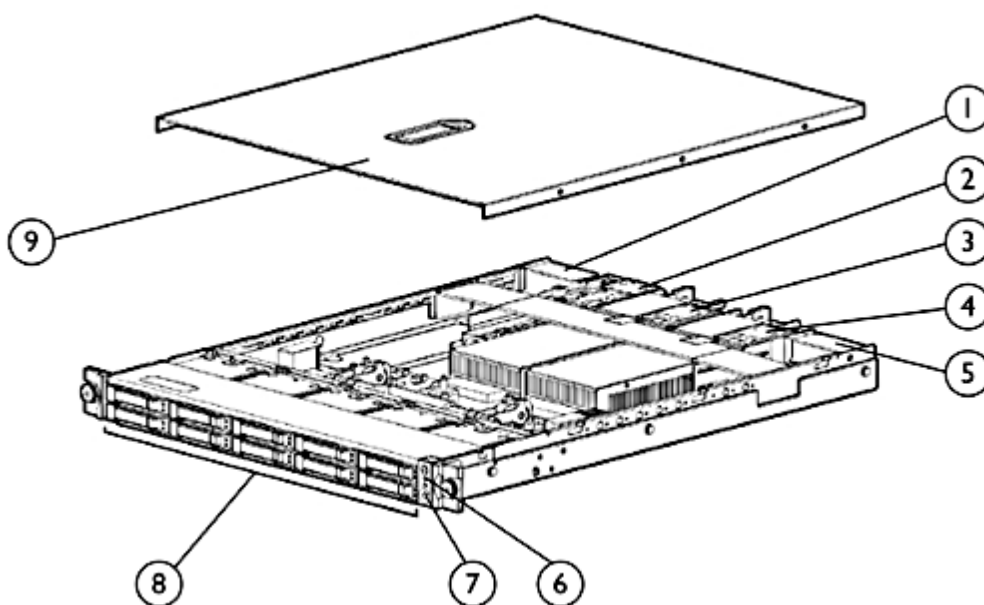


Overview

The HP StorageWorks Modular Smart Array 50 Enclosure MSA50 is a 1U Serial Attach SCSI(SAS) disk drive storage enclosure supporting Small Form Factor(SFF) SAS or Serial ATA(SATA) drives. This enclosure delivers industry-leading data performance, availability, storage density, and upgradeability to meet customers' demanding and growing storage needs. The all new SFF drive carrier is designed to support the new Universal form factor hard drive in either SAS or SATA. This new form factor provides optimized performance per U of space while delivering unparalleled power consumption. The MSA50 enclosure supports direct attach storage to HP ProLiant and Integrity Servers. The MSA50 supports the cascading of shelves in a 1+1 configuration to allow a maximum of 20 SFF drives in a 2U configuration attached to a single controller port. This single controller port incorporates four lanes for a total max throughput of 12Gb/s for SAS.



1. Expansion slot for potential future second I/O
2. Fan
3. Hot-plug power supply
4. Hot-plug power supply
5. I/O module
6. Power button/LED
7. UID button/LED
8. Hot-plug SAS or SATA hard drive bays
9. Access panel

Models

The MSA50 design allows for the mix of SAS and SATA drives in the same enclosure at the same time and is tailored to the needs of HP server customers who require optimized performance per U of rack space.

Model MSA50

HP StorageWorks Modular Smart Array 50 Enclosure

364430-B21

NOTE: Rack-mountable 10 SFF drive enclosure with single I/O module, redundant hot plug power supplies and hot plug fans.

NOTE: For complete compatibility information, refer to the Specifications section of this document. SAS/SATA performance requires a compatible SAS controller. This is noted in the product documentation.

Product Highlights

Customer Benefits	Higher Performance per U of Rack Space	The Serialized nature of SAS combined with the highest spindle count per U of rack space allows the MSA50 to achieve the greatest I/Os per second when compared to parallel SCSI.
	Price Sensitivity	The MSA50 will be the first SAS/SATA SFF JBOD product that will offer a level of availability sufficient for the Enterprise and a price structure that is attractive to SMB.
	Investment Protection	The MSA50 has the future potential to upgrade from 3GB to 6GB SAS, as well as mix and match SAS or SATA drives within the same enclosure. Thus making technology transitions simple and cost effective.
	Reduced Spares Inventory	Universal SFF drives and similar physical characteristics between SAS and SATA drives allow customers to mix/match SAS and SATA in the same enclosure and allow the same drives to be used in servers and external storage.

Key Features

Features of the MSA50 include:

SFF (SAS/SATA) support – Delivering data transfer rates up to 3Gb/s for SAS and 1.5Gb/s for SATA
NOTE: SAS/SATA performance requires a compatible SAS controller. This is noted in the product documentation.

- 1U rack height.
- Supports up to 10 SFF SAS and/or SATA Universal hard disk drives.
- Provides storage capacity of up to 1.4TB per enclosure (using 146GB 10K disk drives)
- Cascadable 1+1 for up to 20 spindles in a 2U configuration or 2.8TB.
- Modular design allows the MSA50 to be used in any storage configuration from JBOD (Just a Bunch of Disks) to Smart Array storage enclosures.
- A common storage platform allows the potential for future storage consolidation to the SAN.
- Universal SFF SAS drive carrier – provides better cooling and reliability for by providing increased air flow through the storage unit.
- Hot pluggable disk drives, fans and power supplies.
- Field replaceable fans, I/O Module and mid plane

Easy removal of parts provides better serviceability. No tools are required!

Upgradeability

Potential Upgrade path for a HP StorageWorks MSA50 is as easy as swapping out the I/O Module on the back of the unit. The unit must be powered down to replace the I/O Module.

Mix and Match of Hard Drive Types

A benefit of SAS and SATA is the use of a common physical connection which allows for both drive types to be mixed together on the same backplane. This common backplane allows customers the choice of using SAS and/or SATA and helps deliver HP's message of industry leading innovation, reliability, adaptability, and performance by allowing customers to choose the reliability of SAS or the lower cost of SATA for tiered storage.

Hot Pluggable

Hot pluggable technology is designed into drives, fans and redundant power supplies. Hot pluggable components can be replaced without powering down the storage system or stopping I/O operations. This feature significantly enhances data availability.

Auto SAS ID Selection

SAS ID is automatically set when a drive is inserted into a drive bay (See drawing on top of unit for bay numbering).

Product Highlights

LED Indicators	Front panel LEDs indicate drive activity, required drive service, and power, giving a quick visual assessment of overall system storage status.
Rack Density	The MSA50 Enclosure has a 1U height.
Environment Monitoring Unit (EMU)	Each MSA50 model is equipped with an EMU that constantly monitors the enclosure, the power supplies, and fans to ensure suggested operating tolerances are maintained.
I/O Module	The single I/O module installed allows one SAS controller to access all drives in the MSA50.
Fault Tolerance	With redundant power supplies and fans, the MSA50 provides a high level of system availability. Using an internal host based controller, the MSA50 can be configured for RAID levels 0, 1, 1 + 0, 5, 6 (RAID ADG) when using a HP Smart Array RAID controller.
Manageability	The MSA50 is managed by HP Systems Insight Manager.
Compatibility and Integration Testing	Intensive compatibility and performance testing with HP ProLiant servers ensures the highest level of integration available in the industry. For a complete list of supported HP servers and workstations, please refer to the QuickSpecs and/or User Guide of the array controller or Host Bus adapter that you are planning to use. The list of supported array controllers and SAS adapters is provided under "Related Options, Controllers".
Product Kit Contents	<p>Redundant power supplies, single I/O module, 9 drive blanks, warranty card, mounting hardware, Enclosure user guide, HP SmartStart CD Kit, documentation CD, one 2 Metre SAS external cable and two Nema 5-15 to C13 and two IEC320-C14 to -C13 power cords.</p> <p>NOTE: The included SAS cable is only for the P600 controller. If connecting to a P800 controller one of the following cables must be ordered: SAS 4x to Mini SAS 4x 2M – 419571-B21 SAS 4x to Mini SAS 4x 4M – 419572-B21 SAS 4x to Mini SAS 4x 6M – 419573-B21</p>
Warranty	<p>MSA50: 3/0/0 limited warranty.</p> <p>NOTE: Certain restrictions and exclusions apply.</p> <p>Hard drive Pre-Failure Warranty: When used with any one of the StorageWorks Smart Array Family controllers and monitored under HP Systems Insight Manager (v4.20 or later), HP hard drives are supported by a Pre-Failure (replacement) Warranty.</p>

Service and Support, HP Care Pack, and Warranty Information

Software Product Services Standalone telephone support
Rights to new license version
Media and documentation updates

Hardware Product Services Installation services
On-site maintenance (includes warranty support)
Response time upgrades during the warranty period
Post-warranty coverage
RAID setup and performance consulting via statement of work
For additional hardware installation and maintenance information, please refer to the URL listed below:
http://www.hp.com/hps/carepack/services/cp_installation.html

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 Services and Support 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 HP Care Pack (hardware & software) information, as well as orderable part numbers, please refer to the URL <http://www.hp.com/hps/carepack>
Care Pack services provide a range of life cycle support options that let you choose the service levels that meet your business requirements, from basic to mission-critical.

A full range of HP Care Pack hardware and software services are available including:

- Installation and start up
- Education courses
- Extended onsite hardware coverage hours from same business day 13 hours, 5 day to 24 hours, 7 days call window with options including 4 hour response or 6-hour Call To Repair
- Comprehensive range of software technical support for Microsoft, Linux, ProLiant Essentials and VMware-based IT solutions helping to deliver high level of application availability. Response times range from 30 mins for critical problems to 2 hours.
- System Management, Performance Services and Mission Critical Support Solution.

NOTE: For more information on HP Care Pack services, contact any of our worldwide sales offices, resellers or visit our worldwide website at: <http://www.hp.com/hps/carepack>

NOTE: For more complete information on HP Services offerings, customers and resellers, please visit us at: <http://www.hp.com/hps>

NOTE: Additional information regarding worldwide limited warranty and technical support is available at: <http://h18004.www1.hp.com/products/servers/platforms/warranty/index.html>

NOTE: For additional information on Server Services, Rack and Power Options, please visit:

Service and Support, HP Care Pack, and Warranty Information

<http://h20219.www2.hp.com/services/cache/111072-0-0-225-121.html>

NOTE: The information contained herein is subject to change without notice and is provided "as is" without warranty of any kind.

NOTE: The warranties for HP products and services are set forth in the express limited warranty statements accompanying such products and services.

NOTE: Nothing herein should be construed as constituting an additional warranty. HP shall not be liable for technical or editorial errors or omissions contained herein.

Components

The following brick level options/components do not have individual HP Care Pack Services. These items will be included in product HP Care Pack Services into which they are installed.

Disk Drives	Tape Drives	CD/DVD ROM	SCSI Hubs in SBBs	Adapters
Bus Converters	Backplane RAID Controllers	Power Supplies	Cabling	Fans

Options

NOTE: Some of the options listed below may be discontinued.

Hard Drives	SFF Serial Attached SCSI (SAS) Hard Drives	
	HP 36GB 3G SAS 10K SFF SP HDD	375859-B21
	HP 72GB 3G SAS 10K SFF SP HDD	375861-B21
	HP 146GB 3G SAS 10K SFF SP HDD	431958-B21
	HP 36GB 3G SAS 15K SFF SP HDD	431933-B21
	HP 72GB 3G SAS 12K SFF SP HDD	431935-B21
	SFF Serial-ATA (SATA) Hard Drive	
HP 60GB 1.5G SATA 5.4K SFF HDD	379306-B21	

NOTE: Go to the [HP Hard Drive Compatibility table](http://www.hp.com/products/harddiskdrives) for complete drive compatibility information (<http://www.hp.com/products/harddiskdrives>). Using hard drives in unsupported configurations will result in voiding the warranty and could result in damage to the drive and/or loss of data.

Storage Controllers	SAS Controller	
	HP Smart Array P800 Controller /512 BBWC Controller	381513-B21
	HP Smart Array P600/256 BBWC Controller	337972-B21
	512MB DDR BBWC Upgrade (P600 Controller)	372538-B21

NOTE: Please see the following Controller QuickSpecs for Technical Specifications such as PCI Bus, PCI Peak Data Transfer Rate, SCSI Protocols supported, SCSI Peak Data Transfer Rate, SCSI Ports, Drives supported, Cache, RAID support, and additional information:
http://h18000.www1.hp.com/products/quickspecs/12247_ca/12247_ca.HTML
(Smart Array P600 Controller)
<http://h18004.www1.hp.com/products/servers/proliantstorage/arraycontrollers/smartarray800/index.html>
(Smart Array P800 Controller)

NOTE: See your server and controller compatibility matrix for details on controller and server compatibility. <http://h18004.www1.hp.com/products/servers/proliantstorage/arraycontrollers/index.html>

Options

SAS Cable Options	Cables used for connecting the HP Smart Array P600/256 BBWC Controller (P/N 337972-B21) to MSA50 & HP Smart Array P600/512 BBWC Controller (P/N 372538-B21) to MSA50		
	HP External SAS Cable – 1m	389665-B21	
	HP External SAS Cable – 1m	389665-B21#0D1	
	HP External SAS Cable – 2m	389668-B21	
	HP External SAS Cable – 2m	389668-B21#0D1	
	HP External SAS Cable – 4m	389671-B21	
	HP External SAS Cable – 4m	389671-B21#0D1	
	Cables used for connecting the HP Smart Array P800/512 BBWC Controller (P/N 381513-B21) to MSA50		
	SAS 4x to Mini SAS 4x 2M	419571-B21	
	SAS 4x to Mini SAS 4x 2M	419571-B21#0D1	
	SAS 4x to Mini SAS 4x 4M	419572-B21	
	SAS 4x to Mini SAS 4x 4M	419572-B21#0D1	
	SAS 4x to Mini SAS 4x 6M	419573-B21	
	SAS 4x to Mini SAS 4x 6M	419573-B21#0D1	
	<hr/>		
	Rack Options	HP 5642 Rack-Unassembled	358254-B21
		10642 (42U) Infrastructure Rack (High Voltage)	379005-001
		10642 (42U) Infrastructure Rack (Low Voltage)	379006-001
		HP S10614 (14U) Rack Cabinet – Shock Pallet	292302-B22
HP 10842 (42U) Rack Cabinet – Pallet		257415-B21	
HP 10842 (42U) Rack Cabinet – Shock Pallet		257415-B22	
HP 10647 (47U) Rack Cabinet – Pallet		245160-B21	
HP 10647 (47U) Rack Cabinet – Crated		245160-B23	
HP 10622 (22U) Rack Cabinet – Pallet		245163-B21	
HP 10622 (22U) Rack Cabinet – Shock Pallet		245163-B22	
HP 10622 (22U) Rack Cabinet – Crated		245163-B23	
HP Rack System/E, 41U, quartz colour		A4902A	
HP Rack System/E, 33U, quartz colour		A4901A	
HP Rack System/E, 41U, graphite colour		A4902D	
HP Rack System/E, 33U, graphite colour		A4901D	
HP9000 Std Rack System E25		A4900A	
42U EVA cab 60Hz		338042-B21	
42U EVA cab 50Hz		338043-B21	
36U EVA cab 60Hz		338044-B21	
36U EVA cab 50Hz		338045-B21	
22U EVA cab 60Hz	338046-B21		

Options

22U EVA cab 50Hz	338047-B21
42U Modular Storage Cabinet 60 Hz (Opal)	180311-B21
42U Modular Storage Cabinet 50 Hz (Opal)	180312-B22
36U Modular Storage Cabinet 60 Hz (Opal)	180313-B21
36U Modular Storage Cabinet 50 Hz (Opal)	180314-B22
22U Modular Storage Cabinet 60 Hz (Opal)	180315-B21
22U Modular Storage Cabinet 50 Hz (Opal)	180316-B22
41U Modular Storage Cabinet 60 Hz (Blue)	180317-B21
41U Modular Storage Cabinet 50 Hz (Blue)	180318-B22
M-Series Rack Rail Kit Option (2-5-2)	3R-A5281-AA

NOTE: It is mandatory to use a shock pallet in order to ship racks with equipment installed.

NOTE: Each Modular Storage Cabinet (42U, 41U, 36U, and 22U) comes with redundant 220 to 240V PDUs and power cables to accommodate Modular Array configurations. For more details on Modular Array solutions, see: <http://h18006.www1.hp.com/storage/array systems.html>.

Legacy Racks Supported	Rack 7142	165753-001
	Rack 9142	120663-B21
	Rack 9136	120664-B21
	Rack 9122	120665-B21

NOTE: Some of the racks referenced above may be discontinued.

NOTE: Certain power support and cooling restrictions apply when housing a maximum number of Model 4314R or Model 4354R enclosures in one of the supported HP racks. Please refer to <http://h18006.www1.hp.com/storage/index.html> for more information.

HP Services and Support	1 Year Next Day HW	HA101A1-7GT
	1 Year 4h 13x5 HW	HA103A1-7GT
	1 Year 4h 24x7 HW	HA104A1-7GT
	1 Year 6h CTR HW	HA105A1-7GT
	1 Year Support Plus	HA109A1-7GT
	1 Year Support Plus 24	HA110A1-7GT
	3 Year Next Day HW	HA101A3-7GT
	3 Year 4h 13x5 HW	HA103A3-7GT
	3 Year 4h 24x7 HW	HA104A3-7GT
	3 Year 6h CTR HW	HA105A3-7GT
	3 Year Support Plus	HA109A3-7GT
	3 Year Support Plus 24	HA110A3-7GT
	Installation	HA113A1-564
	3 Year NBD 9x5 (Electronic)	U8128E
	3 Year 4H 13x5 (Electronic)	U8129E
3 Year 4H 24x7 (Electronic)	U8130E	
3 Year 6H CTR (Electronic)	U8131E	

Options

1 Year NBD 9x5 (Electronic)	U8151E
1 Year 4H 13x5 (Electronic)	U8152E
1 Year 4H 24x7 (Electronic)	U8153E
1 Year 6H CTR (Electronic)	U8154E
Installation (Electronic)	U8132E

NOTE: For additional HP Care Pack (hardware & software) information, as well as orderable part numbers, please refer to the URL <http://www.hp.com/hps/carepack>

Technical Specifications

HP StorageWorks Modular Smart Array 50 Enclosure	Shipping Dimensions (HxWxD)	12 x 23.5 x 33 in (30.24 x 59.22 x 83.16 cm)
	Weight (unloaded)	20 lb (9.07 kg)
	Weight (loaded)	30 lb (13.61 kg)
Redundant Power Supply, 180 watts	Shipping Dimensions (HxWxD)	12.75 x 8 x 3.75 in (32.13 x 20.16 x 9.45 cm)
Protocol Support	3Gb/s SAS	
	1.5Gb/s SATA	
O/S Support	Defined by specific HP array controller or SAS/SATA adapter used; please refer to the QuickSpecs and/or User Guide of the specific array controller or adapter	
Buttons/LED Indicators (on front right panel-listed top to bottom)	UID Button (top)	
	System Field Replaceable Unit (FRU) LED	
	EMU Status LED	
	Fault LED (bottom)	
Drive LED Indicators (on drive trays)	Drive LED (top) - On-line/Activity	
	Drive Failure LED (bottom) - Drive Fault/Locate	
Enclosure Button/ LED Indicators (back of unit)	UID Button (top)	
	System FRU (middle)	
	EMU Status LED (bottom)	
Input Requirements	Nominal Line Voltage	110 to 240 V AC
	Range Line Voltage	90 to 264 V AC
	Line Frequency	47 to 63 Hz
	Typical Input Current	2.3A at 120 V AC
Relative Humidity (non-condensing)	Operating	10% to 90%
	Shipping	5% to 90%
I/O Module Connector	SAS SFF 8470 Connector	
Power	180 Watts per supply (load)	
Temperature Range	Operating	50° to 94° F (10° to 35° C°)
	Shipping	-40° to 151° F (-40° to 66° C)

NOTE: To maintain proper cooling and airflow, a drive blank or drive must occupy all bays during operation.

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

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