

## Overview

## HPE MSA 1050 Storage



The HPE MSA 1050 Storage brings affordable flash storage down to ever lower customer segments. The MSA 1050 is designed to meet entry-level storage requirements and budgetary constraints. With the lowest storage array price points in the HPE Storage portfolio and field-proven ProLiant compatibility, the MSA 1050 is the platform of choice for smaller SAS, iSCSI and FC deployments.

The HPE MSA 1050 features 8Gb Fibre Channel, 12 Gb SAS, and 1GbE and 10GbE iSCSI at previously unattainable entry price points. The array allows users to take advantage of the latest storage technologies in simple and efficient ways by providing a good balance between performance and budget resulting in a highly favorable \$/GB return on their investment. HPE MSA Storage has been the industry-leading entry storage Fibre Channel platform for the past eight years, with nearly 500,000 storage systems sold worldwide. Starting at under \$5,500\* USD, the MSA 1050 provides affordable application acceleration. It's seriously simple and affordable flash-ready storage to help you get the most performance for the lowest cost.

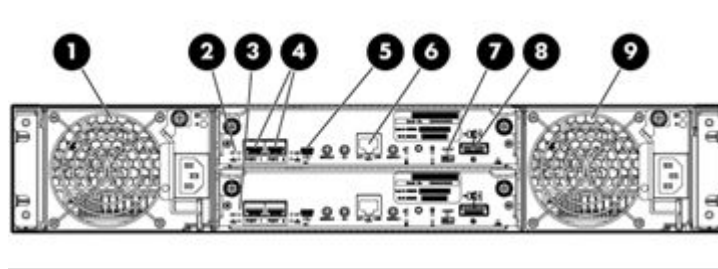
- **Configurations starting at \$5,500 \***
  - Factory-configured, dual controller array with 4 host ports of either 8Gb FC, 1GbE, 10GbE or 12Gb SAS protocols
  - Small Form Factor (SFF) or Large Form Factor (LFF) models available
- **Simple, proven Gen10 ProLiant compatible shared storage**
  - MSA continues its heritage of providing affordable, easy to use shared storage without a big learning curve
  - Intuitive setup and management for ProLiant administrators.
  - New look-and-feel will fit right in with your Gen10 ProLiant servers
- **Access to MSA 2050 advanced data services with simplified licensing approach**
  - Leverage flash storage with easy to use, easy to maintain tiering and read cache technologies
  - No storage expertise necessary, system dynamically responds to workload changes, so you don't have to
- **Expandable and upgradable to meet new demands**
  - Add new HDDs or disk expansions to your MSA 1050
  - Upgrade system to the MSA 2050 through data-in-place upgrade: a simple 15 minute upgrade!
  - No time-consuming migrations required

**NOTE:** \* US Street Price (MSA 1050 base unit, dual 1GbE iSCSI controllers, four 300GB HDDs); prices are subject to change without notice

### Overview

	HPE MSA 1050 Storage
<b>Array</b>	
Access Type	Block
Form Factor	2U, SFF or LFF
Number of controllers per array	2
Number of host ports per array	4
FC host connectivity	8Gb
iSCSI host connectivity	1Gb or 10Gb
SAS host connectivity	6Gb or 12Gb
Cache, per array	
Max Read cache per array	4TB
Data (read/write) cache + system memory per array	12GB
Pool Capacity (with Large Pool Support)	562 TB (512 TiB)
RAID Levels supported	RAID 1, 5, 6, 10
<b>Enclosures</b>	
Expansion Drive Enclosures	0-3 enclosures
LFF/SFF array/enclosure mixing	Supported
Maximum number of drives per array enclosure	24 SFF/12 LFF
Maximum number of drives per drive enclosure	24 SFF/12 LFF
Drive enclosure interface type	6Gb SAS
<b>Drives</b>	
Maximum total HDDs per array	96 SFF / 48 LFF
Maximum total SSDs per array	96 SFF / 48 LFF
Max raw capacity per array enclosure	76.8 TB SFF / 120TB LFF
Max raw capacity per drive enclosure	76.8 TB SFF / 120TB LFF
Max raw capacity per array	307.2TB SFF / 480TB LFF
<b>Drive Capacities</b>	
SFF SSDs (Mixed Use)	400GB, 800GB, 1.6TB, 3.2TB
LFF SSDs (Mixed Use)	400GB, 800GB
SFF HDDs	15K: 300GB, 600GB, 900GB 10K: 300GB, 600GB, 1.2TB, 1.8TB 7.2K: 1.0TB, 2.0TB
LFF HDDs	7.2K: 2TB, 4TB, 6TB, 8TB, 10TB
<b>Software Features</b>	
Thin Technologies	Thin Provisioning, Space Reclamation, Thin Rebuild
Tiering	Performance Tier, Standard Tier, Archive Tier
Replication	Snapshots (512), Volume Copy, Remote Snaps
Quality of Service	Virtual Tier Affinity
<b>Additional Features</b>	
Maximum number of volumes	512
Maximum number of snapshots	512
Maximum number of hosts	512
Maximum number of initiators	1024
Customer self-installable	Yes
Customer self-repairable	Yes
Customer self-upgradeable	Yes

### Overview



### HPE MSA 1050 Storage

- |                                 |                            |
|---------------------------------|----------------------------|
| 1. AC Power supply              | 5. CLI Port (mini USB)     |
| 2. Controller Module A          | 6. Network Management Port |
| 3. Controller Module B          | 7. Cache Status LED        |
| 4. Host Connection Ports<br>(2) | 8. SAS Expansion Port      |
|                                 | 9. AC Power Supply         |

### MSA 1050 Storage Models

#### Descriptions

HPE MSA 1050 8Gb Fibre Channel Dual Controller LFF Storage <sup>1</sup>	Q2R18
HPE MSA 1050 8GB Fibre Channel Dual Controller SFF Storage <sup>2</sup>	Q2R19
HPE MSA 1050 12Gb SAS Dual Controller LFF Storage <sup>3</sup>	Q2R20
HPE MSA 1050 12Gb SAS Dual Controller SFF Storage <sup>4</sup>	Q2R21
HPE MSA 1050 1G iSCSI Dual Controller LFF Storage <sup>5</sup>	Q2R22
HPE MSA 1050 1G iSCSI Dual Controller SFF Storage <sup>6</sup>	Q2R23
HPE MSA 1050 10G iSCSI Dual Controller LFF Storage <sup>7</sup>	Q2R24
HPE MSA 1050 10G iSCSI Dual Controller SFF Storage <sup>8</sup>	Q2R25

#### Part Numbe

#### NOTES:

<sup>1</sup> Includes LFF Array Chassis, two MSA 1050 FC 2-port controllers, SFPs installed, drives not included

<sup>2</sup> Includes SFF Array Chassis, two MSA 1050 FC 2-port controllers, SFPs installed, drives not included

<sup>3</sup> Includes LFF Array Chassis, two MSA 1050 SAS 2-port controllers, SFPs not needed with SAS controllers, drives not included

<sup>4</sup> Includes SFF Array Chassis, two MSA 1050 SAS 2-port controllers, SFPs not needed with SAS controllers, drives not included

<sup>5</sup> Includes LFF Array Chassis, two MSA 1050 1GbE 2-port controllers, SFPs installed, drives not included

<sup>6</sup> Includes SFF Array Chassis, two MSA 1050 1GbE 2-port controllers, SFPs installed, drives not included

<sup>7</sup> Includes LFF Array Chassis, two MSA 1050 10GbE 2-port controllers, SFPs installed, drives not included, direct attached copper cables are supported in 10GbE Controller systems

<sup>8</sup> Includes SFF Array Chassis, two MSA 1050 10GbE 2-port controllers, SFPs installed, drives not included, direct attached copper cables are

### Overview

supported in 10GbE Controller systems

#### All MSA 1050 models offer a common set of valuable features:

- MSA 1050 storage system architecture maximizes performance
  - Includes SFF or LFF array chassis, depending on model
  - Two FC, iSCSI or SAS controllers, depending on model
    - Two host ports per controller
    - Each controller supports 8 Gb FC, 1GbE iSCSI, 10GbE iSCSI or 12Gb SAS host connectivity, depending on model
  - 6 GB cache per controller. (4GB Read/Write plus 2GB System)
  - Battery-free cache backup with super capacitors and compact flash
- Storage Management Utility (SMU). The MSA management GUI brings a new modern look and feel to array management.
- Thin Provisioning allows storage allocation of physical storage resources only once they are consumed by an application. Thin Provisioning also allows over-provisioning of physical storage pool resources allowing ease of growth for volumes without predicting storage capacity upfront.
- All models feature a wide variety of drives: High-performance SSD drives, enterprise-class SAS, and SAS Midline drives.
- The MSA 1050 will support a maximum of 3 disk enclosures (either LFF and/or SFF). Add-on enclosures can either be HPE MSA 2050 LFF Disk Enclosure or HPE MSA 2050 SFF Disk Enclosure. The MSA 2050 LFF or SFF Disk Enclosures will support the MSA 1050 storage system.
- The MSA 1050 can grow incrementally to a maximum of 48 LFF, 96 SFF drives, or a combination of SFF and LFF enclosures up to the maximum of 4 total enclosures.
- Virtual Storage Disks Groups can be spanned across multiple enclosures.
- Virtual Storage RAID levels supported: 1, 5, 6, 10.
- Maximum hard drive counts vary by RAID levels: 2 drive max for RAID level 1; max of 16 drives for RAID levels 5, 6, and 10.
- Multiple Disk Groups can be aggregated into a single storage pool.
- Storage pools allow data on a given LUN to span across all drives in a pool. When capacity is added to a system, the user is also getting a performance benefit of the additional spindles.
- The maximum LUN size is 140TB (128TiB)
- Snapshot enhancements for virtual storage, including performance improvements, hierarchical snapshots, and simplified resource management. Administrators can monitor and optionally control snapshot space usage.
- Prioritize data by assigning appropriate affinity level (Performance, No Affinity or Archive)
- Customers can configure 512 TiB capacity per virtual pool by enabling large pool support.
- Non-disruptive on-line controller code upgrade. Requires Multi-pathing software.
- Upgradable by design. Owners of an MSA 1040 array are able to do data-in-place upgrades to the new MSA 1050 array. This unique ability protects the earlier investments in drives, and JBODs.
- Certain limitations are applicable. Please review the Upgrading to the HPE MSA 1050/2050/2052 Whitepaper before upgrading your MSA 1040, 2040 or 2042 systems
- StoreEasy 3850 Gateway support for block and file storage.

#### Application Solutions

The HPE MSA 1050 Storage is the ideal solution for customers running Oracle, Microsoft, SAP environments and those customers who are deploying virtual server technologies like VMware and Hyper-V. The MSA 1050 delivers enterprise functionality that enhances virtual environments, simplifies management, and reduces costs. Easy to deploy, scale and maintain, HPE MSA 1050 Arrays ensure that crucial business data remains available.

Hewlett Packard Enterprise has developed best-in-class expertise in Oracle, Microsoft, SAP, and Virtualization Hypervisor technology through extensive testing with the HPE MSA 1050, HPE servers, and management software; high availability and disaster recovery solutions; and backup and recovery on the Oracle, Microsoft, and SAP application platforms.

### Overview

**Learn more** To learn more about specific HPE Storage Solutions that are built with Oracle, Microsoft, SAP and Virtualization environments in mind, visit the solution sites supporting each of these applications.

HPE MSA Storage hyperlink to: <http://www.hpe.com/storage/MSA>

### Software

## Product Technology

### MSA 1050 Models

MSA 1050 Storage offers 8 factory configured models:

- MSA 1050 8Gb FC with 4-ports per array system, SFF or LFF
- MSA 1050 12Gb SAS with 4-ports per array system SDD or LFF
- MSA 1050 1GbE iSCSI with 4-ports per array system SFF or LFF
- MSA 1050 10GbE iSCSI with 4-ports per array system, SFF or LFF

### Modular Chassis

2U rack height. 12 LFF or 24 SFF drive bays, accommodating SSDs, SAS and SAS MDL Drives

**NOTE:** The MSA 1050 does not support single controller configurations. Single-controller support is provided only when a controller fails over to its partner controller

### Drives available

The MSA 1050 Storage systems support both the MSA 3.5-inch LFF drives, and the MSA 2.5-inch SFF drives.

- Solid State Drives (SSDs) deliver exceptional performance for applications requiring high random read IOPs performance.
- Serial Attached SCSI (SAS) enterprise-class drives are designed for high demand, 24x7 usage.
- SAS Midline (MDL) drives are usually reserved for archival of data as they are relatively inexpensive and are available in very large capacities.

### Optional Disk Enclosures

Just as the user has a choice of chassis for the array enclosure (LFF or SFF drive bays), they also have a choice of expansion disk enclosures accommodating either drive size. Both the MSA 2050 LFF Disk Enclosure and MSA 2050 SFF Disk Enclosure can be hot-added to an operating array. SFF and LFF Array enclosures and Disk Enclosures can be mixed without limitations.

**MSA 2050 LFF Disk Enclosure.** This 2U enclosure is designed to support twelve HPE Storage LFF drives and accepts MSA dual-ported 12Gb SSD and SAS Midline hard drives. The pre-configured MSA 2050 LFF Disk Enclosure has two I/O modules and supports the MSA 1050 dual controller arrays.

- The MSA 2050 LFF Disk Enclosure can be attached to the MSA 1050 LFF or SFF storage models.
- Each MSA 2050 LFF Disk Enclosure ships standard with two .5m mini-SAS to mini-SAS cables for connection to the MSA 1050 array expansion port or existing disk enclosure cascade port.
- LFF and/or SFF Disk Enclosures can be mixed up to the maximum of 3 total Disk Enclosures

HPE MSA 2050 LFF Disk Enclosure

Q1J06A

**HPE MSA 2050 SFF Disk Enclosure** This 2U enclosure is designed to support twenty four HPE Storage 2.5-inch SFF drive bays and accepts MSA dual ported 12Gb SSD, SAS, or SAS MDL hard drives. The pre-configured MSA 2050 SFF Disk Enclosure has two I/O modules and supports the MSA 1050 dual controller arrays.

- The MSA 2050 SFF Disk Enclosure can be attached to the MSA 1050 LFF or SFF storage models
- Each MSA 2050 SFF Disk Enclosure ships standard with a two .5m mini-SAS to mini-SAS cables for connection to the MSA 1050 array expansion port or existing disk enclosure cascade port.
- LFF and/or SFF Disk Enclosures can be mixed up to the maximum of 3 total Disk Enclosures

HPE MSA 2050 SFF Disk Enclosure

Q1J07A

### Software

- Scalability** The MSA 1050 array configurations are designed to allow an installation to begin with smaller capacity and be able to grow gradually as needed. The flexibility of SSD, SAS or SAS MDL drives technology, form factors, sizes, speeds, and costs per GB allows a system to easily fit in almost any budget.
- Large Form Factor configurations can scale up to 120TB SAS MDL per array enclosure, expandable to 480TB SAS MDL with the addition of a maximum of three MSA 2050 LFF Disk Enclosure.
  - Small Form Factor configurations can scale up to 76.8 TB SAS SSDs per array enclosure, expandable to 307.2 TB SAS with the addition of a maximum of three MSA 2050 SFF Disk Enclosure.
  - Users may configure an MSA 2050 SFF array enclosure with MSA 2050 LFF Disk Enclosure. This is an excellent option for a configuration that supports high-speed SFF SSDs or fast SFF enterprise-class SAS drives in the array enclosure, combined with economical LFF drives staged for archival purposes, all in the same array.
- Disk Group** A Disk Group is a collection of disks in a given redundancy mode (RAID 1, 5, 6, 10). Disk Group RAID level and size can be created based on performance and/or capacity requirements. Multiple Disk Groups can be allocated into a storage pool for use with the Virtual Storage features.
- LUNs** The MSA 1050 arrays support 512 volumes and up to 512 snapshots in a system. All of these volumes can be mapped to LUNs. Maximum LUN sizes up to 140TB (128 TiB). Thin Provisioning allows the user to create the LUNs independent of the physical storage.
- Storage Pools** Storage pools are comprised of one or more Disk Groups. A volume's data on a given LUN can now span all disk drives in a pool. When capacity is added to a system, users will benefit from the performance of all spindles in that pool.
- The MSA 1050 supports large, flexible Volumes with sizes up to 128TiB and facilitates seamless capacity expansion. As pools are expanded data automatically reflows to balance capacity utilization on all drives.
- RAID 1, 5, 6, 10** The MSA 1050 features several important additional RAID levels. RAID 6 offers the highest level of RAID protection. It allocates two sets of parity data across drives and allows simultaneous write operations. It can withstand two simultaneous drive failures without downtime or data loss. RAID 1 is mirroring and striping without parity and allows large Disk Groups to be created with high performance and mirroring for fault tolerance. RAID 5 combines the block striping and parity. Because data and parity are striped across all of the disks, no single disk is a bottleneck. Striping also allows users to reconstruct data in case of a disk failure.
- Performance** The performance figures provided here are for reference as many variables exist between array configurations, workloads, hard drive types, disk group setup parameters and host system setup. Hewlett Packard Enterprise has traditionally published a set of end-to-end MSA performance specifications that are fed into HPE Sizer tools which are based on conservative real-world configurations. For consistency, the MSA performance numbers have been documented in both Benchmark and End-to-End Performance tables. Complete End-to-End Performance results will be provided for the MSA 1050 in a subsequent publication. These numbers are subject to change without notice.

### MSA 1050 End-to-End Performance Results:

### Software

MSA 1050 Array Performance <sup>1</sup>	HPE MSA 1050 8Gb Fibre Channel with HDDs	HPE MSA 1050 8Gb Fibre Channel with SSDs
<b>MSA 1050 RAID 1 SSD Performance Results <sup>2</sup></b>		
Random Reads (IOPs)		69,100
Random Writes (IOPs)		30,600
<b>MSA 1050 RAID 5 Performance Results <sup>3,4</sup></b>		
Segmented Sequential Reads (MB/s)	2,960	
Segmented Sequential Writes (MB/s)	2,850	

#### End-to-End performance notes

1) Performance results were generated using internal HPE test tools. Number and type of applications, drive type and number of drives, operating system used, and the number of hosts will affect overall performance. This table is provided strictly as a test-lab comparison

2) Dual Controller configuration, (4) 400GB Mixed Use SSDs, RAID: 1, two drives per Disk Group; one Disk Group per pool, 2 volumes per pool, block size: 8k, average latency under 5ms, Window Server 2012 host, 8Gb FC direct connect to array

3) Dual Controller configuration, (36) 15k HDD, RAID: 5, nine drives per Disk Group, 2 Disk Group per pool, 2 volumes per pool, block size: 256k, average latency under 30ms, Windows Server 2012 host, 8Gb FC direct connect to array

4) Sequential performance numbers were generated using segmented sequential workloads. For segmented sequential workloads with a queue depth greater than 1, each sequential stream is targeted to operate on a separate LBA range. Other types of sequential workloads that target specific LBA ranges may achieve higher results.

**Configuration and Management Tools** Management access, out-of-band, Storage Management Utility (SMU), CLI. Interface Types: USB 100/1000 Ethernet. Protocols Supported SNMP, SMI-S, SSH, SMTP, FTP, SFTP, HTTP, HTTPS, Telnet

**Web Browser support** The MSA 1050 arrays come integrated with web browser and CLI based software for storage and RAID management, setup, configuration, and troubleshooting. The MSA 1050 management supports Microsoft Internet Explorer, Mozilla Firefox, and Google Chrome.

**Hot Plug Expansion and Replacement Support** All MSA 1050 models support hot plug expansion and replacement of redundant controllers, enclosures, fans, power supplies, and I/O modules for simple, fast installation and maintenance. Hot add expansion of disk enclosures is also supported.

**HPE Server Compatibility** The MSA 1050 supports most HPE ProLiant and BladeSystems servers including

- HPE ProLiant DL, ML Servers
- HPE c-Class Blade Servers
- Compatibility must be confirmed at: <http://www.hpe.com/storage/spock>

**NOTE:** depends on protocol



### Software

#### 3<sup>rd</sup> Party server support

The MSA 1050 supports most multi-vendor industry standard Intel and AMD based (x86) servers. Hewlett Packard Enterprise requires the Third-Party Server to be logged and listed on the Microsoft Windows Server Catalog.

- Hewlett Packard Enterprise recommends that the Third-Party Server Vendor is an active member of TSANet. Refer to the TSANet website for details: <http://www.tsanet.com>
- Non-HPE servers will generally be supported if the HPE storage stack is used. This includes supported HPE branded HBAs and drivers, and supported FC switches.

#### OS Support

Refer to the Hewlett Packard Enterprise support statements for complete current OS version support: <http://www.hpe.com/storage/spock>

- Microsoft Windows Server 2016
- Microsoft Windows Server 2012
- VMware
- Red Hat Linux
- SuSE SLES Linux

**NOTE:** depends on protocol

#### Advanced Virtualized Features

Storage on the MSA 1050 is all virtualized including Automated Tiering of Enterprise SAS (Standard Tier) and Midline SAS (Archive Tier), Read Cache and Wide-Striping. Sub-LUN Tiering from SAS Midline to Enterprise SAS drives is also a standard feature.

**NOTE:** The MSA 1050 supports virtual storage only. Linear storage is not supported on the MSA 1050.

**NOTE:** The purchase of an Advanced Virtualization Upgrade license is not required for virtual storage on the MSA 1050. The Advanced Virtualization Upgrade functionality is included in the base MSA 1050 system as a standard feature.

#### Advanced Data Services Suite

The HPE MSA Advanced Data Services Suite can be purchased as an option on the MSA 1050 Storage systems.

The optional Advanced Data Services Suite includes the following functionality:

- Performance Tiering between the SSD tier and the Standard or Archive Tier
- 512 Snapshots
- Remote Snaps

HPE MSA Advanced Data Services Suite LTU  
Q0H99A

HPE MSA Advanced Data Services Suite E-LTU  
Q0H99AAE

#### Performance Tiering and Archive Tiering

Disk tiers are comprised of aggregating 1 or more Disk Groups of similar physical disks. The MSA 1050 supports 3 distinct tiers:

1. A Performance tier with SSDs
2. A Standard SAS tier with Enterprise SAS HDDs
3. An Archive tier utilizing Midline SAS HDDs.

The MSA 1050 supports sub-LUN tiering and automated data movement between tiers. The MSA 1050 automated tiering engine moves data between available tiers based on the access characteristics of that data. Frequently accessed “pages” will migrate to the highest available tier delivering maximum I/O’s to the application.

To enable the tiering (data movement) between the Performance tier with SSDs and either of the other tiers, the Advanced Data Services Suite is required. Systems containing only SSDs

### Software

#### Snapshot and Volume Copy

will not require additional licenses until additional tiers are added.

- All MSA 1050 arrays come standard with 64 snaps.
- A 512 Snapshot license is available as an option on the MSA 1050
- Snapshots create up to 512 point-in-time copies of data
- Volume Copy can create up to 128 point-in-time copies of data
- Point-in-time copies become standard volumes when they are complete
- Recovery is instant - revert data from any previous Snapshot or Volume Copy
- Backup 'snapped' data to disk, virtual tape, or physical tape without a backup window
- If telephone support and software updates are desired for bundled software functionalities like 64 snapshots and volume copy software, a combination HW + SW support care pack must be purchased.

#### Remote Snap

- HPE MSA Remote Snap Software is array based software that provides remote replication on the HPE MSA 1050 array products. MSA Remote Snap is a form of asynchronous replication which consists of replication of block-level data from a volume on a local system to a volume on a second independent system. This second system may be co-located with the first system or may be located at a remote site.
- HPE Remote Snap replication technology provides the ability to accomplish key data management and protection capabilities. First, because Remote Snap uses snapshots as the underlying technology it creates multiple local recovery points which can be used for such tasks as to complement daily backups; second, replication provides the ability to access data in a remote site which could be used for dispersed operations; and third but definitely not least important replication allows for business continuance in the event of a failure on the primary site.
- In order to perform a replication, a snapshot of the volume to be replicated is taken, creating a point-in-time image of the data. This point-in-time image is then replicated to the destination volume by copying the data represented by the snapshot via iSCSI or Fibre Channel protocols. Replication via the SAS protocol is not supported. The amount of data transferred is minimized through the use of snapshots whenever possible.

**NOTE:** One Advanced Data Services Suite License per array is required for replication. For example, if you have two MSA arrays performing replication (from Primary system to Remote System), you will need a total of 2 licenses.

#### Product Features

- Storage based asynchronous snapshot replication
- Support of iSCSI and Fibre Channel interconnects provides flexible options to the application environments.
- Snapshot based replication technology means only changed data will be replicated to alternate site
- Replication between on MSA 1050 to another MSA is supported (1 to 1 peer connection).
- Replication up to four MSA 1050s to a single MSA 2050 is supported. Typical use case is to replicate from "many" branch offices to the home office for the purpose of backing up data from the branches
- Advanced scheduler provides several options to IT administrators for business continuance
- Flexible architecture allows remote replication between MSA 1050 and MSA 2050 or MSA 2040/1040 arrays using the virtual storage architecture and licensed for Remote Snap. Protects existing investments and enhances business continuity planning objectives.
- Snapshot based replication enables both local and remote recovery depending on the need. Snapshot replication isolates problems to a specific point in time which can be selected by the administrator. Additionally snapshot replication supports longer distance replication.
- 512 Snapshots and Volume Copy integration provides better efficiencies by combining the

### Software

management and array technologies to create local copies.

- Fast application recovery with minimal or no transaction loss
- Creation of disaster tolerant copies of your critical business data
- No-single-point-of-failure solution to increase the availability of your data

### File and Block Storage

Want to get more out of your MSA SAN investment? Do you have unallocated capacity you want to use for file shares or services? HPE StoreEasy 3000 Gateways are the answer: enabling optimized, efficient, secure, and highly available file services and a greater return on your block storage investment for medium to large organizations with branch offices or workgroups and new or existing SANs. Save time and money by supporting hundreds to thousands of concurrent users and devices, as well as multiple diverse workloads through rich file protocols. Your data is indispensable and protected as such through at rest and in flight through features like built-in encryption, sophisticated access controls, and online snapshots. StoreEasy 3000 Gateway is a robust file gateway with turnkey clustered configurations, transparent failover, and online rolling maintenance to deliver near continuous availability of data to users, servers, and applications in demanding 24x7 environments.

**StoreEasy 3850 Gateway product page:** <https://www.hpe.com/us/en/product-catalog/storage/file-storage/pip.hpe-storeeasy-3000-storage.5335826.html>

**StoreEasy 3850 Gateway QuickSpecs:**

<https://www.hpe.com/h20195/v2/GetDOCUMENT.aspx?docname=c04111443>

### HPE OneView for VMware vCenter

HPE OneView for VMware vCenter is a component within the HPE OneView plug-in for vCenter. It provides VMware administrators that are using VMware's vSphere management console (vCenter) with the ability to see how virtual machines are mapped to datastores and individual MSA 1050 volumes. By providing these clear relationships between VM's, datastores and storage, the VMware administrator's productivity increases, as does the ability to ensure quality of service. Roles for administrators can be defined on an individual basis, providing the ability to apply specific permissions for both view and control functions.

HPE OneView for VMware vCenter supports mixed array environments including MSA 1050/2050/2052, MSA 1040/2040/2042 and other HPE Storage systems.

When deployed with the MSA 1050 array, HPE OneView provides the following:

- Active Management functionality for the MSA 1050 array:
  - Create/Expand/Delete a Datastore
  - Create a Virtual Machine from a template
- Monitors the health and status of the MSA 1050
- Displays LUN / volume connections from VMs and ESX servers to the arrays and provides the location and attributes of the MSA 1050 within the SAN
- Identifies what storage features are available to allow administrators to match the features available on the MSA 1050 to their requirements
- Provide a cluster-level view of the storage

HPE OneView for VMware vCenter is downloadable from Software Depot:

<https://h20392.www2.hpe.com/portal/swdepot/displayProductInfo.do?productNumber=HPVPR>

For more information on HPE OneView for VMware vCenter visit:

<http://h22168.www2.hpe.com/us/en/partners/vmware/>

### HPE StoreFront Manager for Microsoft

HPE StoreFront Manager for Microsoft enables management and monitoring of HPE MSA Storage running in Microsoft Hyper-V environment with a single pane-of-glass view to events/alerts, capacity and health dashboards and detailed virtual infrastructure information. It integrates seamlessly with Microsoft System Center Operations Manager (SCOM) and provides Microsoft administrators the following:

### Software

It supports heterogeneous HPE Storage environment including HPE MSA, HPE StoreVirtual, HPE 3PAR StoreServ, HPE StoreOnce, HPE StoreEasy, HPE XP, HPE EVA and HPE StoreEver Storage.

When deployed with the MSA 1050 array, HPE StoreFront Manager provides the following:

- Monitors the health, events and alerts for the MSA 1050 - virtual pools, and volumes
- Provides detailed information on the VMs provisioned through MSA Storage
- Effortless installation and configuration using Powershell

HPE StoreFront Manager for Microsoft for MSA Storage is downloadable from Software Depot: [https://h20392.www2.hpe.com/portal/swdepot/displayProductInfo.do?productNumber=System\\_Center](https://h20392.www2.hpe.com/portal/swdepot/displayProductInfo.do?productNumber=System_Center)

### **vStorage API for Array Integration (VAAI)**

The vStorage API for Array Integration (VAAI) is one of the storage application programming interface (API) sets in vSphere. VAAI is an API storage partners can leverage to enhance performance of virtual machine (VM) management operations by delegating these operations to the storage array. With hardware offload, ESX/ESXi hosts perform certain operations faster and consume less server CPU and memory resources, and also storage port and storage fabric bandwidth. VAAI includes high performance and scalable VM data path primitives.

Storage Hardware Primitives for VAAI

- Full Copy or Hardware Assisted Move
- Block Zeroing or Hardware Assisted Zeroing
- Hardware Assisted Locking or Atomic Test and Set (ATS)

UNMAP reclaims space that is no longer on a thinly provisioned VMFS volume

### Warranty, Service and Support Information

#### Warranty

Three-year limited warranty, parts exchange Next Business day delivery

Enclosures, Hard drives, and Options for the MSA 1050 carry their own warranty. Refer to **Hewlett Packard Enterprise Limited Warranty Statement** for more information.

The MSA 1050 has been designed with customer self-repairable parts to minimize repair time and provide greater flexibility in performing defective parts replacement. Please refer to Hewlett Packard Enterprise limited warranty Statement and parts replacement instructions for further details.

**NOTE:** The warranty of the hard drive options purchased with the MSA 1050 models is different for SAS hard drives versus SAS MDL. SAS hard drive options have a three year warranty and SAS MDL have a one year warranty.

**NOTE:** Firmware updates beyond the 3 year warranty period requires a support contract.

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#### Solid State Drives (SSD) Warranty

3/0/0 warranty; Customer Self Repair (CSR) subject to maximum usage and or maximum supported lifetime limitations, whichever occurs first. Maximum Supported Lifetime is the period in years set to equal the warranty for the device. Maximum usage limit is the maximum amount of data that can be written to the device before reaching the device's write endurance limit.

**NOTE:** SSDs used for replacement will be of equal or greater capacity and are designed to meet or exceed the original SSD warranty. Replacement drive/s could be of the same model drive or of a different model qualified to operate interchangeably inside the MSA array. Warranties of these components are unaffected by any substitution

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#### Service and Support

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

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

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#### Connect your devices

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

<sup>1</sup> IDC

<sup>2</sup> HP CSC reports 2014-2015

Learn more about getting connected at <http://www.hpe.com/services/getconnected>

### Warranty, Service and Support Information

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

HPE Proactive Care gives customers an enhanced call experience. When your products are connected to HPE, Proactive Care helps prevent problems and maintains IT stability by utilizing personalized proactive reports with recommendations and advice. This Service combines three years' proactive reporting and advice with our highest level of hardware support; HPE's 24x7, six hour hardware call-to-repair. HPE is the only leading manufacturer who makes this level of coverage available as a standard service offering for your most valuable servers and storage, including the HPE MSA 1050 Storage.

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

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

HPE Proactive Care gives customers an enhanced call experience. When your products are connected to HPE, Proactive Care helps prevent problems and maintains IT stability by utilizing personalized proactive reports with recommendations and advice. This Service combines three years proactive reporting and advice with our 24x7 coverage, four hour hardware response time when there is a problem.

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

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**Basic Care HPE Foundation Care 24x7, three-year Support Service**

HPE Foundation Care 24x7 gives you access to HPE 24 hours a day, seven days a week for assistance on resolving issues. This service includes need based Hardware onsite response within four hours. Simplify your support experience and make HPE your first call to help resolve hardware or software problems.

<https://www.hpe.com/h20195/V2/GetDocument.aspx?docname=4AA4-8876ENW&cc=us&lc=en>

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**Foundation Care HPE Foundation Care 24x7, three-year Support Service**

HPE Foundation Care 24x7 gives you access to HPE 24 hours a day, seven days a week for assistance on resolving issues. This service includes need based Hardware onsite response within four hours. In addition, collaborative software support is included in this service that provides troubleshooting assistance on industry leading software running on your HPE server. Simplify your support experience and make HPE your first call to help resolve hardware or software problems.

<https://www.hpe.com/h20195/V2/GetDocument.aspx?docname=4AA4-8876ENW&cc=us&lc=en>

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**Parts and Materials**

HPE 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 HPE due to malfunction

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**Related Services****HPE Hardware Installation**

Provides for the basic hardware installation of HPE branded servers, HPE storage including

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### Warranty, Service and Support Information

the MSA 1050 devices and networking options to assist you in bringing your new hardware into operation in a timely and professional manner.

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

#### **HPE Installation and Startup Service**

Provides for the installation and startup of HPE technology including BladeSystems, C-Class enclosure, HPE ProLiant c-Class and Integrity server blades, storage blades, SAN switch blades, HPE Virtual Connect modules (Ethernet and Fibre Channel), Ethernet network interconnects, and InfiniBand, as well as the installation of one supported operating system type (Windows® or Linux). Included the HPE MSA 1050.

#### **HPE Datacenter Care service**

Helps improve IT stability and security, increase the value of IT, and enable agility and innovation. It is a structured framework of repeatable, tested, and globally available services “building blocks.” You can deploy, operate, and evolve your datacenter wherever you are on your IT journey. With HPE Datacenter Care, you benefit from a personalized relationship with HPE via a single point of accountability for HPE and others' products.

For more information, visit <http://www.hpe.com/services/datacentercare>

#### **HPE Factory Express for Servers and Storage**

HPE Factory Express offers configuration, customization, integration and deployment services for HPE servers and storage products. Customers can choose how their factory solutions are built, tested, integrated, shipped and deployed.

Factory Express offers service packages for simple configuration, racking, installation, complete configuration and design services as well as individual factory services, such as image loading asset tagging, and custom packaging. HPE products supported through Factory Express include a wide array of servers and storage: HPE Integrity, HPE ProLiant, HPE Apollo, HPE ProLiant Server Blades, HPE BladeSystem, HPE 9000 servers as well as the HPE MSA Storage, HPE 3PAR Storage, HPE XP, rackable tape libraries and configurable network switches.

#### **HPE Education Services**

Keep your IT staff trained making sure they have the right skills to deliver on your business outcomes. Book on a class today and learn how to get the most from your technology investment. [www.hpe.com/ww/learn](http://www.hpe.com/ww/learn)

#### **HPE Support Center**

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

#### **Learn more [www.hpe.com/support/hpesc](http://www.hpe.com/support/hpesc)**

HPE Insight Remote Support and HPE Support Center are available at no additional cost with a HPE warranty, HPE Support Service or HPE contractual support agreement.

For more information: <http://www.hpe.com/services>

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### Configuration Information

## Configuration Information

### Step 1 - MSA 1050 Base Configurations

<b>Pre-Configured Systems</b>	HPE MSA 1050 8Gb Fibre Channel Dual Controller LFF Storage <sup>1</sup>	Q2R18A
	HPE MSA 1050 8GB Fibre Channel Dual Controller SFF Storage <sup>2</sup>	Q2R19A
	HPE MSA 1050 12Gb SAS Dual Controller LFF Storage <sup>3</sup>	Q2R20A
	HPE MSA 1050 12Gb SAS Dual Controller SFF Storage <sup>4</sup>	Q2R21A
	HPE MSA 1050 1G iSCSI Dual Controller LFF Storage <sup>5</sup>	Q2R22A
	HPE MSA 1050 1G iSCSI Dual Controller SFF Storage <sup>6</sup>	Q2R23A
	HPE MSA 1050 10G iSCSI Dual Controller LFF Storage <sup>7</sup>	Q2R24A
	HPE MSA 1050 10G iSCSI Dual Controller SFF Storage <sup>8</sup>	Q2R25A

#### NOTES:

<sup>1</sup> Includes LFF Array Chassis, two MSA 1050 FC 2-port controllers, SFPs installed, drives not included

<sup>2</sup> Includes SFF Array Chassis, two MSA 1050 FC 2-port controllers, SFPs installed, drives not included

<sup>3</sup> Includes LFF Array Chassis, two MSA 1050 SAS 2-port controllers, SFPs not needed with SAS controllers, drives not included

<sup>4</sup> Includes SFF Array Chassis, two MSA 1050 SAS 2-port controllers, SFPs not needed with SAS controllers, drives not included

<sup>5</sup> Includes LFF Array Chassis, two MSA 1050 1GbE 2-port controllers, SFPs installed, drives not included

<sup>6</sup> Includes SFF Array Chassis, two MSA 1050 1GbE 2-port controllers, SFPs installed, drives not included

<sup>7</sup> Includes LFF Array Chassis, two MSA 1050 10GbE 2-port controllers, SFPs installed, drives not included, direct attached copper cables are supported in 10GbE Controller systems

<sup>8</sup> Includes SFF Array Chassis, two MSA 1050 10GbE 2-port controllers, SFPs installed, drives not included, direct attached copper cables are supported in 10GbE Controller systems

### Step 2 - Select Your Drives.

MSA HDDs and SSDs drives are for use with MSA Storage Systems only.

Customers can mix SSD, SAS, and SAS MDL drives in the same array enclosure and disk enclosure

<b>SFF SSDs</b>	<b>12G SFF SAS SSDs (Mixed Use)</b>	
	HPE MSA 400GB 12G SAS Mixed Use SFF (2.5in) 3yr Warranty Solid State Drive	N9X95A
	HPE MSA 800GB 12G SAS Mixed Use SFF (2.5in) 3yr Warranty Solid State Drive	N9X96A
	HPE MSA 1.6TB 12G SAS Mixed Use SFF (2.5in) 3yr Warranty Solid State Drive	N9X91A
	HPE MSA 3.2TB 12G SAS Mixed Use SFF (2.5in) 3yr Warranty Solid State Drive	N9X92A



### Configuration Information

#### SFF HDDs

#### 12G SFF 15K SAS HDDs

HPE MSA 300GB 12G SAS 15K SFF (2.5in) Enterprise 3yr Warranty Hard Drive J9F40A

HPE MSA 600GB 12G SAS 15K SFF (2.5in) Enterprise 3yr Warranty Hard Drive J9F42A

HPE MSA 900GB 12G SAS 15K SFF (2.5in) Enterprise 3yr Warranty Hard Drive Q1H47A

#### 12G SFF 10K SAS HDDs

HPE MSA 300GB 12G SAS 10K SFF(2.5in) Dual Port Enterprise 3yr Warranty Hard Drive J9F44A

HPE MSA 600GB 12G SAS 10K SFF(2.5in) Dual Port Enterprise 3yr Warranty Hard Drive J9F46A

HPE MSA 1.2TB 12G SAS 10K SFF(2.5in) Dual Port Enterprise 3yr Warranty Hard Drive J9F48A

HPE MSA 1.8TB 12G SAS 10K SFF (2.5in) 512e Enterprise 3yr Warranty Hard Drive J9F49A

#### 12G SFF 7.2K SAS MDL HDDs

HPE MSA 1TB 12G SAS 7.2K SFF (2.5in) 512e Midline 1yr Warranty Hard Drive J9F50A

HPE MSA 2TB 12G SAS 7.2K SFF (2.5in) 512e Midline 1yr Warranty Hard Drive J9F51A

#### NOTE:

- SAS MDL drives are designed for archival or reference data
- SAS MDL drives should not be used in a heavy or intense I/O environment
- Intense I/O environments require the use of enterprise-class SSD or SAS drives

#### LFF SSDs

#### 12G LFF SAS SSDs (Mixed Use)

HPE MSA 400GB 12G SAS Mixed Use LFF (3.5in) Converter Carrier 3yr Wty Solid State Drive P9M79A

HPE MSA 800GB 12G SAS Mixed Use LFF (3.5in) Converter Carrier 3yr Wty Solid State Drive P9M80A

#### LFF HDDs

#### 12G LFF 7.2K SAS Midline Drives

HPE MSA 2TB 12G SAS 7.2K LFF (3.5in) 512n Midline 1yr Warranty Hard Drive N9X93A

HPE MSA 4TB 12G SAS 7.2K LFF (3.5in) 512e Midline 1yr Warranty Hard Drive K2Q82A

HPE MSA 6TB 12G SAS 7.2K LFF (3.5in) 512e Midline 1yr Warranty Hard Drive J9F43A

HPE MSA 8TB 12G SAS 7.2K LFF (3.5in) 512e Midline 1yr Warranty Hard Drive M0S90A

HPE MSA 10TB 12G SAS 7.2K LFF (3.5in) Midline 512e 1yr Wty Hard Drive P9M82A

### Step 3 - Options

**Drive** HPE MSA 2050 LFF Disk Enclosure Q1J06A

**Enclosures** HPE MSA 2050 SFF Disk Enclosure Q1J07A

#### NOTE:

- Each drive enclosure includes two 0.5m MiniSAS to MiniSAS cables
- Add up to 3 additional drive enclosures
- MSA 2050 LFF Disk Enclosure can be connected to either the MSA 1050 SFF or LFF dual controller systems.

### Configuration Information

- HPE MSA 2050 SFF Disk Enclosure can be connected to either the MSA 1050 SFF or LFF dual controller systems.

<b>SAS Cables</b>	HP External Mini SAS 1m Cable	407337-B21
	HP External Mini SAS 2m Cable	407339-B21

**NOTE**

- Connecting MSA 1050 Controller to a JBOD if a longer cable is desired.

<b>AC Power Cords</b>	HP ProLiant 12 ft Power Cord	227099-001
	Power Cord, (Australia/China/New Zealand)	227098-001
	Power Cord, (Central Europe)	157215-001
	Power Cord, (United Kingdom/Hong Kong)	157216-001
	Power Cord, (Switzerland)	157219-001
	Power Cord, (Italy)	157217-001
	Power Cord, (Denmark)	157218-001
	Power Cord, (Japan)	139867-001
	Power Cord, (South East Asia/India)	157220-001

**NOTE:**

- Two PDU cables: one 142263-008 (Black) and one 1422633-013 (Grey), ship standard with all AC-powered enclosures

### Step 4a - Choose Supported Options For Fibre Channel Infrastructure

<b>PremierFlexOM4 type cables</b>	HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 1m Cable	QK732A
	HPE Premier Flex LC/LC Multi-mode OM4 2 fiber 2m Cable	QK733A
	HP Premier Flex LC/LC Multi-mode OM4 2 fiber 5m Cable	QK734A
	HP Premier Flex LC/LC Multi-mode OM4 2 fiber 15m Cable	QK735A
	HP Premier Flex LC/LC Multi-mode OM4 2 fiber 30m Cable	QK736A
	HP Premier Flex LC/LC Multi-mode OM4 2 fiber 50m Cable	QK737A
	HP LC to LC Multi-mode OM3 2-Fiber 0.5m 1-Pack Fiber Optic Cable	AJ833A
	HP LC to LC Multi-mode OM3 2-Fiber 1.0m 1-Pack Fiber Optic Cable	AJ834A
	HPE LC to LC Multi-mode OM3 2-Fiber 2.0m 1-Pack Fiber Optic Cable	AJ835A
	HP LC to LC Multi-mode OM3 2-Fiber 5.0m 1-Pack Fiber Optic Cable	AJ836A
<b>OM3 FC LC-LC cables</b>	HP LC to LC Multi-mode OM3 2-Fiber 15.0m 1-Pack Fiber Optic Cable	AJ837A
	HP LC to LC Multi-mode OM3 2-Fiber 30.0m 1-Pack Fiber Optic Cable	AJ838A
	HP LC to LC Multi-mode OM3 2-Fiber 50.0m 1-Pack Fiber Optic Cable	AJ839A

### Step 4b - Choose Supported Options For 10GbE Infrastructure

<b>Copper Cable</b>	HP BladeSystem c-Class 10GbE SFP+ to SFP+ 0.5m Direct Attach Copper Cable	487649-B21
	HP BladeSystem c-Class 10GbE SFP+ to SFP+ 1m Direct Attach Copper Cable	487652-B21
	HP BladeSystem c-Class 10GbE SFP+ to SFP+ 3m Direct Attach Copper Cable	487655-B21
	HP BladeSystem c-Class 10GbE SFP+ to SFP+ 5m Direct Attach Copper Cable	537963-B21
	HP BladeSystem c-Class 10GbE SFP+ to SFP+ 7m Direct Attach Copper Cable	487658-B21

### Configuration Information

<b>DAC Cable</b>	HPE X242 10G SFP+ to SFP+ 1m Direct Attach Copper Cable	J9281B
	HPE X242 10G SFP+ to SFP+ 3m Direct Attach Copper Cable	J9283B
	HPE X242 10G SFP+ to SFP+ 7m Direct Attach Copper Cable	J9285B
	HPE FlexNetwork X240 10G SFP+ to SFP+ 0.65m Direct Attach Copper Cable	JD095C
	HPE FlexNetwork X240 10G SFP+ to SFP+ 1.2m Direct Attach Copper Cable	JD096C
	HPE FlexNetwork X240 10G SFP+ to SFP+ 3m Direct Attach Copper Cable	JD097C
	HPE FlexNetwork X240 10G SFP+ to SFP+ 5m Direct Attach Copper Cable	JG081C
	HPE FlexNetwork X240 10G SFP+ SFP+ 7m Direct Attach Copper Cable	JC784C

### Step 4c - Choose Supported Options For SAS Infrastructure

#### Supported options

#### Mini-SAS HD to Mini-SAS Fanout Cables

HP Mini SAS High Density to Dual 2-lane Mini SAS External Fanout 1 Meter Cable	K2R02A
HP Mini SAS High Density to Dual 2-lane Mini SAS External Fanout 2 Meter Cable	K2R03A
HP Mini SAS High Density to Dual 2-lane Mini SAS External Fanout 4 Meter Cable	K2R04A

**NOTE:** Recommended to utilize Fanout cables when connecting to SAS HBAs for maximum future flexibility without downtime.

#### Mini-SAS HD to Mini-SAS HD Fanout Cables

HP Mini SAS High Density to Dual 2-lane Mini SAS High Density External Fanout 1 Meter Cable	K2Q99A
HP Mini SAS High Density to Dual 2-lane Mini SAS High Density External Fanout 2 Meter Cable	K2R00A
HP Mini SAS High Density to Dual 2-lane Mini SAS High Density External Fanout 4 Meter Cable	K2R01A

**NOTE:** Recommended to utilize Fanout cables when connecting to SAS HBAs for maximum future flexibility without downtime.

#### Mini SAS Cables

HP 1.0m External Mini SAS High Density to Mini SAS Cable	716189-B21
HP 2.0m External Mini SAS High Density to Mini SAS Cable	716191-B21
HP 4.0m External Mini SAS High Density to Mini SAS Cable	716193-B21

**NOTE:** These cables are used to connect 6Gb SAS initiator to MSA 1050 SAS controller. These are not used for connecting to a disk enclosure.

HP External 1.0m (3ft) Mini-SAS HD 4x to Mini-SAS HD 4x Cable	716195-B21
HP External 2.0m (6ft) Mini-SAS HD 4x to Mini-SAS HD 4x Cable	716197-B21
HP External 4.0m (13ft) Mini-SAS HD 4x to Mini-SAS HD 4x Cable	716199-B21

**NOTE:** These cables are used to connect 12Gb SAS initiator to MSA 1050 SAS controller. These are not used for connecting to a disk enclosure.

#### SAS Host Bus Adapters (HBAs)

HPE Smart Array E208e-p SR Gen10 12G SAS PCIe Plug-in Controller	804398-B21
HP H241 12Gb 2-ports Ext Smart Host Bus Adapter	726911-B21

### Configuration Information

HP H221 PCIe 3.0 SAS Host Bus Adapter	729552-B21
<b>SAS Controllers</b>	
HPE Smart Array P408e-m SR Gen10 12G SAS Mezzanine Controller	804381-B21
HP Smart Array P741m/4GB FBWC 12Gb 4-ports Ext Mezzanine SAS Controller	726782-B21
HPE Smart Array P408e-p SR Gen10 12G SAS PCIe Plug-in Controller	804405-B21
HP Smart Array P441/4GB FBWC 12Gb 2-ports Ext SAS Controller	726825-B21
<b>Switches</b>	
HP 6Gb SAS Switch Single Pack for HP BladeSystem c-Class	BK763A
HP 6Gb SAS Switch Dual Pack for HP BladeSystem c-Class	BK764A

### Step 5 - Software

The MSA Advanced Data Services Suite software is available as an option on the MSA 1050.

HPE MSA Advanced Data Services Suite LTU	Q0H99A
HPE MSA Advanced Data Services Suite E-LTU	Q0H99AAE

**NOTE:**

- The Advanced Data Services Suite includes a Performance Tiering LTU, 512 Snapshot Software LTU, and the Remote Snap Software LTU
- Individual Software titles are not available for sale on the MSA 1050

### Technical Specifications

#### MSA 1050

#### POWER REQUIREMENTS

Input Power Requirements (typical-running I/O) SFF/LFF arrays 110VAC 3.20A, 343W; 220VAC 1.67A,337W

Max Input Power 100-240 VAC, 50/60 Hz., 4.20-1.77A

Heat Dissipation 1174 BTU/hr

#### TEMPERATURE AND HUMIDITY RANGES

Operating Temperature 41°F to 104°F (5°C to 40°C)

Shipping Temperature -40°F to 158°F (-40°C to 70°C)

Operating Humidity 10% to 90% RH @ 104°F (40°C) non-condensing

Non-Operating Humidity Up to 93% RH @ 104°F (40°C)

#### DECLARED ACOUSTIC NOISE LEVELS

Sound Power A weighted sound power LWAd=6,75 B

Sound Pressure A weighted sound pressure LpAm - 55dB

#### SHOCK AND VIBRATION

Shock, Operational 3G's for 11 milliseconds

Shock, Non-Operational Per NEBS GR-63-CORE UNPACKAGED EQUIPMENT SHOCK CRITERIA (4.3.2)

Vibration, Operational 5-500Hz, 0.14 Grms shaped

Vibration, Non-Operational 3-365-3Hz, 1.22 Grms,z-axis,0.85 Grms, X&Y axis shaped spectrum

#### PHYSICAL

Height 3.5 in/ 8.9 cm

Depth (excluding cables) (back of ear to MSA 1050 SFF 24-bay array: 19.5 in / 49.5 cm

back of controller handle) MSA 1050 LFF 12-bay array: 22.5in. / 57.2 cm

Width (body only) 17.6 in / 44.7 cm (w/ ears 19 in / 48.26 cm)

Chassis Weight (no controllers) MSA 2050 LFF chassis: 31 lbs. (DC-pwr model: 32.6 lbs)

MSA 2050 SFF chassis: 29.1 lbs (DC-pwr model: 30.7lbs)

### Technical Specifications

<b>MSA 1050 Controllers:</b>	<b>User Interface</b>	Status and activity provided via management interfaces. Status Indicators on front of Controller
	<b>RAID Support</b>	1, 5, 6, 10,
	<b>Cache Memory</b>	6GB (4GB Read/Write.and 2GB System) ECC protection with backup to Flash memory (indefinite backup)
	<b>Cache Backup</b>	ECC protection with back up to flash memory (indefinite backup)
	<b>Upgradeable Firmware</b>	yes
	<b>Disk Drive and Enclosure Protocol Support</b>	6 Gb SAS - Serial Attached SCSI
	<b>Host Ports</b>	2 x 8Gb Fibre Channel per controller 2 x 1GbE iSCSI per controller 2 x 10GbE iSCSI per controller 2x12Gb SAS per controller
	<b>Expansion Port</b>	SAS (SFF8088) 4x lane 6 Gb SAS
	<b>Weight, controller</b>	MSA 1050 Controllers 4.8 lbs.
	<b>MSA 1050 Regulatory Info</b>	<b>Safety</b>
<b>Electromagnetic Compatibility</b>		VCCI:2008-04 Class A (Japan) FCC 15:109(g) Class A (USA) ICES-003:2004 Class A (Canada) EN55022 : (European Union Class A); CISPR 22 (International Class A) EN61000-3-2 : (Harmonics) (European Union) EN61000-3-3 : (Flicker) (European Union) EN 55024 (European Union, Immunity, Class A);CISPR 24 (International Immunity, Class A) AS/NZS CISPR 22, Class A (Australia, New Zealand) CNS 13438 Taiwan, Class A (Taiwan) KN22 Class A (Emissions Class A); KN24 (Immunity) (S Korea)
<b>RoHS and WEEE</b>		RoHS-6/6 Compliance, China RoHS, WEEE
<b>Country Approvals</b>		United States ,Australia/New Zealand, Canada, China (PRC), European Union, Germany (GS Mark), Japan, South Korea, Taiwan

Summary of Changes

Date	Version History	Action	Description of Change
06-Nov-2017	From Version 1 to 2	Changed	Changes made to the document
25-Sept-2017	Version 1	Created	All Content Created

