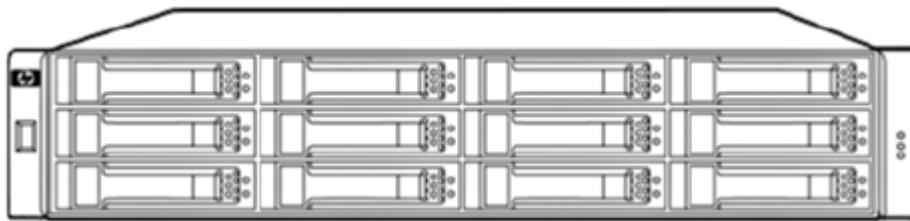


Overview

The HP 2000i Modular Smart Array (MSA2000i) represents the iSCSI model of the MSA2000 family (which includes the MSA2000fc Fibre Channel 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 MSA2000i is an iSCSI GbE connected 2U storage area network (SAN) 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. Each model comes standard with twelve drive bays able to simultaneously accommodate 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 5.4TB SAS or 12TB SATA in the base cabinet, to over 21.6TB 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. It has been fully tested up to 16 hosts.**

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 MSA2000i is a member of HP 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.



MSA2000i

Models

HP MSA2000i Modular Smart Array	HP 2012i Single Controller Modular Smart Array	AJ746A
	HP 2012i Dual Controller Modular Smart Array	AJ747A
	HP 2000i Modular Smart Array Controller	AJ748A
	HP MSA2000 Single I/O 3.5 in 12 Drive Enclosure (w/ two .6m SAS cables)	AJ749A
	HP MSA2000 Dual I/O 3.5 inch 12 Drive Enclosure (w/ two .6m SAS cables)	AJ750A
	HP MSA2000 Drive Enclosure I/O Module	AJ751A

Features and Benefits

Key Features	
Highly efficient consolidation and sharing of storage	<ul style="list-style-type: none"> • Geared to departmental and small to medium business requirements • Grows as the storage demands increase - up to 48 drives and 21.6TB SAS or 48TB SATA • Supports up to 16 hosts with iSCSI GbE 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 drives)	<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • 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 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. SANs allow 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 MSA2000i extends the benefits of shared storage resources (e.g. SAN) 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 21.6TB of SAS or 48TB of SATA 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.

HP MSA2000i Models At a Glance:

- High performance Modular Smart Array controller with two 1GbE ports per controller
- Single and dual controller models
- MSA2012i 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 disks
- 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

Family Information

	MSA2000i	MSA2000fc	MSA2000sa	EVA4400
Capacity (raw) Minimum / with maximum additional drive enclosures	5.4TB SAS or 12TB SATA w/ 3 enclosures: 21.6TB SAS or 48TB SATA	5.4TB SAS or 12TB SATA w/ 3 enclosures: 21.6TB SAS or 48TB SATA	5.4TB SAS or 12TB SATA w/ 3 enclosures: 21.6TB SAS or 48TB SATA	5.4TB FC or 12TB FATA w/ 8 enclosures 43TB FC or 96 TB FATA
Controller Cache	1 GB 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 1GbE iSCSI ports per controller	Two 4Gb Fibre Channel ports per controller	Two 3Gb SAS ports per controller	Two 4Gb Fibre Channel ports per controller
Maximum Drives	48	48	48	96
Maximum host supported	16	64	4	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 FC 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

Product Technology	iSCSI	Two 1GbE 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" Large Form Factor (LFF) drives are for use only in the MSA2000 family.
	Scalability	Up to 5.4TB SAS or 12TB SATA, expandable to 21.6TB SAS or 48TB SATA with the addition of a maximum of three MSA2000 3.5" 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 <u>multiple</u> RAID levels, allowing large arrays with high performance in most cases and superior fault tolerance. RAID 50 combines the block striping and parity of RAID 5

Family Information

Performance

with the straight block striping of RAID 0, yielding higher performance than RAID 5 through the addition of RAID 0, particularly during writes.

Performance numbers are a guideline as established by tests in a lab environment. Forty-eight 300GB 15K SAS drives were used in dual controller configurations of four vDisks with 12 physical drives per vDisk. Each vDisk presented a single volume of maximum capacity according to RAID level. Number and type of applications, number of hosts will affect overall performance.

Performance test comparison of MSA2000i to MSA2000fc models:

Workload	MSA2000i	MSA2012fc	MSA2212fc
MSA2000 RAID 10 Performance Results (rounded down)			
Random Reads IOPs	8,200	10,600	11,200
Random Writes IOPs	4,500	5,000	7,800
Random Mix IOPs 60/40 read/write	6,100	6,700	8,900
Sequential Reads MB	300	650	1,000
Sequential Writes MBs	260	330	470
MSA2000 RAID 5 Performance Results (rounded down)			
Random Reads IOPs	7,800	10,200	10,700
Random Writes IOPs	1,600	1,700	2,400
Sequential Reads MBs	300	670	1,000
Sequential Writes MBs	270	380	580
Random Mix IOPs 60/40 read/write	3,200	3,500	5,700

Configuration and Management Tools

HP 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 MSA2000i 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

Family Information

Overview	The MSA2000i 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	<p>Supports most HP ProLiant servers including</p> <ul style="list-style-type: none"> ● HP ProLiant DL, ML ● HP ProLiant c-Class Blade Servers <p>NOTE: BL20p G1 servers are not supported</p>
Industry Standard X86 servers support	<ul style="list-style-type: none"> ● 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 Storage 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	<ul style="list-style-type: none"> ● Microsoft Windows 2003 and 2003 R2 ● Microsoft Windows 2003 X64 ● Red Hat Linux 4 & 5 (32/64) ● SuSE SLES 9 & 10 (32/64) (SLES 9 requires Qlogic adapter only) ● VMware ESX 3.01, 3.02, 3.5 (32/64) ● Integrated Citrix XenServer HP Enterprise. Citrix Xen Enterprise 4.1.0-7846 ● RedHat Enterprise Linux Virtualization Fibre Channel Connectivity (RHEL 5 U2 /64)
Oracle	<ul style="list-style-type: none"> ● Supported with Oracle RAC, single instance and cluster configurations for Oracle 10g, 11g ● RHEL5 Kernel Versions Including Oracle Enterprise Linux, OEL <p>NOTE: No snapshot or Volume Copyfunctionality is not supported with ASM.</p>
Interconnects	<ul style="list-style-type: none"> ● The MSA2000i is supported only in a Gigabit Ethernet environment. ● The MSA2000i supports industry standard gigabit Ethernet components from various manufacturers that conform to IEEE 802.3ab (1000base-T). ● For details on standard gigabit Ethernet components (including Gigabit Ethernet switches, Network Interface cards and Ethernet cables) from HP: http://welcome.hp.com/country/us/en/prodserv/networking.html
Web Browser support	<ul style="list-style-type: none"> ● MSA2000i supports target based management, and requires a web browser for management. Only Microsoft Internet Explorer V6.X and Mozilla Firefox 1.0.7 or later are supported

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

Path failover (MPIO)

MPIO Basic Failover for Windows provides a single multi-path solution for HP MSA2000i Modular Smart Array on HP ProLiant servers by providing basic path failover. Supports 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>

Linux Clustering

LifeKeeper for Linux Version v6 Update 2 (See LifeKeeper Release Notes v6.2 for additional information at: http://licensing.steeleye.com/Linux_6_2/LKReNotes.pdf)

HP Storage Mirroring

HP 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>

HP Storage Mirroring Software Windows Server Edition 1 LTU	T4441A
HP Storage Mirroring Software Windows Enterprise Server Edition 1 LTU	T4443A
HP Storage Mirroring Software Windows NAS Edition 1 LTU	T4445A
HP Storage Mirroring Software for AiO Edition 1 LTU	T5321A

Optional Software

HP Storage Mirroring Software for 5 Virtual Machines 1 LTU	T4447A
HP XP24000 Power Control I/F MF Kit	AE133A

HP ProLiant Storage Server gateways: Add more value to your MSA array

Stretch your MSA2000 array investment by adding file & print services and management hosting with a ProLiant Storage Server gateway platform. HP ProLiant Storage Servers are optimized file and print server solutions that are built on industry-standard HP ProLiant servers and come with either Microsoft Windows Storage Server 2003 R2 or Windows Unified Data Storage Server 2003 operating system pre-installed. Since they're Windows-based, network integration is easy, your tools and data protection applications run right on the box, and management has a familiar look and feel. Like many Network Attached Storage (NAS) devices, they support heterogeneous file serving environments and are pre-configured to install in minutes.

A DL380 G5 Base Storage Server is a gateway that adds file services and the ability to host Windows tools to your iSCSI array or SAN. It enhances your MSA investment with file and print services and helps create a high-performance unified data solution for your small or medium IT environment. All of your important client and server data can be managed, scaled, and protected on a single MSA2000i array.

For more information:

<http://www.hp.com/go/storageservers>

<http://www.hp.com/go/nas>

HP ProLiant DL380 G5 Base Storage Server AG815A

NOTE: Microsoft Windows Storage Server 2003 R2 Standard x64 Edition O/S; Microsoft iSCSI Software Target is optional and clustering is not supported.

HP ProLiant DL380 G5 x64 SAN Storage Server AG771A

NOTE: Microsoft Windows Unified Data Storage Server 2003 Enterprise x64 Edition O/S; Includes Microsoft iSCSI Software Target and a cluster license.

Service and Support, HP Care Pack, and Warranty Information

Warranty

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

Enclosures, Hard drives, and Options for the MSA2000i carry their own warranty. Refer to HP's Limited Warranty Statement for more information.

The MSA2000i 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 MSA2000i 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.

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

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

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.

Service and Support, HP Care Pack, and Warranty Information

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).
- 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

Service and Support, HP Care Pack, and Warranty Information

Array Installation and Startup Services

The HP installation and startup for HP Disk Arrays service package provides installation and configuration of HP 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: AJ746A, AJ747A

Support Description

Support - 1 Yr Next Day Hardware
 Support - 3 Yr Next Day Hardware
 Support - 4 Yr Next Day Hardware
 Support - 5 Yr, Next Day Hardware
 Support - 1 Yr 4 hr 13x5 Hardware
 Support - 3 Yr, 4 hr 13x5 Hardware
 Support - 4 Yr, 4 hr 13x5 Hardware
 Support - 5 Yr, 4 hr 13x5 Hardware
 Support - 1 Yr, 4 hr 24x7 Hardware
 Support - 3 Yr, 4 hr 24x7 Hardware
 Support - 4 Yr, 4 hr 24x7 Hardware
 Support - 5 Yr, 4 hr 24x7 Hardware
 Support - 1 Yr, 6 hr, CTR
 Support - 3 Yr, 6 hr, CTR
 Support - 4 Yr, 6 hr, CTR
 Support - 5 Yr, 6 hr, CTR
 Support - 1 Yr, Support Plus
 Support - 3 Yr, Support Plus
 Support - 4 Yr, Support Plus
 Support - 5 Yr Support Plus
 Support - 1 Yr, Support Plus 24
 Support - 3 Yr, Support Plus 24
 Support - 4 Yr, Support Plus 24
 Support - 5 Yr, Support Plus 24
 Support - 1 Yr, Proactive 24 Service
 Support - 3 Yr, Proactive 24 Service
 Support - 4 Yr, Proactive 24 Service
 Support - 5 Yr, Proactive 24 Service
 Support - 1 Yr, Critical Service
 Support - 3 Yr, Critical Service
 Support - 4 Yr, Critical Service
 Support - 5 Yr, Critical Service

Care Pack

HA101A1#9CJ
 HA101A3#9CJ
 HA101A4#9CJ
 HA101A5#9CJ
 HA103A1#9CJ
 HA103A3#9CJ
 HA103A4#9CJ
 HA103A5#9CJ
 HA104A1#9CJ
 HA104A3#9CJ
 HA104A4#9CJ
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 HA110A4#9CJ
 HA110A5#9CJ
 HA111A1#9CJ
 HA111A3#9CJ
 HA111A4#9CJ
 HA111A5#9CJ
 HA112A1#9CJ
 HA112A3#9CJ
 HA112A4#9CJ
 HA112A5#9CJ

Service and Support, HP Care Pack, and Warranty Information

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

Support Description

Care Pack

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:

Support Description	T5512A Care Pack	T5513A Care Pack	T5514A Care Pack	T5515A Care Pack
Support - 1 Yr, 9X5, Software Technical Support	HA106A1#9CM	HA106A1#9CN	HA106A1#9CQ	HA106A1#9CP
Support - 3 Yr, 9X5, Software Technical Support	HA106A3#9CM	HA106A3#9CN	HA106A3#9CQ	HA106A3#9CP
Support - 4 Yr, 9X5, Software Technical Support	HA106A4#9CM	HA106A4#9CN	HA106A4#9CQ	HA106A4#9CP
Support - 5 Yr, 9X5, Software Technical Support	HA106A5#9CM	HA106A5#9CN	HA106A5#9CQ	HA106A5#9CP
Support - 1 Yr, 24x7, Software Technical Support	HA107A1#9CM	HA107A1#9CN	HA107A1#9CQ	HA107A1#9CP
Support - 3 Yr, 24x7, Software Technical Support	HA107A3#9CM	HA107A3#9CN	HA107A3#9CQ	HA107A3#9CP
Support - 4 Yr, 24x7, Software Technical Support	HA107A4#9CM	HA107A4#9CN	HA107A4#9CQ	HA107A4#9CP
Support - 5 Yr, 24x7, Software Technical Support	HA107A5#9CM	HA107A5#9CN	HA107A5#9CQ	HA107A5#9CP
Support - 1 Yr, Support Plus	HA109A1#9CM	HA109A1#9CN	HA109A1#9CQ	HA109A1#9CP
Support - 3 Yr, Support Plus	HA109A3#9CM	HA109A3#9CN	HA109A3#9CQ	HA109A3#9CP
Support - 4 Yr, Support Plus	HA109A4#9CM	HA109A4#9CN	HA109A4#9CQ	HA109A4#9CP
Support - 5 Yr, Support Plus	HA109A5#9CM	HA109A5#9CN	HA109A5#9CQ	HA109A5#9CP
Support - 1 Yr, Support Plus 24	HA110A1#9CM	HA110A1#9CN	HA110A1#9CQ	HA110A1#9CP
Support - 3 Yr, Support Plus 24	HA110A3#9CM	HA110A3#9CN	HA110A3#9CQ	HA110A3#9CP
Support - 4 Yr, Support Plus 24	HA110A4#9CM	HA110A4#9CN	HA110A4#9CQ	HA110A4#9CP
Support - 5 Yr, Support Plus 24	HA110A5#9CM	HA110A5#9CN	HA110A5#9CQ	HA110A5#9CP
Support - 1 Yr, Proactive 24	HA111A1#9CM	HA111A1#9CN	HA111A1#9CQ	HA111A1#9CP
Support - 3 Yr, Proactive 24	HA111A3#9CM	HA111A3#9CN	HA111A3#9CQ	HA111A3#9CP
Support - 4 Yr, Proactive 24	HA111A4#9CM	HA111A4#9CN	HA111A4#9CQ	HA111A4#9CP
Support - 5 Yr, Proactive 24	HA111A5#9CM	HA111A5#9CN	HA111A5#9CQ	HA111A5#9CP
Support - 1 Yr, Critical Services	HA112A1#9CM	HA112A1#9CN	HA112A1#9CQ	HA112A1#9CP
Support - 3 Yr, Critical Services	HA112A3#9CM	HA112A3#9CN	HA112A3#9CQ	HA112A3#9CP
Support - 4 Yr, Critical Services	HA112A4#9CM	HA112A4#9CN	HA112A4#9CQ	HA112A4#9CP
Support - 5 Yr, Critical Services	HA112A5#9CM	HA112A5#9CN	HA112A5#9CQ	HA112A5#9CP

Service and Support, HP Care Pack, and Warranty Information

Support Services via HP Authorized Commercial Resellers - Fixed Care Packs Array SKUs: AJ746A, AJ747A

Support Description	Fixed Care Pack Part Number
HP 1y NBD 9x5 MSA2000 Array HWSupp	UJ669E
HP 1y 4h 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 HWSupp	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

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 HWSupp	UK231E
HP 3y 4h 24x7 w/DMR MSA2000 Encl HWSupp	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



Service and Support, HP Care Pack, and Warranty Information

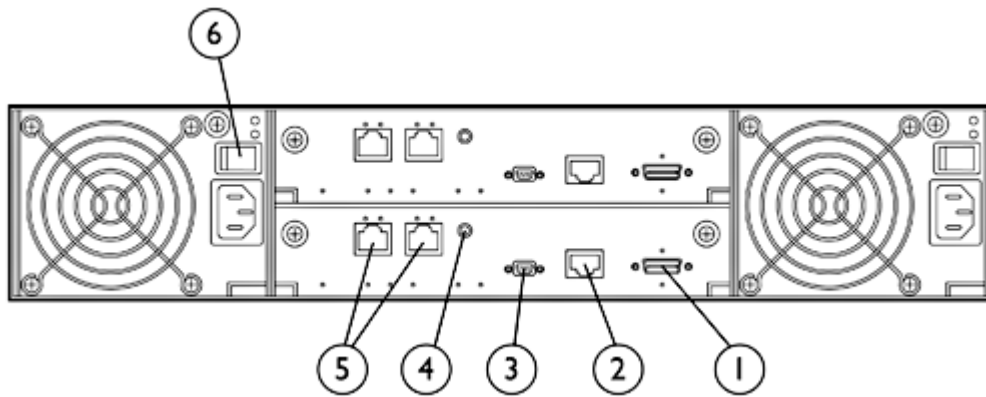
HP 5y NBD 9x5 MSA2000 Enclosure HWSupp	UK238E
HP 5y 4h 13x5 MSA2000 Enclosure HWSupp	UK239E
HP 5y 4h 24x7 MSA2000 Enclosure HWSupp	UK240E
HP 5y 6h CTR MSA2000 Enclosure HWSupp	UK241E
HP 5y 4h13x5 w/DMR MSA2000 Enclosure HWSupp	UK242E
HP 5y 4h 24x7 w/DMR MSA2000 Encl HWSupp	UK243E
HP 5y 6h CTR w/DMR MSA2000 Encl HWSupp	UK244E
HP 1Y PW NBD MSA2000 Enclosure HWSupp	UK245PE
HP 1Y PW 4H 13x5 MSA2000 Encl HWSupp	UK246PE
HP 1Y PW 4H 24x7 MSA2000 Encl HWSupp	UK247PE
HP 1Y PW 6H CTR MSA2000 Encl HWSupp	UK248PE

NOTE: DMR is not available in Europe.

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

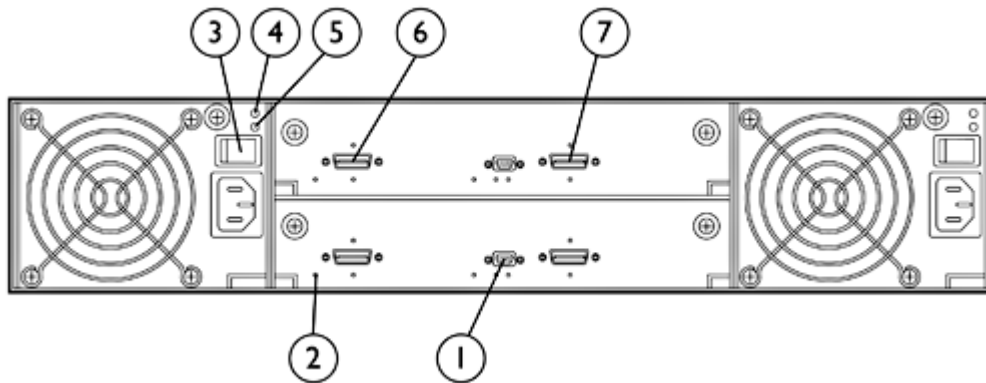
Support Description	Fixed Care Pack Part Number
HP 3y 24x7 MSA2000 Snpsht64 SW Support	UK249E
HP 3y 24x7 MSA2000 Snpsht8 SW Support	UK250E
HP 3y 24x7 MSA2000 Snpsht8-64 SW Supp	UK251E
HP 3y 24x7 MSA2000 Vol Cpy SW Supp	UK252E

Configuration Information



Dual Controller MSA2000i

- | | |
|-------------------|-----------------|
| 1. Expansion Port | 4. Service Port |
| 2. Ethernet Port | 5. iSCSI Ports |
| 3. CU Port | 6. Power Switch |



MSA2000 Dual I/O 3.5" 12 Drive Enclosure

- | | |
|---------------------------|------------------|
| 1. Service Port | 5. AC Power Good |
| 2. Unit Locator | 6. SAS In Port |
| 3. Power Switch | 7. SAS Out Port |
| 4. DC Voltage / Fan Fault | |

Configuration Information

Configure to Order Program Information -

HP introduces the new Configure to Order program for the MSA2000 family. The MSA2000 models and options may or may not be factory installed in a rack with add-on controllers, switches, hubs, MSA2000 disk enclosures and hard drives. The MSA2000 arrays may be integrated with ProLiant servers or as standalone storage.

HP 2012i Single Controller Modular Smart Array	AJ746A#0D1
HP 2012i Dual Controller Modular Smart Array	AJ747A#0D1
HP 2000i Modular Smart Array Controller	AJ748A#0D1
HP MSA2000 3.5-inch Single I/O 12 Drive Encl	AJ749A#0D1
HP MSA2000 3.5-inch Dual I/O 12 Drive Encl	AJ750A#0D1
HP MSA2000 Drive Enclosure I/O Module	AJ751A#0D1
HP MSA2 146GB 3G 15K 3.5-inch SAS HDD	AJ735A#0D1
HP MSA2 300GB 15K 3.5-inch SAS HDD	AJ736A#0D1
HP MSA2 450GB 3G 15K 3.5-inch SAS HDD	AJ737A#0D1
HP MSA2 500GB 7.2K 3.5-inch SATA HDD	AJ738A#0D1
HP MSA2 750GB 7.2K 3.5-inch SATA HDD	AJ739A#0D1
HP MSA2 1TB 7.2K 3.5-inch SATA HDD	AJ740A#0D1

Step 1 - MSA2000i - Base Configuration

Select one:

Model Name	Model Description:	Part Number
MSA2012i	HP 2012i Dual Controller Modular Smart Array	AJ747A
MSA2012i	HP 2012i Single Controller Modular Smart Array	AJ746A

Step 2 - Options

Select each option with quantities specified.

NOTE: SATA drives are designed for archival or reference data. They should not be used in a heavy or intense I/O environment. Those situations require the use of enterprise-class SAS drives. MSA2 3.5" drives are for use only with MSA2000 products.

Step 2a - Options

Description with Parts Shipped:	Quantity	Part Number
---------------------------------	----------	-------------

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 2b - MSA2 SAS and SATA Drive Options

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

HP MSA2 146GB 3G 15K 3.5 inch Dual-port SAS HDD	AJ735A
HP MSA2 300GB 3G 15K 3.5 inch Dual-port SAS HDD	AJ736A
HP MSA2 450GB 3G 15K 3.5 inch Dual-port SAS HDD	AJ737A
HP MSA2 500GB 7.2K 3.5 inch SATA HDD	AJ738A
HP MSA2 750GB 7.2K 3.5 inch SATA HDD	AJ739A
HP MSA2 1TB 7.2K rpm 3.5 inch SATA HDD	AJ740A

Step 2c - Drive Enclosure Options



Configuration Information

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 MSA2000 Single I/O 3.5 in 12 Drive Enclosure	AJ749A
HP MSA2000 Dual I/O 3.5 inch 12 Drive Enclosure	AJ750A

SAS Cables (as needed for additional Drive Enclosures)

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

Step 3 - Other MSA2000i Options

Description	Part Number
HP 2000i Modular Smart Array Controller (for future upgrading of a single controller MSA2000i iSCSI array to a dual controller model)	AJ748A
HP MSA2000 Drive Enclosure I/O Module (for future upgrading of a single I/O 3.5" Disk Enclosure to a dual controller model)	AJ751A

Must choose optional Power Cord for Non-U.S. Configurations

NOTE: Shipped standard with all units.

	Quantity	Part Number
2 ea. Power Cord, 110/220 VAC, US/Canada/Mexico 227099-001		
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 4 - Choose Supported Options For iSCSI Infrastructure

Select each required option with quantities specified.

The MSA2000i supports industry standard Gigabit Ethernet components from various manufacturers that conform to IEEE 802.3ab (1000base-T). The MSA2000i is supported only in a Gigabit Ethernet environment

Description with Parts Shipped:

For details on standard Gigabit Ethernet components (including Gigabit Ethernet switches, Network Interface cards and Ethernet cables) from HP
<http://welcome.hp.com/country/us/en/prodserv/networking.html>

NOTE: The list below is a **partial** list of supported HP ProCurve Switches and Gigabit NICs.

	Description with Parts Shipped:	Part Number
Gigabit Ethernet NIC	HP NC110T PCI Express Gigabit Server Adapter	434905-B21
	HP NC360T PCI Express Gigabit Server Adapter	412648-B21
	HP NC364T PCI Express Gigabit Server Adapter	435508-B21
	HP NC373T PCI Express Gigabit Server Adapter	394791-B21
	HP NC380T PCI Express Gigabit Server Adapter	394795-B21
	HP NC7170 Dual Port PCI-X 1000T Gigabit Server Adapter	313881-B21
	HP NC7771 PCI-X Gigabit Server Adapter	290563-B21



Configuration Information

HP ProCurve Gigabit Ethernet switches	HP ProCurve 2708 Switch	J4898A
	HP ProCurve 2724 Switch	J4897A
	HP ProCurve 2512 Switch	J4812A
	HP ProCurve 2524 Switch	J4813A
	HP ProCurve 2848 Switch	J4904A
	HP ProCurve 2824 Switch	J4903A
	HP ProCurve 3400cl-24G Switch	J4905A
	HP ProCurve 3400cl-48G Switch	J4906A
	HP ProCurve 6108 Switch	J4902A
	CAT 5e cables	CAT 5e cable, RJ45 to RJ45, M/M 1.2m (4ft)
CAT 5e cable, RJ45 to RJ45, M/M 2.1m (7ft)		C7535A
CAT 5e cable, RJ45 to RJ45, M/M 4.3m (14ft)		C7536A
CAT 5e cable, RJ45 to RJ45, M/M 7.6m (25ft)		C7537A
CAT 5e cable, RJ45 to RJ45, M/M 15.2m (50ft)		C7542A
CAT 5e cable kit, 10 of C7636A		C7543A

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

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

Modular Cooling System G2 (MCS G2) AF025A

MCS G2 10642 G2 Expansion Rack AF026A

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

Technical Specifications

MSA2000i	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)	

Modular SAN Array 2000i Controller	User Interface	-Status and activity provided via management interfaces Status Indicators on front of Controller
	Electrical Interface	Ethernet – 1Gbps
	Protocol Support	iSCSI
	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 disk 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	

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