Gen10
P18424- <b>X21</b>	HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	960	RI	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10
P18426- <b>X21</b>	HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	1,920	RI	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10
P18428- <b>X21</b>	HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	3,840	RI	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10





## Technical Specifications

P18430- <b>X21</b>	HPE 7.68TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	7,680	RI	SATA	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10
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### SATA Speeds and Feeds Specifications MULTI VENDOR

#### SATA Interface – (Speeds & Feeds) MULTI VENDOR

HPE Option Kit SKU	Long Description	Lifetime Writes (TB)	Endurance DWPD	MAX Seq Reads / Max Seq Writes Throughput (MiB/s)	Random Read Avg. / Random Write Avg. Latency uSec (4KiB,Q1)	Random Read / Random Writes IOPS (4KiB, Q=16)	MAX Random Read / MAX Random Write IOPS (4KiB)
<b>*Mixed Use Multi Vendor SATA Drives</b>							
P18436- <b>X21</b>	HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Multi Vendor SSD	10,000	3.1	520 / 480	125 / 52	59,000 / 31,000	62,000@Q32 / 31,000@Q4
P18438- <b>X21</b>	HPE 3.84TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Multi Vendor SSD	17,600	2.6	510 / 480	125 / 55	56,000 / 28,000	60,000@Q32 / 28,000@Q4
P18432- <b>X21</b>	HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Multi Vendor SSD	3,000	3.5	520 / 445	125 / 52	66,000 / 29,000	73,500@Q32 / 29,000@Q4
P18434- <b>X21</b>	HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Multi Vendor SSD	6,000	3.4	520 / 480	125 / 125 / 50	63,000 / 31,000	64,500@Q32 / 31,000@Q4
<b>*Read Intensive Multi Vendor SATA Drives</b>							
P18420- <b>X21</b>	HPE 240GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	350	0.8	505 / 255	125 / 70	62,500 / 14,000	69,500@Q32 / 14,000@Q1
P18422- <b>X21</b>	HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	430	0.5	520 / 300	125 / 75	65,000 / 15,000	65,500@Q32 / 15,400@Q1
P18424- <b>X21</b>	HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	1,400	0.8	520 / 480	125 / 60	58,500 / 29,000	58,500@Q32 / 29,000@Q4
P18426- <b>X21</b>	HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	2,800	0.8	520 / 470	125 / 60	55,500 / 24,000	56,000@Q32 / 25,000@Q32
P18428- <b>X21</b>	HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	3,400	0.5	520 / 480	125 / 65	54,000 / 21,000	56,000@Q32 / 22,000@Q4
P18430- <b>X21</b>	HPE 7.68TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	8,400	0.6	520 / 495	125 / 100	54,000 / 10,000	57,000@Q32 / 10,000@Q1

**Notes:** \* Multi-vendor SKUs are composed of numerous vendor manufactured SSDs within a given SATA capacity SKU. When ordering a particular SKU-B21 number the customer will receive a homogenous set of vendor manufactured SSDs in that capacity that has met or exceeds the HPE qualification standards published above.



## Technical Specifications

### SATA Power and Height Specifications MULTI VENDOR

SATA Interface – (Power & Height) MULTI VENDOR									
HPE Option Kit SKU	Long Description	Power Idle Time (Watts)	Power Random Read (Watts)	Power Random Write (Watts)	Power Sequential Read (Watts)	Power Sequential Write (Watts)	Power Random R/W (Watts)	Power MAX (Watts)	z- Height
<b>*Mixed Use Multi Vendor SATA Drives</b>									
P18436- <b>X21</b>	HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Multi Vendor SSD	1.50	3.10	3.10	5.40	6.80	3.10	6.80	7mm
P18438- <b>X21</b>	HPE 3.84TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Multi Vendor SSD	1.36	3.11	3.11	2.36	3.92	3.11	4.00	7mm
P18432- <b>X21</b>	HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Multi Vendor SSD	1.50	2.94	2.94	4.00	6.00	2.94	6.00	7mm
P18434- <b>X21</b>	HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Multi Vendor SSD	1.37	2.79	2.79	2.36	3.23	2.79	6.30	7mm
<b>*Read Intensive Multi Vendor SATA Drives</b>									
P18420- <b>X21</b>	HPE 240GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	1.23	3.00	3.00	3.21	3.90	2.95	4.00	7mm
P18422- <b>X21</b>	HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	1.50	2.92	2.92	4.00	6.00	2.92	6.00	7mm
P18424- <b>X21</b>	HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	1.50	3.02	3.02	4.00	6.00	3.02	6.00	7mm
P18426- <b>X21</b>	HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	1.50	3.15	3.15	4.20	6.30	3.15	6.30	7mm
P18428- <b>X21</b>	HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	1.50	3.46	3.46	4.20	6.30	3.46	6.30	7mm
P18430- <b>X21</b>	HPE 7.68TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	1.50	3.10	3.10	5.40	6.80	3.10	6.80	7mm
<p><b>Notes:</b> *Multi-vendor SKUs are composed of numerous vendor manufactured SSDs within a given SATA capacity SKU. When ordering a particular SKU-<b>X21</b> number the customer will receive a homogenous set of vendor manufactured SSDs in that capacity that has met or exceeds the HPE qualification standards published above.</p>									

## Technical Specifications

### SATA Certifications MULTI VENDOR

SATA Interface – (Certifications) MULTI VENDOR						
HPE Option Kit SKU	Long Description	VMWare / vSAN HCL Certification (Watts)	Microsoft Windows Server 2016 Certification	Software Defined Data Center (SDDC) Premium AQ Certification	Microsoft Windows Server 2019 Certification	WS 2019 Software Defined Data Center (SDDC)
<b>*Mixed Use Multi Vendor SATA Drives</b>						
P18436- <b>X21</b>	HPE 1.92TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Multi Vendor SSD	Certified	Certified	Certified	Certified	Certified
P18438- <b>X21</b>	HPE 3.84TB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Multi Vendor SSD	Certified	Certified	Certified	Certified	Certified
P18432- <b>X21</b>	HPE 480GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Multi Vendor SSD	Certified	Certified	Certified	Certified	Certified
P18434- <b>X21</b>	HPE 960GB SATA 6G Mixed Use SFF (2.5in) SC 3yr Wty Multi Vendor SSD	Certified	Certified	Certified	Certified	Certified
<b>*Read Intensive Multi Vendor SATA Drives</b>						
P18420- <b>X21</b>	HPE 240GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	Pending	Certified	Certified	Certified	Certified
P18422- <b>X21</b>	HPE 480GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	Certified	Certified	Certified	Certified	Certified
P18424- <b>X21</b>	HPE 960GB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	Certified	Certified	Certified	Certified	Certified
P18426- <b>X21</b>	HPE 1.92TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	Certified	Certified	Certified	Certified	Certified
P18428- <b>X21</b>	HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	Certified	Certified	Certified	Certified	Certified
P18430- <b>X21</b>	HPE 7.68TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty Multi Vendor SSD	Certified	Certified	Certified	Certified	Certified
<p><b>Notes:</b> *Multi-vendor SKUs are composed of numerous vendor manufactured SSDs within a given SATA capacity SKU. When ordering a particular SKU-<b>X21</b> number the customer will receive a homogenous set of vendor manufactured SSDs in that capacity that has met or exceeds the HPE qualification standards published above.</p>						



## Technical Specifications

### SAS Capacity, Workload, Carrier Specifications

SAS Interface – (Capacity, Workload, Carrier...)											
HPE Option Kit SKU	Long Description	Capacity	Workload Type	Interface Type	Form Factor	Plug Type	Carrier Type	Digitally Signed Firmware (DS)	Flash Type	Port	Server Gen Supported (Select Platforms)
873351- <b>X21</b>	HPE 400GB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	400	WI	SAS	SFF	Hot Plug	SC	Yes	MLC	Dual	Gen9, Gen10
873355- <b>X21</b>	HPE 800GB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	800	WI	SAS	SFF	Hot Plug	SC	Yes	MLC	Dual	Gen9, Gen10
873460- <b>X21</b>	HPE 800GB SAS 12G Write Intensive SFF (2.5in) STD 3yr Wty Digitally Signed Firmware SSD	800	WI	SAS	SFF	Hot Plug	STD	Yes	MLC	Dual	Gen9, Gen10
P04541- <b>X21</b>	HPE 400GB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	400	WI	SAS	SFF	Hot Plug	SC	Yes	MLC	Dual	Gen9, Gen10
P04543- <b>X21</b>	HPE 800GB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	800	WI	SAS	SFF	Hot Plug	SC	Yes	MLC	Dual	Gen9, Gen10
P04545- <b>X21</b>	HPE 1.6TB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1,600	WI	SAS	SFF	Hot Plug	SC	Yes	MLC	Dual	Gen9, Gen10
P04547- <b>X21</b>	HPE 3.2TB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	3,200	WI	SAS	SFF	Hot Plug	SC	Yes	MLC	Dual	Gen9, Gen10
P04558- <b>X21</b>	HPE 400GB SAS 12G Write Intensive SFF (2.5in) ST 3yr Wty Digitally Signed Firmware SSD	400	WI	SAS	SFF	Hot Plug	ST	Yes	MLC	Dual	Gen9, Gen10
P04562- <b>X21</b>	HPE 800GB SAS 12G Write Intensive SFF (2.5in) ST 3yr Wty Digitally Signed Firmware SSD	800	WI	SAS	SFF	Hot Plug	ST	Yes	MLC	Dual	Gen9, Gen10
P09098- <b>X21</b>	HPE 400GB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	400	WI	SAS	SFF	Hot Plug	SC	Yes	MLC	Dual	Gen9, Gen10



## Technical Specifications

### SAS Interface – (Capacity, Workload, Carrier...)

HPE Option Kit SKU	Long Description	Capacity	Workload Type	Interface Type	Form Factor	Plug Type	Carrier Type	Digitally Signed Firmware (DS)	Flash Type	Port	Server Gen Supported (Select Platforms)
P09100- <b>X21</b>	HPE 800GB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	800	WI	SAS	SFF	Hot Plug	SC	Yes	MLC	Dual	Gen9, Gen10
P09102- <b>X21</b>	HPE 1.6TB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1,600	WI	SAS	SFF	Hot Plug	SC	Yes	MLC	Dual	Gen9, Gen10
P04525- <b>X21</b>	HPE 400GB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	400	MU	SAS	SFF	Hot Plug	SC	Yes	MLC	Dual	Gen9, Gen10
P04527- <b>X21</b>	HPE 800GB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	800	MU	SAS	SFF	Hot Plug	SC	Yes	MLC	Dual	Gen9, Gen10
P04529- <b>X21</b>	HPE 800GB SAS 12G Mixed Use LFF (3.5in) SCC 3yr Wty Digitally Signed Firmware SSD	800	MU	SAS	LFF	Hot Plug	SCC	Yes	MLC	Dual	Gen9, Gen10
P04531- <b>X21</b>	HPE 800GB SAS 12G Mixed Use LFF (3.5in) LPC 3yr Wty Digitally Signed Firmware SSD	800	MU	SAS	LFF	Hot Plug	LPC	Yes	MLC	Dual	Gen9, Gen10
P04533- <b>X21</b>	HPE 1.6TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1,600	MU	SAS	SFF	Hot Plug	SC	Yes	MLC	Dual	Gen9, Gen10
P04535- <b>X21</b>	HPE 1.6TB SAS 12G Mixed Use LFF (3.5in) LPC 3yr Wty Digitally Signed Firmware SSD	1,600	MU	SAS	LFF	Hot Plug	LPC	Yes	MLC	Dual	Gen9, Gen10
P04537- <b>X21</b>	HPE 3.2TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	3,200	MU	SAS	SFF	Hot Plug	SC	Yes	MLC	Dual	Gen9, Gen10
P04539- <b>X21</b>	HPE 6.4TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	6,400	MU	SAS	SFF	Hot Plug	SC	Yes	MLC	Dual	Gen9, Gen10
P09088- <b>X21</b>	HPE 400GB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	440	MU	SAS	SFF	Hot Plug	SC	Yes	MLC	Dual	Gen9, Gen10
P09090- <b>X21</b>	HPE 800GB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	800	MU	SAS	SFF	Hot Plug	SC	Yes	MLC	Dual	Gen9, Gen10
P09092- <b>X21</b>	HPE 1.6TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1,600	MU	SAS	SFF	Hot Plug	SC	Yes	MLC	Dual	Gen9, Gen10
P09094- <b>X21</b>	HPE 3.2TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	3,200	MU	SAS	SFF	Hot Plug	SC	Yes	MLC	Dual	Gen9, Gen10

## Technical Specifications

### SAS Interface – (Capacity, Workload, Carrier...)

HPE Option Kit SKU	Long Description	Capacity	Workload Type	Interface Type	Form Factor	Plug Type	Carrier Type	Digitally Signed Firmware (DS)	Flash Type	Port	Server Gen Supported (Select Platforms)
P09096- <b>X21</b>	HPE 6.4TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	6,400	MU	SAS	SFF	Hot Plug	SC	Yes	MLC	Dual	Gen9, Gen10
P10448- <b>X21</b>	HPE 960GB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	960	MU	SAS	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10
P10450- <b>X21</b>	HPE 960GB SAS 12G Mixed Use LFF (3.5in) SCC 3yr Wty Value SAS Digitally Signed Firmware SSD	960	MU	SAS	LFF	Hot Plug	SCC	Yes	TLC	Single	Gen9, Gen10
P10452- <b>X21</b>	HPE 960GB SAS 12G Mixed Use LFF (3.5in) LPC 3yr Wty Value SAS Digitally Signed Firmware SSD	960	MU	SAS	LFF	Hot Plug	LPC	Yes	TLC	Single	Gen9, Gen10
P10454- <b>X21</b>	HPE 1.92TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	1,920	MU	SAS	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10
P10456- <b>X21</b>	HPE 1.92TB SAS 12G Mixed Use LFF (3.5in) SCC 3yr Wty Value SAS Digitally Signed Firmware SSD	1,920	MU	SAS	LFF	Hot Plug	SCC	Yes	TLC	Single	Gen9, Gen10
P10458- <b>X21</b>	HPE 1.92TB SAS 12G Mixed Use LFF (3.5in) LPC 3yr Wty Value SAS Digitally Signed Firmware SSD	1,920	MU	SAS	LFF	Hot Plug	LPC	Yes	TLC	Single	Gen9, Gen10
P10460- <b>X21</b>	HPE 3.84TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	3,840	MU	SAS	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10
P10462- <b>X21</b>	HPE 3.84TB SAS 12G Mixed Use LFF (3.5in) LPC 3yr Wty Value SAS Digitally Signed Firmware SSD	3,840	MU	SAS	LFF	Hot Plug	LPC	Yes	TLC	Single	Gen9, Gen10
P19913- <b>X21</b>	HPE 800GB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty SSD	800	MU	SAS	SFF	Hot Plug	SC	Yes	MLC	Dual	Gen10, Gen10.5
P19915- <b>X21</b>	HPE 1.6TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty SSD	1,600	MU	SAS	SFF	Hot Plug	SC	Yes	MLC	Dual	Gen10, Gen10.5
P19917- <b>X21</b>	HPE 3.2TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty SSD	3,200	MU	SAS	SFF	Hot Plug	SC	Yes	MLC	Dual	Gen10, Gen10.5
P19919- <b>X21</b>	HPE 6.4TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty SSD	6,400	MU	SAS	SFF	Hot Plug	SC	Yes	MLC	Dual	Gen10, Gen10.5

## Technical Specifications

### SAS Interface – (Capacity, Workload, Carrier...)

HPE Option Kit SKU	Long Description	Capacity	Workload Type	Interface Type	Form Factor	Plug Type	Carrier Type	Digitally Signed Firmware (DS)	Flash Type	Port	Server Gen Supported (Select Platforms)
870148- <b>X21</b>	HPE 15.3TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	15,300	RI	SAS	SFF	Hot Plug	SC	Yes	MLC	Dual	Gen9, Gen10
875330- <b>X21</b>	HPE 3.84TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	3,840	RI	SAS	SFF	Hot Plug	SC	Yes	TLC	Dual	Gen9, Gen10
P04517- <b>X21</b>	HPE 960GB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	960	RI	SAS	SFF	Hot Plug	SC	Yes	MLC	Dual	Gen9, Gen10
P04519- <b>X21</b>	HPE 1.92TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1,920	RI	SAS	SFF	Hot Plug	SC	Yes	MLC	Dual	Gen9, Gen10
P04521- <b>X21</b>	HPE 3.84TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	3,840	RI	SAS	SFF	Hot Plug	SC	Yes	MLC	Dual	Gen9, Gen10
P04523- <b>X21</b>	HPE 7.68TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	7,680	RI	SAS	SFF	Hot Plug	SC	Yes	MLC	Dual	Gen9, Gen10
P06584- <b>X21</b>	HPE 960GB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	960	RI	SAS	SFF	Hot Plug	SC	Yes	TLC	Dual	Gen9, Gen10
P06586- <b>X21</b>	HPE 1.92TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1,920	RI	SAS	SFF	Hot Plug	SC	Yes	TLC	Dual	Gen9, Gen10
P06588- <b>X21</b>	HPE 3.84TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	3,840	RI	SAS	SFF	Hot Plug	SC	Yes	TLC	Dual	Gen9, Gen10
P06590- <b>X21</b>	HPE 7.68TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	7,680	RI	SAS	SFF	Hot Plug	SC	Yes	TLC	Dual	Gen9, Gen10
P06592- <b>X21</b>	HPE 15.3TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	15,300	RI	SAS	SFF	Hot Plug	SC	Yes	TLC	Dual	Gen9, Gen10



## Technical Specifications

### SAS Interface – (Capacity, Workload, Carrier...)

HPE Option Kit SKU	Long Description	Capacity	Workload Type	Interface Type	Form Factor	Plug Type	Carrier Type	Digitally Signed Firmware (DS)	Flash Type	Port	Server Gen Supported (Select Platforms)
P10440- <b>X21</b>	HPE 960GB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	960	RI	SAS	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10
P10442- <b>X21</b>	HPE 1.92TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	1,920	RI	SAS	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10
P10444- <b>X21</b>	HPE 3.84TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	3,840	RI	SAS	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10
P10446- <b>X21</b>	HPE 7.68TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	7,680	RI	SAS	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10
P19903- <b>X21</b>	HPE 960GB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty SSD	960	RI	SAS	SFF	Hot Plug	SC	Yes	MLC	Dual	Gen10, Gen10.5
P19905- <b>X21</b>	HPE 1.92TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty SSD	1,920	RI	SAS	SFF	Hot Plug	SC	Yes	MLC	Dual	Gen10, Gen10.5
P19907- <b>X21</b>	HPE 3.84TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty SSD	3,840	RI	SAS	SFF	Hot Plug	SC	Yes	MLC	Dual	Gen10, Gen10.5
P19909- <b>X21</b>	HPE 7.68TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty SSD	7,680	RI	SAS	SFF	Hot Plug	SC	Yes	MLC	Dual	Gen10, Gen10.5
P19911- <b>X21</b>	HPE 15.36TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty SSD	15,300	RI	SAS	SFF	Hot Plug	SC	Yes	MLC	Dual	Gen10, Gen10.5





## Technical Specifications

### SAS Speeds and Feeds Specifications

SAS Interface – (Speeds & Feeds)								
HPE Option Kit SKU	Long Description	Lifetime Writes (TB)	Endurance DWPD	MAX Seq Reads / Max Seq Writes	Throughput (MiB/s)	Random Read Avg. / Random Write Avg. Latency uSec (4KiB Q=16)	Random Read / Random Writes IOPS (4KiB, Q=16)	MAX Random Read / MAX Random Write IOPS (4KiB)
873351- <b>X21</b>	HPE 400GB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	7,000	10.0	1,050 / 1,005	110 / 45	100,000 / 100,000	170,000@Q64 / 100,000@Q16	
873355- <b>X21</b>	HPE 800GB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1,500	10.0	1,050 / 1,005	105 / 35	120,000 / 100,000	170,000@Q64 / 100,000@Q16	
873460- <b>X21</b>	HPE 800GB SAS 12G Write Intensive SFF (2.5in) STD 3yr Wty Digitally Signed Firmware SSD	1,500	10.0	1,050 / 1,005	105 / 35	120,000 / 100,000	170,000@Q64 / 100,000@Q16	
P04541- <b>X21</b>	HPE 400GB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	7,300	10.0	1,075 / 1,030	135 / 35	104,000 / 115,000	165,000@Q32 / 115,000@Q16	
P04543- <b>X21</b>	HPE 800GB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	14,600	10.0	1,075 / 1,030	135 / 35	109,000 / 120,000	165,000@Q32 / 120,000@Q16	
P04545- <b>X21</b>	HPE 1.6TB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	29,200	10.0	1,075 / 1,030	135 / 35	110,000 / 120,000	165,000@Q32 / 120,000@Q16	
P04547- <b>X21</b>	HPE 3.2TB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	58,400	10.0	1,075 / 1,030	135 / 35	110,000 / 120,000	165,000@Q32 / 120,000@Q16	
P04558- <b>X21</b>	HPE 400GB SAS 12G Write Intensive SFF (2.5in) ST 3yr Wty Digitally Signed Firmware SSD	7,300	10.0	1,075 / 1,030	135 / 35	104,000 / 115,000	165,000@Q32 / 115,000@Q16	
P04562- <b>X21</b>	HPE 800GB SAS 12G Write Intensive SFF (2.5in) ST 3yr Wty Digitally Signed Firmware SSD	14,600	10.0	1,075 / 1,030	135 / 35	109,000 / 120,000	165,000@Q32 / 120,000@Q16	
P09098- <b>X21</b>	HPE 400GB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	7,000	10.0	1,095 / 1,015	100 / 33	140,000 / 120,000	210,000@Q32 / 120,000@Q16	
P09100- <b>X21</b>	HPE 800GB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	15,000	10.0	1,095 / 1,045	100 / 33	130,000 / 120,000	210,000@Q32 / 120,000@Q16	



## Technical Specifications

### SAS Interface – (Speeds & Feeds)

HPE Option Kit SKU	Long Description	Lifetime Writes (TB)	Endurance DWPD	MAX Seq Reads / Max Seq Writes	Throughput (MiB/s)	Random Read Avg. / Random Write Avg.	Latency uSec (4KiB Q=16)	Random Read / Random Writes IOPS (4KiB, Q=16)	MAX Random Read / MAX Random Write IOPS (4KiB)
P09102-X21	HPE 1.6TB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	29,000	10.0	1,095 / 1,045		100 / 33		130,000 / 120,000	210,000@Q32 / 125,000@Q16
P04525-X21	HPE 400GB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	2,190	3.0	1,070 / 670		135 / 35		95,000 / 70,000	165,000@Q64 / 70,000@Q4
P04527-X21	HPE 800GB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	4,380	3.0	1,075 / 1,030		135 / 35		104,000 / 85,000	165,000@Q32 / 85,000@Q16
P04529-X21	HPE 800GB SAS 12G Mixed Use LFF (3.5in) SCC 3yr Wty Digitally Signed Firmware SSD	4,380	3.0	1,075 / 1,030		135 / 35		104,000 / 85,000	165,000@Q32 / 85,000@Q16
P04531-X21	HPE 800GB SAS 12G Mixed Use LFF (3.5in) LPC 3yr Wty Digitally Signed Firmware SSD	4,380	3.0	1,075 / 1,030		135 / 35		104,000 / 85,000	165,000@Q32 / 85,000@Q16
P04533-X21	HPE 1.6TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	8,760	3.0	1,075 / 1,030		135 / 35		109,000 / 105,000	165,000@Q32 / 105,000@Q16
P04535-X21	HPE 1.6TB SAS 12G Mixed Use LFF (3.5in) LPC 3yr Wty Digitally Signed Firmware SSD	8,760	3.0	1,075 / 1,030		135 / 35		109,000 / 105,000	165,000@Q32 / 105,000@Q16
P04537-X21	HPE 3.2TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	17,520	3.0	1,075 / 1,030		135 / 35		110,000 / 110,000	165,000@Q32 / 110,000@Q16
P04539-X21	HPE 6.4TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	35,040	3.0	1,075 / 1,030		135 / 35		113,000 / 105,000	165,000@Q32 / 108,000@Q16
P09088-X21	HPE 400GB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	2,000	3.0	1,095 / 620		100 / 33		125,000 / 100,000	210,000@Q64 / 104,000@Q16
P09090-X21	HPE 800GB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	4,500	3.0	1,095 / 1,010		100 / 34		130,000 / 123,000	210,000@Q32 / 124,000@Q16
P09092-X21	HPE 1.6TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	8,500	3.0	1,095 / 1,045		100 / 33		130,000 / 123,000	210,000@Q32 / 124,000@Q16
P09094-X21	HPE 3.2TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	17,500	3.0	1,095 / 1,045		100 / 34		140,000 / 123,000	210,000@Q32 / 124,000@Q16
P09096-X21	HPE 6.4TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	35,000	3.0	1,095 / 1,045		100 / 34		140,000 / 123,000	210,000@Q32 / 124,000@Q16



## Technical Specifications

### SAS Interface – (Speeds & Feeds)

HPE Option Kit SKU	Long Description	Lifetime Writes (TB)	Endurance DWPD	MAX Seq Reads / Max Seq Writes Throughput (MiB/s)	Random Read Avg. / Random Write Avg. Latency uSec (uB/s)	Random Read / Random Writes IOPS (4KiB, Q=16)	MAX Random Read / MAX Random Write IOPS (4KiB)
P10448- <b>X21</b>	HPE 960GB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	5,250	3	790 / 635	130 / 35	108,000 / 47,000	155,000@Q32 / 48,000@Q4
P10450- <b>X21</b>	HPE 960GB SAS 12G Mixed Use LFF (3.5in) SCC 3yr Wty Value SAS Digitally Signed Firmware SSD	5,250	3	790 / 635	130 / 35	108,000 / 47,000	155,000@Q32 / 48,000@Q4
P10452- <b>X21</b>	HPE 960GB SAS 12G Mixed Use LFF (3.5in) LPC 3yr Wty Value SAS Digitally Signed Firmware SSD	5,250	3	790 / 635	130 / 35	108,000 / 47,000	155,000@Q32 / 48,000@Q4
P10454- <b>X21</b>	HPE 1.92TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	10,500	3	810 / 635	140 / 35	98,000 / 52,000	155,000@Q32 / 52,000@Q4
P10456- <b>X21</b>	HPE 1.92TB SAS 12G Mixed Use LFF (3.5in) SCC 3yr Wty Value SAS Digitally Signed Firmware SSD	10,500	3	810 / 635	140 / 35	98,000 / 52,000	155,000@Q32 / 52,000@Q4
P10458- <b>X21</b>	HPE 1.92TB SAS 12G Mixed Use LFF (3.5in) LPC 3yr Wty Value SAS Digitally Signed Firmware SSD	10,500	3	810 / 635	140 / 35	98,000 / 52,000	155,000@Q32 / 52,000@Q4
P10460- <b>X21</b>	HPE 3.84TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	21,000	3	810 / 635	140 / 35	103,000 / 52,000	155,000@Q32 / 52,000@Q4
P10462- <b>X21</b>	HPE 3.84TB SAS 12G Mixed Use LFF (3.5in) LPC 3yr Wty Value SAS Digitally Signed Firmware SSD	21,000	3	810 / 635	140 / 35	103,000 / 52,000	155,000@Q32 / 52,000@Q4
P19913- <b>X21</b>	HPE 800GB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty SSD	4,280	3.00	1,080 / 1,030	165 / 95	115,000 / 100,000	175,000@Q256 / 100,000@Q16
P19915- <b>X21</b>	HPE 1.6TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty SSD	8,560	3.00	1,080 / 1,030	185 / 95	115,000 / 125,000	175,000@Q256 / 125,000@Q32
P19917- <b>X21</b>	HPE 3.2TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty SSD	17,121	3.00	1,080 / 1,030	165 / 95	110,000 / 125,000	175,000@Q256 / 125,000@Q32
P19919- <b>X21</b>	HPE 6.4TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty SSD	34,241	3.00	1,080 / 1,030	195 / 95	105,000 / 125,000	175,000@Q256 / 125,000@Q32
870148- <b>X21</b>	HPE 15.3TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	28,032	1.0	940 / 1,000	150 / 41	93,000 / 37,000	165,000@Q128 / 37,000@Q4

## Technical Specifications

### SAS Interface – (Speeds & Feeds)

HPE Option Kit SKU	Long Description	Lifetime Writes (TB)	Endurance DWPD	MAX Seq Reads / Max Seq Writes	Throughput (MiB/s)	Random Read Avg. / Random Write Avg.	Latency uSec (4KiB Q=16)	Random Read / Random Writes IOPS (4KiB, Q=16)	MAX Random Read / MAX Random Write IOPS (4KiB)
875330-X21	HPE 3.84TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	7,008	1.0	940 / 1,020		115 / 40		110,000 / 26,000	170,000@Q128 / 26,000@Q4
P04517-X21	HPE 960GB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1,752	1.0	1,075 / 1,030		135 / 35		104,000 / 47,000	165,000@Q32 / 47,000@Q4
P04519-X21	HPE 1.92TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	3,504	1.0	1,075 / 1,030		135 / 35		109,000 / 54,000	165,000@Q32 / 54,000@Q4
P04521-X21	HPE 3.84TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	7,008	1.0	1,075 / 1,030		135 / 35		110,000 / 54,000	165,000@Q32 / 54,000@Q4
P04523-X21	HPE 7.68TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	14,016	1.0	1,075 / 1,030		135 / 35		110,000 / 48,000	165,000@Q32 / 48,000@Q4
P06584-X21	HPE 960GB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1,752	1.0	1,080 / 1,030		105 / 34		120,000 / 32,000	180,000@Q64 / 32,000@Q4
P06586-X21	HPE 1.92TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	3,504	1.0	1,080 / 1,030		105 / 34		120,000 / 48,000	180,000@Q64 / 48,000@Q4
P06588-X21	HPE 3.84TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	7,008	1.0	1,080 / 1,030		105 / 34		115,000 / 55,000	180,000@Q64 / 55,000@Q4
P06590-X21	HPE 7.68TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	14,016	1.0	1,080 / 1,030		120 / 34		113,000 / 67,000	180,000@Q64 / 67,000@Q4
P06592-X21	HPE 15.3TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	28,032	1.0	1,080 / 1,030		120 / 35		110,000 / 58,000	178,000@Q64 / 58,000@Q16
P10440-X21	HPE 960GB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	1,750	1	810 / 635		130 / 35		108,000 / 32,000	155,000@Q32 / 32,000@Q4



## Technical Specifications

### SAS Interface – (Speeds & Feeds)

HPE Option Kit SKU	Long Description	Lifetime Writes (TB)	Endurance DWPD	MAX Seq Reads / Max Seq Writes Throughput (MiB/s)	Random Read Avg. / Random Write Avg. Latency (uSec) (4KiB Q1)	Random Read / Random Writes IOPS (4KiB, Q=16)	MAX Random Read / MAX Random Write IOPS (4KiB)
P10442- <b>X21</b>	HPE 1.92TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	3,500	1	810 / 635	140 / 35	97,000 / 36,000	155,000@Q32 / 36,000@Q4
P10444- <b>X21</b>	HPE 3.84TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	7,000	1	810 / 635	140 / 35	102,000 / 37,000	155,000@Q32 / 37,000@Q4
P10446- <b>X21</b>	HPE 7.68TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	14,000	1	810 / 635	140 / 35	105,000 / 36,000	155,000@Q32 / 37,000@Q4
P19903- <b>X21</b>	HPE 960GB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty SSD	1,712	1.00	1,080 / 1,030	180 / 96	115,000 / 46,000	175,000@Q128 / 46,000@Q4
P19905- <b>X21</b>	HPE 1.92TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty SSD	3,424	1.00	1,080 / 1,030	190 / 95	115,000 / 70,000	175,000@Q128 / 70,000@Q32
P19907- <b>X21</b>	HPE 3.84TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty SSD	6,848	1.00	1,080 / 1,030	175 / 95	110,000 / 92,000	175,000@Q128 / 92,000@Q16
P19909- <b>X21</b>	HPE 7.68TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty SSD	13,697	1.00	1,080 / 1,030	190 / 95	105,000 / 94,000	175,000@Q128 / 92,000@Q16
P19911- <b>X21</b>	HPE 15.36TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty SSD	27,393	1.00	1,080 / 1,030	185 / 95	100,000 / 67,000	175,000@Q128 / 67,000@Q32



## Technical Specifications

### SAS Power and Height Specifications

SAS Interface – (Power & Height)										
HPE Option Kit SKU	Long Description	Power Idle Time (Watts)	Power Random Read (Watts)	Power Random Write (Watts)	Power Sequential Read (Watts)	Power Sequential Write (Watts)	Power Random R/W (Watts)	Power MAX (Watts)	z- Height	
873351- <b>X21</b>	HPE 400GB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	3.46	5.86	5.86	5.65	8.08	5.86	9.00	15mm	
873355- <b>X21</b>	HPE 800GB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	3.61	6.19	6.19	6.63	10.65	6.19	11.00	15mm	
873460- <b>X21</b>	HPE 800GB SAS 12G Write Intensive SFF (2.5in) STD 3yr Wty Digitally Signed Firmware SSD	3.61	6.19	6.19	6.63	10.65	6.19	11.00	15mm	
P04541- <b>X21</b>	HPE 400GB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	4.20	4.82	4.82	6.21	5.75	4.82	6.21	15mm	
P04543- <b>X21</b>	HPE 800GB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	4.26	4.97	4.97	6.71	6.95	4.97	6.71	15mm	
P04545- <b>X21</b>	HPE 1.6TB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	5.00	6.00	6.00	6.98	6.98	5.43	8.98	15mm	
P04547- <b>X21</b>	HPE 3.2TB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	5.00	6.17	6.17	8.56	8.56	5.90	8.56	15mm	
P04558- <b>X21</b>	HPE 400GB SAS 12G Write Intensive SFF (2.5in) ST 3yr Wty Digitally Signed Firmware SSD	4.20	4.82	4.82	6.21	5.75	4.82	6.21	15mm	
P04562- <b>X21</b>	HPE 800GB SAS 12G Write Intensive SFF (2.5in) ST 3yr Wty Digitally Signed Firmware SSD	4.26	4.97	4.97	6.71	6.95	4.97	6.71	15mm	
P09098- <b>X21</b>	HPE 400GB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	3.00	5.22	5.22	4.07	5.74	5.22	5.74	15mm	
P09100- <b>X21</b>	HPE 800GB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	3.00	5.55	5.55	4.52	6.92	5.55	6.92	15mm	
P09102- <b>X21</b>	HPE 1.6TB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	3.00	5.77	5.77	5.37	8.88	5.77	8.88	15mm	
P04525- <b>X21</b>	HPE 400GB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	4.20	4.82	4.82	6.21	5.75	4.82	6.21	15mm	
P04527- <b>X21</b>	HPE 800GB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	4.26	4.97	4.97	6.71	6.95	4.97	6.71	15mm	

## Technical Specifications

SAS Interface – (Power & Height)									
HPE Option Kit SKU	Long Description	Power Idle Time (Watts)	Power Random Read (Watts)	Power Random Write (Watts)	Power Sequential Read (Watts)	Power Sequential Write (Watts)	Power Random R/W (Watts)	Power MAX (Watts)	z-Height
P04529- <b>X21</b>	HPE 800GB SAS 12G Mixed Use LFF (3.5in) SCC 3yr Wty Digitally Signed Firmware SSD	4.26	4.97	4.97	6.71	6.95	4.97	6.71	15mm
P04531- <b>X21</b>	HPE 800GB SAS 12G Mixed Use LFF (3.5in) LPC 3yr Wty Digitally Signed Firmware SSD	4.26	4.97	4.97	6.71	6.95	4.97	6.71	15mm
P04533- <b>X21</b>	HPE 1.6TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	5.00	6.00	6.00	6.98	6.98	5.43	8.98	15mm
P04535- <b>X21</b>	HPE 1.6TB SAS 12G Mixed Use LFF (3.5in) LPC 3yr Wty Digitally Signed Firmware SSD	5.00	6.00	6.00	6.98	6.98	5.43	8.98	15mm
P04537- <b>X21</b>	HPE 3.2TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	5.00	6.17	6.17	8.56	8.56	5.90	8.56	15mm
P04539- <b>X21</b>	HPE 6.4TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	5.00	6.20	6.20	8.56	8.56	5.90	8.56	15mm
P09088- <b>X21</b>	HPE 400GB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	3.00	5.46	5.46	4.59	7.19	5.46	7.19	15mm
P09090- <b>X21</b>	HPE 800GB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	3.00	5.78	5.78	5.26	8.76	5.78	8.76	15mm
P09092- <b>X21</b>	HPE 1.6TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	3.00	6.30	6.30	5.39	9.24	6.30	9.24	15mm
P09094- <b>X21</b>	HPE 3.2TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	3.20	6.11	6.11	5.45	9.31	6.11	9.31	15mm
P09096- <b>X21</b>	HPE 6.4TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	3.50	6.69	6.69	6.07	9.68	6.69	9.68	15mm
P10448- <b>X21</b>	HPE 960GB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	4.26	4.97	4.97	6.71	6.95	6.95	9.65	15mm
P10450- <b>X21</b>	HPE 960GB SAS 12G Mixed Use LFF (3.5in) SCC 3yr Wty Value SAS Digitally Signed Firmware SSD	4.26	4.97	4.97	6.71	6.95	6.95	9.65	15mm
P10452- <b>X21</b>	HPE 960GB SAS 12G Mixed Use LFF (3.5in) LPC 3yr Wty Value SAS Digitally Signed Firmware SSD	4.26	4.97	4.97	6.71	6.95	6.95	9.65	15mm



## Technical Specifications

SAS Interface – (Power & Height)										
HPE Option Kit SKU	Long Description	Power Idle Time (Watts)	Power Random Read (Watts)	Power Random Write (Watts)	Power Sequential Read (Watts)	Power Sequential Write (Watts)	Power Random R/W (Watts)	Power MAX (Watts)	z-Height	
P10454- <b>X21</b>	HPE 1.92TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	4.34	5.05	5.05	6.98	7.26	7.26	7.26	15mm	
P10456- <b>X21</b>	HPE 1.92TB SAS 12G Mixed Use LFF (3.5in) SCC 3yr Wty Value SAS Digitally Signed Firmware SSD	4.34	5.05	5.05	6.98	7.26	7.26	7.26	15mm	
P10458- <b>X21</b>	HPE 1.92TB SAS 12G Mixed Use LFF (3.5in) LPC 3yr Wty Value SAS Digitally Signed Firmware SSD	4.34	5.05	5.05	6.98	7.26	7.26	7.26	15mm	
P10460- <b>X21</b>	HPE 3.84TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	4.47	5.40	5.40	7.93	7.56	7.96	7.96	15mm	
P10462- <b>X21</b>	HPE 3.84TB SAS 12G Mixed Use LFF (3.5in) LPC 3yr Wty Value SAS Digitally Signed Firmware SSD	4.47	5.40	5.40	7.93	7.56	7.96	7.96	15mm	
P19913- <b>X21</b>	HPE 800GB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty SSD	3.47	5.09	5.09	5.79	6.66	5.09	6.66	15mm	
P19915- <b>X21</b>	HPE 1.6TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty SSD	3.47	5.47	5.47	6.31	9.03	5.47	9.03	15mm	
P19917- <b>X21</b>	HPE 3.2TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty SSD	3.42	5.56	5.56	6.44	9.19	5.56	9.19	15mm	
P19919- <b>X21</b>	HPE 6.4TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty SSD	3.66	5.74	5.74	6.84	8.86	5.74	8.86	15mm	
870148- <b>X21</b>	HPE 15.3TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	6.49	7.13	7.13	8.66	8.83	7.13	9.00	15mm	
875330- <b>X21</b>	HPE 3.84TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	4.38	4.69	4.69	4.96	6.60	4.69	7.00	15mm	
P04517- <b>X21</b>	HPE 960GB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	5.00	6.00	6.00	6.98	6.98	5.43	8.98	15mm	
P04519- <b>X21</b>	HPE 1.92TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	5.00	6.00	6.00	6.98	6.98	5.43	8.98	15mm	
P04521- <b>X21</b>	HPE 3.84TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	5.00	6.17	6.17	8.56	8.56	5.90	8.56	15mm	



## Technical Specifications

SAS Interface – (Power & Height)										
HPE Option Kit SKU	Long Description	Power Idle Time (Watts)	Power Random Read (Watts)	Power Random Write (Watts)	Power Sequential Read (Watts)	Power Sequential Write (Watts)	Power Random R/W (Watts)	Power MAX (Watts)	z-Height	
P04523- <b>X21</b>	HPE 7.68TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	5.00	6.20	6.20	8.56	8.56	5.90	8.56	15mm	
P06584- <b>X21</b>	HPE 960GB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	1.50	3.10	3.10	5.40	6.80	3.10	6.80	7mm	
P06586- <b>X21</b>	HPE 1.92TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	3.50	8.62	8.62	7.39	10.17	8.62	10.17	15mm	
P06588- <b>X21</b>	HPE 3.84TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	3.50	9.42	9.42	7.76	10.62	9.42	10.62	15mm	
P06590- <b>X21</b>	HPE 7.68TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	3.64	9.97	9.97	7.27	10.49	9.97	10.49	15mm	
P06592- <b>X21</b>	HPE 15.3TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	4.14	10.05	10.05	7.91	10.48	10.05	10.48	15mm	
P10440- <b>X21</b>	HPE 960GB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	4.26	4.97	4.97	6.71	6.95	6.95	9.65	15mm	
P10442- <b>X21</b>	HPE 1.92TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	4.34	5.05	5.05	6.98	7.26	7.26	7.26	15mm	
P10444- <b>X21</b>	HPE 3.84TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	4.47	5.40	5.40	7.93	7.56	7.96	7.96	15mm	
P10446- <b>X21</b>	HPE 7.68TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	4.80	5.90	5.90	8.56	8.18	8.56	8.56	15mm	
P19903- <b>X21</b>	HPE 960GB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty SSD	3.47	5.09	5.09	5.79	6.66	5.09	6.66	15mm	
P19905- <b>X21</b>	HPE 1.92TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty SSD	3.47	5.47	5.47	6.31	9.03	5.47	9.03	15mm	
P19907- <b>X21</b>	HPE 3.84TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty SSD	3.42	5.56	5.56	6.44	9.19	5.56	9.19	15mm	
P19909- <b>X21</b>	HPE 7.68TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty SSD	3.66	5.74	5.74	6.84	8.86	5.74	8.86	15mm	



## Technical Specifications

P19911- <b>X21</b>	HPE 15.36TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty SSD	4.18	6.28	6.28	7.97	9.59	6.28	9.59	15mm
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## SAS Certifications

### SAS Interface – (Certifications)

HPE Option Kit SKU	Long Description	VMware / vSAN HCL Certification (Watts)	Microsoft Windows Server 2016 Certification	Software Defined Data Center (SDDC) Premium AQ Certification	Microsoft Windows Server 2019 Certification	WS 2019 Software Defined Data Center (SDDC)
873351- <b>X21</b>	HPE 400GB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	N/A	N/A
873355- <b>X21</b>	HPE 800GB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
873460- <b>X21</b>	HPE 800GB SAS 12G Write Intensive SFF (2.5in) STD 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	N/A	N/A
P04541- <b>X21</b>	HPE 400GB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P04543- <b>X21</b>	HPE 800GB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P04545- <b>X21</b>	HPE 1.6TB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P04547- <b>X21</b>	HPE 3.2TB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P04558- <b>X21</b>	HPE 400GB SAS 12G Write Intensive SFF (2.5in) ST 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P04562- <b>X21</b>	HPE 800GB SAS 12G Write Intensive SFF (2.5in) ST 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P09098- <b>X21</b>	HPE 400GB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P09100- <b>X21</b>	HPE 800GB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P09102- <b>X21</b>	HPE 1.6TB SAS 12G Write Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified



## Technical Specifications

### SAS Interface – (Certifications)

HPE Option Kit SKU	Long Description	VMware / vSAN HCL Certification (Watts)	Microsoft Windows Server 2016 Certification	Software Defined Data Center (SDDC) Premium AQ Certification	Microsoft Windows Server 2019 Certification	WS 2019 Software Defined Data Center (SDDC)
P04525- <b>X21</b>	HPE 400GB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P04527- <b>X21</b>	HPE 800GB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P04529- <b>X21</b>	HPE 800GB SAS 12G Mixed Use LFF (3.5in) SCC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P04531- <b>X21</b>	HPE 800GB SAS 12G Mixed Use LFF (3.5in) LPC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P04533- <b>X21</b>	HPE 1.6TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P04535- <b>X21</b>	HPE 1.6TB SAS 12G Mixed Use LFF (3.5in) LPC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P04537- <b>X21</b>	HPE 3.2TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P04539- <b>X21</b>	HPE 6.4TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P09088- <b>X21</b>	HPE 400GB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P09090- <b>X21</b>	HPE 800GB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P09092- <b>X21</b>	HPE 1.6TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P09094- <b>X21</b>	HPE 3.2TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P09096- <b>X21</b>	HPE 6.4TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P10448- <b>X21</b>	HPE 960GB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified

## Technical Specifications

### SAS Interface – (Certifications)

HPE Option Kit SKU	Long Description	VMWare / vSAN HCL Certification (Watts)	Microsoft Windows Server 2016 Certification	Software Defined Data Center (SDDC) Premium AQ Certification	Microsoft Windows Server 2019 Certification	WS 2019 Software Defined Data Center (SDDC)
P10450- <b>X21</b>	HPE 960GB SAS 12G Mixed Use LFF (3.5in) SCC 3yr Wty Value SAS Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P10452- <b>X21</b>	HPE 960GB SAS 12G Mixed Use LFF (3.5in) LPC 3yr Wty Value SAS Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P10454- <b>X21</b>	HPE 1.92TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P10456- <b>X21</b>	HPE 1.92TB SAS 12G Mixed Use LFF (3.5in) SCC 3yr Wty Value SAS Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P10458- <b>X21</b>	HPE 1.92TB SAS 12G Mixed Use LFF (3.5in) LPC 3yr Wty Value SAS Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P10460- <b>X21</b>	HPE 3.84TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P10462- <b>X21</b>	HPE 3.84TB SAS 12G Mixed Use LFF (3.5in) LPC 3yr Wty Value SAS Digitally Signed Firmware SSD	N/A	Certified	Certified	Certified	Certified
P19913- <b>X21</b>	HPE 800GB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty SSD	N/A	Certified	Certified	Certified	Certified
P19915- <b>X21</b>	HPE 1.6TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty SSD	N/A	Certified	Certified	Certified	Certified
P19917- <b>X21</b>	HPE 3.2TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty SSD	N/A	Certified	Certified	Certified	Certified
P19919- <b>X21</b>	HPE 6.4TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty SSD	Certified	Certified	Certified	Certified	Certified
870148- <b>X21</b>	HPE 15.3TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
875330- <b>X21</b>	HPE 3.84TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified



## Technical Specifications

### SAS Interface – (Certifications)

HPE Option Kit SKU	Long Description	VMware / vSAN HCL Certification (Watts)	Microsoft Windows Server 2016 Certification	Software Defined Data Center (SDDC) Premium AQ Certification	Microsoft Windows Server 2019 Certification	WS 2019 Software Defined Data Center (SDDC)
P04517- <b>X21</b>	HPE 960GB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P04519- <b>X21</b>	HPE 1.92TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P04521- <b>X21</b>	HPE 3.84TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P04523- <b>X21</b>	HPE 7.68TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P06584- <b>X21</b>	HPE 960GB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P06586- <b>X21</b>	HPE 1.92TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P06588- <b>X21</b>	HPE 3.84TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P06590- <b>X21</b>	HPE 7.68TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P06592- <b>X21</b>	HPE 15.3TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P10440- <b>X21</b>	HPE 960GB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P10442- <b>X21</b>	HPE 1.92TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P10444- <b>X21</b>	HPE 3.84TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P10446- <b>X21</b>	HPE 7.68TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified



## Technical Specifications

### SAS Interface – (Certifications)

HPE Option Kit SKU	Long Description	VMWare / vSAN HCL Certification (Watts)	Microsoft Windows Server 2016 Certification	Software Defined Data Center (SDDC) Premium AQ Certification	Microsoft Windows Server 2019 Certification	WS 2019 Software Defined Data Center (SDDC)
P19903- <b>X21</b>	HPE 960GB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty SSD	N/A	Certified	Certified	Certified	Certified
P19905- <b>X21</b>	HPE 1.92TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty SSD	N/A	Certified	Certified	Certified	Certified
P19907- <b>X21</b>	HPE 3.84TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty SSD	N/A	Certified	Certified	Certified	Certified
P19909- <b>X21</b>	HPE 7.68TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty SSD	N/A	Certified	Certified	Certified	Certified
P19911- <b>X21</b>	HPE 15.36TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty SSD	N/A	Certified	Certified	Certified	Certified



## Technical Specifications

### Value SAS Capacity, Workload, Carrier Specifications

Value SAS Interface – (Capacity, Workload, Carrier...)												
HPE Option Kit SKU	Long Description	Capacity	Workload Type	Interface Type	Form Factor	Plug Type	Carrier Type	Digitally Signed Firmware (DS)	Flash Type	Port	Server Gen Supported (Select Platforms)	
<b>Mixed Use Value SAS Drives</b>												
P10448- <b>X21</b>	HPE 960GB SAS 12G Mixed Use SC 3yr Wty Value SAS Digitally Signed Firmware SSD	960	MU	SAS	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10	
P10450- <b>X21</b>	HPE 960GB SAS 12G Mixed Use LFF (3.5in) SCC 3yr Wty Value SAS Digitally Signed Firmware SSD	960	MU	SAS	LFF	Hot Plug	SCC	Yes	TLC	Single	Gen9, Gen10	
P10452- <b>X21</b>	HPE 960GB SAS 12G Mixed Use LFF (3.5in) LPC 3yr Wty Value SAS Digitally Signed Firmware SSD	960	MU	SAS	LFF	Hot Plug	LPC	Yes	TLC	Single	Gen9, Gen10	
P10454- <b>X21</b>	HPE 1.92TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	1,920	MU	SAS	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10	
P10456- <b>X21</b>	HPE 1.92TB SAS 12G Mixed Use LFF (3.5in) SCC 3yr Wty Value SAS Digitally Signed Firmware SSD	1,920	MU	SAS	LFF	Hot Plug	SCC	Yes	TLC	Single	Gen9, Gen10	
P10458- <b>X21</b>	HPE 1.92TB SAS 12G Mixed Use LFF (3.5in) LPC 3yr Wty Value SAS Digitally Signed Firmware SSD	1,920	MU	SAS	LFF	Hot Plug	LPC	Yes	TLC	Single	Gen9, Gen10	
P10460- <b>X21</b>	HPE 3.84TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	3,840	MU	SAS	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10	
P10462- <b>X21</b>	HPE 3.84TB SAS 12G Mixed Use LFF (3.5in) LPC 3yr Wty Value SAS Digitally Signed Firmware SSD	3,840	MU	SAS	LFF	Hot Plug	LPC	Yes	TLC	Single	Gen9, Gen10	
<b>Read Intensive Value SAS Drives</b>												
P10440- <b>X21</b>	HPE 960GB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	960	RI	SAS	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10	
P10442- <b>X21</b>	HPE 1.92TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	1,920	RI	SAS	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10	
P10444- <b>X21</b>	HPE 3.84TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed	3,840	RI	SAS	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10	



## Technical Specifications

	Firmware SSD											
P10446- <b>X21</b>	HPE 7.68TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	7,680	RI	SAS	SFF	Hot Plug	SC	Yes	TLC	Single	Gen9, Gen10	

### Notes:

- Value SAS Drives are single-port SAS SSDs. They offer a significant performance boost over SATA SSDs with roughly twice the IOPS, and are typically lower in cost than traditional SAS SSD drives.
- Please use HPE Selector Tool <http://ssd.hpe.com/> to determine server compatibility.

## Value SAS Speeds and Feeds Specifications

### Value SAS Interface – (Speeds & Feeds)

HPE Option Kit SKU	Long Description	Lifetime Writes (TB)	Endurance DWPD	MAX Seq Reads / Max Seq Writes Throughput (MiB/s)	Random Read Avg. / Random Write Avg. Latency uSec (4KiB,Q1)	Random Read / Random Writes IOPS (4KiB, Q=16)	MAX Random Read / MAX Random Write IOPS (4KiB)
<b>Mixed Use Value SAS Drives</b>							
P10448- <b>X21</b>	HPE 960GB SAS 12G Mixed Use SC 3yr Wty Value SAS Digitally Signed Firmware SSD	5,250	3.0	790 / 635	130 / 35	108,000 / 47,000	155,000@Q32 / 48,000@Q4
P10450- <b>X21</b>	HPE 960GB SAS 12G Mixed Use LFF (3.5in) SCC 3yr Wty Value SAS Digitally Signed Firmware SSD	5,250	3.0	790 / 635	130 / 35	108,000 / 47,000	155,000@Q32 / 48,000@Q4
P10452- <b>X21</b>	HPE 960GB SAS 12G Mixed Use LFF (3.5in) LPC 3yr Wty Value SAS Digitally Signed Firmware SSD	5,250	3.0	790 / 635	130 / 35	108,000 / 47,000	155,000@Q32 / 48,000@Q4
P10454- <b>X21</b>	HPE 1.92TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	10,500	3.0	810 / 635	140 / 35	98,000 / 52,000	155,000@Q32 \ 52,000@Q4
P10456- <b>X21</b>	HPE 1.92TB SAS 12G Mixed Use LFF (3.5in) SCC 3yr Wty Value SAS Digitally Signed Firmware SSD	10,500	3.0	810 / 635	140 / 35	98,000 / 52,000	155,000@Q32 \ 52,000@Q4
P10458- <b>X21</b>	HPE 1.92TB SAS 12G Mixed Use LFF (3.5in) LPC 3yr Wty Value SAS Digitally Signed Firmware SSD	10,500	3.0	810 / 635	140 / 35	98,000 / 52,000	155,000@Q32 \ 52,000@Q4
P10460- <b>X21</b>	HPE 3.84TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	21,000	3.0	810 / 635	140 / 35	103,000 / 52,000	155,000@Q32 \ 52,000@Q4
P10462- <b>X21</b>	HPE 3.84TB SAS 12G Mixed Use LFF (3.5in) LPC 3yr Wty Value SAS Digitally Signed Firmware SSD	21,000	3.0	810 / 635	140 / 35	103,000 / 52,000	155,000@Q32 \ 52,000@Q4





## Technical Specifications

### Value SAS Interface – (Speeds & Feeds)

HPE Option Kit SKU	Long Description	Lifetime Writes (TB)	Endurance DWPD	MAX Seq Reads / Max Seq Writes Throughput (MiB/s)	Random Read Avg. / Random Write Avg. Latency uSec (4KiB,Q1)	Random Read / Random Writes IOPS (4KiB, Q=16)	MAX Random Read / MAX Random Write IOPS (4KiB)
<b>Read Intensive Value SAS Drives</b>							
P10440- <b>X21</b>	HPE 960GB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	1,750	1.0	810 / 635	130 / 35	108,000 / 32,000	155,000@Q32 / 32,000@Q4
P10442- <b>X21</b>	HPE 1.92TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	3,500	1.0	810 / 635	140 / 35	97,000 / 36,000	155,000@Q32 / 36,000@Q4
P10444- <b>X21</b>	HPE 3.84TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	7,000	1.0	810 / 635	140 / 35	102,000 / 37,000	155,000@Q32 / 37,000@Q4
P10446- <b>X21</b>	HPE 7.68TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	14,000	1.0	810 / 635	140 / 35	105,000 / 36,000	155,000@Q32 / 37,000@Q4

### Value SAS Power and Height Specifications

#### Value SAS Interface – (Power & Height)

HPE Option Kit SKU	Long Description	Power Idle Time (Watts)	Power Random Read (Watts)	Power Random Write (Watts)	Power Sequential Read (Watts)	Power Sequential Write (Watts)	Power Random R/W (Watts)	Power MAX (Watts)	z- Height
<b>Mixed Use Value SAS Drives</b>									
P10448- <b>X21</b>	HPE 960GB SAS 12G Mixed Use SC 3yr Wty Value SAS Digitally Signed Firmware SSD	4.26	4.97	4.97	6.71	6.95	6.95	9.65	15mm
P10450- <b>X21</b>	HPE 960GB SAS 12G Mixed Use LFF (3.5in) SCC 3yr Wty Value SAS Digitally Signed Firmware SSD	4.26	4.97	4.97	6.71	6.95	6.95	9.65	15mm
P10452- <b>X21</b>	HPE 960GB SAS 12G Mixed Use LFF (3.5in) LPC 3yr Wty Value SAS Digitally Signed Firmware SSD	4.26	4.97	4.97	6.71	6.95	6.95	9.65	15mm



## Technical Specifications

Value SAS Interface – (Power & Height)										
HPE Option Kit SKU	Long Description	Power Idle Time (Watts)	Power Random Read (Watts)	Power Random Write (Watts)	Power Sequential Read (Watts)	Power Sequential Write (Watts)	Power Random R/W (Watts)	Power MAX (Watts)	z-Height	
P10454- <b>X21</b>	HPE 1.92TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	4.34	5.05	5.05	6.98	7.26	7.26	7.26	15mm	
P10456- <b>X21</b>	HPE 1.92TB SAS 12G Mixed Use LFF (3.5in) SCC 3yr Wty Value SAS Digitally Signed Firmware SSD	4.34	5.05	5.05	6.98	7.26	7.26	7.26	15mm	
P10458- <b>X21</b>	HPE 1.92TB SAS 12G Mixed Use LFF (3.5in) LPC 3yr Wty Value SAS Digitally Signed Firmware SSD	4.34	5.05	5.05	6.98	7.26	7.26	7.26	15mm	
P10460- <b>X21</b>	HPE 3.84TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	4.47	5.40	5.40	7.93	7.56	7.96	7.96	15mm	
P10462- <b>X21</b>	HPE 3.84TB SAS 12G Mixed Use LFF (3.5in) LPC 3yr Wty Value SAS Digitally Signed Firmware SSD	4.47	5.40	5.40	7.93	7.56	7.96	7.96	15mm	
Read Intensive Value SAS Drives										
P10440- <b>X21</b>	HPE 960GB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	4.26	4.97	4.97	6.71	6.95	6.95	9.65	15mm	
P10442- <b>X21</b>	HPE 1.92TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	4.34	5.05	5.05	6.98	7.26	7.26	7.26	15mm	
P10444- <b>X21</b>	HPE 3.84TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	4.47	5.40	5.40	7.93	7.56	7.96	7.96	15mm	
P10446- <b>X21</b>	HPE 7.68TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	4.80	5.90	5.90	8.56	8.18	8.56	8.56	15mm	

**Notes:** Please use HPE Selector Tool <http://ssd.hpe.com/> to determine server compatibility.



## Technical Specifications

### Value SAS Certifications

Value SAS Interface – (Certifications)						
HPE Option Kit SKU	Long Description	VMWare / vSAN HCL Certification (Watts)	Microsoft Windows Server 2016 Certification	Software Defined Data Center (SDDC) Premium AQ Certification	Microsoft Windows Server 2019 Certification	WS 2019 Software Defined Data Center (SDDC)
<b>Mixed Use Value SAS Drives</b>						
P10448- <b>X21</b>	HPE 960GB SAS 12G Mixed Use SC 3yr Wty Value SAS Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P10450- <b>X21</b>	HPE 960GB SAS 12G Mixed Use LFF (3.5in) SCC 3yr Wty Value SAS Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P10452- <b>X21</b>	HPE 960GB SAS 12G Mixed Use LFF (3.5in) LPC 3yr Wty Value SAS Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P10454- <b>X21</b>	HPE 1.92TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P10456- <b>X21</b>	HPE 1.92TB SAS 12G Mixed Use LFF (3.5in) SCC 3yr Wty Value SAS Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P10458- <b>X21</b>	HPE 1.92TB SAS 12G Mixed Use LFF (3.5in) LPC 3yr Wty Value SAS Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P10460- <b>X21</b>	HPE 3.84TB SAS 12G Mixed Use SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P10462- <b>X21</b>	HPE 3.84TB SAS 12G Mixed Use LFF (3.5in) LPC 3yr Wty Value SAS Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
<b>Read Intensive Value SAS Drives</b>						
P10440- <b>X21</b>	HPE 960GB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P10442- <b>X21</b>	HPE 1.92TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified



## Technical Specifications

P10444- <b>X21</b>	HPE 3.84TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P10446- <b>X21</b>	HPE 7.68TB SAS 12G Read Intensive SFF (2.5in) SC 3yr Wty Value SAS Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified

**Notes:** Please use HPE Selector Tool <http://ssd.hpe.com/> to determine server compatibility

## PCIe/NVMe Capacity, Workload, Carrier Specifications

### PCIe/NVMe Interface – SKUs (Capacity, Workload, Carrier...)

HPE Option Kit SKU	Long Description	Capacity	Workload Type	Interface Type	Form Factor	Plug Type	Carrier Type	Digitally Signed Firmware (DS)	Flash Type	Port	Server Gen Supported (Select Platforms)
<b>NVMe High Performance Low Latency SSDs</b>											
<b>Write Intensive SSDs</b>											
878014- <b>X21</b>	HPE 375GB NVMe x4 Lanes Write Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	375	WI	NVMe	SFF	Hot Plug	SCN	Yes	SLC	Single	Gen9, Gen10
878038- <b>X21</b>	HPE 750GB PCIe x4 Lanes Write Intensive HHHH 3yr Wty Digitally Signed Firmware Card	750	WI	NVMe	AIC	Non-Hot Plug	AIC	Yes	SLC	Single	Gen9, Gen10
P06952- <b>X21</b>	HPE 750GB NVMe x4 Lanes Write Intensive SFF (2.5in) SCN 3yr Wty	750	WI	NVMe	SFF	Hot Plug	SCN	Yes	SLC	Single	Gen9, Gen10
<b>NVMe High Performance Mixed Use Drives</b>											
875585- <b>X21</b>	HPE 800GB NVMe x4 Lanes Mixed Use M.2 22110 3yr Wty Digitally Signed Firmware SSD	800	MU	NVMe	M.2	N/A	N/A	Yes	MLC	Single	Gen9, Gen10
P07179- <b>X21</b>	HPE 800GB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	800	MU	NVMe	SFF	Hot Plug	SCN	Yes	TLC	Single	Gen10
P07181- <b>X21</b>	HPE 1.6TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	1,600	MU	NVMe	SFF	Hot Plug	SCN	Yes	TLC	Single	Gen10
P07183- <b>X21</b>	HPE 3.2TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	3,200	MU	NVMe	SFF	Hot Plug	SCN	Yes	TLC	Single	Gen10
P07185- <b>X21</b>	HPE 6.4TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	6,400	MU	NVMe	SFF	Hot Plug	SCN	Yes	TLC	Single	Gen10



## Technical Specifications

PCIe/NVMe Interface – SKUs (Capacity, Workload, Carrier...)												
HPE Option Kit SKU	Long Description	Capacity	Workload Type	Interface Type	Form Factor	Plug Type	Carrier Type	Digitally Signed Firmware (DS)	Flash Type	Port	Server Gen Supported (Select Platforms)	
P10222- <b>X21</b>	HPE 1.6TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	1,600	MU	NVMe	SFF	Hot Plug	SCN	Yes	MLC	Single	Gen9, Gen10	
P10224- <b>X21</b>	HPE 3.2TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	3,200	MU	NVMe	SFF	Hot Plug	SCN	Yes	MLC	Single	Gen9, Gen10	
P10226- <b>X21</b>	HPE 6.4TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	6,400	MU	NVMe	SFF	Hot Plug	SCN	Yes	MLC	Single	Gen9, Gen10	
P10264- <b>X21</b>	HPE 1.6TB NVMe x8 Lanes Mixed Use HHHL 3yr Wty Digitally Signed Firmware Card	1,600	MU	NVMe	AIC	Non-Hot Plug	AIC	Yes	TLC	Single	Gen 9,10	
P10266- <b>X21</b>	HPE 3.2TB NVMe x8 Lanes Mixed Use HHHL 3yr Wty Digitally Signed Firmware Card	3,200	MU	NVMe	AIC	Non-Hot Plug	AIC	Yes	TLC	Single	Gen 9,10	
P10268- <b>X21</b>	HPE 6.4TB NVMe x8 Lanes Mixed Use HHHL 3yr Wty Digitally Signed Firmware Card	6,400	MU	NVMe	AIC	Non-Hot Plug	AIC	Yes	TLC	Single	Gen 9,10	
P12114- <b>X21</b>	HPE 1.6TB NVMe x4 Lanes Mixed Use SFF (2.5in) RW 3yr Wty Digitally Signed Firmware SSD	1,600	MU	NVMe	SFF	Non-Hot Plug	RW	Yes	TLC	Single	Gen9, Gen10	
P13668- <b>X21</b>	HPE 800GB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	800	MU	NVMe	SFF	Hot Plug	SCN	Yes	TLC	Single	Gen9, Gen10	
P13670- <b>X21</b>	HPE 1.6TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	1,600	MU	NVMe	SFF	Hot Plug	SCN	Yes	TLC	Single	Gen9, Gen10	
P13672- <b>X21</b>	HPE 3.2TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	3,200	MU	NVMe	SFF	Hot Plug	SCN	Yes	TLC	Single	Gen9, Gen10	
P13674- <b>X21</b>	HPE 6.4TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	6,400	MU	NVMe	SFF	Hot Plug	SCN	Yes	TLC	Single	Gen9, Gen10	
P13699- <b>X21</b>	HPE 1.6TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	1,600	MU	NVMe	SFF	Hot Plug	SCN	Yes	TLC	Single	Gen9, Gen10	



## Technical Specifications

PCIe/NVMe Interface – SKUs (Capacity, Workload, Carrier...)												
HPE Option Kit SKU	Long Description	Capacity	Workload Type	Interface Type	Form Factor	Plug Type	Carrier Type	Digitally Signed Firmware (DS)	Flash Type	Port	Server Gen Supported (Select Platforms)	
P13701- <b>X21</b>	HPE 3.2TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	3,200	MU	NVMe	SFF	Hot Plug	SCN	Yes	TLC	Single	Gen9, Gen10	
P13703- <b>X21</b>	HPE 6.4TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	6,400	MU	NVMe	SFF	Hot Plug	SCN	Yes	TLC	Single	Gen9, Gen10	
P16497- <b>X21</b>	HPE 1.6TB NVMe High Performance Mixed Use SFF (2.5in) SC 3yr Wty Universal Connect SSD	1,600	MU	NVMe	SFF	Hot Plug	SC	Yes	MLC	Single	Gen10, Gen10.5	
P16499- <b>X21</b>	HPE 3.2TB NVMe High Performance Mixed Use SFF (2.5in) SC 3yr Wty Universal Connect SSD	3,200	MU	NVMe	SFF	Hot Plug	SC	Yes	MLC	Single	Gen10, Gen10.5	
877986- <b>X21</b>	HPE 2TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	2,000	RI	NVMe	SFF	Hot Plug	SCN	Yes	MLC	Single	Gen9, Gen10	
P07190- <b>X21</b>	HPE 960GB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	960	RI	NVMe	SFF	Hot Plug	SCN	Yes	TLC	Single	Gen10	
P07192- <b>X21</b>	HPE 1.92TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	1,920	RI	NVMe	SFF	Hot Plug	SCN	Yes	TLC	Single	Gen10	
P07194- <b>X21</b>	HPE 3.84TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	3,840	RI	NVMe	SFF	Hot Plug	SCN	Yes	TLC	Single	Gen10	
P07196- <b>X21</b>	HPE 7.68TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	7,680	RI	NVMe	SFF	Hot Plug	SCN	Yes	TLC	Single	Gen10	
P07198- <b>X21</b>	HPE 15.36TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	15,360	RI	NVMe	SFF	Hot Plug	SCN	Yes	TLC	Single	Gen10	
P10208- <b>X21</b>	HPE 960GB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	960	RI	NVMe	SFF	Hot Plug	SCN	Yes	TLC	Single	Gen9, Gen10	



## Technical Specifications

PCIe/NVMe Interface – SKUs (Capacity, Workload, Carrier...)												
HPE Option Kit SKU	Long Description	Capacity	Workload Type	Interface Type	Form Factor	Plug Type	Carrier Type	Digitally Signed Firmware (DS)	Flash Type	Port	Server Gen Supported (Select Platforms)	
P10210- <b>X21</b>	HPE 1.92TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	1,920	RI	NVMe	SFF	Hot Plug	SCN	Yes	TLC	Single	Gen9, Gen10	
P10212- <b>X21</b>	HPE 3.84TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	3,840	RI	NVMe	SFF	Hot Plug	SCN	Yes	TLC	Single	Gen9, Gen10	
P10214- <b>X21</b>	HPE 1.92TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	1,920	RI	NVMe	SFF	Hot Plug	SCN	Yes	MLC	Single	Gen9, Gen10	
P10216- <b>X21</b>	HPE 3.84TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	3,840	RI	NVMe	SFF	Hot Plug	SCN	Yes	MLC	Single	Gen9, Gen10	
P10218- <b>X21</b>	HPE 7.68TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	7,680	RI	NVMe	SFF	Hot Plug	SCN	Yes	MLC	Single	Gen9, Gen10	
P12112- <b>X21</b>	HPE 3.84TB NVMe x4 Lanes Read Intensive SFF (2.5in) Raw 3yr Wty Digitally Signed Firmware SSD	3,840	RI	NVMe	SFF	Hot Plug	RW	Yes	TLC	Single	Gen9, Gen10	
P13676- <b>X21</b>	HPE 960GB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	960	RI	NVMe	SFF	Hot Plug	SCN	Yes	TLC	Single	Gen9, Gen10	
P13678- <b>X21</b>	HPE 1.92TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	1,920	RI	NVMe	SFF	Hot Plug	SCN	Yes	TLC	Single	Gen9, Gen10	
P13680- <b>X21</b>	HPE 3.84TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	3,840	RI	NVMe	SFF	Hot Plug	SCN	Yes	TLC	Single	Gen9, Gen10	
P13682- <b>X21</b>	HPE 7.68TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	7,680	RI	NVMe	SFF	Hot Plug	SCN	Yes	TLC	Single	Gen9, Gen10	
P13689- <b>X21</b>	HPE 960GB NVMe x4 Lanes Read Intensive M.2 22110 3yr Wty Digitally Signed Firmware SSD	960	RI	NVMe	M.2	Non Hot Plug	N/A	Yes	MLC	Single	Gen9, Gen10	

## Technical Specifications

PCIe/NVMe Interface – SKUs (Capacity, Workload, Carrier...)												
HPE Option Kit SKU	Long Description	Capacity	Workload Type	Interface Type	Form Factor	Plug Type	Carrier Type	Digitally Signed Firmware (DS)	Flash Type	Port	Server Gen Supported (Select Platforms)	
P13691- <b>X21</b>	HPE 1.92TB NVMe x4 Lanes Read Intensive M.2 22110 3yr Wty Digitally Signed Firmware SSD	1,920	RI	NVMe	M.2	Non Hot Plug	N/A	Yes	MLC	Single	Gen9, Gen10	
P13693- <b>X21</b>	HPE 3.84TB NVMe x4 Lanes Read Intensive M.2 22110 3yr Wty Digitally Signed Firmware SSD	3,840	RI	NVMe	M.2	Non Hot Plug	N/A	Yes	MLC	Single	Gen9, Gen10	
P13695- <b>X21</b>	HPE 2TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	2,000	RI	NVMe	SFF	Hot Plug	SCN	Yes	TLC	Single	Gen9, Gen10	
P13697- <b>X21</b>	HPE 4TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	4,000	RI	NVMe	SFF	Hot Plug	SCN	Yes	TLC	Single	Gen9, Gen10	
P16501- <b>X21</b>	HPE 1.92TB NVMe High Performance Read Intensive SFF (2.5in) SC 3yr Wty Universal Connect SSD	1,920	RI	NVMe	SFF	Hot Plug	SC	Yes	MLC	Single	Gen10, Gen10.5	
P16503- <b>X21</b>	HPE 3.84TB NVMe High Performance Read Intensive SFF (2.5in) SC 3yr Wty Universal Connect SSD	3,840	RI	NVMe	SFF	Hot Plug	SC	Yes	MLC	Single	Gen10, Gen10.5	
P24188- <b>X21</b>	HPE 480GB NVMe x4 Lanes Read Intensive M.2 22110 3yr Wty Digitally Signed Firmware SSD	480	RI	NVMe	M.2	Non Hot Plug	N/A	Yes	MLC	Single	Gen10, Gen10.5	





## Technical Specifications

### PCIe/NVMe Speeds and Feeds Specifications

PCIe/NVMe Interface – SKUs (Speeds and Feeds)							
HPE Option Kit SKU	Long Description	Lifetime Writes (TB)	Endurance DWPD	MAX Seq Reads / Max Seq Writes Throughput (MiB/s)	Random Read Avg. / Random Write Avg. Latency uSec (4KiB,Q1)	Random Read / Random Writes IOPS (4KiB, Q=16)	MAX Random Read / MAX Random Write IOPS (4KiB)
<b>NVMe High Performance Low Latency SSDs</b>							
<b>Write Intensive SSDs</b>							
878014- <b>X21</b>	HPE 375GB NVMe x4 Lanes Write Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	20,500	30.0	2,550 / 2,150	17 / 17	585,000 / 550,000	585,000@Q16 / 550,000@Q16
878038- <b>X21</b>	HPE 750GB PCIe x4 Lanes Write Intensive HHHHL 3yr Wty Digitally Signed Firmware Card	41,000	30.0	2,550 / 2,300	17 / 18	575,000 / 580,000	575,000@Q16 / 580,000@Q16
P06952- <b>X21</b>	HPE 750GB NVMe x4 Lanes Write Intensive SFF (2.5in) SCN 3yr Wty	41,000	30.0	2,500 / 2,300	17 / 17	575,000 / 585,000	575,000@Q16 / 585,000@Q16
875585- <b>X21</b>	HPE 800GB NVMe x4 Lanes Mixed Use M.2 22110 3yr Wty Digitally Signed Firmware SSD	4,950	3.0	2,300 / 575	100 / 31	132,500 / 32,000	240,000@Q64 / 32,000@Q16
P07179- <b>X21</b>	HPE 800GB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	4,380	3.00	3,150 / 1,250	125 / 21	118,000 / 110,000	370,000@Q256 / 110,000@Q16
P07181- <b>X21</b>	HPE 1.6TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	8,760	3.00	3,150 / 2,500	125 / 21	125,000 / 160,000	655,000@Q256 / 160,000@Q16
P07183- <b>X21</b>	HPE 3.2TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	17,520	3.00	3,200 / 3,050	125 / 21	129,000 / 170,000	785,000@Q256 / 170,000@Q16
P07185- <b>X21</b>	HPE 6.4TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	35,040	3.00	3,200 / 3,050	125 / 21	129,000 / 165,000	785,000@Q256 / 165,000@Q16
P10222- <b>X21</b>	HPE 1.6TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	14,600	5	3,400 / 1,900	86 / 24	160,000 / 135,000	720,000@Q256 / 145,000@Q16
P10224- <b>X21</b>	HPE 3.2TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	29,200	5	3,400 / 2,900	86 / 26	165,000 / 145,000	780,000@Q256 / 195,000@Q64
P10226- <b>X21</b>	HPE 6.4TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	58,400	5	3,400 / 2,800	100 / 25	149,000 / 155,000	780,000@Q256 / 200,000@Q32



## Technical Specifications

### PCIe/NVMe Interface – SKUs (Speeds and Feeds)

HPE Option Kit SKU	Long Description	Lifetime Writes (TB)	Endurance DWPD	MAX Seq Reads / Max Seq Writes Throughput (MiB/s)	Random Read Avg. / Random Write Avg. Latency uSec (4KiB,Q1)	Random Read / Random Writes IOPS (4KiB, Q=16)	MAX Random Read / MAX Random Write IOPS (4KiB)
P10264- <b>X21</b>	HPE 1.6TB NVMe x8 Lanes Mixed Use HHHHL 3yr Wty Digitally Signed Firmware Card	14,600	5	5,200 / 1,900	175 / 115	130,000 / 135,000	750,000@Q256 / 145,000@Q256
P10266- <b>X21</b>	HPE 3.2TB NVMe x8 Lanes Mixed Use HHHHL 3yr Wty Digitally Signed Firmware Card	29,200	5	6,200 / 2,900	85 / 25	175,000 / 150,000	880,000@Q256 / 200,000@Q256
P10268- <b>X21</b>	HPE 6.4TB NVMe x8 Lanes Mixed Use HHHHL 3yr Wty Digitally Signed Firmware Card	58,400	5	6,100 / 2,900	96 / 25	150,000 / 155,000	930,000@Q256 / 210,000@Q256
P12114- <b>X21</b>	HPE 1.6TB NVMe x4 Lanes Mixed Use SFF (2.5in) RW 3yr Wty Digitally Signed Firmware SSD	14,600	5	3,400 / 1,900	86 / 24	160,000 / 135,000	720,000@Q256 / 145,000@Q16
P13668- <b>X21</b>	HPE 800GB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	5,037	3.45	3,300 / 650	100 / 27	126,000 / 67,000	230,000@Q256 / 68,000@Q16
P13670- <b>X21</b>	HPE 1.6TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	10,162	3.48	3,300 / 1,250	100 / 25	147,000 / 125,000	425,000@Q256 / 125,000@Q16
P13672- <b>X21</b>	HPE 3.2TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	20,440	3.50	3,300 / 2,400	100 / 25	157,000 / 169,000	650,000@Q256 / 175,000@Q16
P13674- <b>X21</b>	HPE 6.4TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	40,997	3.51	3,100 / 2,550	100 / 25	155,000 / 165,000	635,000@Q256 / 170,000@Q16
P13699- <b>X21</b>	HPE 1.6TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	12,250	4.10	3,200 / 1,950	83 / 18	165,000 / 200,000	660,000@Q256 / 205,000@Q32
P13701- <b>X21</b>	HPE 3.2TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	21,850	3.70	3,200 / 2,900	83 / 18	165,000 / 215,000	660,000@Q256 / 230,000@Q32
P13703- <b>X21</b>	HPE 6.4TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	36,540	3.10	3,200 / 3,100	83 / 18	170,000 / 205,000	680,000@Q256 / 225,000@Q32
P16497- <b>X21</b>	HPE 1.6TB NVMe High Performance Mixed Use SFF (2.5in) SC 3yr Wty Universal Connect SSD	8,560	3	6,300 / 2,400	90 / 41	150,000 / 180,000	600,000@Q128 / 225,000@Q64



## Technical Specifications

PCIe/NVMe Interface – SKUs (Speeds and Feeds)							
HPE Option Kit SKU	Long Description	Lifetime Writes (TB)	Endurance DWPD	MAX Seq Reads / Max Seq Writes Throughput (MiB/s)	Random Read Avg. / Random Write Avg. Latency uSec (4KiB,Q1)	Random Read / Random Writes IOPS (4KiB, Q=16)	MAX Random Read / MAX Random Write IOPS (4KiB)
P16499- <b>X21</b>	HPE 3.2TB NVMe High Performance Mixed Use SFF (2.5in) SC 3yr Wty Universal Connect SSD	17,121	3	6,600 / 3,700	85 / 37	165,000 / 170,000	680,000@Q128 / 290,000@Q256
877986- <b>X21</b>	HPE 2TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	1,790	0.5	3,200 / 1,100	87 / 25	150,000 / 41,000	510,000@Q256 / 41,000@Q4
P07190- <b>X21</b>	HPE 960GB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	1,750	1.00	3,150 / 1,250	125 / 21	118,000 / 59,000	370,000@Q256 / 59,000@Q16
P07192- <b>X21</b>	HPE 1.92TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	3,500	1.00	3,150 / 2,500	135 / 22	125,000 / 91,000	570,000@Q256 / 91,000@Q16
P07194- <b>X21</b>	HPE 3.84TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	7,000	1.00	3,200 / 3,050	125 / 25	129,000 / 97,000	780,000@Q256 / 97,000@Q16
P07196- <b>X21</b>	HPE 7.68TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	14,000	1.00	3,200 / 3,050	125 / 25	130,000 / 97,000	780,000@Q256 / 97,000@Q16
P07198- <b>X21</b>	HPE 15.36TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	28,000	1.00	3,200 / 2,950	165 / 27	97,000 / 43,000	480,000@Q128 / 43,000@Q4
P10208- <b>X21</b>	HPE 960GB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	876	0.50	3,000 / 860	125 / 46	115,000 / 21,500	340,000@Q256 / 21,500@Q1
P10210- <b>X21</b>	HPE 1.92TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	1,750	0.50	3,000 / 780	135 / 46	105,000 / 21,500	305,000@Q256 / 21,500@Q1
P10212- <b>X21</b>	HPE 3.84TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	4,480	0.60	3,000 / 1,500	130 / 25	115,000 / 41,500	560,000@Q256 / 41,500@Q1
P10214- <b>X21</b>	HPE 1.92TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	3,500	1	3,400 / 1,900	86 / 29	160,000 / 52,000	720,000@Q256 / 52,000@Q4



## Technical Specifications

PCIe/NVMe Interface – SKUs (Speeds and Feeds)							
HPE Option Kit SKU	Long Description	Lifetime Writes (TB)	Endurance DWPD	MAX Seq Reads / Max Seq Writes Throughput (MiB/s)	Random Read Avg. / Random Write Avg. Latency uSec (4KiB,Q1)	Random Read / Random Writes IOPS (4KiB, Q=16)	MAX Random Read / MAX Random Write IOPS (4KiB)
P10216- <b>X21</b>	HPE 3.84TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	7,000	1	3,400 / 2,900	87 / 31	165,000 / 74,000	780,000@Q256 / 75,000@Q16
P10218- <b>X21</b>	HPE 7.68TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	14,000	1	3,400 / 2,800	100 / 30	149,000 / 94,000	780,000@Q256 / 94,000@Q16
P12112- <b>X21</b>	HPE 3.84TB NVMe x4 Lanes Read Intensive SFF (2.5in) Raw 3yr Wty Digitally Signed Firmware SSD	7,000	1.00	3,200 / 3,050	125 / 25	129,000 / 97,000	780,000@Q256 / 97,000@Q16
P13676- <b>X21</b>	HPE 960GB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	2,312	1.32	3,300 / 650	100 / 32	125,000 / 30,000	230,000@Q256 / 30,000@Q4
P13678- <b>X21</b>	HPE 1.92TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	4,695	1.34	3,300 / 1,250	100 / 27	147,000 / 55,000	425,000@Q256 / 55,000@Q4
P13680- <b>X21</b>	HPE 3.84TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	9,461	1.35	3,300 / 2,350	100 / 28	155,000 / 72,000	650,000@Q256 / 72,000@Q4
P13682- <b>X21</b>	HPE 7.68TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	19,062	1.36	3,100 / 2,550	105 / 31	154,000 / 73,000	635,000@Q256 / 73,000@Q4
P13689- <b>X21</b>	HPE 960GB NVMe x4 Lanes Read Intensive M.2 22110 3yr Wty Digitally Signed Firmware SSD	981	0.56	3,300 / 1,350	91 / 29	155,000 / 47,500	480,000@Q256 / 47,500@Q4
P13691- <b>X21</b>	HPE 1.92TB NVMe x4 Lanes Read Intensive M.2 22110 3yr Wty Digitally Signed Firmware SSD	4,765	1.36	3,300 / 1,250	97 / 28	145,000 / 54,000	425,000@Q256 / 54,500@Q64
P13693- <b>X21</b>	HPE 3.84TB NVMe x4 Lanes Read Intensive M.2 22110 3yr Wty Digitally Signed Firmware SSD	9,601	1.37	3,300 / 1,300	97 / 28	155,000 / 64,500	645,000@Q256 / 64,500@Q4
P13695- <b>X21</b>	HPE 2TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	2,600	0.70	3,100 / 1,900	80 / 22	170,000 / 83,000	670,000@Q256 / 83,000@Q16



## Technical Specifications

PCIe/NVMe Interface – SKUs (Speeds and Feeds)								
HPE Option Kit SKU	Long Description	Lifetime Writes (TB)	Endurance DWPD	MAX Seq Reads / Max Seq Writes Throughput (MiB/s)	Random Read Avg. / Random Write Avg.	Latency uSec (4KiB,Q1)	Random Read / Random Writes IOPS (4KiB, Q=16)	MAX Random Read / MAX Random Write IOPS (4KiB)
P13697- <b>X21</b>	HPE 4TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	6,300	0.80	2,900 / 2,800	80 / 21		170,000 / 120,000	670,000@Q256 / 120,000@Q16
P16501- <b>X21</b>	HPE 1.92TB NVMe High Performance Read Intensive SFF (2.5in) SC 3yr Wty Universal Connect SSD	3,424	1	6,300 / 2,400	90 / 41		150,000 / 115,000	690,000@Q128 / 115,000@Q16
P16503- <b>X21</b>	HPE 3.84TB NVMe High Performance Read Intensive SFF (2.5in) SC 3yr Wty Universal Connect SSD	6,848	1	6,600 / 3,700	90 / 40		155,000 / 130,000	700,000@Q128 / 150,000@Q32
P24188- <b>X21</b>	HPE 480GB NVMe x4 Lanes Read Intensive M.2 22110 3yr Wty Digitally Signed Firmware SSD	482	0.55	2,800 / 690	91 / 45		135,000 / 26,500	250,000@Q256 / 26,500@128

## PCIe/NVMe Power & Height Specifications

PCIe/NVMe Interface – (Power & Height)									
HPE Option Kit SKU	Long Description	Power Idle Time (Watts)	Power Random Read (Watts)	Power Random Write (Watts)	Power Sequential Read (Watts)	Power Sequential Write (Watts)	Power Random R/W (Watts)	Power MAX (Watts)	z- Height
<b>NVMe High Performance Low Latency SSDs</b>									
<b>Write Intensive SSDs</b>									
878014- <b>X21</b>	HPE 375GB NVMe x4 Lanes Write Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	4.00	5.16	5.16	8.50	12.20	5.16	13.00	15mm
878038- <b>X21</b>	HPE 750GB PCIe x4 Lanes Write Intensive HHHHL 3yr Wty Digitally Signed Firmware Card	4.70	9.8	9.80	9.50	13.90	9.80	14.00	Half Height/ Half Length
P06952- <b>X21</b>	HPE 750GB NVMe x4 Lanes Write Intensive SFF (2.5in) SCN 3yr Wty	4.50	9.74	9.74	9.74	9.12	14.04	14.04	15mm
875585- <b>X21</b>	HPE 800GB NVMe x4 Lanes Mixed Use M.2 22110 3yr Wty Digitally Signed Firmware SSD	2.60	4.50	5.50	6.50	7.50	5.00	8.00	22110 M.2



## Technical Specifications

PCIe/NVMe Interface – (Power & Height)									
HPE Option Kit SKU	Long Description	Power Idle Time (Watts)	Power Random Read (Watts)	Power Random Write (Watts)	Power Sequential Read (Watts)	Power Sequential Write (Watts)	Power Random R/W (Watts)	Power MAX (Watts)	z- Height
P07179- <b>X21</b>	HPE 800GB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	4.84	6.13	6.13	6.13	9.02	7.66	9.02	15mm
P07181- <b>X21</b>	HPE 1.6TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	4.89	6.30	6.30	6.30	9.41	10.71	10.71	15mm
P07183- <b>X21</b>	HPE 3.2TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	5.09	6.74	6.74	6.74	10.63	12.22	12.22	15mm
P07185- <b>X21</b>	HPE 6.4TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	5.48	7.24	7.24	7.24	11.48	13.13	13.13	15mm
P10222- <b>X21</b>	HPE 1.6TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	6.20	10.00	10.00	13.70	14.90	10.00	14.90	15mm
P10224- <b>X21</b>	HPE 3.2TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	7.20	10.80	10.80	14.40	18.00	10.80	18.00	15mm
P10226- <b>X21</b>	HPE 6.4TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	8.66	13.62	13.62	14.40	18.00	13.62	18.00	15mm
P10264- <b>X21</b>	HPE 1.6TB NVMe x8 Lanes Mixed Use HHHHL 3yr Wty Digitally Signed Firmware Card	7.18	12.22	12.22	17.49	15.24	12.22	18.00	Half Height/ Half length
P10266- <b>X21</b>	HPE 3.2TB NVMe x8 Lanes Mixed Use HHHHL 3yr Wty Digitally Signed Firmware Card	7.30	13.24	13.24	17.97	18.85	13.24	19.00	Half Height/ Half length
P10268- <b>X21</b>	HPE 6.4TB NVMe x8 Lanes Mixed Use HHHHL 3yr Wty Digitally Signed Firmware Card	7.42	13.72	13.72	18.51	21.44	13.72	22.00	Half Height/ Half length
P12114- <b>X21</b>	HPE 1.6TB NVMe x4 Lanes Mixed Use SFF (2.5in) RW 3yr Wty Digitally Signed Firmware SSD	6.20	10.00	10.00	13.70	14.90	10.00	15.00	15mm

## Technical Specifications

PCIe/NVMe Interface – (Power & Height)									
HPE Option Kit SKU	Long Description	Power Idle Time (Watts)	Power Random Read (Watts)	Power Random Write (Watts)	Power Sequential Read (Watts)	Power Sequential Write (Watts)	Power Random R/W (Watts)	Power MAX (Watts)	z- Height
P13668- <b>X21</b>	HPE 800GB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	3.30	5.38	5.38	7.66	5.39	5.38	7.66	15mm
P13670- <b>X21</b>	HPE 1.6TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	3.25	7.00	7.00	7.94	7.41	7.00	7.94	15mm
P13672- <b>X21</b>	HPE 3.2TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	3.35	8.64	8.64	8.18	11.41	8.64	11.41	15mm
P13674- <b>X21</b>	HPE 6.4TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	3.49	10.65	10.65	9.12	13.81	10.65	13.81	15mm
P13699- <b>X21</b>	HPE 1.6TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	4.38	10.49	10.49	10.49	8.90	11.83	11.83	15mm
P13701- <b>X21</b>	HPE 3.2TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	4.36	10.56	10.56	10.56	8.43	13.37	13.37	15mm
P13703- <b>X21</b>	HPE 6.4TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	4.97	12.13	12.13	12.13	8.84	14.48	14.48	15mm
P16497- <b>X21</b>	HPE 1.6TB NVMe High Performance Mixed Use SFF (2.5in) SC 3yr Wty Universal Connect SSD	7.00	8.40	8.40	11.00	14.00	8.40	14.00	15mm
P16499- <b>X21</b>	HPE 3.2TB NVMe High Performance Mixed Use SFF (2.5in) SC 3yr Wty Universal Connect SSD	7.00	8.40	8.40	11.00	14.00	8.40	14.00	15mm
877986- <b>X21</b>	HPE 2TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	<5.00	11.35	12.90	9.62	13.45	12.00	14.00	15mm
P07190- <b>X21</b>	HPE 960GB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	4.74	5.91	5.91	5.91	8.72	6.77	8.72	15mm



## Technical Specifications

PCIe/NVMe Interface – (Power & Height)									
HPE Option Kit SKU	Long Description	Power Idle Time (Watts)	Power Random Read (Watts)	Power Random Write (Watts)	Power Sequential Read (Watts)	Power Sequential Write (Watts)	Power Random R/W (Watts)	Power MAX (Watts)	z- Height
P07192- <b>X21</b>	HPE 1.92TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	4.84	6.26	6.26	6.26	9.47	10.65	10.65	15mm
P07194- <b>X21</b>	HPE 3.84TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	5.10	6.71	6.71	6.71	10.56	12.26	12.26	15mm
P07196- <b>X21</b>	HPE 7.68TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	5.44	7.23	7.23	7.23	11.45	13.15	13.15	15mm
P07198- <b>X21</b>	HPE 15.36TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	5.55	7.59	7.59	7.59	11.82	15.06	15.06	15mm
P10208- <b>X21</b>	HPE 960GB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	4.74	5.91	5.91	5.91	8.72	6.77	8.72	15mm
P10210- <b>X21</b>	HPE 1.92TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	4.83	6.19	6.19	6.19	8.97	7.20	8.97	15mm
P10212- <b>X21</b>	HPE 3.84TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	5.06	6.70	6.70	6.70	9.51	9.71	9.71	15mm
P10214- <b>X21</b>	HPE 1.92TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	6.20	10.00	10.00	13.70	14.90	10.00	14.90	15mm
P10216- <b>X21</b>	HPE 3.84TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	7.20	10.00	10.00	14.60	18.10	10.00	18.10	15mm
P10218- <b>X21</b>	HPE 7.68TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	8.64	10.50	10.50	14.69	18.72	10.50	18.72	15mm
P12112- <b>X21</b>	HPE 3.84TB NVMe x4 Lanes Read Intensive SFF (2.5in) Raw 3yr Wty Digitally Signed Firmware SSD	5.10	6.71	6.71	6.71	10.56	12.26	12.26	15mm





## Technical Specifications

PCIe/NVMe Interface – (Power & Height)									
HPE Option Kit SKU	Long Description	Power Idle Time (Watts)	Power Random Read (Watts)	Power Random Write (Watts)	Power Sequential Read (Watts)	Power Sequential Write (Watts)	Power Random R/W (Watts)	Power MAX (Watts)	z- Height
P13676- <b>X21</b>	HPE 960GB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	3.30	5.38	5.38	7.66	5.39	5.38	7.66	15mm
P13678- <b>X21</b>	HPE 1.92TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	3.25	7.00	7.00	7.94	7.41	7.00	7.94	15mm
P13680- <b>X21</b>	HPE 3.84TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	3.35	8.64	8.64	8.18	11.41	8.64	11.41	15mm
P13682- <b>X21</b>	HPE 7.68TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	3.49	10.65	10.65	9.12	13.81	10.65	13.81	15mm
P13689- <b>X21</b>	HPE 960GB NVMe x4 Lanes Read Intensive M.2 22110 3yr Wty Digitally Signed Firmware SSD	2.41	6.16	6.16	6.57	6.33	6.16	6.57	2mm
P13691- <b>X21</b>	HPE 1.92TB NVMe x4 Lanes Read Intensive M.2 22110 3yr Wty Digitally Signed Firmware SSD	2.42	6.27	6.27	6.80	6.55	6.27	6.80	2mm
P13693- <b>X21</b>	HPE 3.84TB NVMe x4 Lanes Read Intensive M.2 22110 3yr Wty Digitally Signed Firmware SSD	2.43	7.49	7.49	6.90	6.64	7.49	7.49	2mm
P13695- <b>X21</b>	HPE 2TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	4.53	10.71	10.71	10.71	9.47	11.76	11.76	15mm
P13697- <b>X21</b>	HPE 4TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	4.54	10.47	10.47	10.47	8.88	12.56	12.56	15mm
P16501- <b>X21</b>	HPE 1.92TB NVMe High Performance Read Intensive SFF (2.5in) SC 3yr Wty Universal Connect SSD	7.00	8.40	8.40	11.00	14.00	8.40	14.00	15mm
P16503- <b>X21</b>	HPE 3.84TB NVMe High Performance Read Intensive SFF (2.5in) SC 3yr Wty Universal Connect SSD	7.00	8.40	8.40	11.00	14.00	8.40	14.00	15mm



## Technical Specifications

P24188- <b>X21</b>	HPE 480GB NVMe x4 Lanes Read Intensive M.2 22110 3yr Wty Digitally Signed Firmware SSD	2.41	4.62	4.62	6.49	4.66	4.62	6.49	2mm
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### Inbox NVMe Drivers

Inbox NVMe drivers for the minimally supported operating systems listed below have been tested on HPE NVMe SSDs and Add-in Cards. Check the specifications for the HPE server of interest to determine if it supports one of these Operating Systems.

- Windows Server 2019
- Windows Server 2016
- Windows Server 2012R2
- Red Hat Enterprise Linux Server 6.5
- Red Hat Enterprise Linux Server 7.0
- SUSE Linux Enterprise Server 12
- Ubuntu 14.04 VMWare vSphere 6.1

### NVMe Certifications

#### NVMe Interface – (Certifications)

HPE Option Kit SKU	Long Description	VMWare / vSAN HCL Certification (Watts)	Microsoft Windows Server 2016 Certification	Software Defined Data Center (SDDC) Premium AQ Certification	Microsoft Windows Server 2019 Certification	WS 2019 Software Defined Data Center (SDDC)
<b>NVMe High Performance Low Latency SSDs</b>						
<b>Write Intensive SSDs</b>						
878014- <b>X21</b>	HPE 375GB NVMe x4 Lanes Write Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
878038- <b>X21</b>	HPE 750GB PCIe x4 Lanes Write Intensive HHHL 3yr Wty Digitally Signed Firmware Card	Certified	Certified	Certified	Certified	Certified
P06952- <b>X21</b>	HPE 750GB NVMe x4 Lanes Write Intensive SFF (2.5in) SCN 3yr Wty	Pending	Certified	Certified	Certified	Certified
<b>NVMe High Performance Mixed Use Drives</b>						
875585- <b>X21</b>	HPE 800GB NVMe x4 Lanes Mixed Use M.2 22110 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	N/A	N/A
P07179- <b>X21</b>	HPE 800GB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P07181- <b>X21</b>	HPE 1.6TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified



## Technical Specifications

### NVMe Interface – (Certifications)

HPE Option Kit SKU	Long Description	VMware / vSAN HCL Certification (Watts)	Microsoft Windows Server 2016 Certification	Software Defined Data Center (SDDC) Premium AQ Certification	Microsoft Windows Server 2019 Certification	WS 2019 Software Defined Data Center (SDDC)
P07183- <b>X21</b>	HPE 3.2TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P07185- <b>X21</b>	HPE 6.4TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P10222- <b>X21</b>	HPE 1.6TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P10224- <b>X21</b>	HPE 3.2TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P10226- <b>X21</b>	HPE 6.4TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P10264- <b>X21</b>	HPE 1.6TB NVMe x8 Lanes Mixed Use HHHL 3yr Wty Digitally Signed Firmware Card	Certified	Certified	Certified	Certified	Certified
P10266- <b>X21</b>	HPE 3.2TB NVMe x8 Lanes Mixed Use HHHL 3yr Wty Digitally Signed Firmware Card	Certified	Certified	Certified	Certified	Certified
P10268- <b>X21</b>	HPE 6.4TB NVMe x8 Lanes Mixed Use HHHL 3yr Wty Digitally Signed Firmware Card	Certified	Certified	Certified	Certified	Certified
P12114- <b>X21</b>	HPE 1.6TB NVMe x4 Lanes Mixed Use SFF (2.5in) RW 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P13668- <b>X21</b>	HPE 800GB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P13670- <b>X21</b>	HPE 1.6TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P13672- <b>X21</b>	HPE 3.2TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified



## Technical Specifications

### NVMe Interface – (Certifications)

HPE Option Kit SKU	Long Description	VMWare / vSAN HCL Certification (Watts)	Microsoft Windows Server 2016 Certification	Software Defined Data Center (SDDC) Premium AQ Certification	Microsoft Windows Server 2019 Certification	WS 2019 Software Defined Data Center (SDDC)
P13674- <b>X21</b>	HPE 6.4TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P13699- <b>X21</b>	HPE 1.6TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P13701- <b>X21</b>	HPE 3.2TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P13703- <b>X21</b>	HPE 6.4TB NVMe x4 Lanes Mixed Use SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P16497- <b>X21</b>	HPE 1.6TB NVMe High Performance Mixed Use SFF (2.5in) SC 3yr Wty Universal Connect SSD	N/A	Pending	Pending	Pending	Pending
P16499- <b>X21</b>	HPE 3.2TB NVMe High Performance Mixed Use SFF (2.5in) SC 3yr Wty Universal Connect SSD	N/A	Pending	Pending	Pending	Pending
877986- <b>X21</b>	HPE 2TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	NR	NR
P07190- <b>X21</b>	HPE 960GB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P07192- <b>X21</b>	HPE 1.92TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P07194- <b>X21</b>	HPE 3.84TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P07196- <b>X21</b>	HPE 7.68TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified

## Technical Specifications

### NVMe Interface – (Certifications)

HPE Option Kit SKU	Long Description	VMware / vSAN HCL Certification (Watts)	Microsoft Windows Server 2016 Certification	Software Defined Data Center (SDDC) Premium AQ Certification	Microsoft Windows Server 2019 Certification	WS 2019 Software Defined Data Center (SDDC)
P07198- <b>X21</b>	HPE 15.36TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P10208- <b>X21</b>	HPE 960GB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Pending	Certified	Certified
P10210- <b>X21</b>	HPE 1.92TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Pending	Certified	Certified
P10212- <b>X21</b>	HPE 3.84TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Pending	Certified	Certified
P10214- <b>X21</b>	HPE 1.92TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P10216- <b>X21</b>	HPE 3.84TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P10218- <b>X21</b>	HPE 7.68TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P12112- <b>X21</b>	HPE 3.84TB NVMe x4 Lanes Read Intensive SFF (2.5in) Raw 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P13676- <b>X21</b>	HPE 960GB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P13678- <b>X21</b>	HPE 1.92TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P13680- <b>X21</b>	HPE 3.84TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified



## Technical Specifications

### NVMe Interface – (Certifications)

HPE Option Kit SKU	Long Description	VMWare / vSAN HCL Certification (Watts)	Microsoft Windows Server 2016 Certification	Software Defined Data Center (SDDC) Premium AQ Certification	Microsoft Windows Server 2019 Certification	WS 2019 Software Defined Data Center (SDDC)
P13682- <b>X21</b>	HPE 7.68TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P13689- <b>X21</b>	HPE 960GB NVMe x4 Lanes Read Intensive M.2 22110 3yr Wty Digitally Signed Firmware SSD	Pending	Pending	Pending	Pending	Pending
P13691- <b>X21</b>	HPE 1.92TB NVMe x4 Lanes Read Intensive M.2 22110 3yr Wty Digitally Signed Firmware SSD	Pending	Pending	Pending	Pending	Pending
P13693- <b>X21</b>	HPE 3.84TB NVMe x4 Lanes Read Intensive M.2 22110 3yr Wty Digitally Signed Firmware SSD	Pending	Pending	Pending	Pending	Pending
P13695- <b>X21</b>	HPE 2TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P13697- <b>X21</b>	HPE 4TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P16501- <b>X21</b>	HPE 1.92TB NVMe High Performance Read Intensive SFF (2.5in) SC 3yr Wty Universal Connect SSD	N/A	Pending	Pending	Pending	Pending
P16503- <b>X21</b>	HPE 3.84TB NVMe High Performance Read Intensive SFF (2.5in) SC 3yr Wty Universal Connect SSD	N/A	Pending	Pending	Pending	Pending
P24188- <b>X21</b>	HPE 480GB NVMe x4 Lanes Read Intensive M.2 22110 3yr Wty Digitally Signed Firmware SSD	Pending	Pending	Pending	Pending	Pending



## Technical Specifications

### M.2 Enablement Kits Capacity, Workload, Carrier Specifications

M.2 Enablement Kits – (Capacity, Workload, Carrier...)											
HPE Option KIT SKU	Long Description	Capacity	Workload Type	Interface Type	Form Factor	Plug Type	Carrier Type	Digitally Signed Firmware (DS)	Flash Type	Server Gen Supported (Select Platforms)	
878783- <b>X21</b> *	HPE Universal SATA HHHL 3yr Wty M.2 Kit	N/A	N/A	SATA	M.2e	Non-Hot Plug	AIC	Yes	N/A	Gen9, Gen10	
P06607- <b>X21</b> **	HPE Dual 240GB SATA 6G Mixed Use M.2 - UFF to SFF SCM 3yr Wty Digitally Signed Firmware SSD	240	MU	SATA	SFF	Hot Plug	SCM	Yes	MLC	Gen10	
P06609- <b>X21</b> **	HPE Dual 480GB SATA 6G Read Intensive M.2 - UFF to SFF SCM 3yr Wty Digitally Signed Firmware SSD	480	RI	SATA	SFF	Hot Plug	SCM	Yes	MLC	Gen10	
P19894- <b>X21</b>	HPE Dual 240GB SATA 6G Read Intensive M.2 - UFF to SFF SCM 3yr Wty SSD	240	RI	SATA	SFF	Hot Plug	SCM	Yes	TLC	Gen10, Gen10.5	
P19896- <b>X21</b>	HPE Dual 480GB SATA 6G Read Intensive M.2 - UFF to SFF SCM 3yr Wty SSD	480	RI	SATA	SFF	Hot Plug	SCM	Yes	TLC	Gen10, Gen10.5	

#### Notes:

- \*878783-**X21** enablement Kit is an Add-In-Card, for installation inside of the server, that can be configured to be either Single or Dual with choice of any SATA 2280 M.2 in the HPE M.2 portfolio. See SATA M.2s in Tables above.
- \*\*Speeds and Feeds information should be taken from the M.2 drives used within the enablement kits. See SATA M.2s in tables above and below.

### M.2 Enablement Kits – (Speeds & Feeds)

**Notes:** \*\*Speeds and Feeds information should be taken from the M.2 drives used within the enablement kits. See SATA M.2s in tables above and below.

### M.2 Enablement Kits Power and Height Specifications

M.2 Enablement Kits – (Power & Height)										
HPE Option Kit SKU	Long Description	Power Idle Time (Watts)	Power Random Read (Watts)	Power Random Write (Watts)	Power Sequential Read (Watts)	Power Sequential Write (Watts)	Power Random R/W (Watts)	Power MAX (Watts)	z-Height	
878783- <b>X21</b> *	HPE Universal SATA HHHL 3yr Wty M.2 Kit	NA	NA	NA	NA	NA	NA	NA	Half Height/ Half Length	
P06607- <b>X21</b> **	HPE Dual 240GB SATA 6G Mixed Use M.2 - UFF to SFF SCM 3yr Wty Digitally Signed Firmware SSD	2.00	2.84	2.84	3.90	5.74	2.84	6.00	7mm	



## Technical Specifications

P06609- <b>X21</b> **	HPE Dual 480GB SATA 6G Read Intensive M.2 - UFF to SFF SCM 3yr Wty Digitally Signed Firmware SSD	2.00	2.84	2.84	3.90	5.74	2.84	6.00	7mm
P19894- <b>X21</b>	HPE Dual 240GB SATA 6G Read Intensive M.2 - UFF to SFF SCM 3yr Wty SSD	1.03	1.26	1.26	1.89	2.22	1.26	2.22	7mm
P19896- <b>X21</b>	HPE Dual 480GB SATA 6G Read Intensive M.2 - UFF to SFF SCM 3yr Wty SSD	1.03	1.23	1.23	1.89	2.50	1.23	2.50	7mm

### Notes:

- Power information should be taken from the M.2 drives used within the enablement kits. See SATA M.2s in tables above and below.
- \*878783-**X21** enablement Kit is an Add-In-Card, for installation inside of the server, that can be configured to be either Single or Dual with choice of any SATA 2280 M.2 in the HPE M.2 portfolio. See SATA M.2s in Tables above and below.
- \*\*Speeds and Feeds information should be taken from the M.2 drives used within the enablement kits. See SATA M.2s in tables above and below.
- Please use HPE Selector Tool <http://ssd.hpe.com/> to determine server compatibility

## M.2 Enablement Kits Certifications

### M.2 Enablement Kits – (Certifications)

HPE Option Kit SKU	Long Description	VMWare / vSAN HCL Certification (Watts)	Microsoft Windows Server 2016 Certification	Software Defined Data Center (SDDC) Premium AQ Certification	Microsoft Windows Server 2019 Certification	WS 2019 Software Defined Data Center (SDDC)
878783- <b>X21</b> *	HPE Universal SATA HHL 3yr Wty M.2 Kit	NA	NA	NA	NA	NA
P06607- <b>X21</b> **	HPE Dual 240GB SATA 6G Mixed Use M.2 - UFF to SFF SCM 3yr Wty Digitally Signed Firmware SSD	NA	Certified	Certified	Certified	Certified
P06609- <b>X21</b> **	HPE Dual 480GB SATA 6G Read Intensive M.2 - UFF to SFF SCM 3yr Wty Digitally Signed Firmware SSD	NA	Certified	Certified	Certified	Certified
P19894- <b>X21</b>	HPE Dual 240GB SATA 6G Read Intensive M.2 - UFF to SFF SCM 3yr Wty SSD	Pending	Pending	Pending	Pending	Pending
P19896- <b>X21</b>	HPE Dual 480GB SATA 6G Read Intensive M.2 - UFF to SFF SCM 3yr Wty SSD	Pending	Pending	Pending	Pending	Pending

**Notes:** Please use HPE Selector Tool <http://ssd.hpe.com/> to determine server compatibility.





## Technical Specifications

### M.2 Capacity, Workload, Carrier Specifications

M.2s- (Capacity, Workload, Carrier...)											
HPE Option Kit SKU	Long Description	Capacity	Workload Type	Interface Type	Form Factor	Plug Type	Carrier Type	Digitally Signed Firmware (DS)	Flash Type	Server Gen Supported (Select Platforms)	
<b>Mixed Use SATA M.2s</b>											
875488- <b>X21</b>	HPE 240GB SATA 6G Mixed Use M.2 2280 3yr Wty Digitally Signed Firmware SSD	240	MU	SATA	M.2	N/A	N/A	Yes	TLC	Gen9, Gen10	
875490- <b>X21</b>	HPE 480GB SATA 6G Mixed Use M.2 2280 3yr Wty Digitally Signed Firmware SSD	480	MU	SATA	M.2	N/A	N/A	Yes	TLC	Gen9, Gen10	
875492- <b>X21</b>	HPE 960GB SATA 6G Mixed Use M.2 2280 3yr Wty Digitally Signed Firmware SSD	960	MU	SATA	M.2	N/A	N/A	Yes	TLC	Gen9, Gen10	
<b>Read Intensive SATA M.2s</b>											
875498- <b>X21</b>	HPE 480GB SATA 6G Read Intensive M.2 2280 3yr Wty Digitally Signed Firmware SSD	480	RI	SATA	M.2	N/A	N/A	Yes	TLC	Gen9, Gen10	
875500- <b>X21</b>	HPE 960GB SATA 6G Read Intensive M.2 2280 3yr Wty Digitally Signed Firmware SSD	960	RI	SATA	M.2	N/A	N/A	Yes	TLC	Gen9, Gen10	
P19888- <b>X21</b>	HPE 240GB SATA 6G Read Intensive M.2 2280 3yr Wty SSD	240	RI	SATA	M.2	Non Hot Plug	N/A	Yes	TLC	Gen10, Gen10.5	
P19890- <b>X21</b>	HPE 480GB SATA 6G Read Intensive M.2 2280 3yr Wty SSD	480	RI	SATA	M.2	Non Hot Plug	N/A	Yes	TLC	Gen10, Gen10.5	
P19892- <b>X21</b>	HPE 960GB SATA 6G Read Intensive M.2 2280 3yr Wty SSD	960	RI	SATA	M.2	Non Hot Plug	N/A	Yes	TLC	Gen10, Gen10.5	
<b>Notes:</b> Please use HPE Selector Tool <a href="http://ssd.hpe.com/">http://ssd.hpe.com/</a> to determine server compatibility.											



## Technical Specifications

### M.2 Speeds and Feeds Specifications

M.2s- (Speeds & Feeds)								
HPE Option Kit SKU	Long Description	Lifetime Writes (TB)	Endurance DWPD	MAX Seq Reads / Max Seq Writes	Throughput	Random Read Avg. / Random Write Avg. Latency uSec (4KiB,Q1)	Random Read / Random Writes IOPS (4KiB, Q=16)	MAX Random Read / MAX Random Write IOPS (4KiB)
<b>Mixed Use SATA M.2s</b>								
875488- <b>X21</b>	HPE 240GB SATA 6G Mixed Use M.2 2280 3yr Wty Digitally Signed Firmware SSD	650	1.5	500 / 260	135 / 40	60,000 / 34,000	66,000@Q32 / 34,000@Q4	
875490- <b>X21</b>	HPE 480GB SATA 6G Mixed Use M.2 2280 3yr Wty Digitally Signed Firmware SSD	1,300	1.5	500 / 400	130 / 40	60,000 / 34,000	68,000@Q32 / 34,000@Q4	
875492- <b>X21</b>	HPE 960GB SATA 6G Mixed Use M.2 2280 3yr Wty Digitally Signed Firmware SSD	4,400	2.6	500 / 465	130 / 40	60,000 / 30,000	68,000@Q32 / 30,000@Q4	
<b>Read Intensive SATA M.2s</b>								
875498- <b>X21</b>	HPE 480GB SATA 6G Read Intensive M.2 2280 3yr Wty Digitally Signed Firmware SSD	450	0.5	500 / 425	130 / 40	61,000 / 46,000	67,000@Q32 / 46,000@Q64	
875500- <b>X21</b>	HPE 960GB SATA 6G Read Intensive M.2 2280 3yr Wty Digitally Signed Firmware SSD	900	0.5	500 / 465	130 / 40	61,000 / 41,000	67,000@Q32 / 41,000@Q4	
P19888- <b>X21</b>	HPE 240GB SATA 6G Read Intensive M.2 2280 3yr Wty SSD	438	1.00	520 / 210	125 / 85	48,000 / 11,500	50,500@Q128 / 11,800@Q16	
P19890- <b>X21</b>	HPE 480GB SATA 6G Read Intensive M.2 2280 3yr Wty SSD	1,324	1.50	510 / 400	125 / 37	65,000 / 38,000	76,000@Q64 / 39,500@Q256	
P19892- <b>X21</b>	HPE 960GB SATA 6G Read Intensive M.2 2280 3yr Wty SSD	2,628	1.50	510 / 490	125 / 38	67,000 / 37,000	76,000@Q32 / 38,000@Q4	
<b>Mixed Use NVMe M.2s</b>								
<b>Notes:</b> Please use HPE Selector Tool <a href="http://ssd.hpe.com/">http://ssd.hpe.com/</a> to determine server compatibility.								

## Technical Specifications

### M.2 Power and Height Specifications

<b>M.2s- (Power &amp; Height)</b>									
<b>HPE Option Kit SKU</b>	<b>Long Description</b>	<b>Power Idle Time (Watts)</b>	<b>Power Random Read (Watts)</b>	<b>Power Random Write (Watts)</b>	<b>Power Sequential Read (Watts)</b>	<b>Power Sequential Write (Watts)</b>	<b>Power Random R/W (Watts)</b>	<b>Power MAX (Watts)</b>	<b>z- Height</b>
<b>Mixed Use SATA M.2s</b>									
875488- <b>X21</b>	HPE 240GB SATA 6G Mixed Use M.2 2280 3yr Wty Digitally Signed Firmware SSD	1.07	3.00	3.00	3.21	3.90	2.95	4.00	2280 M.2
875490- <b>X21</b>	HPE 480GB SATA 6G Mixed Use M.2 2280 3yr Wty Digitally Signed Firmware SSD	1.07	3.02	3.02	3.42	4.03	3.00	5.00	2280 M.2
875492- <b>X21</b>	HPE 960GB SATA 6G Mixed Use M.2 2280 3yr Wty Digitally Signed Firmware SSD	1.07	3.17	3.17	3.82	5.62	3.10	6.00	2280 M.2
<b>Read Intensive SATA M.2s</b>									
875498- <b>X21</b>	HPE 480GB SATA 6G Read Intensive M.2 2280 3yr Wty Digitally Signed Firmware SSD	1.07	3.02	3.02	3.42	4.03	3.00	5.00	2280 M.2
875500- <b>X21</b>	HPE 960GB SATA 6G Read Intensive M.2 2280 3yr Wty Digitally Signed Firmware SSD	1.07	3.17	3.17	3.82	5.62	3.10	6.00	2280 M.2
P19888- <b>X21</b>	HPE 240GB SATA 6G Read Intensive M.2 2280 3yr Wty SSD	1.03	1.26	1.26	1.89	2.22	1.26	2.22	2280 M.2
P19890- <b>X21</b>	HPE 480GB SATA 6G Read Intensive M.2 2280 3yr Wty SSD	1.03	1.23	1.23	1.89	2.50	1.23	2.50	2280 M.2
P19892- <b>X21</b>	HPE 960GB SATA 6G Read Intensive M.2 2280 3yr Wty SSD	1.04	1.27	1.27	2.10	2.80	1.27	2.80	2280 M.2
<b>Mixed Use NVMe M.2s</b>									



## Technical Specifications

### M.2 Enablement Kits Certifications

#### M.2 Enablement Kits – (Certifications)

HPE Option Kit SKU	Long Description	VMWare / vSAN HCL Certification (Watts)	Microsoft Windows Server 2016 Certification	Software Defined Data Center (SDDC) Premium AQ Certification	Microsoft Windows Server 2019 Certification	WS 2019 Software Defined Data Center (SDDC)
<b>Mixed Use SATA M.2s</b>						
875488- <b>X21</b>	HPE 240GB SATA 6G Mixed Use M.2 2280 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
875490- <b>X21</b>	HPE 480GB SATA 6G Mixed Use M.2 2280 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
875492- <b>X21</b>	HPE 960GB SATA 6G Mixed Use M.2 2280 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
<b>Read Intensive SATA M.2s</b>						
875498- <b>X21</b>	HPE 480GB SATA 6G Read Intensive M.2 2280 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
875500- <b>X21</b>	HPE 960GB SATA 6G Read Intensive M.2 2280 3yr Wty Digitally Signed Firmware SSD	Certified	Certified	Certified	Certified	Certified
P19888- <b>X21</b>	HPE 240GB SATA 6G Read Intensive M.2 2280 3yr Wty SSD	Pending	Pending	Pending	Pending	Pending
P19890- <b>X21</b>	HPE 480GB SATA 6G Read Intensive M.2 2280 3yr Wty SSD	Pending	Pending	Pending	Pending	Pending
P19892- <b>X21</b>	HPE 960GB SATA 6G Read Intensive M.2 2280 3yr Wty SSD	Pending	Pending	Pending	Pending	Pending

### Previous To Current Workload Naming Conversion

Please use the table below for comparing older SSD models to the newer workload descriptions.

Previous Workload	Current Workload Alignment
(HE) High Endurance	(WI) Write Intensive (>25 DWPD)
(ME) Mainstream Endurance	(WI) Write Intensive (>25 DWPD)
(LE) Light Endurance	(MU) Mixed Use (>1 & <10 DWPD)
(VE) Value Endurance	(RI) Read Intensive (<=1 DWPD)



## Technical Specifications

### Carrier Key Decoder

HPE Solid State Drives (SSDs) utilize a wide variety of carriers, which houses the SSD and also enables a specific chassis fit to support a broad range of HPE server and storage products.

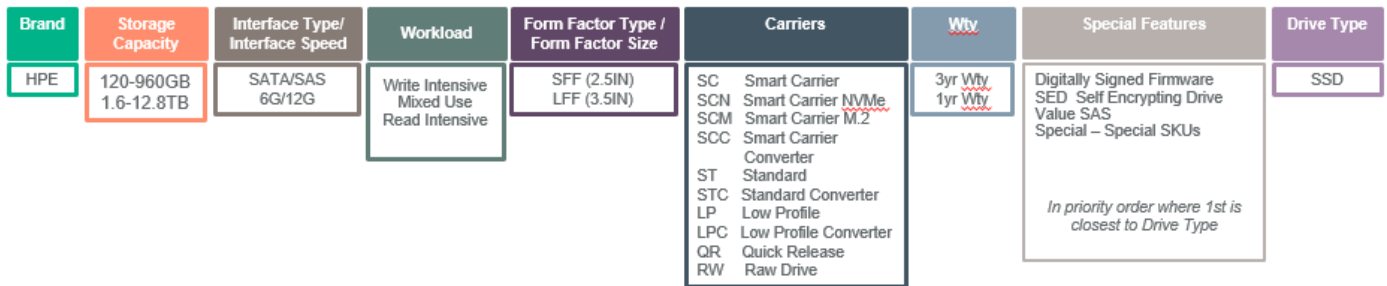
The table below summarizes the various form factors, plug types, and carrier attributes.

Carriers				
Form Factor	HP/NHP	Smart/Non-Smart	Carrier Name (Abbreviation)	SFF/LFF
SFF Carrier	Hot Plug	Smart	Smart Carrier (SC)	SFF
			Smart Carrier NVMe (SCN)	SFF
			Smart Carrier M.2 (SCM)	SFF
	Non-Hot Plug	Non-Smart	Standard (ST)	SFF
			Quick Release (QR)	SFF
LFF Carrier	Hot Plug	Smart	Smart Carrier (SC)	LFF
			Smart Carrier Converter (SCC)	LFF
		Non-Smart	Low Profile (LP)	LFF
			Low Profile Converter (LPC)	LFF
	Non-Hot Plug	Non-Smart	Standard (ST)	LFF
			Quick Release (QR)	LFF
			Raw SFF HDD/SSD (RW)	SFF
No Carrier	Non-Hot Plug	Non-Smart	Raw LFF HDD (RW)	LFF
			M.2	N/A
			PCIe AIC Card	N/A

### SAS and SATA SSD SKU Decoders

The following charts are provided to assist in decoding the SSD short & long product descriptions; additional details can also be found within the Carrier Key Decoder & the Previous To Current Workload Naming Conversion tables within this document.

#### HPE 3.84TB SATA 6G Read Intensive SFF (2.5in) SC 3yr Wty. Digitally Signed Firmware SSD



SSD SKU Decoder Long Name



Technical Specifications

**HPE 3.84TB SATA RI SFF SC DS SSD**

Brand	Storage Capacity	Interface Type	Workload	Form Factor Type	Carriers	Special Features	Drive Type
HPE	120-960GB 1.6-12.8TB	SATA/SAS	WI MU RI	SFF LFF	SC Smart Carrier SCN Smart Carrier NVMe SCM Smart Carrier M.2 SCC Smart Carrier Converter ST Standard STC Standard Converter LP Low Profile LPC Low Profile Converter QR Quick Release RW Raw Drive	DS Digitally Signed Firmware SED Self Encrypting Drive VS Value SAS SPL Special SKU  <i>In priority order where 1<sup>st</sup> is closest to drive type</i>	SSD

SSD SKU Decoder Short Name

**HPE 1TB NVMe x4 Lanes Read Intensive SFF (2.5in) SCN 3yr Wty Digitally Signed Firmware SSD**

Brand	Storage Capacity	Interface Type/ Interface Speed	Workload	Form Factor Type / Form Factor Size	Carriers	Wty	Special Features	Drive Type
HPE	400-960GB 1-8TB	NVMe/ x4 Lanes	Write Intensive Mixed Use Read Intensive	SFF (2.5IN) HHHL/FHHL	SCN Smart Carrier NVMe	3yr Wty 1yr Wty	Digitally Signed Firmware  <i>In priority order where 1<sup>st</sup> is closest to Drive Type</i>	SSD

NVMe SSDs SKU Decoder Long Name

**HPE 1TB NVMe x4 RI SFF SCN DS SSD**

Brand	Storage Capacity	Interface Type	Workload	Form Factor Type	Carriers	Special Features	Drive Type
HPE	120-960GB 1.6-12.8TB	NVMe x4	WI MU RI	SFF HH FH	SCN Smart Carrier NVMe	DS Digitally Signed Firmware  <i>In priority order where 1<sup>st</sup> is closest to Drive Type</i>	SSD

NVMe SSDs SKU Decoder Short Name

**HPE 960GB NVMe x4 Lanes Read Intensive M.2 2280 3yr Wty Digitally Signed Firmware SSD**

Brand	Storage Capacity	Interface Type/ Interface Speed	Workload	Form Factor Type / Form Factor Size	Wty	Special Features	Drive Type
HPE	400-960GB 1-8TB	NVMe x4 Lanes/ SATA 6Gb	Write Intensive Mixed Use Read Intensive	M.2/ 2280/22110	3yr Wty 1yr Wty	Digitally Signed Firmware	SSD

M.2 SSDs SKU Decoder Long Name



Technical Specifications

**HPE 960GB NVMe x4 Lanes RI M.2 2280 DS SSD**

Brand	Storage Capacity	Interface Type/ Interface Speed	Workload	Form Factor Type / Form Factor Size	Special Features	Drive Type
HPE	400-960GB 1-8TB	NVMe x4 / SATA 6Gb	WI MU RI	M.2/ 2280/22110	DS Digitally Signed Firmware	SSD

M.2 SSDs SKU Decoder Short Name

**HPE 340GB SATA Read Intensive HHHL 3yr Wty Dual M.2 Kit**

Brand	Storage Capacity	Interface Type/ Interface Speed	Workload	Form Factor Type / Form Factor Size	Wty	Special Features	Drive Type
HPE	150-960GB 1.92TB	SATA/ NVMe	Write Intensive Mixed Use Read Intensive	HHHL FHHL UFF	3yr Wty 1yr Wty	Dual Quad Blank=Single	M.2 Kit

M.2 eKits SKU Decoder Long Name

**HPE 340GB SATA RI HH Dual M.2 Kit**

Brand	Storage Capacity	Interface Type/ Interface Speed	Workload	Form Factor Type / Form Factor Size	Special Features	Drive Type
HPE	150-960GB 1.92TB	SATA/ NVMe	WI MU RI	HH FH UFF	Dual Quad Blank=Single	M.2 Kit

M.2 eKits SKU Decoder Short Name

**HPE 1.6TB PCIe x4 Lanes Read Intensive HHHL 3yr Wty Digitally Signed Firmware Card**

Brand	Storage Capacity	Interface Type/ Interface Speed	Workload	Form Factor Type / Form Factor Size	Wty	Special Features	Drive Type
HPE	400-960GB 1-8TB	PCIe x4 Lanes	Write Intensive Mixed Use Read Intensive	HHHL FHHL Mezz	3yr Wty 1yr Wty	Digitally Signed Firmware	Card

Add-In Card SKU Decoder Long Name



## Technical Specifications

### HPE 1.6TB PCIe x4 RI HH DS Card

Brand	Storage Capacity	Interface Type/ Interface Speed	Workload	Form Factor Type / Form Factor Size	Special Features	Drive Type
HPE	400-960GB 1-8TB	PCIe x4	WI MU RI	FH/HH Mezz	DS (Digitally Signed Firmware)	Card

#### AIC SKU Decoder Short Name

### 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.





## Summary of Changes

Date	Version History	Action	Description of Change
18-May-2020	Version 33	Changed	Tables were fixed and updated
27-Apr-2020	Version 32	Changed	Technical Specifications section was updated
03-Feb-2020	Version 31	Changed	Technical Specifications section was updated
16-Dec-2019	Version 30	Changed	Format Revised
02-Dec-2019	Version 29	Changed	New drive models added. Technical Specifications revised and updated
07-Oct-2019	Version 28	Changed	New drive models added. Technical Specifications revised and updated
05-Aug-2019	Version 27	Changed	Technical Specifications section was updated
01-Jul-2019	Version 26	Changed	Technical Specifications section was updated
03-Jun-2019	Version 25	Changed	New drive models added. Technical Specifications revised and updated
02-Apr-2019	Version 24	Changed	New drive models added. Technical Specifications revised and updated
07-Jan-2019	Version 23	Changed	Technical Specifications section was updated
03-Dec-2018	Version 22	Changed	New drive models added. Technical Specifications revised and updated
15-Oct-2018	Version 21	Changed	Technical Specifications Section was updated
01-Oct-2018	Version 20	Changed	New drive models added. Technical Specifications revised and updated
06-Aug-2018	Version 19	Changed	New drive models added. Technical Specifications revised and updated
02-Jul-2018	Version 18	Changed	Overview and SKU description were updated
04-Jun-2018	Version 17	Changed	New drive models added. Technical Specifications revised and updated
02-Apr-2018	Version 16	Changed	New drive models added, Technical Specifications revised and updated
05-Mar-2018	Version 15	Changed	Technical Specifications revised and updated, images revised
05-Feb-2018	Version 14	Changed	Format Revised New drive models added
04-Dec-2017	Version 13	Changed	New drive model was added Technical Specifications were revised
02-Oct-2017	Version 12	Changed	Technical Specifications were revised
25-Sep-2017	Version 11	Changed	New drive models were added Technical Specifications were revised The title was changed to HPE Solid State Disk Drives (SSD & Add-In Cards)
14-Aug-2017	Version 10	Changed	Technical Specifications were revised
07-Aug-2017	Version 9	Changed	Technical Specifications were revised
17-Jul-2017	Version 8	Changed	Technical Specifications were revised
28-Jun-2017	Version 7	Changed	Technical Specifications were revised
12-Jun-2017	Version 6	Changed	Technical Specifications were revised
06-Jun-2017	Version 5	Changed	Technical Specifications were revised
17-Mar-2017	Version 4	Changed	SSD Selection verbiage was revised
10-Mar-2017	Version 3	Changed	Edits to tables and various verbiage
17-Feb-2017	Version 2	Changed	Technical Specifications were revised
13-Feb-2017	Version 1	New	New QuickSpecs

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For hard drives, 1GB = 1 billion bytes. Actual formatted capacity is less.

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