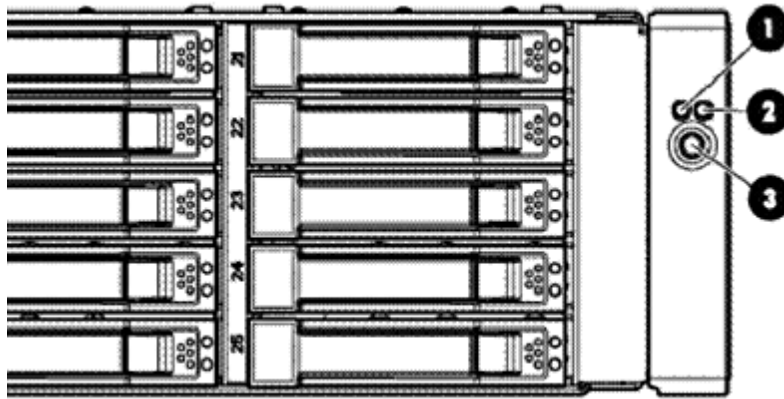


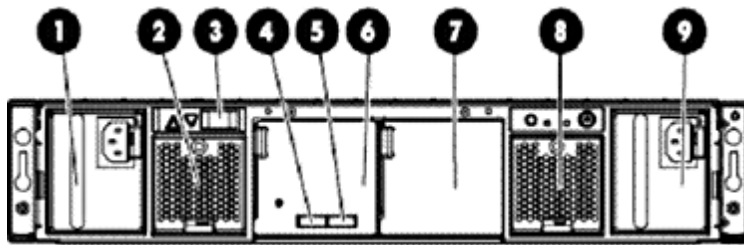
Overview

The HP StorageWorks 70 Modular Smart Array enclosure is a 2U Serial Attach SCSI (SAS) disk drive storage enclosure supporting 2.5" 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" Universal SAS or 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 port on the Smart Array P800 controller for a total of 100 drives in 4 enclosures. (this single controller port incorporates four lanes for a total max throughput of 12Gb/s for SAS)



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 |
| 2. Fan module 1 | 7. For future use |
| 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

- 3 Gb/s SAS host connectivity
- Supports twenty five 2.5" hot pluggable drives
- Supports HP SAS 3 Gb/s disk drives, (36GB, 72GB, 146GB capacities)
- Supports HP SATA 1.5Gb/s disk drives, (60GB capacities)
- Maximum storage capacity of 3.6 TB (with twenty five 146GB HP SAS 3Gb/s), or 1.5 TB (with twenty five HP SATA 1.5Gb/s 60GB hard drives)
- Attached to Smart Array P800
- Supports boot from storage
- Redundant hot-plug power supplies and fans standard

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 14.4 TB (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 ProLiant 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" 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 controller for a total of 100 drives.

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/Flexibility to mix and match SAS/SATA drives in the same storage. 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
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

Product Highlights

High Levels of Storage Density, Data Protection, and Functionality

- **Storage Capacity** - The MSA70 enclosure supports up to twenty five 2.5" SAS or SATA drives for a maximum capacity of 3.6 TB with 146GB SAS drives, or 1.5 TB with 60GB 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)
- **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 ProLiant 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. These tools consistently lower the cost of ownership by reducing training and technical expertise necessary to install and maintain HP server storage.

Modular Smart Array 70 Components

MSA70 Enclosure

The 2U array houses up to twenty five 2.5" 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)

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.

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

- Microsoft Win PE
- 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
- Novell NetWare 6.5 Open Enterprise Server
- Red Hat Enterprise Linux 3 (AS/ES) (x86)
- Red Hat Enterprise Linux 3 (AMD64/EM64T)
- Red Hat Enterprise Linux 4 (x86)
- Red Hat Enterprise Linux 4 (AMD64/EM64T)
- SCO OpenServer 5.0.7
- SCO OpenServer 6.0.0
- SCO UnixWare 7.1.3
- SCO UnixWare 7.1.4
- SUSE Linux Enterprise 9 (SLES9) (x86)
- SUSE Linux Enterprise 9 (AMD64/EM64T)
- SUSE SLES 10 (x86)
- SUSE Linux Enterprise 10 (AMD64/EM64T)

Not all configurations are supported on all operating systems; please refer to compatibility matrix <http://www.hp.com/products/sharedstorage> for latest compatibility information.

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 and VMware-based IT 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>

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

Service and Support, HP Care Pack, and Warranty Information

	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
Fixed Care Packs	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 M HP 1y PW NBD MSA70 HW Support SA70 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	35.25 x 23.5 x 15.75 in (89.5 x 59.7 x 40.0 cm)	418800-B21
MSA70 Starter Kit		

Step 2: Array Controllers

	Description	Part Number
Smart Array Controllers Supported	Smart Array P800 controller	381513-B21

Step 3: Choose ProLiant Server(s)

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

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>

Step 4: Choose Hard Drives

SAS Drives	HP 36GB 10K SAS 2.5" SFF SP HDD	375859-B21
	HP 72GB 10K SAS 2.5" SFF SP HDD	375861-B21
	HP 146GB 10K SAS 2.5" SFF SP HDD	431958-B21
	HP 36GB 15K SAS 2.5" SFF SP HDD	431933-B21
	HP 72GB 15K SAS 2.5" SFF SP HDD	431935-B21
SATA Drives	HP 60GB 1.5G SATA 5.4K 2.5" SFF HDD	379306-B21

NOTE: Mix of SAS and SATA drives will be available in the future

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

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

Configuration Information

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 Shock Rack	AF012A
	HP Universal Rack 10636 G2 w/Ext Shock Rack	AF014A
	HP Module Cooling System	AF092A
HP Rack	HP Rack S10614 (14U) Rack Cabinet - Shock Pallet	292302-B22
	HP Rack 10842 (42U, 800mm wide) - Pallet	257415-B21
	HP Rack 10842 (42U, 800mm wide) - Shock Pallet	257415-B22
	HP Rack 10647 (47U) - Pallet	245160-B21
	HP Rack 10647 (47U) - Crated	245160-B23
	HP Rack 10622 (22U) - Pallet	245163-B21
	HP Rack 10622 (22U) - Shock Pallet	245163-B22
	HP Rack 10622 (22U) - Crated	245163-B23

Family Comparison

	HP StorageWorks 20 Modular Smart Array Enclosure	HP StorageWorks 30 Modular Smart Array (MSA30 SB, MSA30 DB and MSA30 MI)	HP StorageWorks 50 Modular Smart Array Enclosure	HP StorageWorks 60 Modular Smart Array	HP StorageWorks 70 Modular Smart Array
Total Drive Count	12 SATA drives	14	10	12 SAS 12 SATA	25 SAS 25 SATA
Maximum Storage	9 TB	2TB	1.4TB per enclosure (using 146GB 10K disk drives)(28 TB in a 2U configuration)	9 TB	3.6 TB
Expansion Options	MSA1500, MSA1510i	N/A	None	None	None
Host Interface	Ultra320 SCSI	U320 SCSI	SAS	SAS	SAS
Drive Interface	SATA	SCSI	SAS/SATA	SAS/SATA	SAS/SATA
Drive Form Factor	3.5 in.	3.5 in.	2.5 in.	3.5 in.	2.5 in.
Clustering Support	No	HP-UX only	No	No	No
SAN Backup Support	Yes	No	No	No	No
Storage Mirroring Support	Yes	Yes	No	No	No
Systems Insight Manager Support	Yes	Yes	Yes	Yes	Yes
OS Support	Microsoft Windows Server 2003 Web Edition, Microsoft Windows Server 2003 Standard Edition, Microsoft Windows Server 2003 Enterprise Edition, Microsoft Windows 2000 Server, Microsoft Windows 2000 Advanced Server, Novell NetWare 5.1, & 6.5, Red Hat Enterprise Linux 2.1, Red Hat Linux Advanced Server 3.0, Red Hat Linux Advanced Server 4.0, SuSE Linux Enterprise 9 (SLES9), SCO OpenServer 6.0.0, SCO UnixWare 7.1.3, SCO UnixWare 7.1.4	Windows, Linux, NetWare, HP-UX, OpenVMS	Windows, Linux, NetWare	Windows, Linux, NetWare, SCO	Windows, Linux, NetWare, SCO
Rack Height	2U	3U	1U	2U	2U

Family Comparison

Warranty (parts/labor/onsite)	3-0-0	3-0-0	3-0-0	3-0-0	3-0-0
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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 3 Gb/s
Maximum Number of Drives	Up to twenty five 2.5" 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.
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" SAS 3 Gb/s

Technical Specifications

I/O Module	Connector Type	IPass (mini-SAS)
	Number of Ports	Two (one IN, other is OUT)
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)

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The only warranties for HP products and services are set forth in the express warranty statements accompanying such products and services. Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.

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