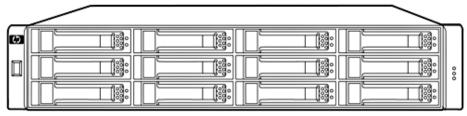*Overview*

The HP StorageWorks 2000sa Modular Smart Array (MSA2000sa) represents the end-to-end Serial Attached SCSI (SAS) model of the MSA2000 family (which includes the MSA2000fc Fibre Channel and MSA2000i iSCSI models), a new generation of HP storage arrays specifically designed for entry-level customers featuring the very latest in functionality and technology at highly affordable price points.

The MSA2000sa is a 2U direct attach, external shared storage solution designed for small to medium size deployments or remote locations. It comes in two models - a basic single controller model for low initial cost with the ability to upgrade later; and a model with dual controllers standard for maximum performance. This solution offers a SAS host interface to accommodate twelve 3.5 inch enterprise class SAS drives and archival-class SATA drives. Additional capacity can easily be added when needed by attaching up to three MSA2000 12 bay drive enclosures. Maximum raw capacity ranges from 3.6TB SAS or 12TB SATA in the base cabinet, to over 14.4TB SAS or 48TB SATA with the addition of the maximum number of drive enclosures. NOTE: there are no additional hidden charges, licenses or fees as you add enclosures or hosts and users.

The MSA2000 offers many distinct features such as the ability to mix SAS and SATA RAID sets (volumes) within the same enclosure greatly increases the flexibility and economy of assigning mission-critical data and archival data to the proper drive type. The wide variety of RAID levels supported assures the user of just the right level of performance and protection demanded by his application. The capability of implementing controller-based snapshots and clones affordably brings enterprise-class functionality into smaller departments, remote locations, and small but growing companies.

The MSA2000sa is a member of HP StorageWorks Modular Smart Array offerings, delivering simple and affordable storage technology to meet today's demanding and growing IT needs. These storage solutions offer excellent price/performance and availability features for direct attach environments, small clusters, workgroups and entry-level SAN environments. Each solution is designed to be easy to deploy, secure, with low management costs, while driving rapid return on investment.

MSA2000fc

QuickSpecs

Models

Models

HP StorageWorks MSA2000sa Modular Smart Array

HP StorageWorks 2012sa Single Controller Modular Smart Array	AJ752A
HP StorageWorks 2012sa Dual Controller Modular Smart Array	AJ753A
HP StorageWorks 2000sa Modular Smart Array Controller	AJ754A
HP StorageWorks MSA2000 Single I/O 3.5 in 12 Drive Enclosure (w/ two .6m SAS cables)	AJ749A
HP StorageWorks MSA2000 Dual I/O 3.5 inch 12 Drive Enclosure (w/ two .6m SAS cables)	AJ750A
HP StorageWorks MSA2000 Drive Enclosure I/O Module	AJ751A

Features and Benefits

Key Features

Highly efficient consolidation and sharing of storage

- Geared to departmental and small to medium business requirements
- Grows as the storage demands increase - up to 48 drives and 14.4TB SAS or 48TB SATA
- Supports up to 4 hosts with SAS direct connect along with support for 256 LUNs and LUN sizes up to 16TB
- Optional controller-based snapshot and clone capability for increased data protection

Flexibility in drives (MSA2000 family-specific)

- Enterprise-class SAS or archival-class SATA drives as the need and budget dictate
- Dual-ported SAS drives for enterprise needs
- Large capacity SATA drives for inexpensive archival storage
- Able to mix SAS and SATA drives within the same drive enclosure

Cost efficient plus high-availability choices

- Choose either single (future upgradeable) or dual controller array models
- Choice of low cost single I/O or high-availability dual I/O drive enclosure models.

Customer Benefits

- The HP StorageWorks 2000 Modular Smart Array family manages growing storage requirements across multiple HP ProLiant servers for customers who need a centralized dedicated storage solution for applications. Shared storage allows for controlled, cost-effective growth and increased protection of data.
- Its ease of management allows a department or small company to effectively handle growing storage requirements with a minimum of complexity.
- The MSA2000sa extends the benefits of shared storage resources to first time implementers on a tight budget
- The modular design allows the user to start relatively small but supports future growth to hundreds of users and up to 14.4TB of SAS or 48TB of SAS storage
- The optional controller-based snapshot and clone capability as part of the MSA2000 family allows the smaller departmental user or company to implement functionality once only available to much larger firms with expensive arrays.

QuickSpecs

HP StorageWorks 2000sa Modular Smart Array

At a Glance

HP MSA2000sa Models At a Glance:

- High performance Modular Smart Array controller with two 3Gb SAS ports
- Single and dual controller models
- MSA2012sa models utilize Celeron 566MHz processor(s)
- 1 GB transportable cache per controller - battery-free cache backup with super capacitors and compact flash
- 256 LUNs with 16TB LUNs supported
- 2U rack mount chassis combining both the controller and disk shelf
- Twelve 3.5 inch dual-ported SAS or SATA MSA2000-specific drives (supports mixing of drive types in a single shelf)
- Support expansion to 3 additional enclosures & total of 48 disk drives
- Redundant power supplies and fans are standard
- RAID levels 0, 1, 3, 5, 6, 10, 50
- Non-disruptive on-line controller code upgrade
- Heterogeneous support for 32- bit and 64-bit Windows, Red Hat and SuSE
- Qualified and certified for Windows and Linux clustering
- Optional controller-based snapshot and clone functionality

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Family Information

	MSA2000sa	MSA2000fc	MSA2000i	EVA4400
Capacity (raw) Minimum / with maximum additional drive enclosures	3.6TB SAS or 12TB SATA w/ 3 enclosures: 14.4TB SAS or 48TB SATA	3.6TB SAS or 12TB SATA w/ 3 enclosures: 14.4TB SAS or 48TB SATA	3.6TB SAS or 12TB SATA w/ 3 enclosures: 14.4TB SAS or 48TB SATA	3.6TB FC or 12TB FATA w/ 8 enclosures 43TB FC or 96 TB FATA
Controller Cache	1GB per controller	1 GB per controller	1 GB per controller	2 GB per controller
Host connect MSA2000 has 1 or 2 controllers, EVA has 2 controllers standard	Two 3Gb SAS ports per controller	Two 4Gb Fibre Channel ports per controller	Two 1GbE iSCSI ports per controller	Two 4Gb Fibre Channel ports per controller
Maximum Drives	48	48	48	96
Maximum host supported	4	64	16	512
Snapshot, remote replication	Snapshot, clone	Snapshot, clone	Snapshot, clone	Snapshot, clone, remote data replication
Use for Storage	Primary Storage with SAS Secondary with SATA	Primary Storage with SAS Secondary with SATA	Primary Storage with SAS Secondary with SATA	Primary Storage with Fibre Channel Secondary with FATA

*maximum available storage capacity depends on the RAID level being implemented, and is based on maximum number of LUNs and LUN size

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Product Technology	SAS	Two 3Gb host ports per controller
	Modular Chassis	2U, 12 Large Form Factor drive bays, accommodating MSA2 SAS and SATA hard drives (MSA2000-specific). Comes standard with one or two controllers.
	Drives available	Serial Attached SCSI (SAS) enterprise-class drives designed for high volume, 24x7 usage. Serial-ATA (SATA) are usually reserved for archival of data as they are both relatively inexpensive and are available in very large capacities. The MSA2000 family of arrays can accommodate both SAS and SATA drives within the same enclosure making it ideal to have both business-critical, high activity files on SAS drives while using snapshot or clone capability to keep back-up data on the less expensive drives. SAS drive performance can be approximately 30%greater than SATA performance on sequential host IO. SAS performance excels in sequential lower latency response time and random IO per second transaction performance due to higher rpm disk speeds yielding lower seek times. NOTE: MSA2 3.5 inch Large Form Factor (LFF) drives are for use only in the MSA2000 family.
	Scalability	Up to 3.6TB SAS or 12TB SATA, expandable to 14.4TB SAS or 48TB SATA with the addition of a maximum of three MSA2000 3.5 inch Disk Enclosures.
	LUNs	The MSA2000 family of arrays supports 256 LUNs and LUN sizes up to 16TB. The arrays support LUN expansion and deletion of any LUN.
	RAID 0, 1, 3, 5, 6, 10, 50	In addition to the usual RAID levels, the MSA2000 family features several important additional levels. RAID 6 is 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 10 is mirroring and striping without parity. It is the most popular of the multiple RAID levels, allowing large arrays with high performance in most cases and superior fault tolerance. RAID 50 combines

Family Information

	the block striping and parity of RAID 5 with the straight block striping of RAID 0, yielding higher performance than RAID 5 through the addition of RAID 0, particularly during writes.
Configuration and Management Tools	HP StorageWorks MSA Storage Management Utility (SMU), Management access, out-of-band: WEB GUI, CLI. Interface Types: Mini DB9 RS232, 10/100 Ethernet Protocols Supported SNMP, SSL, SSH, SMTP, HTTP, Telnet
Hot Plug Expansion and Replacement Support	The MSA2000sa supports hot plug expansion and replacement of redundant controllers, fans, power supplies, and I/O modules for simple, fast installation and maintenance.
Snapshot and Clone	Optional controller based functionality. Offers higher levels of data protection, enabling an almost instant recovery from data failure or corruption. Offers alternative development testing of 'offline' production data and the ability to backup snapped/cloned data

Overview	The MSA2000sa comes integrated with web browser based software for storage and RAID management, setup, configuration and troubleshooting. This reduces the cost of ownership by reducing the training and technical expertise necessary to install and maintain your HP storage solution.
Server Compatibility	Supports most HP ProLiant servers including ● HP ProLiant DL, ML
Industry Standard X86 servers support	● Supports most multi-vendor industry standard 32-bit Intel and AMD based (x86) servers. HP requires the Third-Party Server to be logo'd and listed on the Microsoft Windows Server Catalog. ● Refer to the Microsoft website: http://www.microsoft.com/windows/catalog/server/ ● HP StorageWorks Division recommends that the Third-Party Server Vendor is an active member of TSANet. Refer to the TSANet website for details: www.tsanet.com
OS Support	● Microsoft Windows Server 2008 ● Microsoft Windows Server 2003 and 2003 R2 (32/64) ● Red Hat Linux 5 (32/64) ● SuSE 10 (32/64) ● VMware ESX 3.5 (32/64)
Supported Clustering Solutions	● Microsoft Cluster Service for Microsoft Windows Server 2008 and 2003 ● SteelEye's LifeKeeper for Linux on , Red Hat Enterprise Linux AS 5 and SuSE Linux Enterprise Server 10 (supported with ProLiant servers only)
Web Browser support	● MSA2000sa supports target based management, and requires a web browser for management. Only Microsoft Internet Explorer V6.X and above, and Mozilla Firefox 1.0.7 or later are supported

QuickSpecs

Optional Software

MSA2000 Snapshot and Volume Copy Software

Product Features

Data Protection

- Snapshots create up to 64 point-in-time pictures of data
- Volume Copies create up to 128 point-in-time copies of data
- 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

Data Testing

- Snap or clone data to test the performance of a software application on 'offline' production data
- Snap or clone data to test how a software patch or enhancement will function on 'offline; production data

HP StorageWorks 2000 Modular Smart Array Snapshot 64 Software LTU	T5512A
HP StorageWorks 2000 Modular Smart Array Snapshot 8 Software LTU	T5513A
HP StorageWorks 2000 Modular Smart Array Snapshot 8 to 64 Upgrade Software LTU	T5515A
HP StorageWorks 2000 Modular Smart Array Volume Copy Software LTU	T5514A

Path Failover (MPIO)

MPIO Failover for Windows provides a single multi-path solution for HP StorageWorks MSA2000sa Modular Smart Array on HP ProLiant servers by providing basic path failover. Supports Windows 2008, Windows 2003, Windows 2003 R2, and Windows 2003 X64 operating systems.

Failover support for Linux is with Device Mapper 4.0.

NOTE: For more information visit
http://h18006.www1.hp.com/products/sanworks/multipathoptions/index.html

HP StorageWorks Storage Mirroring

HP StorageWorks Storage Mirroring Software provides host-based, continuous replication for customers seeking a low-cost alternative to fabric or array-based replication. Patented replication and failover technology continuously captures byte-level data changes as they happen and replicates those changes to one or more target servers at any location without geographic limitations. By replicating only the bytes that change, Storage Mirroring Software uses the absolute minimum bandwidth on your existing LAN or WAN to replicate your data. Storage Mirroring also provides server failover where a production server can automatically be 'replaced' by the storage mirroring server in the event of failure. Couple Storage Mirroring with MSA2000 Snapshots and/or Volume Copy to achieve an Enterprise class data protection strategy creating different data recovery points using continuous data protection with Storage Mirroring and point-in-time data protection with Snapshots and/or Volume Copy.
Storage Mirroring Software supports:

- Any DAS, NAS, and SAN storage device.
- Any Windows ProLiant server including all ML, DL, and BL platforms
- Many Windows platforms including Windows Server 2000, Windows Server 2003, Windows Server 2003 R2, Windows Storage Server 2003, Windows Storage Server 2003 R2, 64-bit Windows, and Windows on Itanium

For more information visit: http://h18006.www1.hp.com/products/storage/software/sm/index.html

StorageWorks Storage Mirroring Media Kit v5	T5437A

Optional Software

StorageWorks Storage Mirroring Server Edition 1 LTU	T5438A
StorageWorks Storage Mirroring Server Edition 10 LTU	T5439A
StorageWorks Storage Mirroring Enterprise Server Edition 1 LTU	T5440A
StorageWorks Storage Mirroring Enterprise Server Edition 10 LTU	T5441A
StorageWorks Storage Mirroring NAS Edition 1 LTU	T5442A
StorageWorks Storage Mirroring NAS Edition 10 LTU	T5443A
StorageWorks Storage Mirroring for 5 Virtual Machines 1 LTU	T5444A
StorageWorks Storage Mirroring for Itanium Servers 1 LTU	T5445A
StorageWorks Storage Mirroring for AiO Edition 1 LTU	T5446A
Storage Mirroring Srvr Rcvry Op 1 LTU	T5447A
Storage Mirroring SW Linux 1 LTU	T5448A
Storage Mirroring SW Linux 10 LTU	T5449A
Storage Mirroring Virtual Infrastructure 1LTU	T5450A

QuickSpecs

Service and Support, HP Care Pack, and Warranty Information

Configure to Order Program Information - Future support, No CTO Available at Launch

Warranty
- Three-year limited warranty
- Three years parts exchange
- Next Business day delivery

Enclosures, Hard drives, and Options for the MSA2000sa carry their own warranty. Refer to HP's Limited Warranty Statement for more information.

The MSA2000sa has been designed with customer self repairable parts to minimize repair time and provide greater flexibility in performing defective parts replacement. Please refer to HP's limited warranty Statement and parts replacement instructions for further details.

http://h18006.www1.hp.com/products/storageworks/warranty.html

Products included in various Kits carry their own individual warranties.

NOTE: The warranty of the hard drive options purchased with the MSA2000sa product is different for SAS hard drives versus SATA hard drives. SAS hard drive options have a three year warranty and SATA hard drives options have a one year warranty. Reference HP's communication for further details: http://www.hp.com go to search, enter CN0089W

Warranty Upgrade Options
- Response - Upgrade on-site response from next business day to same day 4-hour response or 6 Hour Call To Repair
- Coverage - Extend hours of coverage from next business day to 9 hours x 5 days to 24 hours x 7 days
- Duration Select duration of coverage for a period of 1, 3, 4 or 5 years

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HP Care Pack Information
- HP Care Pack is defined as an upgrade to the product warranty attribute, available for a specific duration and hours of coverage.
- HP Care Pack is not available for less than the product's warranty duration.
- HP Care Pack is available for sale anytime during the warranty period for most products, but the commencement date will be the same as the Warranty Start Date (delivery date to end user customer). Proof of purchase may be required.
- HP Care Pack services are prepaid.

For additional information on Product Services and HP Care Pack, as well as orderable part numbers, please refer to the URL: http://www.hp.com/hps/carepack/.
If you have specific questions about availability or how to obtain services contact your local HP representative. Contact information for your local area can be found at:
http://welcome.hp.com/country/us/en/contact_us.html

Service and Support, HP Care Pack, and Warranty Information

Software Product Services   Product support provides the customer access to HP's experienced technical support resources, as well as access to HP's Information Services database for support on a variety of multi-vendor/multiplatform software products. Product support includes escalation and problem coordination with the appropriate engineering group. HP Services offer a variety of options to allow you to tailor your product service to meet the needs of your organization. Basic warranty on products can be uplifted from day one to ensure you receive the service you need when you need it.

Warranty and Support   HP warrants only that the software media will be free of physical defects for a period of ninety (90) days from delivery.
The following services are offered as HP Care Pack Services at the time of software product order:

- Software Technical Support 24 x 7 (1, 3, 4, and 5 years) is available 24 hours per day, Monday through Sunday, including holidays (includes phone-in software technical support 24 x 7 and software product and documentation updates).
- Installation Service (software installation) and Installation and Startup Service (software installation, configuration, startup testing and knowledge transfer).
- HP Care Pack services must be ordered with the product and are prepaid.
- For tailored support contracts based on personalized statement of work contact your local support center via http://www.hp.com/support.

For additional software product services information for HP Care Pack services, as well as orderable part numbers, please refer to the URLs listed below:
All storage services: http://www.hp.com/hps/storage/.
All HP Care Pack Services: http://www.hp.com/hps/carepack/storage/cp_networked.html.
Software Support HP Care Pack Services: http://www.hp.com/hps/carepack/software/cp_storage.html.
Installation and Startup Services: http://www.hp.com/hps/storage/ns_implementation.html.
If you have specific service questions contact your local HP representative. Contact information for your local area can be found at: http://welcome.hp.com/country/us/en/contact_us.html
Maintenance releases, bug fixes and software patches are available at:
http://welcome.hp.com/country/us/en/support.html.

Hardware Product Services

- Installation services that include basic installation and Array Installation and Startup
- On-site maintenance (includes warranty support)
- Response time upgrades during the warranty period
- Post-warranty coverage or warranty extension
- RAID setup and performance consulting via statement of work
- Migration service consulting via statement of work
- Environmental, Mission Critical Services

For product services information for HP Care Pack services, as well as orderable part numbers, please refer to the URLs listed below:
All storage services: http://www.hp.com/hps/storage/.
All HP Care Pack Services: http://www.hp.com/hps/carepack/storage/cp_networked.html.
Installation and Startup Services: http://www.hp.com/hps/storage/ns_implementation.html.
If you have specific service questions contact your local HP representative. Contact information for your local area can be found at: http://welcome.hp.com/country/us/en/contact_us.html

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Service and Support, HP Care Pack, and Warranty Information

Array Installation and Startup Services

The HP installation and Startup for HP StorageWorks Disk Arrays service package provides installation and configuration of HP StorageWorks Disk Array products. Service highlights include:

- Service planning
- Installation and Startup provides installation, and configuration of the MSA2000i. This includes:

  - Service planning
  - Service deployment
  - Installation Verification Testing (IVT) required for this service
  - Customer orientation session
- Please contact your local HP sales organization for further details

Installation & Startup Care Packs: Flex - HA114A1 #5J0; Fixed: UA868E

Support Services via HP Authorized Commercial Resellers - Flex Care Packs
Array SKUs: AJ752A, AJ753A

Support Description	Care Pack	Support Band
Support - 1 Yr Next Day Hardware	HA101A1	9CJ
Support - 3 Yr Next Day Hardware	HA101A3	9CJ
Support - 4 Yr Next Day Hardware	HA101A4	9CJ
Support - 5 Yr, Next Day Hardware	HA101A5	9CJ
Support - 1 Yr 4 hr 13x5 Hardware	HA103A1	9CJ
Support - 3 Yr, 4 hr 13x5 Hardware	HA103A3	9CJ
Support - 4 Yr, 4 hr 13x5 Hardware	HA103A4	9CJ
Support - 5 Yr, 4 hr 13x5 Hardware	HA103A5	9CJ
Support - 1 Yr, 4 hr 24x7 Hardware	HA104A1	9CJ
Support - 3 Yr, 4 hr 24x7 Hardware	HA104A3	9CJ
Support - 4 Yr, 4 hr 24x7 Hardware	HA104A4	9CJ
Support - 5 Yr, 4 hr 24x7 Hardware	HA104A5	9CJ
Support - 1 Yr, 6 hr, CTR	HA105A1	9CJ
Support - 3 Yr, 6 hr, CTR	HA105A3	9CJ
Support - 4 Yr, 6 hr, CTR	HA105A4	9CJ
Support - 5 Yr, 6 hr, CTR	HA105A5	9CJ
Support - 1 Yr, Support Plus	HA109A1	9CJ
Support - 3 Yr, Support Plus	HA109A3	9CJ
Support - 4 Yr, Support Plus	HA109A4	9CJ
Support - 5 Yr Support Plus	HA109A5	9CJ
Support - 1 Yr, Support Plus 24	HA110A1	9CJ
Support - 3 Yr, Support Plus 24	HA110A3	9CJ
Support - 4 Yr, Support Plus 24	HA110A4	9CJ
Support - 5 Yr, Support Plus 24	HA110A5	9CJ
Support - 1 Yr, Proactive 24 Service	HA111A1	9CJ
Support - 3 Yr, Proactive 24 Service	HA111A3	9CJ
Support - 4 Yr, Proactive 24 Service	HA111A4	9CJ

Service and Support, HP Care Pack, and Warranty Information

Support - 5 Yr, Proactive 24 Service	HA111A5	9CJ
Support - 1 Yr, Critical Service	HA112A1	9CJ
Support - 3 Yr, Critical Service	HA112A3	9CJ
Support - 4 Yr, Critical Service	HA112A4	9CJ
Support - 5 Yr, Critical Service	HA112A5	9CJ

Support Services via HP Authorized Commercial Resellers - Flex Care Packs Drive Enclosure
SKUs: AJ749A, AJ750A

Support - 1 Yr Next Day Hardware	HA101A1	9CL
Support - 3 Yr Next Day Hardware	HA101A3	9CL
Support - 4 Yr Next Day Hardware	HA101A4	9CL
Support - 5 Yr, Next Day Hardware	HA101A5	9CL
Support - 1 Yr 4 hr 13x5 Hardware	HA103A1	9CL
Support - 3 Yr, 4 hr 13x5 Hardware	HA103A3	9CL
Support - 4 Yr, 4 hr 13x5 Hardware	HA103A4	9CL
Support - 5 Yr, 4 hr 13x5 Hardware	HA103A5	9CL
Support - 1 Yr, 4 hr 24x7 Hardware	HA104A1	9CL
Support - 3 Yr, 4 hr 24x7 Hardware	HA104A3	9CL
Support - 4 Yr, 4 hr 24x7 Hardware	HA104A4	9CL
Support - 5 Yr, 4 hr 24x7 Hardware	HA104A5	9CL
Support - 1 Yr, 6 hr, CTR	HA105A1	9CL
Support - 3 Yr, 6 hr, CTR	HA105A3	9CL
Support - 4 Yr, 6 hr, CTR	HA105A4	9CL
Support - 5 Yr, 6 hr, CTR	HA105A5	9CL
Support - 1 Yr, Support Plus	HA109A1	9CL
Support - 3 Yr, Support Plus	HA109A3	9CL
Support - 4 Yr, Support Plus	HA109A4	9CL
Support - 5 Yr Support Plus	HA109A5	9CL
Support - 1 Yr, Support Plus 24	HA110A1	9CL
Support - 3 Yr, Support Plus 24	HA110A3	9CL
Support - 4 Yr, Support Plus 24	HA110A4	9CL
Support - 5 Yr, Support Plus 24	HA110A5	9CL
Support - 1 Yr, Proactive 24 Service	HA111A1	9CL
Support - 3 Yr, Proactive 24 Service	HA111A3	9CL
Support - 4 Yr, Proactive 24 Service	HA111A4	9CL
Support - 5 Yr, Proactive 24 Service	HA111A5	9CL
Support - 1 Yr, Critical Service	HA112A1	9CL
Support - 3 Yr, Critical Service	HA112A3	9CL
Support - 4 Yr, Critical Service	HA112A4	9CL
Support - 5 Yr, Critical Service	HA112A5	9CL

Service and Support, HP Care Pack, and Warranty Information

Support Services via HP Authorized Commercial Resellers - Flex Care Packs
Software SKUs: T5512A, T5513A, T5514A, T5515A

Support - 1 Yr, 9X5, Software Technical Support	HA106A1	9Cx
Support - 3 Yr, 9X5, Software Technical Support	HA106A3	9Cx
Support - 4 Yr, 9X5, Software Technical Support	HA106A4	9Cx
Support - 5 Yr, 9X5, Software Technical Support	HA106A5	9Cx
Support - 1 Yr, 24x7, Software Technical Support	HA107A1	9Cx
Support - 3 Yr, 24x7, Software Technical Support	HA107A3	9Cx
Support - 4 Yr, 24x7, Software Technical Support	HA107A4	9Cx
Support - 5 Yr, 24x7, Software Technical Support	HA107A5	9Cx
Support - 1 Yr, Support Plus	HA109A1	9Cx
Support - 3 Yr, Support Plus	HA109A3	9Cx
Support - 4 Yr, Support Plus	HA109A4	9Cx
Support - 5 Yr, Support Plus	HA109A5	9Cx
Support - 1 Yr, Support Plus 24	HA110A1	9Cx
Support - 3 Yr, Support Plus 24	HA110A3	9Cx
Support - 4 Yr, Support Plus 24	HA110A4	9Cx
Support - 5 Yr, Support Plus 24	HA110A5	9Cx
Support - 1 Yr, Proactive 24	HA111A1	9Cx
Support - 3 Yr, Proactive 24	HA111A3	9Cx
Support - 4 Yr, Proactive 24	HA111A4	9Cx
Support - 5 Yr, Proactive 24	HA111A5	9Cx
Support - 1 Yr, Critical Services	HA112A1	9Cx
Support - 3 Yr, Critical Services	HA112A3	9Cx
Support - 4 Yr, Critical Services	HA112A4	9Cx
Support - 5 Yr, Critical Services	HA112A5	9Cx

Support Bands: T5512A=9CM; T5513A=9CN; T5514A=9CQ ; T5515A=9CP

Service and Support, HP Care Pack, and Warranty Information

Support Services via HP Authorized Commercial Resellers - Fixed Care Packs
Array SKUs: AJ752A, AJ753A

Support Description	Fixed Care Pack Part Number
HP 1y NBD 9x5 MSA2000 Array HWSupp	UJ669E
HP 1y 4 hr 13x5 MSA2000 Array HWSupp	UJ670E
HP 1y 4h 24x7 MSA2000 Array HWSupp	UJ671E
HP 1y 6h CTR MSA2000 Array HWSupp	UJ672E
HP 3y NBD 9x5 MSA2000 Array HWSupp	UJ673E
HP 3y 4h 13x5 MSA2000 Array HWSupp	UJ674E
HP 3y 4h 24x7 MSA2000 Array HWSupp	UJ675E
HP 3y 6h CTR MSA2000 Array HWSupp	UJ676E
HP 3y 4h 13x5 w/DMR MSA2000 Array HWSupp	UJ677E
HP 3y 4h 24x7 w/DMR MSA2000 Array HWSupp	UJ678E
HP 3y 6h CTR w/DMR MSA2000 Array HWSupp	UJ679E
HP 4y NBD 9x5 MSA2000 Array HWSupp	UJ680E
HP 4y 4h 13x5 MSA2000 Array HWSupp	UJ681E
HP 4y 4h 24x7 MSA2000 Array HWSupp	UJ682E
HP 4y 6h CTR MSA2000 Array HWSupp	UJ683E
HP 5y NBD 9x5 MSA2000 Array HWSupp	UJ684E
HP 5y 4h 13x5 MSA2000 Array HWSupp	UJ685E
HP 5y 4h 24x7 MSA2000 Array HWSupp	UJ686E
HP 5y 6h CTR MSA2000 Array HWSupp	UJ687E
HP 5y 4h13x5 w/DMR MSA2000 Array HWSup	UJ688E
HP 5y 4h 24x7 w/DMR MSA2000 Array HWSupp	UJ689E
HP 5y 6h CTR w/DMR MSA2000 Array HWSupp	UJ690E
HP 1Y PW NBD MSA2000 Array HWSupp	UK193PE
HP 1Y PW 4H 13x5 MSA2000 Array HWSupp	UK194PE
HP 1Y PW 4H 24x7 MSA2000 Array HWSupp	UK195PE
HP 1Y PW 6H CTR MSA2000 Array HWSupp	UK196PE

Service and Support, HP Care Pack, and Warranty Information

Support Services via HP Authorized Commercial Resellers - Fixed Care Packs Drive Enclosure
SKUs: AJ749A, AJ750A

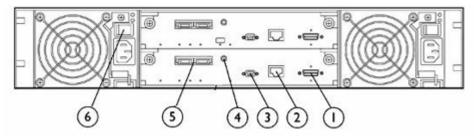| Support Description	Fixed Care Pack Part Number
HP 1y NBD 9x5 MSA2000 Enclosure HWSupp	UK223E
HP 1y 4h 13x5 MSA2000 Enclosure HWSupp	UK224E
HP 1y 4h 24x7 MSA2000 Enclosure HWSupp	UK225E
HP 1y 6h CTR MSA2000 Enclosure HWSupp	UK226E
HP 3y NBD 9x5 MSA2000 Enclosure HWSupp	UK227E
HP 3y 4h 13x5 MSA2000 Enclosure HWSupp	UK228E
HP 3y 4h 24x7 MSA2000 Enclosure HWSupp	UK229E
HP 3y 6h CTR MSA2000 Enclosure HWSupp	UK230E
HP 3y 4h 13x5 w/DMR MSA2000 Encl HWSup	UK231E
HP 3y 4h 24x7 w/DMR MSA2000 Encl HWSup	UK232E
HP 3y 6h CTR w/DMR MSA2000 Encl HWSupp	UK233E
HP 4y NBD 9x5 MSA2000 Enclosure HWSupp	UK234E
HP 4y 4h 13x5 MSA2000 Enclosure HWSupp	UK235E
HP 4y 4h 24x7 MSA2000 Enclosure HWSupp	UK236E
HP 4y 6h CTR MSA2000 Enclosure HWSupp	UK237E
HP 5y NBD 9x5 MSA2000 Enclosure HWSupp	UK238E
HP 5y 4h 13x5 MSA2000 Enclosure HWSup	UK239E
HP 5y 4h 24x7 MSA2000 Enclosure HWSupp	UK240E
HP 5y 6h CTR MSA2000 Enclosure HWSupp	UK241E
HP 5y 4h13x5 w/DMR MSA2000 Enclosure HWSupp	UK242E
HP 5y 4h 24x7 w/DMR MSA2000 Encl HWSup	UK243E
HP 5y 6h CTR w/DMR MSA2000 Encl HWSup	UK244E
HP 1Y PW NBD MSA2000 Enclosure HWSupp	UK245PE
HP 1Y PW 4H 13x5 MSA2000 Encl HWSup	UK246PE
HP 1Y PW 4H 24x7 MSA2000 Encl HWSup	UK247PE
HP 1Y PW 6H CTR MSA2000 Encl HWSupp	UK248PE

Support Services via HP Authorized Commercial Resellers - Fixed Care Packs
Software SKUs: T5512A, T5513A, T5514A, T5515A

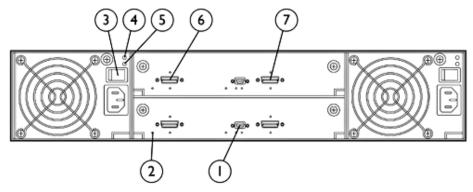| Support Description	Fixed Care Pack Part Number
HP 3y 24x7 MSA2000 Snpsht64 SW Support	UK249E
HP 3y 24x7 MSA2000 Snpsht8 SW Support	UK250E
HP 3y 24x7 MSA2000 Snpsht8-64 SW Supp	UK251E
HP 3y 24x7 MSA2000 Vol Cpy SW Supp	UK252E

Configuration Information

Dual Controller MSA2000sa

1. Expansion Port
2. Ethernet Port
3. CLI Port

4. Service Port
5. SAS host Ports
6. Power Switch

MSA2000 Dual I/O 3.5 inch 12 Drive Enclosure

1. Service Port
2. Unit Locator
3. Power Switch
4. DC Voltage / Fan Fault

5. AC Power Good
6. SAS In Port
7. SAS Out Port

Step 1 - MSA2000sa - Base Configuration

Select one:

Model Name	Model Description:	Part Number
MSA2012sa	HP StorageWorks 2012sa Single Controller Modular Smart Array	AJ752A
MSA2012sa	HP StorageWorks 2012sa Dual Controller Modular Smart Array	AJ753A

Configuration Information

Step 2 - Choose Supported Options For SAS HBA

Select each required option with quantities specified.

SAS HBA	Description with Parts Shipped:	Part Number
HP SC08Ge HBA	SAS HBA to connect to a host	488765-B21

Step 2b - SAS Cables (as needed for connecting MSA2000sa to an HBA)

Model Description	Part Number
mini-SAS 4x 1M Cable All	407337-B21
mini-SAS 4x 2M Cable All	407339-B21
mini-SAS 4x 4M Cable All	432238-B21

Step 3 - Options

The base controller chassis with one or two controllers has twelve drive bays for both SAS and/or SATA drives. For additional twelve additional drive bays purchase an MSA2000 3.5" Disk Enclosure. You may attach a total of three Drive Enclosures for a total of forty-eight drive bays. Single controller arrays support Single I/O Disk Enclosures; dual controller arrays support Dual I/O Disk Enclosures.

Step 3a - MSA2 SAS and SATA Drive Options

NOTE: MSA2000 3.5 inch drives are for use only with MSA2000 products.

HP StorageWorks MSA2 146GB 3G 15K 3.5 inch SAS DP HDD	AJ735A
HP StorageWorks MSA2 300GB 3G 15K 3.5 inch SAS DP HDD	AJ736A
HP StorageWorks MSA2 500GB 7.2K 3.5 inch SATA HDD	AJ738A
HP StorageWorks MSA2 750GB 7.2K 3.5 inch SATA HDD	AJ739A
HP StorageWorks MSA2 1TB 7.2K 3.5 inch SATA HDD	AJ740A

Step 3b - Drive Enclosure Options

The array itself has twelve drive bays. Should you require a drive enclosure, the model you choose depends to which array model it will be attached. If it is a single controller array, then choose the JBOD designated as "Single I/O". If it is attaching to a dual controller array then choose the "Dual I/O" JBOD

HP StorageWorks MSA2000 Single I/O 3.5 in 12 Drive Enclosure (w/ two .6m SAS cables)	AJ749A
HP StorageWorks MSA2000 Dual I/O 3.5 inch 12 Drive Enclosure (w/ two .6m SAS cables)	AJ750A

SAS Cables (as needed for additional Drive Enclosures where standard .6m not sufficient length)

HP Ext SAS 1m Cable	389665-B21
HP Ext SAS 2m Cable	389668-B21
HP Ext SAS 4m Cable	389671-B21

Configuration Information

Step 4 - Other MSA2000sa Options

Description	Quantity	Part Number
HP StorageWorks 2000sa Modular Smart Array Controller (for future upgrading of a single controller MSA2000sa array to a dual controller model)		AJ754A
HP StorageWorks MSA2000 Drive Enclosure I/O Module (for future upgrading of a single I/O 3.5 inch Disk Enclosure to a dual controller model)		AJ751A

Must choose optional Power Cord for Non-U.S. Configurations
NOTE: Shipped standard with all units.
2 ea. Power Cord, 110/220 VAC, US/Canada/Mexico 227099-001

Description	Quantity	Part Number
Power Cord, 220/240 VAC, (US/Canada/Mexico)	2	227099-001
Power Cord, (Australia/China/New Zealand)	2	227098-001
Power Cord, (Central Europe)	2	157215-001
Power Cord, (United Kingdom/Hong Kong)	2	157216-001
Power Cord, (Switzerland)	2	157219-001
Power Cord, (Italy)	2	157217-001
Power Cord, (Denmark)	2	157218-001
Power Cord, (Japan)	2	139867-001
Power Cord, (South East Asia/India)	2	157220-001

Step 5 - Choose Rack Options

Select each required option with quantities specified.

Rack Cabinet, Customer Assembled

5642 - 5000 Series rack	358254-B21

14U rack

HP S10614 Rack with Shock Pallet	292302-B22

Rack Cabinets 10622 G2

10622 G2 Universal Rack w/Shock Pallet	AF022A
10622 G2 Universal Rack w/Standard Pallet	AF021A

Rack Cabinets under 10636 G2

10636 G2 (36U) Rack Cabinet - Pallet	AF011A
10636 G2 (36U) Rack Cabinet - Shock Pallet	AF012A
10636 G2 (36U) Rack Cabinet - Crated	AF013A
10636 G2 (36U) Rack Cabinet, with Extension - Shock Pallet	AF014A

Rack Cabinets 10642 G2

10642 G2 (42U) Rack Cabinet - Pallet	AF001A
10642 G2 (42U) Rack Cabinet - Shock Pallet	AF002A
10642 G2 (42U) Rack Cabinet - Crated	AF003A

Configuration Information

10642 G2 (42U) Rack Cabinet, with Extension - Shock Pallet	AF004A

Rack Cabinets 10842 G2

10842 G2 Universal Rack w/Shock Pallet	AF042A
10842 G2 Universal Rack w/Standard Pallet	AF041A

Rack Cabinets 10647 G2

10647 Rack G2 Pallet	AF031A

Configure to Order Program Information

HP introduces Configure to Order program so customers can customize their order according to their needs. It allows customers, at no additional cost, the ability to add Servers, Storage and options pre-racked and ready for deployments. However, It may not be available with all SKUs. The MSA2000sa may be integrated with ProLiant servers as standalone storage.

NOTE: No CTO Available at Launch

Configure to Order (CTO)	Product approved for CTO	
MSA2000sa Base Components	HP MSA2012sa SC Factory Integrated	AJ752A#0D1
	HP MSA2012sa DC Factory Integrated	AJ753A#0D1
	HP MSA2012sa Controller Factory Integrated	AJ754A #0D1
HBA	HP SC08Ge HBA	488765-B21#0D1
Cables (as needed for connecting MSA2000sa to HBA)	mini-SAS 4x 1M Cable All	407337-B21#0D1
	mini-SAS 4x 2M Cable All	407339-B21#0D1
	mini-SAS 4x 4M Cable All	432238-B21#0D1
MSA2 SAS and SATA Drives	HP MSA2 146GB 3G 15K 3.5 inch SAS DP HDD	AJ735A#OD1
	HP MSA2 300GB 3G 15K 3.5 inch SAS DP HDD	AJ736A#OD1
	HP MSA2 500GB 7.2K 3.5 inch SATA HDD	AJ738A#OD1
	HP MSA2 750GB 7.2K 3.5 inch SATA HDD	AJ739A#OD1
	HP MSA2 1TB 7.2K 3.5 inch SATA HDD	AJ740A#OD1
MSA Drive Enclosures	HP MSA2000 Single I/O 3.5 inch 12 Drive Enclosure	AJ749A#OD1
	HP MSA2000 Dual I/O 3.5 inch 12 Drive Enclosure	AJ750A#OD1
Cables (as needed for additional Drives Enclosures)	HP Ext SAS 1m Cable	389665-B21#OD1
	HP Ext SAS 2m Cable	389668-B21#OD1
	HP Ext SAS 4m Cable	389671-B21#OD1
	NOTE: MSA2 3.5 inch drives are for use only with MSA2000 products.	

Technical Specifications

MSA2000sa	POWER REQUIREMENTS	
	Input Power Requirements	100-240VAC, 50/60 Hz, 4.5-1.9A
	Max Input Power	475W maximum continuous
	Heat Dissipation	1622 BTU/hour
	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) **NOTE:** Derate 2°C for every km, up to 3000 meters
	Operating Humidity	10% to 90% RH @ 104° F (40° C), non-condensing
	Non-Operating Humidity	Up to 93% RH @ 104° F (40° C), non-condensing
	DECLARED ACOUSTIC NOISE LEVELS	
	Sound Power	<6.03B Sound Power
	Sound Pressure	<55dBA Sound Pressure
	SHOCK AND VIBRATION	
	Shock, Operational	5.0G, 10ms, half sine
	Shock, Non-Operational	15G 11ms, half sine
	Vibration, Operational	0.21Grms Random 5Hz to 500Hz flat spectrum/feed forward
	Vibration, Non-Operational	0.5G 1 octave/minute 5Hz to 500Hz to 5 Hz sine sweep
		0.5Grms Random 20Hz to-1000Hz flat spectrum
	PHYSICAL	
	Height	3.5 in (8.9 cm)
	Depth (excluding cables)	23.7 ins (60.2 cm)
	Width	17.6 in (44.7 cm)
	Chassis Weight	44 lbs (19.96 kg)

MSA2000sa Controller	Host Interface	2 x4 lane SAS ports - 3Gb/s per lane
	Protocol Support	SAS
	RAID Support	0, 1, 3, 5, 6, 10, 50
	Cache Memory	1GB Read/Write.
	Cache Backup	ECC protection with back up to flash memory (indefinite backup)
	Upgradeable Firmware	- yes - partner firmware update (PFU)
	Disk Drive and Enclosure Protocol Support	3Gb SAS - Serial Attached SCSI / 3 Gb SATA=II
	Expansion Port	One 4X SAS connector (SFF8470) Expand up to 3 more drive enclosures

Technical Specifications

Regulatory	Safety	UL 60950-1:2003 (USA)
		CAN/CSA-C22.2 No.60950-1-03 (Canada)
		EN 60950-1 :2001 + A11 (European Union)
		IEC 60950-1 :2001 (International)
	Electromagnetic Compatibility	CFR 47 Part 15 Subpart B (U.S.A., Class A)
		ICES-003 Issue 4 (Canada, Class A)
		EN 55022 :98 +A1 +A2 (European Union, Class A)
		EN61000-3-2:2000+A1,+A2,+A14 (Harmonics)
		EN 61000-3-3 :2001 (Flicker)
		EN 55024 :1998 +A1 (European Union, Immunity)
		CISPR 22 :2005 (International, Class A)
		CISPR 24 :97 (International, Immunity)
	RoHS and WEEE	RoHS-5 Compliance , China RoHS, WEEE
	Country Approvals	Australia/New Zealand, Canada, China (PRC), European Union, Germany (GS Mark), Japan, South Korea, Taiwan, United States