

### Overview

The HP StorageWorks 70 Modular Smart Array enclosure is a 2U Serial Attach SCSI (SAS) disk drive storage enclosure supporting 2.5 inch SAS or Serial ATA (SATA) drives. This enclosure delivers industry-leading data performance, availability, storage density, and upgradeability to meet customers' demanding and growing storage needs. This enclosure is designed to support 2.5 inch Universal SAS and SATA hard drive form factors. The MSA70 enclosure supports direct attach storage (DAS) to HP ProLiant and Integrity Servers. The MSA70 supports the cascading of shelves in a 1+1 configuration to allow a maximum of 50 drives in a 4U configuration behind each of the two external ports on the HP Smart Array P800, the HP Smart Array E500, the HP Smart Array P411 or the HP Smart Array P212 Controller for a total of 100 drives in 4 enclosures (a single controller port incorporates four lanes for a total max throughput of 12Gb/s for SAS). (**NOTE: Smart Array P411 Controller is supported on ProLiant servers only**).

On HP ProLiant servers Dual Domain support is available for the HP Smart Array P800 attached to a MSA70 with the addition of the HP StorageWorks Dual Domain I/O Module Option (AG779A). (Single initiator environment only.)

The MSA70 also supports the HP Smart Array P600 and the HP Smart Array P212 Controllers. Behind the single external port on the HP Smart Array P600 controller 1+1 cascading allows a maximum of 50 drives in a 4U configuration. (**NOTE: Smart Array P212 Controller is supported on ProLiant servers only**).

For HP-UX and Open VMS environments on selected HP Integrity Servers the MSA70 supports the HP (AH303A) SC44Ge Host Bus Adapter with the addition of the HP StorageWorks Dual Domain I/O Module Option (AG779A). Behind the single external port on the HP (AH303A) SC44Ge Host Bus Adapter 1+1 cascading allows a maximum of 50 drives in a 4U configuration. The HP (AH303A) SC44Ge Host Bus Adapter will only support HP-UX and Open VMS environments and will be available on all rack mounted HP Integrity Servers with PCIe slots.

The addition of the I/O Module with the HP SC44Ge Host Bus Adapter adds support for Multi Initiator JBOD Clusters. It will support HP-UX and Open VMS on selected HP Integrity servers only. The MSA70 with the I/O Module and the HP SC44Ge Host Bus Adaptor will not support ProLiant servers. Multi Initiator JBOD clusters are supported with dual port SAS drives only.

Support for HP Serviceguard software on HP-UX with HP-UX 11iv2/11iv3 only. HP Serviceguard monitors the health of each node and rapidly responds to failures in a way that minimizes or eliminates application downtime.

**NOTE: HP Integrity servers that are supported:**

[rx2660, rx3600, rx6600, rx7640, rx8640, Superdome sx2000 \(only the version that support PCI-e cards\)](#)

The MSA70 is also supported when attached to a HP StorageWorks 2324fc Dual Controller Modular Smart Array (MSA2324fc). The MSA2324fc is a 4Gb Fibre Channel connected 2U storage area network (SAN) or direct connect solution that can accommodate twenty four (24) Small Form Factor (SFF) drives and is designed for small to medium size departments or remote locations. The MSA2324fc supports attachment of up to three (3) dual I/O MSA70 SFF JBODs (99 SFF drives)

**NOTE: MSA70 is NOT supported behind a MSA2312fc (LFF)**

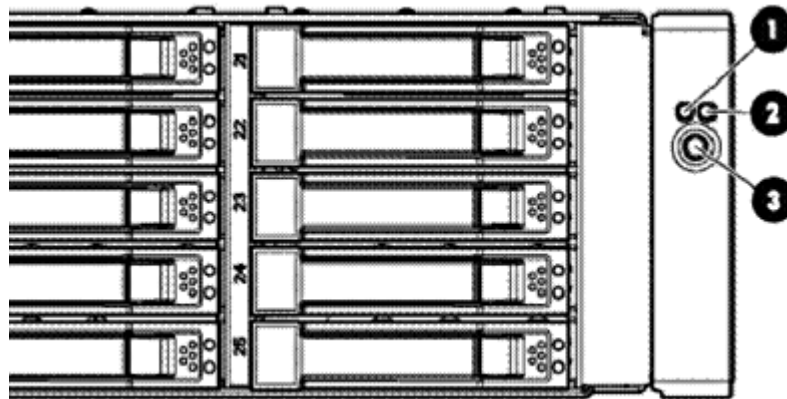
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## What's New

Adding support for the new

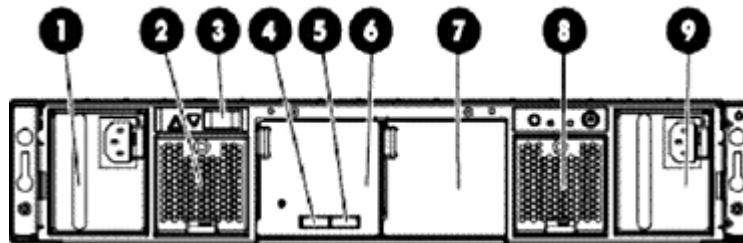
- 500 GB 6G SAS 7.2K 2.5 inch (SFF) Dual Port MDL HDD (NOTE: 6G SAS drives will only function as 3G drives in a MSA70)
- 500 GB 3G SATA 7.2K 2.5 inch (SFF) MDL HDD

### Overview



#### Front panel LEDs and buttons

1. Status LED
2. Fault LED
3. UID button/LED



#### Rear Panel components

- |                            |                   |
|----------------------------|-------------------|
| 1. Power supply 1          | 6. I/O module bay |
| 2. Fan module 1            | 7. I/O module bay |
| 3. 7-segment display board | 8. Fan module 2   |
| 4. SAS in connector        | 9. Power supply 2 |
| 5. SAS out connector       |                   |

### Overview

#### At A Glance

- 3G SAS host connectivity
- Dual Domain support with HP Smart Array P800 Controller for HP ProLiant and Integrity servers (requires dual port SAS drives) (single environment only)
- Multi Initiator support with the SC44Ge Host Bus Adapter (AH303A) (HP-UX and Open VMS on selected HP Integrity Servers) with dual port SAS drives only
- Supports twenty five 2.5 inch hot pluggable drives
- Supports HP 3G SAS Dual-port disk drives, (36 GB, 72 GB, 146 GB & 300 GB capacities)
- Supports HP 6G SAS Dual-port Midline (MDL) disk drives (500 GB capacity)
- Supports HP SATA 1.5G and 3G disk drives, (60 GB 1.5G , 120 GB, 250 & 500 GB capacities)
- Maximum storage capacity of 7.5 TB (with twenty five 300 GB 3G DP SAS), 12.5 TB (with twenty five 500 GB 6G SAS DP MDL) or 12.5 TB (with twenty five HP SATA 3G 500 GB hard drives)
- Attached to Smart Array P800, the Smart Array E500, the HP Smart Array P600, the HP Smart Array P411 or the HP Smart Array P212 Controllers for HP ProLiant and Integrity Servers. (**NOTE: Smart Array P411 & P212 Controllers are supported on ProLiant servers only**).
- Attached to HP SC44Ge Host Bus Adapter for HP-UX and Open VMs support on selected HP Integrity Servers (servers that support PCI-e cards) Supports attachment of up to three (3) dual I/O MSA70 behind a MSA2324fc (99 SFF drives for a total of 29.7TB SAS or 24.7TB SATA) (NOTE: MSA70 is NOT supported behind a MSA2312fc (LFF)) (MSA2000 G2 Arrays not yet qualified with the 500 GB SAS MDL and 500 GB SATA MDL drives)
- Supports MS Windows 2003, Microsoft Windows 2008, Red Hat Linux, SUSE Linux, VMware, Novell NetWare, HP-UX 11iv2 and 11iv3, Open VMS 8.3 1H
- 1+1 Cascade support (behind a single SAS port)
- Supports boot from storage
- Redundant hot-plug power supplies and fans standard
- Addition of second I/O Module adds Dual Domain capability providing higher level of redundancy and reliability

### Standard Features

#### Modular Smart Array Family

The HP StorageWorks Modular Smart Array family delivers simple, affordable storage technology to meet today's demanding and growing IT needs. These storage solutions offer the best price/performance and best price/availability features for direct attach environments, small clusters, workgroups and entry-level SAN environments. Each solution is designed to be easy to deploy, secure, and reduce management costs, while driving rapid return on investment.

#### Modular Smart Array 70

The HP StorageWorks 70 Modular Smart Array is an end-to-end flexible storage array, offering data availability, enhanced reliability, enhanced performance and tiered storage capability with SAS and SATA drives and investment protection.

Manage your small and midrange business growing storage needs by deploying this low cost, flexible tiered storage system with up to 30 TB SAS, 50 TB SAS MDL or 50 TB SATA (100 drives across four enclosures) capacity supporting both SAS and SATA. The modular, scalable design of the MSA70 provides a flexible platform allowing you to buy what is needed today and purchase additional capacity as data storage needs grow, instead of making a large up-front investment. Additional drives and enclosures can be easily added as customer needs dictate without extra management charges as needs grow. For Small businesses, it is a stepping stone to simplify capacity expansion of HP ProLiant and HP Integrity Server environments to external storage without having to make the full move to SAN or NAS. For fast growing Small or Medium businesses MSA70 can scale to multiple TBytes, by adding additional drive bays.

This enclosure is designed to support the 2.5 inch Universal form factor hard drive in either SAS or SATA. Configuration and setup is easy with HP Array Configuration Utility (ACU). The 2U storage supports direct attach storage to HP ProLiant and HP Integrity Servers. Enclosures can be cascaded in a 1 + 1 configuration allowing a maximum of 50 drives in a 4U configuration behind each port on the Smart Array P800 or the Smart Array E500 controller for a total of 100 drives.

The MSA70 is also supported when attached to a HP StorageWorks 2324fc Dual Controller Modular Smart Array (MSA2324fc). The MSA2324fc is a 4Gb Fibre Channel connected 2U storage area network (SAN) or direct connect solution that can accommodate twenty four (24) Small Form Factor (SFF) drives and is designed for small to medium size departments or remote locations. The MSA2324fc supports attachment of up to three (3) dual I/O MSA70 SFF JBODs (99 SFF drives)

**NOTE:** MSA70 is NOT supported behind a MSA2312fc (LFF)

### Standard Features

#### Key Features

<b>Affordability</b>	MSA70 provides end-to-end SAS host modular flexible platform in a high capacity 2U disk drive external direct storage system
<b>Flexibility</b>	2U SFF SAS/SATA allows customer choice. Extends the benefit of tiered storage to direct attach customers
<b>Investment protection</b>	Modular platform allows customers to purchase based on current need and future growth, no hidden management charges.
<b>Simplicity: Manageability</b>	Manage the array with the highly refined HP Systems Insight Manager
<b>Cascadeability</b>	Up to 2 enclosures can be connected together to form a single controller port. Grow storage capacity easily
<b>Reliability</b>	Hot plug compatibility: can add or replace hard drives without service disruption RAID levels provide various levels of data protection and availability. RAID level choices provide flexibility. RAID 6 with ADG provides additional level reliability
<b>High Availability</b>	Serviceguard maximizes application availability while protecting data integrity. (HP-UX and Open VMS support on selected HP Integrity Servers only)
<b>HP Portfolio - end-to-end solution</b>	HP offers a complete portfolio of SAS storage enclosure, Smart Array Controllers and HP ProLiant and HP Integrity Servers for end-to-end solution leading the competition

### Product Highlights

#### High Levels of Storage Density, Data Protection, and Functionality

- **Storage Capacity** - The MSA70 enclosure supports up to twenty five 2.5 inch SAS or SATA drives for a maximum capacity of 7.5 TB with 300GB SAS drives, 12.5 TB SAS MDL with 500 GB SAS MDL drives or 12.5 TB with 500 GB SATA drives.
- **Data Protection** - MSA70 is designed for a high level of data protection. It includes redundant fans and power supplies (standard), and support for various RAID levels including RAID 6 with ADG (depending upon the Smart Array Controller used).
- **Dual Domain** - Dual domain SAS creates redundant pathways from servers to storage devices. The redundant paths created by these configurations reduce or eliminate single points of failure within the storage network. This provides increased levels of high availability with redundant paths from the controller to the drives.
- **Storage Manageability** - The MSA70 features familiar configuration and management tools such as Array Configuration Utility (ACU) and HP Systems Insight Manager (SIM). Online Management Features include: Online Capacity Expansion, Online RAID Level Migration, Online Stripe Size Migration, Online Spares.
- **Choice of Computing Platform** - The MSA70 is designed and qualified for HP ProLiant and HP Integrity servers.
- **Advanced Data Guarding (RAID 6 with ADG) Fault Tolerance** - It allocates two sets of parity data across drives and allows simultaneous write operations. This level of fault tolerance can withstand two simultaneous drive failures without downtime or data loss.

#### Low Total Cost of Ownership

The modular, scalable design of the MSA70 provides an extremely flexible platform. You can buy what you need today and purchase additional capacity as your data storage needs grow, instead of making a large up-front investment. Additional drives and enclosures can be easily added as your needs dictate.

- **Cascading** - The MSA70 has the capability of cascading up to two (2) enclosures behind a single SAS port (depends on the Smart Array Controller).
- **Tiered Storage** - MSA70 supports mixing SAS and SATA drives in the same enclosure, allowing you to more effectively utilize mission critical storage where you need it most.
- **Universal SATA Hard Drive Support**- Since the MSA70 supports HP Universal SATA drives, your investment in disk drives is protected and cost is minimized as you add new drives.
- **Pre-Failure Warranty** - Drives installed in a MSA70 and monitored under HP Systems Insight Manager are supported by a Pre-Failure (replacement) Warranty (3 years for SAS and 1 year for SATA drives). Pre-Failure Warranty allows for the replacement of designated drives in MSA70 before they actually fail when using HP Systems Insight Manager on HP ProLiant or HP Integrity servers.

**NOTE:** Some operating systems may not support all of these features.

- **Integrated Configuration and Management Tools** - The MSA70 utilizes the standard, integrated set of Smart Array management and utility software for HP ProLiant Servers. These tools consistently lower the cost of ownership by reducing training and technical expertise necessary to install and maintain HP server storage. HP-UX and Open VMS uses HP Integrity ODE for storage enclosure support.

### Modular Smart Array 70 Components

#### MSA70 Enclosure

The 2U array houses up to twenty five 2.5 inch Universal hot pluggable SAS or SATA hard drives. Each MSA70 includes the following standard components:

- MSA70 base enclosure with redundant power supplies and fan modules
- Rack mounting hardware kit
- 0.5m mini-SAS cable
- Two AC power cords & two PDU interconnect cords

#### Smart Array P800 Features

- HP's highest performing 16-port PCI-express controller with expander support
- Expander support enables the addition of external storage, allowing increased number of drives for increased performance
- Provides highest level of data protection standard by using RAID 6 with Advanced Data Guarding
- Supports a maximum of 108 drives (100 drives across four enclosures plus 8 drives in the server internal backplane)
- Supported in a single initiator environment

#### Smart Array E500 Features

- HP's first external connect only PCI Express (PCIe) Serial Attached SCSI (SAS) RAID controller
- Expander support enables the addition of external storage, allowing increased number of drives for increased performance
- Offers RAID 0, 1 & 1+0 and can be upgraded with battery-backed write cache (BBWC) module for RAID 5
- Supports a maximum total of 108 hard drives
- Supported in a single initiator environment

#### Smart Array P411 Features

- The HP Smart Array P411 is HP's PCI Express (PCIe) Serial Attached SCSI (SAS) RAID controller
- Low profile, half height card has 8 ports and utilizes DDR2-800 memory
- The P411 is ideal for RAID 0/1, 5, 1+0 & 5+0 and can be upgraded with the 512MB battery-backed write cache (BBWC) module and Smart Array Advanced via license key for RAID 6 & 6+0

#### Smart Array P212 Features

- The HP Smart Array P212 is HP's entry level PCI Express (PCIe) Serial Attached SCSI (SAS) RAID controller
- The Low Profile, Half Height card has 8 ports and utilizes DDR2-266 memory
- The P212 is ideal for RAID 0/1, 1+0 and can be upgraded with the 256MB battery-backed write cache (BBWC) module for RAID 5, 5+0

#### HP (AH303A) SC44Ge Host Bus Adapter

- SAS technology delivers high performance and data bandwidth up to 3Gbp/s per physical link.
- PCI Express x8 capable
- PCIe x8 (2.5 GB/s bandwidth)
- Supported in a Multi Initiator environment

### Modular Smart Array 70 Components

#### RAID

Several fault tolerant configurations keep data available and servers running while drives are being replaced - RAID levels that offer fault tolerance include:

- RAID 6 with ADG: Allocates the equivalence of two parity drives across multiple drives and allows simultaneous write operations.
- Distributed Data Guarding (RAID 5): Allocates parity data across multiple drives and allows simultaneous write operations.
- Drive Mirroring (RAID 1 and 1+0 Striped Mirroring): Allocates half of the drive array to data and the other half to mirrored data, providing two copies of every file.

### Software Components

The MSA70 utilizes a single, consistent set of utility software for storage and RAID management, setup, configuration and troubleshooting. This consistency reduces the cost of ownership by reducing the training and technical expertise necessary to install and maintain your HP server storage solution.

#### Dual Domain (NEW)

Dual domain SAS creates redundant pathways from servers to storage devices. The redundant paths created by these configurations reduce or eliminate single points of failure within the storage network. This provides increased levels of high availability with redundant paths from the controller to the drives. Dual domain SAS implementations make it possible to tolerate host bus adapter (HBA) failure, external cable failure, expander failure, failure in a spanned disk (JBOD) environments.

#### Configuration Utilities

Array Configuration Utility (ACU) [On-line for Microsoft and Linux, Remote Web-Based & Off-line] Option ROM Configuration for Arrays (ORCA), NetWare ACU CPQONLIN (only online support no Web based support)

#### Management/Health Utilities

HP Systems Insight Manager

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#### Array Configuration Utility (ACU)

- Provides a graphical view of HP drive array configurations.
- Easy to use Wizards for configuration.
- Web Based ACU supports On-Line, Remote Web Based and Off-line configuration.
- Supports on-line configuration for Microsoft, NetWare and Linux.

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#### HP Systems Insight Manager

- Powerful storage, server and server option management tool.
- Monitor storage from a remote central location.
- Browser based Insight Manager 7 provides full access from anywhere on the Intranet, eliminating the need for a dedicated Insight Manager console.

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#### Supported Operating Systems

- HPUX 11iv2/11iv3
- Microsoft Win PE
- Windows Server 2003: 2003 SP2 and later
- Web Edition:
  - Embedded Systems Edition
  - Standard Edition and Standard x64 Edition: Enterprise Edition and Enterprise x64 Edition: Datacenter Edition and Datacenter x64 Edition: (non-program Datacenter)
  - Compute Cluster Server 2003 (CCS 2003)
- Windows 2008:
  - Web Server
  - Small Business
  - Embedded Systems
  - Standard Edition and Standard x64 Edition:
  - Enterprise Edition and Enterprise x64 Edition: supported on all servers
  - Datacenter Edition and Datacenter x64 Edition: (non-program Datacenter)
- Windows HPC Server 2008
- Microsoft Windows Server 2003/R2 (Std. & EE, both 32 & 64-bit)
- Microsoft Windows Server 2003/R2 SBS
- Microsoft Windows Server 2003/R2 Web Edition
- Microsoft Windows Server 2003 Standard Edition
- Microsoft Windows Server 2003 Enterprise Edition
- Microsoft Windows Server 2003 on Itanium
- Novell NetWare 6.5 Open Enterprise Server

### Software Components

- Open VMS V8.3 1H
- Red Hat Enterprise Linux 5 (x86, AMD/64/EM64T)
- Red Hat Enterprise Linux 4 (x86, AMD/64/EM64T)
- Red Hat Enterprise Linux 3 (x86,AMD64/EM64T)
- Red Hat Enterprise Linux 4 for IA64
- Red Hat Enterprise Linux 5 for IA64
- SLES 9 (x86, AMD/64/EM64T)
- SLES 10 (x86, AMD/64/EM64T)
- Solaris 10
- SUSE Linux Enterprise Server 10 for IA64
- VMware ESX 3.5.x

**NOTE:** HPUX 11iv2/11.iv3 (for Dual Domain only)

Needs I/O Module (#AG779A), and HP (AH303A) SC44Ge Host Bus Adapter or HP Smart Array P800 Controller (single initiator environment only)

Qualified for the following HP Integrity servers:

rx2660, rx3600, rx6600, rx7640, rx8640, Superdome sx2000 (only the version that support PCI-e cards)

**NOTE:** Open VMS (for Dual Domain only)

Needs I/O Module (#AG779A), and HP (AH303A) SC44Ge Host Bus Adapter

Qualified for the following HP Integrity servers:

rx2660, rx3600, rx6600, rx7640, rx8640, Superdome sx2000 (only the version that support PCI-e cards)

### Service and Support, HP Care Pack, and Warranty Information

#### Service and Support

Three-year limited parts only warranty, including hardware diagnostic support, pre-failure warranty (coverage of hard drives, memory and processors). The warranty is fully supported by HP Services and a worldwide network of resellers and service providers. In addition 90-day's getting started software telephone support may be covered under the warranty or available for an additional fee. Enhancements to warranty services are available through HP Care Pack services.

**NOTE:** The MSA70 has a limited 3 year parts only warranty. SAS drives have 3 year warranty and SATA drives have a 1 year warranty

Care Pack services provide a range of life cycle support options that let you choose the service levels that meet your business requirements, from basic to mission-critical.

A full range of HP Care Pack hardware and software services are available including:

- Installation and start up
- Education courses
- Extended onsite hardware coverage hours from same business day 13 hours, 5 day to 24 hours, 7 days call window with options including 4-hour response or 6-hour Call To Repair
- Comprehensive range of software technical support for Microsoft, Linux, ProLiant Essentials solutions helping to deliver high level of application availability. Response times range from 30 minutes for critical problems to 2 hours.
- System Management, Performance Services and Mission Critical Support Solution

Service includes HP branded hardware options qualified for the storage enclosure, purchased at the same time or afterwards, internal to the enclosure. These will be covered at the same service level and coverage period as the storage enclosure.

**NOTE:** For more information on HP Care Pack services, contact any of our worldwide sales offices or resellers or visit our worldwide Web site on the internet at: <http://www.hp.com/hps/carepack>

**NOTE:** For more complete information on HP Services offerings, customers and resellers, please visit us at: <http://www.hp.com/hps>

**NOTE:** Additional information regarding worldwide limited warranty and technical support is available at: <http://h18004.www1.hp.com/products/servers/platforms/warranty/index.html>

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#### HP Care Pack Information Flexible Support

1 Year Support

HA101A1-87G  
HA103A1-87G  
HA104A1-87G  
HA105A1-87G  
HA109A1-87G  
HA110A1-87G  
HA111A1-87G  
HA112A1-87G

3 Year Support

HA101A3-87G  
HA103A3-87G  
HA104A3-87G



### Service and Support, HP Care Pack, and Warranty Information

		HA105A3-87G
		HA109A3-87G
		HA110A3-87G
		HA111A3-87G
		HA112A3-87G
	4 Year Support	HA101A4-87G
		HA103A4-87G
		HA105A4-87G
		HA109A4-87G
		HA110A4-87G
		HA111A4-87G
		HA112A4-87G
	5 Year Support	HA101A5-87G
		HA103A5-87G
		HA105A5-87G
		HA109A5-87G
		HA110A5-87G
		HA111A5-87G
		HA112A5-87G
		HA113A1-564
Fixed Care Packs	Installation & Support	
	HP 1y NBD 9x5 MSA70 HW Support	UF297E
	HP 1y 4h 13x5 MSA70 HW Support	UF298E
	HP 1y 4h 24x7 MSA70 HW Support	UF299E
	HP 1y 6h ctr MSA70 HW Support	UF300E
	HP 3y NBD 9x5 MSA70 HW Support	UF301E
	HP 3y 4h 13x5 MSA60 HW Support	UF302E
	HP 3y 4h 24X7 MSA70 HW Support	UF303E
	HP 3y 6h CTR MSA70 HW Support	UF304E
	HP 1y PW NBD MSA70 HW Support	UF305PE
	HP 1y PW 4h 13X5 MSA70 HW Support	UF306PE
	HP 1y PW 4h 24X7	UF307PE
	HP 1y PW NBD MSA70 HW Support	UF308PE
	Hardware Installation, Electronic	U8132E

### Configuration Information

#### Step 1: Order Required Items

Model	Shipping Dimensions	Part Number
MSA70	HP Storage Works 70 Modular Smart Array	418800-B21
I/O Module	HP StorageWorks Dual Domain I/O Module <b>NOTE:</b> The I/O Module is a field upgradeable Option Kit the addition of which in the MSA70 will allow dual domain capability providing higher level of redundancy and reliability.	AG779A
	<ul style="list-style-type: none"> <li>HP Smart Array P800 Controller (381513-B21) supports Dual Domain on the MSA70 with the addition of the HP StorageWorks Dual Domain I/O Module in a single initiator environment.                             <ul style="list-style-type: none"> <li>Requires Dual port SAS drives</li> </ul> </li> <li>HP (AH303A) SC44Ge Host Bus Adapter supports Dual Domain on the MSA70 with the addition of the HP StorageWorks Dual Domain I/O Module in a Multi Initiator environment. Supports only HP-UX and Open VMS and on selected HP Integrity Servers only.</li> </ul>	
MSA70 Single Port drive Bundles	HP StorageWorks MSA70 1.8TB SAS HDD Bundle (MSA70 w/25 72GB 15K SAS SFF SP HDD)	AG825A
	HP StorageWorks MSA70 3.6TB SAS HDD Bundle (MSA70 w/25 146GB 10K SAS SFF SP HDD)	AG893A
	<b>NOTE:</b> Drives in the bundles are Single Port drives only.	
MSA70 Dual Port drive Bundle	HP StorageWorks Dual Domain MSA70 7.5TB DP SAS HDD Bundle (MSA70 w/25 300GB SFF DP SAS HDD + I/O Module)	AP715A
MSA70 Americas Bundles	HP MSA70 w/ Dual Domain I/O Module; (12) 2.5-in. 146GB SAS Drives w/ cable Solution	AJ923A
	<b>NOTE:</b> available in USA & Canada only (1) HP MSA70 Modular Smart Array Enclosure; (1) HP Modular Dual Domain I/O Module Option Kit; (12) HP 146GB 3G 10K SAS 2.5" SFF DP HDD; (1) Mini SAS 4x2M Cable All	

#### Step 2: Array Controllers

	Description	Part Number
Smart Array Controllers Supported (Single Domain)	<b>HP ProLiant Servers</b>	
	HP Smart Array P800 controller	381513-B21
	HP Smart Array E500 controller	435129-B21
	HP Smart Array P600/256 BBWC Controller	337972-B21
	HP Smart Array P411/256MB Controller	462830-B21
	HP Smart Array P411/512MB BBWC	462832-B21
	HP Smart Array P212/256MB Controller	462834-B21
	<b>HP Integrity Servers</b>	
	HP Smart Array P800 Controller	AD335A
	HP Smart Array E500 Controller	AD226A
	HP Smart Array P600/256 BBWC Controller	337972-B21

### Configuration Information

**NOTE:** The HP Smart Array P800 supports the cascading of shelves in a 1+1 configuration to allow a maximum of 50 drives in a 4U configuration behind each of the two external ports on the HP Smart Array P800 controller for a total of 100 drives in 4 enclosures.

**NOTE:** Dual Domain is supported for the HP Smart Array P800 Controller (single initiator environment only)

**NOTE:** The HP Smart Array P600 supports the cascading of shelves in a 1+1 configuration to allow a maximum of 50 drives in a 2U configuration behind or the HP Smart Array P600 controller as the P600 has only a single external port.

**NOTE:** The Smart Array E500 offers RAID 0, 1 and 1+0 and can be upgraded with ProLiant server to RAID 5 with battery-backed write cache (BBWC) module - 383280-B21.

#### SAS Controllers Supported (Dual Domain)

##### HP ProLiant Servers

HP Smart Array P800 controller

381513-B21

##### HP Integrity Servers

HP SC44Ge Host Bus Adapter

AH303A

**NOTE:** Only HP-UX and Open VMS on selected HP Integrity servers supported.

HP Integrity servers that are supported:

rx2660, rx3600, rx6600, rx7640, rx8640, Superdome sx2000 (only the version that support PCI-e cards).

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### Step 3: Choose Server(s)/MSA2000 Arrays

#### Compatibility

HP ProLiant ML310 G3  
HP ProLiant ML310 G4  
HP ProLiant ML350 G5  
HP ProLiant ML370 G5  
HP ProLiant ML570 G4  
HP ProLiant DL320 G4  
HP ProLiant DL320s  
HP ProLiant DL360 G5  
HP ProLiant DL365 G2  
HP ProLiant DL380 G5  
HP ProLiant DL385 G2  
HP ProLiant DL580 G4  
HP ProLiant DL585 G2  
HP ProLiant DL385 G2

HP Integrity Server rx2660 with combination PCIx/PCIe riser only  
HP Integrity Server rx3600 with combination PCIx/PCIe backplane only  
HP Integrity Server rx6600 with combination PCIx/PCIe backplane only  
HP integrity Server rx7640 with combination PCIx/PCIe only  
HP integrity Server rx8640 with combination PCIx/PCIe only  
HP integrity Server sx2000 with combination PCIx/PCIe only  
HP StorageWorks 2324fc Dual Controller Modular Smart Array (SFF)

### Configuration Information

**NOTE:** HP ProLiant servers above may not support all Smart Array controllers, see matrix on:  
<ftp://ftp.compaq.com/pub/products/servers/ProLiantstorage/arraycontrollers/compatibility-matrix.pdf>  
**NOTE:** HP Integrity Server home:  
[http://www.hp.com/products1/serverconnectivity/support\\_matrices.html](http://www.hp.com/products1/serverconnectivity/support_matrices.html)  
**NOTE:** MSA2300fc home: [www.hp.com/go/msa2000fc](http://www.hp.com/go/msa2000fc)  
**NOTE:** MSA70 is NOT supported behind a MSA2312fc (LFF)

## Step 4: Choose Hard Drives

### SAS Drives

#### 3G SFF Serial Attached SCSI (SAS) Hard Drives

HP 72GB 3G SAS 10K 2.5 inch SFF SP HDD	375861-B21
HP 146GB 3G SAS 10K 2.5 inch SFF SP HDD	431958-B21
HP 36GB 3G SAS 15K 2.5 inch SFF SP HDD	431933-B21
HP 72GB 3G SAS 15K 2.5 inch SFF SP HDD	431935-B21
HP 72GB 3G SAS 10K 2.5 inch SFF DP ENT HDD	384842-B21
HP 146GB 3G SAS 10K 2.5 inch SFF DP ENT HDD	418367-B21
HP 300GB 3G SAS 10K 2.5 inch SFF DP ENT HDD	492620-B21
HP 36GB 3G SAS 15K 2.5 inch SFF DP ENT HDD	418369-B21
HP 72GB 3G SAS 15K 2.5 inch SFF DP ENT HDD	418371-B21
HP 146GB 3G SAS 15K 2.5 inch SFF DP ENT HDD	504062-B21

#### 6G SFF Serial Attached SCSI (SAS) Hard Drives

HP 72GB 6G SAS 15K 2.5 inch SFF DP ENT HDD	512545-B21
HP 146GB 6G SAS 10K 2.5 inch SFF DP ENT HDD	507125-B21
HP 146GB 6G SAS 15K 2.5 inch SFF DP ENT HDD	512547-B21
HP 300GB 6G SAS 10K 2.5 inch SFF DP ENT HDD	507127-B21

**NOTE:** 6G SAS drives will only function as 3G drives in a MSA70

**NOTE:** In a single domain environment Dual Port (DP) drives will function as Single Port (SP) drives only.

**NOTE:** Only Dual Port (DP) drives will work in the Dual Domain environment. Dual Domain environment requires the HP StorageWorks Dual Domain I/O Module Option (# AG779A).

### SAS Midline (MDL)

HP 500 GB 6G SAS 7.2K 2.5 inch SFF DP MDL HDD	507610-B21
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**NOTE:** 6G SAS drives will only function as 3G drives in a MSA70

**NOTE:** In a single domain environment Dual Port (DP) drives will function as Single Port (SP) drives only.

**NOTE:** Only Dual Port (DP) drives will work in the Dual Domain environment. Dual Domain environment requires the HP StorageWorks Dual Domain I/O Module Option (# AG779A).

### SATA Drives

HP 250 GB 3G 5.4K 2.5 inch SFF SATA ETY HDD	460355-B21
HP 500 GB 3G SATA 7.2K 2.5 inch SFF MDL HDD	507750-B21

**NOTE:** SATA drives are not dual port (DP) drives.

**NOTE:** Go to the HP Hard Drive Compatibility table for complete drive compatibility information (<http://www.hp.com/products/harddiskdrives>). Using hard drives in unsupported configurations will result in voiding the warranty and could result in damage to the drive and/or loss of data

## Configuration Information

**NOTE:** 500 GB SAS MDL and SATA MDL HDDs have not yet been qualified on the MSA2000 G2 Arrays.

### Cable Options

**Cables used for connecting the HP Smart Array P800/512 BBWC Controller (P/N 381513-B21 or AD335A), the HP Smart Array E500 (P/N 435129-B21 or AH226A), the HP Smart Array P212 (P/N 462834-B21), or the HP Smart Array P411 (P/Ns 462830-B21 or 462832-B21) to MSA70**

Mini SAS 4x 2M Cable All	407339-B21
Mini SAS 4x 4M Cable All	432238-B21
Mini SAS 4x 6M Cable All	432239-B21

**NOTE:** #0D1 will appear after this part number on your sales order if factory integration is indicated.

**Cables used for connecting the HP Smart Array P600/512 BBWC Controller (P/N 337972-B21) or the HP SC44Ge Host Bus Adapter (P/N AH303A) to MSA70**

SAS 4x to Mini SAS 4x 2M	419571-B21
SAS 4x to Mini SAS 4x 4M	419572-B21
SAS 4x to Mini SAS 4x 6M	419573-B21

**NOTE:** #0D1 will appear after this part number on your sales order if factory integration is indicated.

## Step 5: Choose Rack Option

HP Universal Rack	HP Universal Rack 10642 G2 Shock Rack	AF002A
	HP Universal Rack 10642 G2 w/Ext Shock Rack	AF004A
	HP Universal Rack 10636 G2 Pallet ALL	AF011A
	HP Universal Rack 10636 G2 Shock Rack	AF012A
	HP Universal Rack 10636 G2 Crated ALL	AF013A
	HP Universal Rack 10636 G2 w/Ext Shock Rack	AF014A
	HP 10642 G2 200mm Extn Shock Rack	AF034A
	HP 10647 G2 200mm Extn Shock Rack	AF044A
HP Rack	HP Rack S10614 (14U) Rack Cabinet - Shock Pallet	292302-B22
	HP Module Cooling System	AF092A

### Family Comparison

	HP StorageWorks 50 Modular Smart Array Enclosure	HP StorageWorks 60 Modular Smart Array	HP StorageWorks 70 Modular Smart Array
<b>Total Drive Count</b>	10 SAS 10 SATA 10 SAS MDL	12 SAS 12 SATA 12 SAS MDL	25 SAS 25 SATA
<b>Maximum Storage</b>	3TB SAS per enclosure or 5TB SAS MDL or SATA	12 TB per enclosure (using 1TB SATA disk drives)	7.5 TB SAS, or 12.5 TB SAS MDL per enclosure or 12.5 TB SATA
<b>Expansion Options</b>	None	None	None
<b>Host Interface</b>	SAS	SAS	SAS
<b>Drive Interface</b>	SAS/SATA/SAS MDL	SAS/SATA/SAS MDL	SAS/SATA
<b>Drive Form Factor</b>	2.5 in.	3.5 in.	2.5 in.
<b>Clustering Support</b>	No	HP-UX only	HP-UX only
<b>SAN Backup Support</b>	No	No	No
<b>Storage Mirroring Support</b>	Yes	Yes	Yes
<b>Systems Insight Manager Support</b>	Yes	Yes	Yes
<b>OS Support</b>	Windows, Linux, NetWare	Windows, Linux, NetWare, SCO, HP-UX, Open VMS	Windows, Linux, NetWare, SCO, HP-UX, Open VMS, VMware
<b>Rack Height</b>	1U	2U	2U
<b>Warranty (parts/labor/onsite)</b>	3-0-0	3-0-0	3-0-0

### Technical Specifications

LED Indicators for Drive Modules (2)	Online (bottom) Drive failure LED (top)
LED Indicators on Front Panel (3)	Heartbeat LED Fault LED UID LED
LED Indicators on Rear Panel	I/O Module LED UID button/LED Heartbeat LED Fault LED Power On/Standby button system Power supply LED Fan Module LED
Host Interface	SAS 3Gb/s
Maximum Number of Drives	Up to twenty five 2.5 inch SAS or SATA drives
Temperature Range	<b>Operating</b> 50° to 95° F (10° to 35° C) <b>Shipping</b> -40° to 150° F (-40° to 66° C) <b>NOTE:</b> Rated 1°C per 1000 feet of elevation to 10,000 ft.
Relative Humidity	<b>Operating</b> 10% to 90% <b>Non-operating</b> Up to 95%
Input Power Requirements	<b>Rated Input Voltage</b> 100 to 240 VAC <b>Rated Input Frequency</b> 50 to 60 Hz <b>Rated Input Current</b> 3.9A at 110 VAC typical, 6A Maximum <b>Input Power (max)</b> 345 W
Heat Dissipation (maximum)	1175 Btu/hr <b>NOTE:</b> Input Power and Heat Dissipation specifications are maximum values and apply to worst-case conditions at full rated power supply load. The power/heat dissipation for your installation will vary depending on the equipment configuration.
User Interface	Controller display with Status indicators (2) and push buttons (4) on front of controller
Logical Drives (LUN)	Up to 32 Logical drives when connected to P800 Smart Array controller
Maximum Logical Drive Size	> 2 TB
RAID Support	RAID 6 with ADG (Advanced Data Guarding) RAID 5 (Distributed Data Guarding) RAID 1 + 0 (Mirroring and Striping) RAID 1 (Mirroring) RAID 0 (Striping)
Upgradeable Firmware	4MB Flashable
Disk Drives and Enclosure Protocol Support	HP 2.5 inch 3G SAS
I/O Module	<b>Connector Type</b> IPass (mini-SAS) 4x (SFF8088) <b>Number of Ports</b> Two (one IN, other is OUT)

### Technical Specifications

<b>Modular Smart Array 70 Cabinet</b>	2U Rack Form Factor	
	<b>Dimensions</b> (HxWxD)	3.47 x 17.64 x 23.25 in (8.8 x 44.8 x 59 cm)
	<b>Weight</b> (Net)	35 lb (15.9 kg)
	<b>Weight</b> (Gross)	48 lb (24.6 kg)

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