QuickSpecs

Overview

The HP 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, the HP Smart Array P212 or the P812 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 and P812 Controllers are 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 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 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 Bust 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 MSA2000 G2 or P2000 G3 Small Form Factor (SFF) Arrays. The SFF MSA2000 G2 or the P2000 G3 can accommodate up to twenty four (24) SFF drives and is designed for small to medium size department and remote locations. The MSA2000 G2 supports attachment of up to three (3) dual I/O MSA70 SFF JBODs (99 SFF drives). P2000 G3 Arrays support attachment of up to five(5) dual I/O MSA70 SFF JBODs (149 SFF drives).
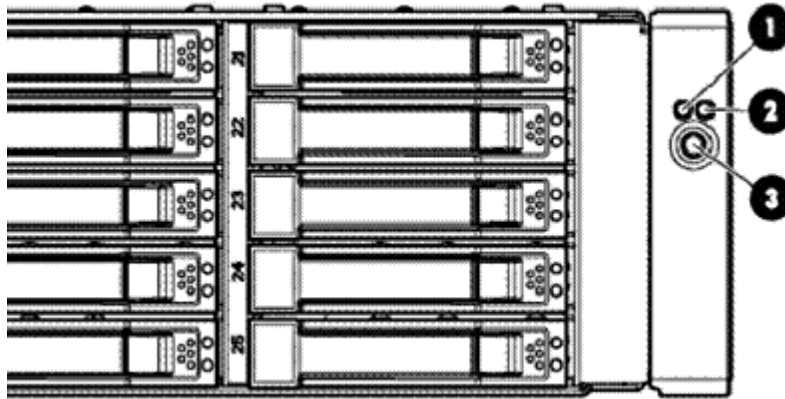
What's New

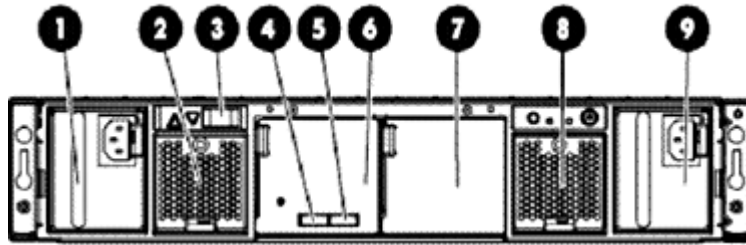- 300GB 6G SAS 15K rpm SFF (2.5in) Enterprise Hard Drive

QuickSpecs

Overview

Front panel LEDs and buttons

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

Rear Panel components

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

QuickSpecs

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 6G SAS Dual-port disk drives, (146 GB, 300 GB, 600 GB & 900 GB capacities)
- Supports HP 6G SAS Dual-port Midline (MDL) disk drives (500 GB & 1 TB capacities)
- Supports HP SATA 3G disk drives, (500 GB & 1 TB capacities)
- Maximum storage capacity of 22.5 TB (with twenty five 900 GB 6G DP SAS), 25 TB (with twenty five 1 TB 6G SAS DP MDL) or 25 TB (with twenty five HP SATA 3G 1 TB hard drives)
- 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 Small Form Factor MSA2000 G2 (99 SFF drives for a total of 59.4TB SAS or 24.7TB SATA) (NOTE: MSA70 is NOT supported behind a MSA2000 G2 (LFF)).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
- Supports attachment of up to five (5) dual I/O MSA70 behind a Small Form Factor P2000 G3 (149 SFF drives for a total of 89.4TB SAS or 74.5TB SAS MDL or SATA) (NOTE: MSA70 is NOT supported behind a P2000 G3 (LFF))
- 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

QuickSpecs

Standard Features

Modular Smart Array Family	The HP 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 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 90 TB SAS, 100 TB SAS MDL or SATA MDL (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, E500, P411 or the P812 controller for a total of 100 drives.

The MSA70 is also supported when attached to a HP MSA2000 G2 or P2000 G3 Small Form Factor (SFF) Arrays. The SFF MSA2000 G2 or the P2000 G3 can accomodate up to twenty four (24) SFF drives and is designed for small to medium size department and remote locations. The MSA2000 G2 supports attachment of up to three (3) dual I/O MSA70 SFF JBODs (99 SFF drives). P2000 G3 Arrays support attachment of up to five(5) dual I/O MSA70 SFF JBODs (149 SFF drives).

QuickSpecs

Standard Features

Key Features	Affordability	MSA70 provides end-to-end SAS host modular flexible platform in a high capacity 2U disk drive external direct storage system
	Flexibility	2U SFF SAS/SATA allows customer choice. Extends the benefit of tiered storage to direct attach customers
	Investment protection	Modular platform allows customers to purchase based on current need and future growth, no hidden management charges.
	Simplicity: Manageability	Manage the array with the highly refined HP Systems Insight Manager
	Cascadeability	Up to 2 enclosures can be connected together to form a single controller port. Grow storage capacity easily
	Reliability	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
	High Availability	Serviceguard maximizes application availability while protecting data integrity. (HP-UX and Open VMS support on selected HP Integrity Servers only)
	HP Portfolio - end-to-end solution	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

QuickSpecs

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 22.5 TB with 900GB SAS drives, 25 TB SAS MDL or SATA MDL 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 SAS MDL or 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.

QuickSpecs

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
- For more information see:
  http://h18004.www1.hp.com/products/quickspecs/12616_div/12616_div.html

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
- For more information see:
  http://h18004.www1.hp.com/products/quickspecs/12700_div/12700_div.html

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 + 0,50 & 60
- For more information see:
  http://h18004.www1.hp.com/products/quickspecs/13202_div/13202_div.html

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
- For more information see:
  http://h18004.www1.hp.com/products/quickspecs/13203_div/13203_div.html

QuickSpecs

Modular Smart Array 70 Components

Smart Array P812 Features
- The HP Smart Array P812 provides superior RAID performance, while delivering high levels of connectivity, reliability, and many advanced features
- Increased connectivity with 8 internal ports and 16 external ports.
- 1 G 72-bit wide DDR2-800 flash-backed write cache (FBWC).
- Smart Array Advanced Pack (SAAP) license key included standard
- For moreinformation see:
  http://h18004.www1.hp.com/products/quickspecs/13558_div/13558_div.html

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

RAID

Several fault tolerant configurations keep data available and servers running while drives are being replaced - RAID levels that offer fault tolerance include:
- **RAID 50 (RAID 5+0)** protects against failure of one drive (and failure of particular multiple drives). RAID 50 is a nested RAID method that uses RAID 0 striping across RAID 5 arrays. RAID 50 tolerates one drive failure in each spanned array without loss of data. RAID 50 requires less rebuild time than single RAID 5 arrays RAID 50 requires a minimum of six drives.
- **RAID 60 (RAID 6+0)** allows administrators to split the RAID 6 storage across multiple external boxes. RAID 60 requires a minimum of eight drives. RAID 60 is a nested RAID method that uses RAID 0 block-level striping across multiple RAID 6 arrays with dual distributed parity. With the inclusion of dual parity, RAID 60 will tolerate the failure of two disks in each spanned array without loss of data.
- **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.

QuickSpecs

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

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.

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.

Supported Operating Systems

HP ProLiant Servers
NOTE: For information on supported Operating Systems, please see the following Smart Array Quickspecs:
E500: http://h18004.www1.hp.com/products/quickspecs/12700_div/12700_div.html
P600: http://h18004.www1.hp.com/products/quickspecs/12247_div/12247_div.html
P800: http://h18004.www1.hp.com/products/quickspecs/12616_div/12616_div.html
P212: http://h18004.www1.hp.com/products/quickspecs/13203_div/13203_div.html
P411: http://h18004.www1.hp.com/products/quickspecs/13202_div/13202_div.html
P812: http://h18004.www1.hp.com/products/quickspecs/13558_div/13558_div.html

HP Integrity Servers

- HPUX 11iv2/11iv3
- Open VMSV 8.3 1H
  NOTE: HPUX 11iv2/11iv3 (for Dual Domain only)
  Needs I/O Module (#AG779A), and HP SC44Ge Host Bus Adapter or HP Smart Array P800 Controller
  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

QuickSpecs

Software Components

cards)
- MSA2000 G2 Arrays
  NOTE: For information on supported Operating Systems please see the MSA2000 G2 Quickspecs:
  www.hp.com/go/msa2000
- P2000 G3 Arrays
  NOTE: For information on supported Operating Systems please see the P2000 G3 Quickspecs:
  www.hp.com/go/P2000

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)

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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. SAS MDL 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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Service and Support, HP Care Pack, and Warranty Information

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
			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
		Installation & Support	HA113A1-564

QuickSpecs

Configuration Information

Step 1: Order Required Items

Model	Shipping Dimensions	Part Number
MSA70	HP 70 Modular Smart Array	418800-B21
	HP Dual Domain I/O Module	AG779A
I/O Module	**NOTE:** 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.	

- HP Smart Array P800 Controller (381513-B21) supports Dual Domain on the MSA70 with the addition of the HP Dual Domain I/O Module in a single initiator environment.
    - Requires Dual port SAS drives
- HP (AH303A) SC44Ge Host Bus Adapter supports Dual Domain on the MSA70 with the addition of the HP Dual Domain I/O Module in a Multi Initiator environment. Supports only HP-UX and Open VMS and on selected HP Integrity Servers only.

MSA70 Single Port drive Bundles	**NOTE:** Drives in the bundles are Single Port drives only**.**	
MSA70 Dual Port drive Bundle	HP Dual Domain MSA70 7.5TB DP SAS HDD Bundle (MSA70 w/25 300GB SFF DP SAS HDD + I/O Module)	AP715A

Step 2: Array Controllers

	Description	Part Number
Smart Array Controllers Supported (Single Domain)	**HP ProLiant Servers**	
	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 P812 Controller/ 1G Flash Backed Cache Controller	487204-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
	HP Integrity Servers	
	HP Smart Array P800 Controller	AD335A
	HP Smart Array E500 Controller	AD226A
	HP Smart Array P600/256 BBWC Controller	337972-B21

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.

QuickSpecs

<div align="right">

HP 70 Modular Smart Array

</div>

Configuration Information

	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).	

Step 3: Choose Server(s)/MSA2000 G2/P2000 G3Arrays

Compatibility	**HP ProLiant Servers**
	For up to date compatibility, please see the following URL for complete Smart Array P600, P800, E500, P411, P212 & P812 Controller compatibility and support information:
	http://h18004.www1.hp.com/products/servers/proliantstorage/arraycontrollers/index.html
	HP Integrity Servers
	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
	NOTE: HP Integrity Server home:
	http://www.hp.com/products1/serverconnectivity/support_matrices.html
	HP MSA2000 G2/P2000 G3 Arrays
	P2000 G3 home: www.hp.com/go/P2000
	MSA2000 G2 home: www.hp.com/go/msa2000
	NOTE: MSA70 is NOT supported behind a MSA2000 G2 (LFF) or a P2000 G3 (LFF)

Step 4: Choose Hard Drives

SAS Drives	**6G SFF Serial Attached SCSI (SAS) Hard Drives**	
	HP 72 GB 6G SAS 15K 2.5 inch SFF DP ENT HDD	512545-B21
	HP 146 GB 6G SAS 10K 2.5 inch SFF DP ENT HDD	507125-B21
	HP 146 GB 6G SAS 15K 2.5 inch SFF DP ENT HDD	512547-B21
	HP 300 GB 6G SAS 10K 2.5 inch SFF DP ENT HDD	507127-B21
	HP 300GB 6G SAS 15K rpm SFF (2.5-inch) Dual Port Enterprise 3yr Warranty Hard Drive	627117-B21
	HP 450 GB 6G SAS 10K 2.5 inch SFF DP ENT HDD	581284-B21
	HP 600 GB 6G SAS 10K 2.5 inch SFF DP ENT HDD	581286-B21
	HP 900 GB 6G SAS 10K 2.5 inch SFF DP ENT HDD	619291-B21
	NOTE: 6G drives will work in 3G systems like the MSA70. 6G drives will only function as 3G drives in a MSA70	

Configuration Information

	NOTE: 450/600GB 6G SAS HDDs have not yet been qualified on the MSA2000 G2/P2000 G3 Arrays 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 Dual Domain I/O Module Option (# AG779A).	
SAS Midline (MDL)	HP 1 TB 6G SAS 7.2K 2.5 inch SFF DP MDL HDD	605835-B21
	HP 500 GB 6G SAS 7.2K 2.5 inch SFF DP MDL HDD	507610-B21
SATA Drives	HP 1 TB 3G SATA 7.2K 2.5 inch SFF MDL HDD	625609-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	
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), the HP Smart Array P411 (P/Ns 462830-B21 or 462832-B21) or the P812 (P/Ns 487204-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

QuickSpecs

Family Comparison

	HP 50 Modular Smart Array Enclosure	**HP 60 Modular Smart Array**	**HP 70 Modular Smart Array**
Total Drive Count	10 SAS 10 SATA 10 SAS MDL	12 SAS 12 SATA 12 SAS MDL	25 SAS 25 SATA 25 SAS MDL
Maximum Storage	6TB SAS per enclosure or 5TB SAS MDL or SATA	24 TB per enclosure (using 2TB SATA disk drives)	22.5 TB SAS, or 25 TB SAS MDL or SATA MDL per enclosure
Expansion Options	None	None	None
Host Interface	SAS	SAS	SAS
Drive Interface	SAS/SATA/SAS MDL	SAS/SATA/SAS MDL	SAS/SATA/SAS MDL
Drive Form Factor	2.5 in.	3.5 in.	2.5 in.
Clustering Support	No	HP-UX only	HP-UX only
SAN Backup Support	No	No	No
Storage Mirroring Support	Yes	Yes	Yes
Systems Insight Manager Support	Yes	Yes	Yes
OS Support	Windows, Linux, NetWare	Windows, Linux, NetWare, SCO,HP-UX, Open VMS	Windows, Linux, NetWare, SCO, HP-UX, Open VMS, VMware
Rack Height	1U	2U	2U
Warranty (parts/labor/onsite)	3-0-0	3-0-0	3-0-0

QuickSpecs

Technical Specifications

LED Indicators for HDDs	Online (bottom)	
	Drive failure LED (top)	
LED Indicators on Front Panel	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	4 x wide SAS 3Gb/s ports	
Maximum Number of Drives	Up to 25 (twenty five) 2.5 inch SAS or SATA drives	
Temperature Range	**Operating**	50° to 95° F (10° to 35° C)
	Shipping	-40° to 150° F (-40° to 66° C)
		NOTE: Rated 1°C per 1000 feet of elevation to 10,000 ft.
Relative Humidity	**Operating**	10% to 90%
	Non-operating	Up to 95%
Input Power Requirements	**Rated Input Voltage**	100 to 240 VAC
	Rated Input Frequency	50 to 60 Hz
	Rated Input Current	3.9A at 110 VAC typical, 6A Maximum
	Input Power (max)	345 W
Heat Dissipation (maximum)	1175 Btu/hr	
	NOTE: 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.	
RAID Support	See QuickSpecs for Smart Array Controllers P600, P800, E500, P212, P411 & P812 http://h18004.www1.hp.com/products/servers/proliantstorage/arraycontrollers/index.html MSA2000 G2: See Quickspecs for MSA2000 G2: www.hp.com/go/msa2000 P2000 G3: See Quickspecs for P2000 G3: www.hp.com/go/P2000	
Upgradeable Firmware	Yes, Offline only. Firmware updates available through hp.com	
Disk Drives and Enclosure Protocol Support	HP 2.5 inch 3G SAS	
I/O Module	**Connector Type**	IPass (mini-SAS) 4x (SFF8088)
	Number of Ports	Two (one IN, other is OUT)

QuickSpecs

Technical Specifications

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

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