

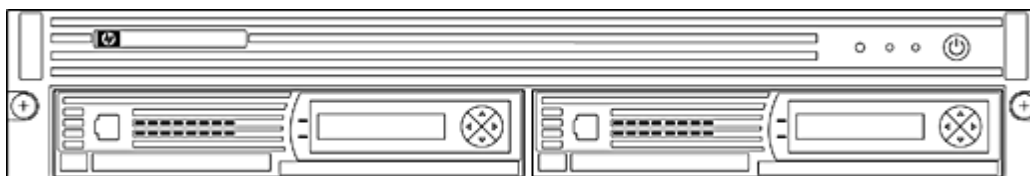
Overview

The HP StorageWorks 1500 cs Modular Smart Array is a 2Gb Fibre Channel SAN attached 2U controller shelf that connects to both enterprise-class SCSI and Serial ATA (SATA) disk enclosures. HP recommends SCSI drives for intensive heavy I/O requirements while SATA drives should only be used in archived, reference, or "near on-line" disk-to-disk backup configurations. This combination provides customers with a low cost, high capacity storage solution. NOTE: SCSI hard drive options have a three year warranty and SATA hard drives options have a one year warranty. This solution has been designed as a hardware foundation for which future solutions can be designed and implemented for investment protection. The MSA1500 cs with up-to-eight attached SATA enclosures can provide the customer with up to 24 TB (96 - 250 GB SATA disk drives) of native capacity. If the business requires SCSI reliability then attach up-to-four SCSI enclosures for a raw capacity of 16.8 TB (using 56 - 300 GB SCSI disks). The system supports mixing SCSI and SATA enclosures.

The MSA1500 cs provides 2 Gb Fibre Channel to the hosts. By utilizing existing SCSI drive enclosures and MSA1000/1500 controller technology and integrating the use of our lowest cost SATA hard drives and enclosures, the MSA1500 cs lowers the total cost of ownership and extends the customers hardware investments into the future. With lower cost of ownership, customers can now take advantage of tiered storage capabilities matching up data with appropriate levels of performance, availability and cost of data storage. The result is lower overall cost without giving up the needs of business applications.

The MSA1500 cs is a member of the HP StorageWorks Modular Smart Array family, delivering industry-leading technology to meet today's demanding and growing storage needs. These storage solutions offer the best price performance features for direct attach environments and entry-level and mid-range SAN environments. Each solution is designed to maximize transfer rates, reduce management costs, while driving rapid return on investment.

The MSA1500 cs can be remotely managed by using management tools such as HP Insight Manager, Array Configuration Utility and the HP StorageWorks Fabric Switch Management Utility depending on the host's operating system.



What's New

- Updating both of the MSA1500 cs SAN Starter Kits and the MSA1500 SAN Starter Kit HA Bundle to include the new B-series 4Gb HP StorageWorks 4/8 Base SAN Switch and four 4Gb SFPs. The array itself and the included HBAs remain 2Gb.

Overview

Models

HP StorageWorks 1500 cs Modular Smart Array	MSA1500 cs 2U Fibre Channel SAN Attach Controller Shelf	AA986A
	MSA1500 2U Fibre Channel SAN Attach Controller Shelf, with one MSA20 SATA drive enclosure NOTE: For Americas, Asia Pacific, and Japan.	AD509A
	MSA1500 2U Fibre Channel SAN Attach Controller Shelf, with one MSA30 SCSI drive enclosure NOTE: For Americas, Asia Pacific, and Japan only.	AD510A
	MSA1500 SAN SCSI Starter Kit (Windows, NetWare or Linux compatible) NOTE: Includes (1) MSA1500 (1) MSA30 SCSI drive enclosure (1) 4/8 Base SAN Switch (4) 4Gb SFP transceivers (2) FCA2214 HBAs + cables.	AE327A
	MSA1500 SAN SATA Starter Kit (Windows, NetWare or Linux compatible) NOTE: Includes (1) MSA1500 (1) MSA20 SATA drive enclosure (1) 4/8 Base SAN Switch (4) 4Gb SFP transceivers (2) FCA2214 HBAs + cables. NOTE: For Americas, Asia Pacific, and Japan.	AE326A
	MSA1500 SAN Starter Kit HA Bundle for Windows, NetWare or Linux (for SAN Starter Kits) NOTE: Includes (1) redundant controller; (1) FC I/O module; (1) 4/8 Base SAN Switch (4) 4Gb SFP transceivers (2) FCA2214 HBAs + cables. Designed as upgrades for the MSA1500 SAN Starter Kits. Software is needed to enable path failover. This can be Industry Standard (MPIO for Windows, QLogic for Linux) or HP Secure Path (available for all three OSs)	AE328A

Key Features

- Ability to mix primary (SCSI) and near-online (SATA) storage behind the same SAN controller for easy to install tiered storage solutions.
- RAID 6 with HP's Advanced Data Guarding technology (RAID ADG)) - Highest level of fault tolerance, 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.
- 2 Gb/1 Gb Fibre connection to host - Supports both 1 Gb and 2 Gb Fibre Channel fabrics to ensure your investment in 1 Gb infrastructure is protected. Also works with the new 4Gb switches and HBAs at 2Gb speed.
- High performance controller(s) built on DAS to SAN (DtS) architecture.
- Scalable to eight SATA enclosures for 24 TB or four SCSI enclosures for 16.8 TB of storage capacity with 4- dual channel SCSI I/O cards.
- Ability to hot plug disk enclosures to the controller shelf.
- Hot plug expansion and replacement support - Hot plug expansion and replacement of hard drives, redundant controllers, for simple, fast installation and maintenance. Fans and power supplies are also hot plug replaceable.
- Key solution certified for backup and restore, file retention and compliance, replication, write once read many for disk, media and broadcasting, medical, clustering and archiving. See page 6 for expanded list.

Overview

Customer Benefits

- Capability of building an enterprise-class SAN with SCSI reliability by attaching up-to-four MSA30 SCSI-drive enclosures for a native capacity of 16.8 TB (using 56 - 300 GB SCSI disks)
- Low cost, high capacity - For less than \$.01 per/MB customers can obtain up to 24 TB of capacity (eight SATA enclosures) using up to 96 - 250 GB SATA disk drives.
- Flexibility - Can choose SATA configuration for secondary storage of data, and/or SCSI configuration for primary storage, mixing of both technologies behind the same controller is supported but limited to separate SCSI I/O modules.
- Ability to utilize a tiered storage approach as data values decrease, choosing the right disk technology for your data storage.
- Investment Protection - the ability to upgrade from the MSA1000 to the MSA1500 cs. Remove the controllers from the MSA1000 and place them into the controller bays in the MSA1500 cs and upgrade the firmware. (Requires purchase of one MSA1500 FC I/O Module per moved controller)

Family Comparison

	MSA1500 cs	MSA1000	MSA500
Capacity (Maximum)	16.8 TB SCSI 24 TB SATA	12.6 TB SCSI	4.2 TB SCSI
SCSI Interface	Ultra 3, Ultra 320	Ultra 2, Ultra 3, Ultra 320	Ultra 2, Ultra 3, Ultra 320
Controller Cache	256 MB, upgradeable to 512 MB	256 MB, upgradeable to 512 MB	256 MB, upgradeable to 512 MB
Direct or SAN	Direct or SAN Attach - Fibre	Direct or SAN Attach - Fibre	Direct Attach - SCSI
Maximum Drives	56 SCSI 96 SATA or mixed	42 SCSI	14 SCSI
MTBF (drives)	1.5M w/ SCSI @ 100% 500,000 w/ SATA @ 20%	1.5M @ 100%	1.5M @ 100%
Integrated Interconnect Options	No	Yes, optional 8-port Switch or 3-port Hub	No
Use for Storage	Primary Storage with SCSI, Secondary with SATA	Primary Storage	Primary Storage

Product Highlights

Product Technology

Modular Chassis - The modular design of the MSA1500 controller shelf supports up to eight SATA enclosures on 4 dual channel SCSI I/O cards, or 4 single channel SCSI enclosures, redundant controllers, 2 Gb Fibre Channel I/O modules, fans and power supplies.

Scalability - up to 16.8 TB storage capacity utilizing 56 SCSI hard drives and four MSA30 SCSI enclosures or up to 24 TB storage capacity utilizing 96 SATA hard drives and eight MSA20 SATA enclosures.

Performance - The MSA1500 cs and its components have been designed using the latest in standard 2 Gb interconnects and Fibre Channel technology. Performance tests indicate a transmission rate of up to 30,000 IOPs and bandwidth of up to 200 MB per second.

Fault Tolerance - RAID 6 with HP's Advanced Data Guarding technology (RAID ADG). This is the highest level of 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.

DtS Architecture - DtS (Direct Attach to SAN) architecture is an exclusive MSA1000 and MSA1500 cs feature that provides a quick and easy way to migrate stored data on SCSI disks protected by most Smart Array controllers to a MSA1000 or MSA1500 cs storage system.

Pre-Failure Warranty - Enclosures and hard drives attached to an MSA1500 cs and monitored under Insight Manager are supported by a Pre-Failure (replacement) Warranty.

NOTE: Pre-Failure Warranty allows for the replacement of designated SCSI drives in an HP StorageWorks disk enclosure before they actually fail when using Insight Manger.

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

Integrated Configuration and Management Tools - The MSA1500 cs utilizes a standard, integrated set of management and utility software. These tools consistently lower the cost of ownership by reducing training and technical expertise necessary to install and maintain the MSA1500 cs.

Hot Plug Expansion and Replacement Support - The MSA1500 cs supports hot plug expansion and replacement of redundant controllers, fans, power supplies, Serial ATA and SCSI disk enclosures, and I/O cards for simple, fast installation and maintenance.

Software Components

Overview

The MSA1500 cs utilize 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 storage solution. Not all operating systems allow use of all of these tools.

Array Configuration Utility (OS dependent)

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

Selective Storage Presentation (SSP)

- Built-in to the controller firmware and controlled via ACU
- Allows setting of access rights to the MSA1500 cs storage by hosts
- Access control can be set up to a logical volume level using the Array Controller Utility

Insight Manager

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

Compatibility

HP's extensive compatibility testing program assures that your HP StorageWorks MSA1500 cs works with leading servers, operating systems, and backup applications - and not just those sold by HP. The MSA1500 cs works seamlessly in many environments, making them especially suitable if you have a mixed system environment. For the latest list of servers, workstations, operating systems, and backup software that supports the MSA1500 cs, check the Modular Smart Array compatibility pages on our web site at:

<http://www.hp.com/go/MSA1500cs>.

HP Server Compatibility The HP StorageWorks MSA1500 cs supported on the following servers:

Supports most 32-bit ProLiant servers including BL20P G2, BL20P G3, BL25P, BL30P, BL35P, BL40P, DL145, DL360, DL360 G2, DL360 G3, DL360 G4, DL380, DL380 G2, DL380 G3, DL380 G4, DL385, DL560, DL580, DL580 G2, DL580 G3, DL585, DL740, DL760, DL760 G2, ML330, ML330 G2, ML330 G3, ML350, ML350 G2, ML350 G3, ML350 G4, ML370, ML370 G2, ML370 G3, ML370 G4, ML530, ML530 G2, ML570, ML570 G2, ML750.

(See HBA and Switch FC components for various support limitations)

Supports most 64-bit Integrity including Integrity Superdome rx1600, rx1620, rx2600, rx2620, rx4610, rx4640, rx5670, rx7620, rx8620, rx8800, rx9610 and PA-RISC servers A180, A180C, A400, A500, rp2400, rp2430, rp2450, rp2470, rp5400, rp5430, rp5450, rp5470, rp3410, rp3440_1, rp4440_1, rp7400, rp7410, rp7420_1, rp8400, rp8420_1, SD16000, SD-32/64/128, SD32000, SD64000.

NOTE: Certification of new ProLiant & Integrity server models is ongoing. Not all OSes are supported on all models. Supports most multi-vendor industry standard 32-bit Intel-based (x86) and Opteron servers.

OS Support

- Microsoft Windows Enterprise Edition 2003 (32 & 64-bit)
- Microsoft Windows Standard Edition 2003 (32 & 64-bit)
- Microsoft Windows 2000 Server Edition (32 & 64-bit)
- Microsoft Windows 2000 Advanced Server (sp4) (32 & 64-bit)
- HP-UX 11.11, and 11.23 (single controller in homogeneous environments only, see below)
- Red Hat Linux Enterprise Advanced Server 2.1 and Enterprise Linux 3.0 (32 & 64-bit) & 4.0 (32-bit & 64-bit)
- SuSE Linux SLES8 and SLES9 (32 & 64-bit)
- Netware v5.1 and 6.5

The optional second controller can be used with all listed operating systems except HP-UX as a passive, fail-over device. Presently HP-UX is only supported in a single controller configuration.

Please refer to compatibility matrix at <http://www.hp.com/go/msa1500cs> for complete configuration support.

HP-UX support (specific guidelines)

The MSA1000 for HP-UX supports single controller configurations only. HP-UX support is of a homogeneous nature. Command Line Interface (CLI) is used for configuration and Event Monitoring Service (EMS) for monitoring. Root/Boot/Dump/Swap/Install is also supported. PV Links is supported for multi (HBA) path / single controller (2 HBAs) configurations. HP-UX support is now enabled with the standard firmware that ships with the MSA1000.

- Command Line Interface (CLI) is used for configuration and Event Monitoring Service (EMS) for monitoring.
- Root/Boot/Dump/Swap/Install is also supported.
- PV Links is supported for multi (HBA) path / single controller (2 HBAs) configurations.
- Fabric, hub and direct Connect are supported
- HP-UX 11.11 & 11.23, PA-RISC and Itanium

Compatibility

Solution Offerings/Software Certifications

- | | |
|-------------------------------|---|
| Clustering | <ul style="list-style-type: none">• Polyserve - Matrix Server for Windows• Microsoft Cluster Server• SteelEye LifeKeeper for Linux Certification• Netware Clustering (SCSI Only) |
| Backup and Restore | <ul style="list-style-type: none">• HP Data Protector• VERITAS Backup Exec and NetBackup• Legato NetWorker for Windows• Computer Associates BrightStor Enterprise Backup |
| Media and Broadcasting | <ul style="list-style-type: none">• ADIC StorNext for Windows, Linux |
| File Retention and Compliance | <ul style="list-style-type: none">• KOM Networks KOMworx |
| HSM | <ul style="list-style-type: none">• HP File System Extender• CommVault QiNetix Data Migrator |
| Database Archiving | <ul style="list-style-type: none">• Princeton Softech Archive for Servers |
| Medical Imaging Management | <ul style="list-style-type: none">• Bycast StorageGRID |
| Replication | <ul style="list-style-type: none">• HP Storage Mirroring for Windows• HP Virtual Replicator for Windows |
| Other | <ul style="list-style-type: none">• Microsoft Virtual Server• VMware |

NOTE: Supports Write Once Read Many (WORM) on disk.

Please refer to Solutions at <http://www.hp.com/go/msa1500cs> for more information.

Optional Software

HP OpenView Storage Virtual Replicator

Storage Virtual Replicator combines a rich set of innovative capabilities that enhances and simplifies storage management for Windows Server 2003 and Windows 2000 environments. Through virtualization, online volume growth, snapshot and management features, the software complements the capabilities within the operating system. HP OpenView Storage Virtual Replicator enables simplification of storage configuration, management, scalability and enhanced availability with e-mail notification for event customization, enhanced pool deletion that enables deletion of pool or disk containing snapshots, enhanced policy descriptions for easier identification. Support is for Windows 2000 and Windows Server 2003.

- **Virtualization** - multiple storage arrays can be consolidated into a pool of disk space for individual or clustered systems to use. Multiple virtual disks, up to 2 terabyte in size, can be created from a pool for users and their applications. Existing storage units with production data can be imported into a pool. The data partition is preserved as a virtual disk and unused capacity is added to the pool.
- **Online volume growth** - Enables easy, non-disruptive growth with zero downtime. Allows a system administrator to grow an existing volume on virtual disks and Windows 2000 basic disk. The system will remain online, and the data on the volume will remain intact.
- **Snapshots** - Instant, point-in-time snapshots for backup, online restore, testing or data mining. Enable instant creation of multipurpose virtual replicas of production data without the requirement of a physical copy. Snapshots identical to ordinary physical disks, with both read and write capability. Snapshots can remain online for restore operations, testing, and data mining. Full interoperability with the Windows Server 2003 Volume Shadow-copy Service (VSS).
- **E-mail notification** - customization of events for servers under your span of control.
- **Enhanced pool deletion** - delete a pool that contains snapshots and virtual disks or delete a virtual disk that contains snapshots with the DELTREE command.
- Interoperability with OpenView Storage Mirroring
- **Enhanced policy descriptions** - the policy key descriptions have been updated for easier identification. Please refer to the Optional Software section of this document or visit

Compatibility

<http://www.hp.com/go/MSA1500cs> for additional details.

HP StorageWorks Secure Path

HP StorageWorks Secure Path is a family of high availability multi-pathing software products providing continuous data access from the HP RAID Array to host servers running the Windows Server 2003, Windows 2000, and Linux operating systems.

Redundant hardware, advanced RAID technology and Secure Path's automated failover capability are used to enhance fault tolerance and availability. Secure Path effectively eliminates controllers, disk drives, interconnect hardware and host bus adapters as single points of failure in the storage subsystem.

The attachment of non-Secure Path (single HBA) servers to a MSA1500 cs with dual controllers that has servers with Secure Path (dual HBA) attached is supported where the operating system is Windows or Netware. Users must realize that in event of a controller fail-over (failure of active controller) the single path servers will lose access to their data on the MSA1500 cs.

NOTE: If Secure Path for Linux is used on any node attached to an MSA1500 cs, all nodes must also have Secure Path installed, regardless of operating systems.

NOTE: refer to <http://www.hp.com/go/securepath> for the latest Secure Path parameters.

Key Features

- Maintains connections to storage
- Monitors I/O paths and alerts on significant events
- Used in Stand alone Configurations, Cluster Configurations, and SAN configurations

MSA1500 Clustering

Clustering is rapidly gaining in popularity as users desire a high level of data availability. Many of the old cluster restrictions that were the product of both hardware and operating systems have been overcome. While there still remain configuration limits, the result is a new high degree of flexibility both in number of clusters, mixing clusters with single nodes, and the integration of dissimilar operating systems. Initially Windows, HP-UX and Linux clusters can be attached to an MSA1500 having both SCSI and SATA drives, while NetWare clusters currently only support SCSI drives. This is only a restriction in a NetWare clustered environment.

For example you may mix three Microsoft (Windows Server 2003, or Windows 2000) clusters and other individual servers, even doing so in a heterogeneous server operating system environment. Windows Server 2003 allows a single cluster of up to eight nodes.

Single-path (single controller, non-Secure Path) NetWare clustering has been successfully tested up to a 12-node cluster. NetWare clusters employing Secure Path (dual controller, dual HBAs) are limited to six nodes. Multiple NetWare clusters (and single servers) may have concurrent access with no limitation inherent to the MSA1500 cs. Likewise up to a 16-node Linux cluster (single controller, non-Secure Path) utilizing SteelEye LifeKeeper for Linux clustering software has been tested and is supported. Refer to <http://www.hp.com/go/securepath> for any restriction with Secure Path.

The MSA1500 cs has the ability to be configured with thirty-two LUNs. A configuration of twenty attached servers has been tested and is supported. More commonly, users have had an average of four to eight nodes. This can be any combination of hosts or clusters with different operating systems (while holding fast to the guidelines and limits described in the above paragraphs. Performance within these guidelines is heavily dependent on the actual number of end users and types of applications being employed.

For more information, click on the link: <http://www.hp.com/enterprise/highavailability/index.html>.

Compatibility

HP ProLiant Cluster HA/F200 for Entry Level SAN	The ProLiant Cluster F200 for the Entry Level SAN is designed to assist in simplifying the configuration of cluster solutions that provide high levels of data and applications availability in the Microsoft Windows Operating System environment through clustering to provide no-single-point-of-failure. The ProLiant Cluster F200 for the Entry Level SAN supports a two-node cluster based on Microsoft Windows 2000 Advanced Server and two to eight-nodes cluster based on Microsoft Windows Server 2003 Enterprise Edition operating system, the StorageWorks 1000 Modular Smart Array (MSA1000) and MSA1500 cs, or Raid Array RA4100 and ProLiant Servers. This solution also supports StorageWorks Secure Path management software.	
	ProLiant Cluster HA/F200 for the Entry Level SAN	364026-B21
	ProLiant Cluster HA/F200 for the Entry Level SAN (Japan)	364026-291

HP ProLiant Cluster Starter Kit	The ProLiant Cluster Starter Kit is a ProLiant cluster "How-to-Guide" that includes documentation for ProLiant Clusters that use StorageWorks MSA1000, MSA1500 cs, RA4100, EVA5000, EVA3000, MA8000, and EMA12000. The kit also includes multimedia with animation to illustrate the actual components required to build a Fibre Channel Cluster and two 30-day trial licenses of OpenView Storage Mirroring.	
	NOTE: This kit does not include Secure Path Software.	
	HP ProLiant Cluster Starter Kit	364023-B21

HP ProLiant Cluster Kit with OpenView Mirroring (Host based)	The ProLiant Cluster Kit with OpenView Storage Mirroring is designed to assist in simplifying the configuration of cluster solutions for customers that require a cost effective disaster recovery alternative. This solution provides high levels of data and application availability in the Microsoft Windows Operating System environment through clustering to provide no-single-point-of-failure. The ProLiant Cluster Kit with OpenView Storage Mirroring supports a two-node cluster based on Microsoft Windows 2000 Advanced Server and two to eight-nodes cluster based on Microsoft Windows Server 2003 Enterprise Edition operating system, the StorageWorks Modular Smart Array (MSA1000 & MSA1500 cs with MSA20 or MSA30 attached) and ProLiant Servers. This solution also provides replication capabilities to make one or more copies of the cluster data. Replication can take place between a cluster and standalone configuration or between two clusters.	
	HP ProLiant Cluster Kit with OpenView Mirroring	364025-B21

HP OpenView Storage Mirroring (Host based)	HP OpenView Storage Mirroring is designed to take small-medium enterprises beyond periodic backup to provide continuous data protection with minimal data loss and immediate recovery from any disaster or system outage. Utilizing patented STAR technology, OV Storage Mirroring captures byte-level changes as they happen and replicates those changes to one or more target servers at any location in the exact sequence sent by the source. Advanced features put you in control of bandwidth usage, queue data changes for replication during off-peak hours, enable e-mail, pager or wireless notification when changes occur and scales organically to meet the need of your environment. OV Storage Mirroring is the core component to the following solutions: disaster recovery, remote availability, centralized backup, serverless backup, data distribution, mining and server/storage migration.	
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Compatibility

- Supports Microsoft Windows 2000/2003 servers
- One-to-one failover/fail back solution for MS-Exchange, MS-SQL and Oracle providing automatic failover and near instantaneous access to replicated data or use replicated data or rebuild your local server.
- Server Groups - enables the "grouping" of servers on the management console (GUI) allowing focus on only those servers under your span of control
- Continuous, asynchronous byte-level replication with intelligent data compression captures changes as they occur, ensures sequence of data mirrored on target, and provides user-configurable compression levels to ensure efficient usage of network resources.
- One-to-many and many-to-one host configurations allowing multiple production servers to use the same target server

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

HP ProLiant Clusters for NetWare

HP supports a broad range of solutions for NetWare Cluster services including configurations featuring the MSA1500 cs and optionally with HP StorageWorks Secure Path. These solutions provide high availability and maximum resource utilization for NetWare environments from small file sharing implementations to enterprise business computing. Single-path (single controller, non-Secure Path) NetWare clusters of up to 12-nodes have been successfully tested. Presently 2-node NetWare clusters with Secure Path have been tested and approved with larger NetWare cluster testing planned. Multiple NetWare clusters are allowed.

NOTE: SCSI Disk Technology Only.

NOTE: Refer to <http://www.hp.com/go/securepath> for the latest Secure Path for NetWare parameters.

Configure to Order Program Information

HP introduces the new Configure to Order program on a limited basis. It is not yet available in all areas. The MSA1500 cs and its options may or may not be factory installed in a rack with add-on controllers, switches, hubs, MSA20 enclosures, MSA30 enclosures and hard drives. The MSA1500 cs may be integrated with 64-bit Integrity and PA-RISC servers or ProLiant or as standalone storage.

Configure to Order	Products Approved for CTO	Part Number
	1500 cs Modular Smart Array NOTE: 0D1 will appear after this part number on your sales order when factory integration is indicated.	AA986A
	HP MSA1000 Controller 256 cache ALL NOTE: 0D1 will appear after this part number on your sales order when factory integration is indicated.	218231-B22
	256 MB Cache Upgrade NOTE: 0D1 will appear after this part number on your sales order when factory integration is indicated.	254786-B21
	MSA1500 cs Fibre Channel I/O Module NOTE: 0D1 will appear after this part number on your sales order when factory integration is indicated.	AA987A
	MSA1500 cs Dual Channel SCSI I/O Module NOTE: 0D1 will appear after this part number on your sales order when factory integration is indicated.	AA988A
NO CTO Available	MSA1500cs 2U Fibre Channel SAN Attach Controller Shelf, with SATA	AD509A
	MSA1500cs 2U Fibre Channel SAN Attach Controller Shelf, with SCSI	AD510A
	MSA1500 cs upgrade shelf	AD511A

Service and Support, HP Care Pack, and Warranty Information

Warranty

- Three-year Limited Warranty for MSA1500, Fibre Channel Cables and SFP Transceivers
- 3 years parts exchange
- 1 year labor
- 1 year on-site
- Next business day response

Options for the MSA1500 carry their own warranty. Refer to HP's Limited Warranty Statement for further details. In countries where available, your HP Limited Warranty includes Customer Self Repair warranty services. Please refer to HP's Limited Warranty Statement 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 MSA1500 cs product is different for SCSI hard drives versus SATA hard drives. SCSI 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 hours
- Coverage - Extend hours of coverage from 9 hours x 5 days to 24 hours x 7 days
- Duration - Select duration of coverage for a period of 1, 3, 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.

NOTE: Refer to Step 6 "Choose HP Care Pack Services" in the Configuration Information section below for all Service, Warranty Plans, Installation and Startup Services available for the MSA1500

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 and 3 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>.
- Secure Path Software Services**
- Software product services included with Secure Path: One year of Software Technical Support 24 x 7 HP Care Pack Services (includes phone-in software technical support 24 x 7 and software product and documentation updates).
 - HP Care Pack services are available to upgrade the one year of Software Technical Support 24 x 7 included with the Secure Path product to 3 full years.
 - Installation service (software installation).

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 StorageWorks Disk Arrays service package provides installation and configuration of HP StorageWorks Disk Array products. Service highlights include: Installation and Startup provides, installation, LUN Disk Design and configuration of the MSA 1500 which includes

- Service Planning
- Service Deployment
- Installation Verification Testing (IVT) required for this service
- Customer Orientation session
- Service Deployment includes the deployment of the MSA disc array into a new or pre-existing SAN which may consist of switch, hub or SCSI bridge technology. Installation includes the customization of up to four host servers, eight host bus adapters (hba's) and up to four high availability software licenses.

SAN Solution Service

SAN Solution Service covers your entry-level disk array solution with:

- Comprehensive SAN implementation strategy and planning
- Hardware and software installation and configuration
- Integration of the installed disk array in your SAN environment
- Firmware verification
- SAN testing
- Solution handover to your staff

The Array Installation and Startup service is a pre-requisite for the SAN Solution Service.

For more information about the SAN solution service, please visit:

http://www.hp.com/hps/storage/ns_san.html

Kit Contents

Model Name	Contents' Description	Part Number
MSA1500 cs	MSA1500 controller shelf, 1-controller, 1- FC module, 1- SFP transceiver, 1- dual channel SCSI I/O card, 2- power cables, redundant fans, redundant power supplies, universal rack-mounting kit, MSA1500 support CD and documentation, serial cable. NOTE: Fibre Channel cables, disk enclosures and hard drives are ordered separately.	AA986A
MSA1500 cs with one SATA drive enclosure	1- MSA1500 controller shelf base configuration, and 1-MSA20 SATA disk enclosure base configuration. NOTE: For Americas, Asia Pacific, and Japan.	AD509A
MSA1500 cs with one SCSI drive enclosure	1- MSA1500 controller shelf base configuration, and 1-MSA30 single-channel SCSI disk enclosure base configuration. NOTE: For Americas, Asia Pacific, and Japan.	AD510A
MSA1500 SAN SCSI Starter Kit	(Windows, NetWare or Linux compatible) NOTE: Includes (1) MSA1500 (1) MSA30 SCSI drive enclosure (1) 4/8 Base SAN Switch (4) 4Gb SFP transceivers (2) FCA2214 HBAs + cables.	AE327A
MSA1500 SAN SATA Starter Kit	(Windows, NetWare or Linux compatible) NOTE: Includes (1) MSA1500 (1) MSA20 SATA drive enclosure (1) 4/8 Base SAN Switch (4) 4Gb SFP transceivers (2) FCA2214 HBAs + cables. NOTE: For Americas, Asia Pacific, and Japan only.	AE326A
MSA1500 SAN Starter Kit HA Bundle (for both SCSI and SATA SAN Starter Kits)	(Windows, NetWare or Linux compatible) NOTE: Includes (1) redundant controller; (1) FC I/O module; (1) 4/8 Base SAN Switch (4) 4Gb SFP transceivers (2) FCA2214 HBAs + cables. User will need to employ either Secure Path, QLogic failover, or Windows MPIO for path failover implementation, not included. NetWare requires Secure Path.	AE328A
MSA1500 cs upgrade shelf	MSA1500 controller shelf, 1- dual channel SCSI I/O card, 2- power cables, redundant fans, redundant power supplies, universal rack-mounting kit, MSA1500 support CD and documentation, serial cable. NOTE: This MSA1500 cs upgrade shelf does not include a controller or a Fibre Channel I/O Module. It is intended for those customers who wish to upgrade from their MSA1000 to the MSA1500 cs. For each controller added to this shelf, one Fibre Channel I/O module (PN AA987A) is required. NOTE: When upgrading to the MSA1500 cs, there is no space for the MSA1000 embedded switch or hub.	AD511A

Configuration Information

Step 1 - "Product" - Base Configuration

Select one:

Model Name	Model Description:	Part Number
MSA1500 cs	MSA1500 controller shelf, 1-controller, 1- FC module, 1- SFP transceiver, 1- dual channel SCSI I/O card, 2- power cables, redundant fans, redundant power supplies, universal rack-mounting kit, MSA1500 cs support CD and documentation, serial cable.	AA986A

Step 2 - Required Options (Must Choose Serial ATA or SCSI)

Select each required 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 SCSI drives.

Description with Parts Shipped:	Quantity	Part Number
Dual Channel SCSI I/O Module (1 ships with base unit, 3 more can be added)	Up to 4	AA988A
MSA20 - Serial ATA enclosure, SCSI cable, redundant fans and power supplies, power cable	Up to 8	335921-B21
160 GB Serial ATA hard drive, universal carrier	Up to 12 per MSA20 enclosure	349238-B21
250 GB Serial ATA hard drive, universal carrier	Up to 12 per MSA20 enclosure	349239-B21
MSA30 - Dual Channel SCSI enclosure, SCSI cable, redundant fans and power supplies, power cable	Up to 2	302970-B21
MSA30 - Single Channel SCSI enclosure, SCSI cable, redundant fans and power supplies, power cable	Up to 4	302969-B21
72.8 GB Pluggable Ultra320 Universal Hard Drive, 10,000 rpm (1")	Up to 14 per MSA30 enclosure	286714-B22
146.8 GB Pluggable Ultra320 Universal Hard Drive, 10,000 rpm (1")	Up to 14 per MSA30 enclosure	286716-B22
300 GB Pluggable Ultra320 Universal Hard Drive, 10,000 rpm (1")	Up to 14 per MSA30 enclosure	350964-B22
36.4 GB Pluggable Ultra320 Universal Hard Drive, 15,000 rpm (1")	Up to 14 per MSA30 enclosure	286776-B22
72.8 GB Pluggable Ultra320 Universal Hard Drive, 15,000 rpm (1")	Up to 14 per MSA30 enclosure	286778-B22
146.8 GB Pluggable Ultra320 Universal Hard Drive, 15,000 rpm (1")	Up to 14 per MSA30 enclosure	347708-B22

NOTE: Two SATA disk enclosures can be attached to one SCSI I/O module. Only one SCSI disk enclosure can be attached to a SCSI I/O module.

NOTE: It is recommended that the same hard drive capacity (ex. All 250 GB SATA in SATA enclosure or all 146 GB SCSI in SCSI enclosure) be installed in a disk enclosure.

NOTE: All Ultra320 Universal Hard Drives are backward compatible to U2 or U3 speeds.

NOTE: For complete compatibility information, refer to the Compatibility table located at <http://www.hp.com/go/msa1500cs>

Configuration Information

Must choose optional Power Cord for Non-U.S. Configurations	Quantity	Part Number
Power Cord, 110/220 VAC, US/Canada/Mexico NOTE: Shipped standard with all units.	2	227099-001
Power Cord, 220/240 VAC, (US/Canada/Mexico)	2	227099-002
Power Cord, (Australia/China/New Zealand)	2	227098-011
Power Cord, (Central Europe)	2	157215-021
Power Cord, (United Kingdom/Hong Kong)	2	157216-031
Power Cord, (Switzerland)	2	157219-111
Power Cord, (Italy)	2	157217-061
Power Cord, (Denmark)	2	157218-081
Power Cord, (Japan)	2	139867-006
Power Cord, (South East Asia/India)	2	157220-AR1

NOTE: Redundant configurations require two Host Bus Adapters per server, an additional controller and fibre channel I/O module, and Secure Path software for each server.

Step 3 – Choose Redundant MSA1500 System Options

Description	Quantity	Part Number
MSA Controller NOTE: The MSA1500 utilizes the MSA1000 controller with specific firmware	1	218231-B22
256 MB Cache Modules for Controller (one additional for each controller) NOTE: The MSA1500 and MSA1000 utilize the same Cache Modules	2	254786-B21
MSA1500 Fibre Channel I/O module	1	AA987A
HP StorageWorks Secure Path or an industry standard path failover solution such as Windows MPIO or QLogic Failover for Linux (appropriate for the operating system) NOTE: Redundant configurations require two Host Bus Adapters per server, an additional controller and fibre channel I/O module, redundant switches and cables, and Secure Path software or Industry Standard failover depending on the operating system for each server.		

Step 4 – Choose Supported Options For 2 Gb Infrastructure

Select each required option with quantities specified.

	Description with Parts Shipped:	Part Number
4 Gb Fibre Channel	4 Gb SFP SW Transceiver Kit	A7446A
Fabric "B-Series" family of switches	HP StorageWorks 4/8 Base SAN Switch 8 port 4Gb/s switch with zero e-ports	A7984A
	HP StorageWorks 4/8 SAN Switch 4Gb/s with full fabric	A8000A
	HP StorageWorks 4/16 SAN Switch	A7985A
	HP StorageWorks 4/16 SAN Switch Power Pack	A7987A

Configuration Information

2 Gb Fibre Channel Fabric "B-Series" family of switches	2 Gb SFP SW Transceiver Kit	221470-B21
	HP StorageWorks SAN Switch 2/8V	AA979A
	HP StorageWorks SAN Switch 2/8V Power Pack	AA980A
	HP StorageWorks SAN Switch 2/16V	AA978A
	HP StorageWorks SAN Switch 2/16N	AA990A
	HP StorageWorks SAN Switch 2/16N Power Pack	AA977A
	HP StorageWorks SAN Switch 2/32 Power Pack Upgrade	313448-B21
	HP StorageWorks SAN Switch 2/16	322118-B21

2 Gb Fibre Channel Fabric "M-Series" family of switches	HP StorageWorks Edge Switch 2/32	286810-B21
	NOTE: 16 active ports with SFPs	
	8-FlexPort upgrade for Edge 2/32	302660-B21
	HP StorageWorks Edge Switch 2/24	316095-B21
	NOTE: 8 ports active with SFPs	
	8-FlexPort upgrade for Edge 2/24	316096-B21
	HP StorageWorks Edge Switch 2/12	348406-B21
	NOTE: 4 ports active with SFPs	
	4-FlexPort upgrade for edge 2/24	348407-B21

2 Gb Fibre Channel Fabric "C-Series" family of switches	Cisco MDS 9506 Multilayer Director w/OSFPs	A7471A
	Cisco MDS 9509 Multilayer Director w/O SFPs	A7462A
	Cisco MDS 9216 Multilayer Fabric Switch w/16 SFPs	A7473A
	Cisco MDS 9216A Multilayer Fabric Switch	A7557A
	Cisco MDS 9216i Multilayer Fabric Switch	A7557A
	Cisco MDS 9120 Fabric Switch w/O SFPs	A7426A
	Cisco MDS 9140 Fabric Switch w/O SFPs	A7427A
	Optical Transceivers, Small Form Factor Pluggable, Short Wave	A7428A

2 Gb Fibre Channel HBAs	FCA2214 Host Adapter (Linux, Microsoft 32-bit, Netware)	281541-B21
	FCA2214DC Host Adapter (Linux, Microsoft OS 32-bit, Netware) dual channel	321835-B21
	Windows 32-bit single channel PCI-X (Windows Server 2003, W2K)	A7388A
	Windows 32-bit dual channel PCI-X (Windows Server 2003, W2K)	A7387A
	Host Adapter for Windows Server 2003 64-bit, Integrity servers	AB232A
	Host adapter PCI-X Dual channel for HP-UX and Linux, Integrity servers	A6826A
	HP-UX HBA: PCI 2GB Fibre Channel Adapter	A6795A
	HP-UX HBA: PCI-X 2Gb Fibre Channel/1000Base-T	A9784A
	HP-UX HBA: PCI-X 2Gb Fibre Channel/1000Base-SX	A9782A
	2Gb PCI-e for 32-bit Windows	A7560A
	Host Adapter for Windows Server 2003 64-bit, Integrity servers, single channel 2 Gb PCI-X	AB467A
	Host Adapter for Windows Server 2003 64-bit, Integrity servers, dual channel 2 Gb PCI-X	AB466A
	Host adapter Q2300 64-bit PCI-X for Linux, Integrity servers	A7538A

Configuration Information

4 Gb Fibre Channel HBAs	HP StorageWorks FC2142SR HBA 4Gb PCI-e for Windows, Linux	A8002A
	HP StorageWorks FC2242SR DC HBA 4Gb PCI-e for Windows, Linux	A8003A

Fibre Channel cables for 2 Gb Infrastructure	Use 2 Gb Fibre Channel cables when connecting the MSA Fibre Channel I/O Module to FCA2101 HBA(s)	
	2 m LC-LC Multi-Mode Fibre Channel Cable	221692-B21
	5 m LC-LC Multi-Mode Fibre Channel Cable	221692-B22
	15 m LC-LC Multi-Mode Fibre Channel Cable	221692-B23
	30 m LC-LC Multi-Mode Fibre Channel Cable	221692-B26
50 m LC-LC Multi-Mode Fibre Channel Cable	221692-B27	

Fibre Channel Cables for 1 Gb Fabric Switches and Hub	Use 1 Gb Fibre Channel cables when connecting the MSA Fibre Channel I/O Module and FCA2101 HBA(s) to 1 Gb Fabric Switches or hubs.	
	2 m LC-SC Multi-Mode Fibre Channel Cable	221691-B21
	5 m LC-SC Multi-Mode Fibre Channel Cable	221691-B22
	15 m LC-SC Multi-Mode Fibre Channel Cable	221691-B23
	30 m LC-SC Multi-Mode Fibre Channel Cable	221691-B26
50 m LC-SC Multi-Mode Fibre Channel Cable	221691-B27	

Step 5 – Choose Rack Options

Select each required option with quantities specified.

10647 (47U) Rack Cabinet - Pallet	245160-B21
10647 (47U) Rack Cabinet - Crated	245160-B23
10642 (42U) Rack Cabinet - Pallet	245161-B21
10642 (42U) Rack Cabinet - Shock Pallet	245161-B22
NOTE: It is mandatory to use a shock pallet in order to ship racks with equipment installed	
10642 (42U) Rack Cabinet - Crated	245161-B23
10636 (36U) Rack Cabinet - Pallet	245162-B21
10636 (36U) Rack Cabinet - Shock Pallet	245162-B22
NOTE: It is mandatory to use a shock pallet in order to ship racks with equipment installed	
10636 (36U) Rack Cabinet - Crated	245162-B23
10622 (22U) Rack Cabinet - Pallet	245163-B21
10622 (22U) Rack Cabinet - Shock Pallet	245163-B22
NOTE: It is mandatory to use a shock pallet in order to ship racks with equipment installed.	
10622 (22U) Rack Cabinet - Crated	245163-B23
S10614 (14U) Rack Cabinet - Shock Pallet	292302-B22
NOTE: It is mandatory to use a shock pallet in order to ship racks with equipment installed.	
10842 (800 mm wide, 42U) Rack Cabinet - Pallet	257415-B21

Configuration Information

10842 (800 mm wide, 42U) Rack Cabinet - Shock Pallet	257415-B22
NOTE: It is mandatory to use a shock pallet in order to ship racks with equipment installed.	
Rail Kit for mounting in a M-Series rack	313877-B21
42U EVA cab 60Hz	338042-B21
36U EVA cab 60Hz	338044-B21
22U EVA cab 60Hz	338046-B21
42U EVA cab 50 Hz	338043-B21
36U EVA cab 50 Hz	338045-B21
22U EVA cab 50 Hz	338047-B21
HP9000 Std Rack System E25	A4900A
HP Rack System/E, 33U, quartz color	A4901A
HP Rack System/E, 33U, graphite color	A4901D
HP Rack System/E, 41U, quartz color	A4902A
HP Rack System/E, 41U, graphite color	A4902D

MSA1500 cs to PDU	2.5m (8.2') 10A, IEC C 13 to IEC C14 PDU Jumper Cable (1 per pack)	142257-002
	3.0m (9.8') 10A, IEC C 13 to IEC C14 PDU Jumper Cable (1 per pack)	142257-003
	1.4m (4.5') 10A, IEC C 13 to IEC C14 PDU Jumper Cable (1 per pack)	142257-006

Step 6— Choose HP Care Pack Services

Hardware Product Services	1 Yr 4hr 24x7/Onsite	UA774A/E
	1 Yr 4hr 13x5/Onsite	UA775A/E
	1 Yr 6 hr CTR	UA776A/E
	3 Yr next Day/Onsite	UB950A/E
	3 Yr 4hr 13x5 /Onsite	UB951A/E
	3 Yr 4hr 24x7 /Onsite	UB952A/E
	3 Yr 6 hr CTR	UB953A/E
	Hardware Installation	U4368A/E
	Installation and Startup	UA868A/E
	Flexible Care Pack Part Numbers:	
	1 Yr 4hr 13x5 Hardware	HA103A1
	1 Yr 4h 24x7 Hardware	HA104A1
	1 Yr 6 hr CTR	HA105A1
	1 Yr Support Plus	HA109A1
	1 Yr Support Plus 24	HA110A1
	1 Yr Proactive 24	HA111A1
	1 Year Critical Services	HA112A1
	3 yr Next Day	HA101A3
	3 Yr 4hr 13x5 Hardware	HA103A3
	3 Yr 4hr 24x7 Hardware	HA104A3
	3YR 6hr CTR	HA105A3
	3Yr Support Plus	HA109A3

Configuration Information

3 Yr Support Plus 24	HA110A3
3 Yr Proactive 24	HA111A3
3 Year Critical Services	HA112A3
4 year Next Day	HA101A4
4 Yr 4hr 13x5 Hardware	HA103A4
4 Yr 4h 24x7 Hardware	HA104A4
4 Yr 6 hr CTR	HA105A4
4 Yr Support Plus	HA109A4
4 Yr Support Plus 24	HA110A4
4 Yr Proactive 24	HA111A4
4 Year Critical Services	HA112A4
5 Yr Support Plus	HA109A5
5 Yr Support Plus 24	HA110A5
5 Yr Proactive 24	HA111A5
5 Year Critical Services	HA112A5
Hardware Installation	HA113A3
Installation and Startup Service	HA114A1

Related Options

Storage Virtual Replicator v4.1.1 (Microsoft operating systems)	1 System LTU	T3593A
	3 System LTU	T3598A
	5 System LTU	T3597A
	10 System LTU	T3594A
	Base Media and Documentation Kit (license required)	T3591A
	1 System LTU upgrade:	T3599A
	3 System LTU upgrade:	T3604A
	5 System LTU upgrade:	T3603A
	10 System LTU upgrade:	T3600A
	1 System LTU upgrade Japan	T3615A

Secure Path v4.0C (SP1) for Windows Workgroup Edition (including Windows Server 2003/32-bit and 64-bit)	Secure Path v4.0C for Windows Workgroup one license	213076-B26
	Secure Path v4.0C for Windows Workgroup Edition five licenses	231316-B26
	Secure Path v4.0C for Windows Workgroup Edition 10 licenses	231317-B26
	Secure Path v4.0C for Windows Workgroup Edition 25 licenses	231318-B26
	Secure Path v4.0C for Windows Workgroup Edition 50 licenses	231319-B26
	Secure Path v4.0C for Windows Workgroup Edition Upgrade License	261715-B24
	Secure Path v4.0C for Windows Workgroup Edition for ProLiant BL line 8 licenses	325634-B23

NOTE: At present 64-bit Windows with Secure Path can operate in a homogenous configuration of multiple (up to 5) 2-node clusters.

NOTE: Refer to <http://www.hp.com/go/securepath> for the latest Secure Path parameters for Windows.

Secure Path v3.0C for Linux Workgroup Edition	Secure Path v3.0C for Linux Workgroup Edition one license	T3581A
	Secure Path v3.0C for Linux Workgroup Edition five licenses	T3582A
	Secure Path v3.0C for Linux Workgroup Edition 10 licenses	T3584A
	Secure Path v3.0C for Linux Workgroup Edition 25 licenses	T3585A
	Secure Path v3.0C for Linux Workgroup Edition 50 licenses	T3586A

NOTE: Refer to <http://www.hp.com/go/securepath> for the latest Secure Path parameters for Linux

QLogic Failover Driver for Linux	Provides a no cost multi-path solution for Linux when using specific QLogic Host Bus Adapters
	For more information visit http://h18006.www1.hp.com/products/sanworks/multipathoptions/index.html or http://www.qlogic.com

Windows MPIO Failover Driver	Provides a single multi-path solution for Windows
	<ul style="list-style-type: none"> • Microsoft Windows 2000 and Windows Server 2003 (32bit and 64bit) operating systems • DSM driver is required from HP for operation and configuration:
	For more information visit http://h18006.www1.hp.com/products/sanworks/multipathoptions/index.html or http://www.microsoft.com

Technical Specifications

1500 cs Modular Smart Array	LED Indicators on Front (4)	System heartbeat System UID Power On/Standby Fault detected in enclosure
	LED Indicators on Rear Panel (7)	System UID SCSI Module Power indicator (1 per SCSI I/O module) SCSI Activity (1 per SCSI I/O module) Fibre Channel I/O card status (1 per Fibre I/O module) Fibre channel link status (2 per Fibre I/O module) Power supply status (1 per power supply) Fan Module status (1 per fan module)
	Interface	Ultra3 SCSI to Hard Drives 2 Gb Fibre Channel to Hosts
	Maximum Number of Drives	96 SATA hard drives in 8 MSA20 SATA enclosure or 56 SCSI hard drives in 4 MSA30 enclosures
	Temperature Range	Operating 50° to 95° F (10° to 35° C) up to 8000' -22° to 122° F (-30° to 50° C)
	Relative Humidity	Operating 10% to 90% Non-operating Up to 95%
	Input Power Requirements	Rated Input Voltage 100 to 240 VAC Rated Input Frequency 47 to 63 Hz Rated Input Current 6.4A Max, 1A typical Input Power (max) 400W Max, 95W typical The supply will handle 90Vrms - 254 Vrms (100 - 240 V, +6%, -10%) Frequency is 47 - 63 Hz
	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.	
MSA1500 Controller Shelf	2U Rack Form Factor	Dimensions (H x W x D) 3.46 x 19.06 x 24.32 Weight 55 lbs
	Shipping Packaging	Dimensions (L x W x D) 32.50 x 11.25 x 34.06 Weight (Gross) 68 lbs
		Dimensions (H x W x D) 3.2 x .92 x 14.62 Weight 1.01 lbs
SCSI I/O Module (Positioned in shelf)	Shipping Packaging	Dimensions (H x W x D) 19.88 x 9.06 x 2.76 Weight (Gross) 1.93 lbs
		Dimensions (H x W x D) 3.2 x .92 x 14.62 Weight .96lbs
	Shipping Packaging	Dimensions (H x W x D) 19.88 x 9.0 6 x 2.76 Weight (Gross) 1.87lbs
Fibre Channel I/O Module (Positioned in shelf)		Dimensions (H x W x D) 3.2 x .92 x 14.62 Weight .96lbs
	Shipping Packaging	Dimensions (H x W x D) 19.88 x 9.0 6 x 2.76 Weight (Gross) 1.87lbs
		Dimensions (H x W x D) 3.2 x .92 x 14.62 Weight .96lbs

Technical Specifications

User Interface	Controller display with Status Indicators (2) and push buttons (4) on front of controller
Electrical Interface	LVD (Low Voltage Differential)
Protocol Support	Wide Ultra3 SCSI
SCSI Ports	2-ports per SCSI I/O card, up to 4 cards total
Maximum Capacity	24 TB with 96- 250 GB SATA HDD, or 16.8 TB with 56-300 GB SCSI HDD
Logical Drives (LUN)	Up to 32 Logical Drives
Maximum Logical Drive size	2.0 TB

Modular SAN Array 1000 Controller	User Interface	Controller Display with Status Indicators (2) and Push Buttons (4) Status Indicators on front of Controller (16)
	Electrical Interface	LVD (Low Voltage Differential)
	Protocol Support	Wide Ultra3 SCSI (160 MB/s per channel)
	RAID Support	RAID 6 with HP's Advanced Data Guarding technology (RAID ADG) RAID 5 (Distributed Data Guarding) RAID 1 + 0 (Mirroring + Striping) RAID 0 (Striping)
	Cache Memory	Up to 512 MB Read/Write (256 MB modules). If redundant controllers are used they must have equally configured cache ECC protection, battery-backed, and removable Standard as of November 19, 2002: 256 MB cache memory (single module)
	Cache Batteries	Up to three days of redundant battery life, removable for easy replacement
	Upgradeable Firmware	2 MB flashable ROM
	Disk Drive and Enclosure Protocol Support	HP Ultra 320, Ultra3, and Ultra2 SCSI 1-inch Universal drives
	Packaging	Dimensions (L x W x D) 15.5 x 12.0 x 3.25 Weight (Gross) 2.5 lb

Modular SAN Array Fibre Channel I/O Module	Connector Type	LC
	Number of Fibre Channel Ports	One 2 Gb Fibre Channel Port using removable Small-Form-Factor-Pluggable Transceiver (SFP)
	Bandwidth	200 MB/s
	Operation Modes	Fibre Channel Class 2 and 3 connectionless service
	Protocols Supported	Fibre Channel
	Packaging	Dimensions (L x W x D) 19.88 x 9.06 x 2.76 Weight (Gross) 1.87 lbs

Technical Specifications

Multi-Mode Fibre Channel Cables Kits (218960-B21)	Cable Type	LC-LC (2 Gb to 2 Gb connections) and LC-SC (2 Gb to 1 Gb connections) 50 Micron multi-mode Fiber	
	Available Cable Lengths	6.5 ft, 16.4 ft, and 49.2 ft (2 m, 5 m, and 15 m)	
	Packaging	Dimensions (L x W x D)	11.5 x 9 x 1.5 in (29.2 x 22.8 x 3.8 cm)
		Weight (Gross)	0.75 to 1 lb (0.34 to 0.45 kg)

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