*Overview*
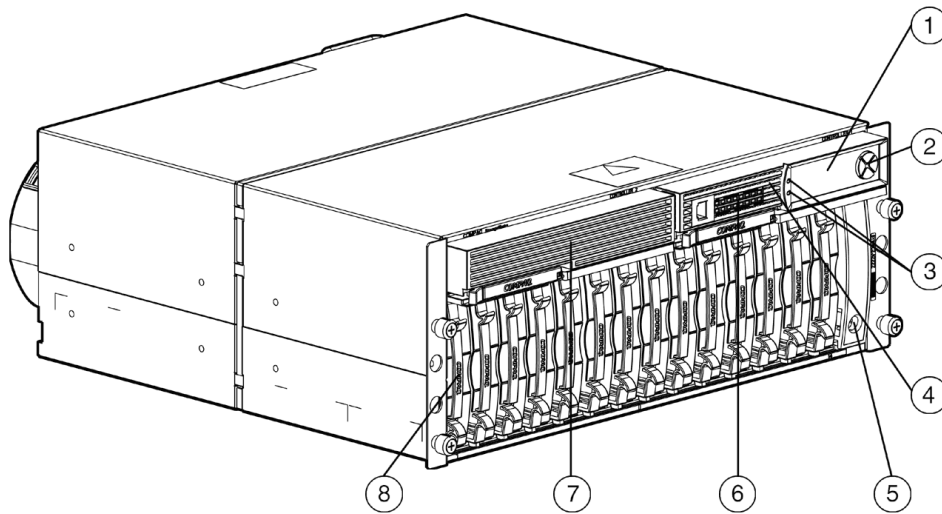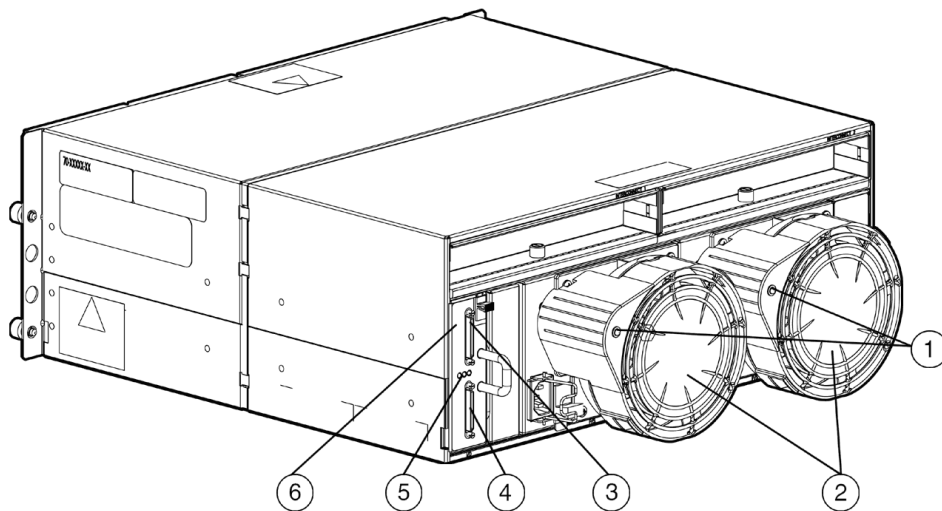
1. Display
2. Display Buttons
3. Display Indicators
4. Modular Smart Array Controller

5. Power Switch
6. Status Indicators
7. Redundant Controller Slot Blank
8. Drive Bay(s)

1. Power Supply/Blower Indicators
2. Power Supply/Blower Assemblies
3. SCSI Port A

4. SCSI Port B
5. SCSI I/O Indicators
6. SCSI I/O with Integrated Environmental Monitoring Unit (EMU)

# QuickSpecs

## *Overview*

## What's New

- New name, formerly named Modular Smart Array 500
- MSA500 Starter Kit with 2 host adapters included
- MSA500 High Availability Kit includes everything needed to make MSA500 system fully redundant at a new low price
- Microsoft® Windows® Server 2003 Support
- UnitedLinux 1.0 Support
- Novell NetWare 6.5 Support
- Storage sharing with up to 4 direct attached servers

## At A Glance

- Two node high availability clustering
- Shared storage for up to 4 ProLiant servers
- Redundant capable Smart Array Controllers with LCD screen to show system status messaging.
- Total storage capacity of 2TB, by using 14 HP Universal U320 Hard Disks of 146.8 GB each
- Multipath connectivity option with load balancing
- Redundant Power Supplies and Fans standard
- Fully convertible to HP StorageWorks Modular Smart Array 1000
- RAID 0, 1, 1+0, 5 and ADG standard
- Supports up to 512 MB of Battery Backed Cache (2x256 MB).
- Pre-Failure Warranty that covers disk drives

## *Standard Features*

**Modular Smart Array Family**

The HP StorageWorks Modular Smart Array family delivers easy, affordable storage technology to meet today's demanding and growing IT needs. These storage solutions offer the best price/performance features for direct attach environments, small clusters, workgroup sharing and entry-level SAN environments. Each solution is designed to be easy to deploy, secure, reduce management costs, while driving rapid return on investment.

**Modular Smart Array 500**

The HP StorageWorks Modular Smart Array 500 (MSA 500), formerly named Modular Smart Array 500, is an Ultra3 SCSI (supporting Ultra320 hard drives) storage system, supporting up to 2TB of data capacity, designed specifically for 2-node clustering and multiple node (up to 4 servers) shared storage. Designed to reduce the complexity and expense of clustering and storage sharing, the Modular Smart Array 500 is built upon Smart Array and ProLiant technologies to provide advanced data protection features yet is simple to deploy, configure and manage. Ideal for entry level clustering and shared storage, the Modular Smart Array 500 is familiar SCSI technology, making it a simple and powerful storage platform. As the customer's clustering and storage requirements grow, the Modular Smart Array 500 may be converted to a SAN array by replacing the controller(s) and I/O module and installing a MSA 1000 FC I/O module, or MSA 1000 FC switch, providing the customer with extended hardware investment protection into the future.
The Modular Smart Array 500 combines the array controller shelf and the drive shelf, which holds up to fourteen 1 HP Universal Disk drives in a single 4U rack mount cabinet, that's over 2 terabytes of storage.

## Key Features

- High performance Modular Smart Array controller(s) with LCD for system status messages.
- Standard 128-MB Battery Backed Cache, upgradeable to 512 MB maximum.
- Optional redundant Modular Smart Array controller.
- 4U rack mount chassis combining both the controller and disk shelf.
- Ultra3 SCSI back panel and drive interconnect.
- SSP (Selective Storage Presentation) for storage sharing with multiple servers.
- 2TB capacities with support of 14 Ultra320, Ultra3 and Ultra2 Universal 1 Drives.
- Redundant power supplies and fans are standard.
- RAID levels 0, 1, 1 0, 5, RAID ADG.
- Optional 4-Port Shared Storage Module with Smart Array Multipath software with load balancing.
- Optional ProLiant Essentials Recovery Server Option
- Convertible to MSA 1000 for capacity expansion and increased host connections
- Remote configuration and monitoring via ACU & Insight Manager 7.
- Qualified and certified for Windows, Linux and NetWare 2-node clustering
- Support for select ProLiant servers (see Server Compatibility on page 14 or http://www.hp.com/go/msa for latest compatibility).

# QuickSpecs

*Product Highlights*

## Modular Smart Array 500 Highlights

**High Levels of Performance, Data Protection and Functionality**

- **High Availability** – supports a broad range of clustering options for Microsoft Windows Server, Linux Server and Novell NetWare environments.
- **High Performance** – Data transmission rate of 14,000 IOPS – 2 Node cluster configuration using Smart Array 5i Plus embedded controller in the ProLiant servers.
- **Storage Capacity** – The Modular Smart Array 500 cabinet supports up to fourteen 1" Universal hard drives, for a maximum of 2TB of shared storage capacity using HP 146.8 Ultra320 SCSI Universal 1" hard drives.
- **Data Protection** – Modular Smart Array 500 is designed for a high level of data protection. It includes redundant controllers (optional), redundant fans and power supplies (standard); multiple I/O path capability with Smart Array Multipath software option, support for Hot Pluggable AIT and DAT tape drives in the storage enclosure, transportable battery-backed cache and RAID ADG (standard).
- **Storage Manageability** – The Smart Array Controllers feature familiar configuration and management tools such as Smart Array Configuration Utility and Insight Manager. Online Management Features: Online Capacity Expansion (single path only), Online RAID Level Migration, Online Stripe Size Migration, Online Spares (Global), User Selectable Read/Write cache, User Selectable Expand and Rebuild Priority.
- **Choice of Computing Platform** – The Modular Smart Array 500 is designed and qualified for ProLiant servers.
- **Advanced Data Guarding (RAID ADG) Fault Tolerance** – This is the highest level of RAID 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 (DAS to SAN) Technology**

The Smart Array architecture provides a quick and easy way to migrate from the Modular Smart Array 500 to the Modular Storage Array 1000 (MSA 1000).

In order to convert the Modular Smart Array 500 to a SAN, simply remove the Modular Smart Array Controller(s) and replace them with StorageWorks MSA 1000 Controller(s) and add FC I/O board or FC Switch (please refer to MSA 1000 QuickSpecs for additional SAN requirements information). This is referred to as DtS technology (DAS-to-SAN technology). In addition to convertibility to the SAN, the Modular Smart Array 500 allows the seamless migration of stored data in ProLiant servers protected by Smart Array PCI controllers to a Modular Smart Array 500 system. Data that is currently stored on 1" Universal disk drives using HP Smart Array controllers, as well as data on an RA4100 can easily be migrated to the Modular Smart Array 500. Simply remove the drives from the older systems and insert them into the Modular Smart Array 500. Existing data and configuration will remain intact. In addition, the RAID set and data will be preserved allowing migration to be completed in minutes, not hours.

**Low Total Cost of Ownership**

The modular, scalable design of the Modular Smart Array 500 provides an extremely flexible platform. You can buy what you need today and purchase additional capacity and performance as your data storage needs grow, instead of making a large up-front investment. Additional drives, controllers, and cache can be easily added as your needs dictate.

- **Storage Consolidation** – Improve storage utilization and lower storage management cost through moving internal storage to the Modular Smart Array 500.
- **Universal Hard Drive** – Since the Modular Smart Array 500 supports Universal 1" SCSI drives, your investment in disk drives is protected and cost is minimized as you add new drives. Sharing of a common universal drive form factor between your server and storage can significantly reduce needs for hardware and spare inventory, and offer overall reduction in storage management and business costs.
- **Pre-Failure Warranty** – Drives installed in a Modular Smart Array 500 and monitored under Insight Manager are supported by a Pre-Failure (replacement) Warranty. Pre-Failure Warranty allows for the replacement of designated drives in Modular Smart Array 500 before they actually fail when using Insight Manager on ProLiant servers. NOTE: Some operating systems may not support all of these features.
- **Integrated Configuration and Management Tools** – The Modular Smart Array 500 utilizes the standard, integrated set of Smart Array management and utility software. These tools consistently lower the cost of ownership by reducing training and technical expertise necessary to install and maintain HP server storage.

**Modular Smart Array 500**

The 4U array houses up to fourteen 1" Universal hot pluggable Ultra320, Ultra3 and/or Ultra2 drives. Each Modular Smart Array 500 includes the following standard components: Modular Smart Array 500 Controller, 2-port Ultra3 SCSI I/O Module, dual hot pluggable fans/power supplies, two power cables, two VHDCI SCSI cables and a crossover Ethernet cable.

# QuickSpecs

## *Modular Smart Array 500 Components*

**Modular Smart Array 500 Controller**

The Modular Smart Array 500 Controller is an integrated RAID controller with an integrated LCD/LED status display and 128-MB read/write battery-backed cache (expandable to 512MB per controller). One Modular Smart Array 500 Controller is included with the Modular Smart Array 500; the redundant Modular Smart Array 500 Controller is an option.

**4-Port Shared Storage Module with Smart Array Multipath**

The 4-Port Shared Storage Module is an option which may be used in one of two configurations:

- Enhance cluster fault tolerance by adding multiple paths from the host servers to the shared storage. This provides an additional level of fault tolerance by adding redundancy to both the HBA in the host server as well as the SCSI cables connecting the host servers to the shared storage.
- Attach up to four independent servers to the Modular Smart Array 500. The storage capacity to each server is assigned with SSP (Shared Storage Presentation), a feature of the Array Configuration Utility. Using SSP and sharing storage among multiple host servers maximizes hard drive capacity utilization, and allows for additional hard drive capacity to be deployed (up to 14) with the volume extension and capacity expansion capabilities.

**Modular Smart Array 500 Controller Management Features**

- Online RAID Level Migration: allows for online post-configuration change to RAID level without destroying data or volume information.
- Online Capacity Expansion: allows for adding storage to an operational Modular Smart Array 500-reducing expensive server downtime (single path configuration only).
- Online Volume Extension: allows for the capacity growth of existing logical volumes (single path configuration only).
- Logical Drive Capacity Extension: allows the user to increase the size of existing logical drives online under Windows NT® and offline for other operating systems.
- Online Stripe Size Migration: Allows changing stripe sizing of a logical drive.
- User Selectable Read/Write Cache size, allocate cache sizes.
- User Selectable Expand and Rebuild Priority.

**Controller Firmware Cloning**

Enhanced Controller Firmware Auto-Cloning allows customer choice of controller firmware version when adding redundant controller with different firmware version.

**Multi Host Storage Sharing**

Selective Storage Presentation (SSP) support standard on both the base 2-port model of Modular Smart Array 500 as well as the optional 4-port Shared Storage Module. SSP allows the administrator to create volumes and assign access rights to a particular host server. This allows sharing the Modular Smart Array 500 with up to 4 host servers maximizing storage capacity utilization. SSP also allows online capacity expansion as well as online volume extension in DAS configurations.

**RAID**

Several fault tolerant configurations keep data available and servers running while drives are being replaced, including:

- Advanced Data Guarding (RAID ADG): Allocates the equivalence of 2 parity drives across multiple drives and allows simultaneous write operations.
- Distributed Data Guarding (RAID 5): Allocates parity data across multiple drives and allows simultaneous write operations.
- Drive Mirroring (RAID 1 and 1+0 Striped Mirroring): Allocates half of the drive array to data and the other half to mirrored data, providing two copies of every file.

# QuickSpecs

## Modular Smart Array 500 Components

| | | |
|---|---|---|
| **Modular Smart Array 500 Controller** | **Controller Cache Upgrade** | • Cache on the Modular Smart Array 500 Controller may be upgraded to a maximum of 512 MB. |

> **NOTE:** The Modular Smart Array 500 Controller allows the following cache configurations: 1 x 128 MB; 2 x 128 MB; 1 x 256 MB; 2 x 256 MB
> **NOTE:** When redundant controllers are installed, the cache configurations in both controllers must be identical.

**Fault Recovery**

- Minimizes downtime, reconstructs data, and facilitates a quick recovery from drive failure.
- On-Line Spares: If a failure occurs, recovery begins with an on-line spare and data is reconstructed automatically. One on-line spare can be assigned per array and used across multiple arrays. It is also possible to assign different on-line spares across different arrays.
- Array Accelerator: Onboard, battery-backed cache memory protects data in the event of a power failure. In the unlikely event of a controller failure, the battery-backed cache will save critical user data for up to three days.

**SCSI I/O Module**

The I/O module on the Modular Smart Array includes an integrated Environmental Monitoring Unit which performs several functions including monitoring the enclosure functions, providing I/O connectors and signaling enclosure status. Modular Smart Array 500 ships standard with a 2-Port I/O Module.
The 4-Port Shared Storage Module with Smart Array Multipath is available as an option.
The 4-Port Shared Storage Module may be deployed as follows:

- As the shared storage component with up to four servers in a DAS (Direct Attached Storage) configuration.
- Multiple I/O paths to a two node cluster or two direct attached servers.

# QuickSpecs

## Software Components

The Modular Smart Array 500 utilizes a single, consistent set of utility software for storage and RAID management, setup, configuration and troubleshooting. This consistency reduces the cost of ownership by reducing the training and technical expertise necessary to install and maintain your HP server storage solution.

**Configuration Utilities**  Array Configuration Utility (ACU) [On-line for Microsoft and Linux, Remote Web-Based & Off-line]
Option ROM Configuration for Arrays (ORCA)

**Management/Health Utilities**  Insight Manager 7

**Array Configuration Utility** (ACU)
- Provides a graphical view of HP drive array configurations.
- Easy to use Wizards for configuration.
- Web Based ACU supports On-Line, Remote Web Based and Off-line configuration.
- Supports on-line configuration for Microsoft and Linux.
- Configures Selective Storage Presentation (SSP).

**Insight Manager 7**
- Powerful storage, server and server option management tool.
- Monitor storage from a remote central location.
- Browser based Insight Manager 7 provides full access from anywhere on the Intranet, eliminating the need for a dedicated Insight Manager console.

**Supported Operating Systems**
- Microsoft Windows Server 2003 Web Edition
- Microsoft Windows Server 2003 Standard Edition
- Microsoft Windows Server 2003 Enterprise Edition
- Microsoft Windows 2000 Server
- Microsoft Windows 2000 Advanced Server
- Microsoft Windows NT EE 4.0
- Novell NetWare 5.1
- Novell NetWare 6.0
- Novell NetWare 6.5
- Red Hat Linux 7.2, 7.3, 8.0
- Red Hat Enterprise Linux 2.1
- Red Hat Linux Advanced Server 2.1
- UnitedLinux 1.0 (including SuSE Linux Enterprise Server 8)
- SuSE Linux Enterprise Server 7 (SLES 7)
- SCO OpenServer 5.0.5 and SCO OpenServer 5.0.6a

UnitedLinux = Conectiva Linux Enterprise Edition, SCO Linux 4.0, SuSE Linux Enterprise 8 and TurboLinux 8 all powered by UnitedLinux 1.0
Not all configurations are supported on all operating systems; please refer to compatibility matrix
http://www.hp.com/products/sharedstorage for latest compatibility information.

## Software Components

| Supported Clustering Solutions | |
|---|---|

**Supported Clustering Solutions**

- Microsoft Cluster Service for Microsoft Windows Server 2003 Enterprise Edition
- Microsoft Cluster Service for Microsoft Windows 2000 Advanced Server
- Microsoft Cluster Service for Microsoft Windows NT EE 4.0
- Novell Cluster Services on Novell NetWare 5.1
- Novell Cluster Services on Novell NetWare 6.0
- Novell Cluster Services on Novell NetWare 6.5
- HP Serviceguard for Linux on Red Hat Linux 7.3, Red Hat Enterprise Linux 2.1, UnitedLinux 1.0 (including SuSE Linux Enterprise Server 8)
- SteelEye's LifeKeeper for Linux on Red Hat Linux 7.2, 7.3, 8.0, Red Hat Enterprise Linux 2.1, Red Hat Linux Advanced Server 2.1, UnitedLinux 1.0 (including SuSE Linux Enterprise Server 8), and SuSE Linux Enterprise Server 7 (SLES 7)

UnitedLinux = Conectiva Linux Enterprise Edition, SCO Linux 4.0, SuSE Linux Enterprise 8 and TurboLinux 8 all powered by UnitedLinux 1.0
Please refer to the HP High Availability Web site http://www.compaq.com/solutions/enterprise/highavailability for latest information.

**Smart Array Multipath Software** (Optional)

Enhance cluster fault tolerance by adding dual paths from the host servers to the shared storage. This provides an additional level of fault tolerance by adding redundancy and performance to both the HBA in the host server as well as the SCSI cables connecting the host servers to the shared storage. Smart Array Multipath software delivers dual path functionality and supports failover capabilities for redundant host bus adapters (HBAs) in a server with redundant cabling to a Modular Smart Array 500. This fault-tolerance tool enhances availability of clustering and direct attached storage (DAS) solutions with up to two servers managing up to 2 TB of stored data.
When an HBA failure occurs, the software moves the logical drives from the path of the failed HBA to the path of the redundant HBA located in the same server.

- Increase availability by protecting against connectivity (HBA) and cable failures and accidental pull-outs.
- Ships with 4-Port Shared Storage Module
- Increase performance with Static LUN Balancing (Microsoft OS) enables the administrator to optimize I/O by assigning specific volumes to specific paths in the storage system. If one path fails the system moves volumes to the path for redundant HBA for I/O management.
- Increase performance with Static Load (read-only) Balancing (Linux OS) enables the HBAs to optimize I/O with dual paths to the same volumes in the storage system. If one HBA fails the system moves volumes to the path for the redundant HBA for I/O management.
- Supported Operating Systems: Windows Server 2003 Standard Edition, Windows Server 2003 Enterprise Edition; Windows 2000 Server; Windows 2000 Advanced Server; Red Hat Enterprise Linux 2.1, Red Hat Linux Advanced Server 2.1, UnitedLinux 1.0 (including SuSE Linux Enterprise Server 8), SLES 7.

**Warranty**

Three-year labor, parts, on-site (3/3/3) Limited Warranty for Modular Smart Array 500.

# QuickSpecs

## Service and Support, HP Care Pack, and Warranty Information

**Software Product Services**
- Stand-alone 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 URLs listed below:
http://h18005.www1.hp.com/services/carepaq/us/install/
http://h18005.www1.hp.com/services/carepaq/us/hardware/

**Warranty Upgrade Options**
- Response – Upgrade on-site response from next business day to same day 4-hours
- Coverage – Extend hours of coverage from 5 days x 9 hours to 7 days x 24 hours
- Duration – Three-year, on-site Limited Warranty for Modular Smart Array 500, expandable to five years

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 listed below:
http://h18005.www1.hp.com/services/carepaq/index.html

| HP Care Pack Description (U.S. Only) | | |
|---|---|---|
| 9x5, 4-Hour Response, On-Site Coverage, 3 years | 402165-002 |
| 24x7, 4-Hour Response, On-Site Coverage, 3 years | 402164-002 |
| Hardware Installation | 402162-002 |

| HP Care Pack Description (EMEA Only) | | |
|---|---|---|
| 9x5, 4-Hour Response, On-Site Coverage, 3 years | 160875-022 |
| 24x7, 4-Hour Response, On-Site Coverage, 3 years | 160883-022 |

| HP Care Pack Description (Canada Only) | | |
|---|---|---|
| 9x5, 4-Hour Response, On-Site Coverage, 3 years | FP-FC4HR-36 |
| 24x7, 4-Hour Response, On-Site Coverage, 3 years | FP-FC724-36 |
| Hardware Installation (on site) | FP-FCINS-IN |

# QuickSpecs

## Configuration Information

### Step 1: Order Required Items

**Models**

| | |
|---|---|
| HP Modular Smart Array 500 Starter Kit (includes MSA 500 and 2 SA-532 Adapters) | 351504-B21 |
| HP Modular Smart Array 500 | 201724-B21 |

**Package Contents**

4U Modular Smart Array 500

Modular Smart Array 500 Controller with 128 MB cache

2-port SCSI I/O Module

Redundant Hot Pluggable Power Supply/blower assemblies

Modular Smart Array 500 Rack Mounting Kit

Modular Smart Array 500 Support Software or Smart Start

Power cables (2)

VHDCI SCSI cables 6' each (2)

Crossover Ethernet cable for clustering

User Manual

Smart Array 532 Adapters (2) – Included in "MSA500 Starter Kit Only"

### Step 2: Choose Modular Smart Array 500 System Options

**Options**

| | |
|---|---|
| Modular Smart Array 500 High Availability Kit (includes MSA500 controller, 4-port IO Module, Smart Array Multipath Software and 2 SA-532 Adapters) | 351281-B21 |
| Modular Smart Array 500 Controller | 218252-B21 |
| 4-Port Shared Storage Module with Smart Array Multipath Software | 292944-B21 |
| 128MB Battery Backed Cache Module | 153506-B21 |
| 256MB Battery Backed Cache Module | 254786-B21 |
| M-Series Rack Rail Kit Option | 313877-B21 |

NOTE: The Modular Smart Array 500 Controller allows the following cache configurations:
1 x 128 MB; 2 x 128 MB; 1 x 256 MB; 2 x 256 MB.
NOTE: When redundant controllers are installed, the cache configurations in both controllers must be identical.

*Configuration Information*

## Step 3: Choose ProLiant Server(s)

| Server Compatibility | |
|---|---|
| | ML330 G2 (Direct Attached and RSO configurations only) |
| | ML330 G3 (Direct Attached and RSO configurations only) |
| | ML350 G2 (Direct Attached and RSO configurations only) |
| | ML350 G3 (Clustering, Direct Attached and RSO configurations) |
| | ML370 G2 (Clustering, Direct Attached and RSO configurations) |
| | ML370 G3 (Clustering, Direct Attached and RSO configurations) |
| | DL360 G2 (Clustering, Direct Attached and RSO configurations) |
| | DL360 G3 (Clustering, Direct Attached and RSO configurations) |
| | DL380 G2 (Clustering, Direct Attached and RSO configurations) |
| | DL380 G3 (Clustering, Direct Attached and RSO configurations) |
| | DL560 (Clustering, Direct Attached and RSO configurations) |
| | DL580 (Clustering, Direct Attached and RSO configurations) |
| | DL580 G2 (Clustering, Direct Attached and RSO configurations) |
| | DL740 (Clustering and Direct Attached configurations) |
| | DL760 (Clustering and Direct Attached configurations) |
| | DL760 G2 (Clustering and Direct Attached configurations) |

## Step 4: Choose Host Connectivity (Skip If Purchased MSA500 Starter Kit)

NOTE: Some of the options listed below may be discontinued

| **Required for ML330 G2, ML350 G2, ML350 G3, ML370 G3, DL360 G2, DL360 G3, DL580, DL580 G2, DL760** | Smart Array 532 Controller Option Kit | 225338-B21 |
|---|---|---|
| | Smart Array 532 Controller Option Kit (Japan) | 225338-291 |

| **Required for ML370 G2** | Smart Array 532 Controller | 225338-B21 |
|---|---|---|
| | Smart Array 532 Controller (Japan) | 225338-291 |
| | Smart Array 5i Controller Option Kit | 226593-B21 |
| | Smart Array 5i Controller Option Kit (Japan) | 226593-291 |
| | NOTE: Either one Smart Array 532 Controller or one Smart Array 5i or Smart 5i Plus Controller Option Kit is required. | |

| **Optional for DL380 G2** | Smart Array 532 Controller Option Kit | 225338-B21 |
|---|---|---|
| | Smart Array 532 Controller Option Kit (Japan) | 225338-291 |
| | NOTE: The Smart Array 5i controller is included with the ProLiant DL380 G2. **No additional adapter required unless implementing Smart Array Multipath technology** | |

| **Optional for DL380 G3** | Smart Array 532 Controller Option Kit | 225338-B21 |
|---|---|---|
| | Smart Array 532 Controller Option Kit (Japan) | 225338-291 |
| | NOTE: The Smart Array 5i Plus controller is included with the ProLiant DL380 G3. No additional adapter required unless implementing Smart Array Multipath technology | |

## Step 5: Choose Configuration Options

# QuickSpecs

## Configuration Information

| High Availability Software | ProLiant Essentials Recovery Server Option (RSO) | 280189-B21 |
|---|---|---|
| | HP Serviceguard for Linux ProLiant Cluster | 305199-B24 |
| | HP Serviceguard for Linux License | 307754-B24 |

NOTE: Above options not required for Microsoft clustering, Novell clustering or non-clustered shared storage configurations

## Step 6: Choose Hard Drives

| Pluggable, Universal Hard Drives | 72.8-GB 10,000 rpm, U320 Universal Hard Drive (1") | 286714-B22 |
|---|---|---|
| | 146.8-GB 10,000 rpm, U320 Universal Hard Drive (1") | 286716-B22 |
| | 300-GB 10,000 rpm U320 Universal Hard Drive (1") | 350964-B22 |
| | 36.4-GB 15,000 rpm, U320 Universal Hard Drive (1") | 286776-B22 |
| | 146.8-GB 10,000 rpm U320 Universal Hard Drive (1") | 347708-B22 |
| | 72.8-GB 15,000 rpm, U320 Universal Hard Drive (1") | 286778-B22 |

NOTE: All U320 Universal Hard Drives are backward compatible to U2 or U3 speeds. U320 drives require an optional U320 Smart Array Controller or U320 SCSI HBA to support U320 transfer rates.

NOTE: For complete compatibility information, refer to the HP SCSI Hard Drive Compatibility table located at http://www.compaq.com/products//hdd/hotplug.html

## Step 7: Choose Rack Option

| HP Rack 5000 Series | HP 5642 RACK - UNASSEMBLED | 358254-B21 |
|---|---|---|
| HP Options for Rack 5000 Series | Stabilizer Kit for 5642 rack (Graphite Carbon)<br>NOTE: The stabilizing kit is used to prevent rack from tipping over. | 374493-B21 |
| | Baying Kit for 5642 rack (Graphite Carbon)<br>NOTE: The baying kit is used to join two or more HP 5642 racks. | 374499-B21 |
| HP Rack 10000 Series (Graphite Metallic) | Rack, HP Infrastructure 42U (HV) | 379005-001 |
| | Rack, HP Infrastructure 42U (LV) | 379006-001 |
| | HP Rack S10614 (14U) Rack Cabinet - Shock Pallet | 292302-B22 |
| | HP Rack 10842 (42U, 800mm wide) - Pallet | 257415-B21 |
| | HP Rack 10842 (42U, 800mm wide) - Shock Pallet | 257415-B22 |
| | HP Rack 10647 (47U) - Pallet | 245160-B21 |
| | HP Rack 10647 (47U) - Crated | 245160-B23 |
| | HP Rack 10642 (42U) - Pallet | 245161-B21 |
| | HP Rack 10642 (42U) - Shock Pallet | 245161-B22 |
| | HP Rack 10642 (42U) - Crated | 245161-B23 |
| | HP Rack 10636 (36U) - Pallet | 245162-B21 |
| | HP Rack 10636 (36U) - Shock Pallet | 245162-B22 |
| | HP Rack 10636 (36U) - Crated | 245162-B23 |
| | HP Rack 10622 (22U) - Pallet | 245163-B21 |
| | HP Rack 10622 (22U) - Shock Pallet | 245163-B22 |
| | HP Rack 10622 (22U) - Crated | 245163-B23 |

NOTE: -B21 (pallet) used to ship empty racks shipped on a truck
-B22 (shock pallet) used to ship racks with equipment installed (by custom systems, VARs and Channels)
-B23 (crated) used for air shipments of empty racks.

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

# QuickSpecs

*Configuration Information*

## Step 8: Expansion Options

**SAN Conversion Options**

| | |
|---|---|
| Modular Smart Array 1000 Controller | 218231-B22 |
| MSA Fibre Channel I/O Module | 218960-B21 |
| MSA SAN Switch 2/8 (Integrated) | 288247-B21 |
| FAC2214 Host Adapter (Microsoft/Linux) | 281541-B21 |
| 2Gb/s SFP SW Transceiver Kit | 221470-B21 |
| Modular Smart Array 30 Single Bus (rack-mountable) | 302969-B21 |

NOTE: The MSA 1000 controller and the MSA 1000 Fibre Channel I/O module (or the MSA SAN Switch 2/8) are required for conversion. To obtain conversion procedure document go to http://www.hp.com/go/msa500 and download "Converting Modular Smart Array 500 to a Modular Smart Array 1000 for Additional Scalability document.

# QuickSpecs

*Technical Specifications*

## Modular Smart Array 500 Controller

| | | |
|---|---|---|
| **LED Indicators on Front** (3) | Power | |
| | Fault detected in one or more sub-systems | |
| | Fault in Enclosure Management | |
| **LED Indicators for Drive Modules** (3) | Drive Access (center) | |
| | Online (left) | |
| | Drive Failure (right) | |
| **LED Indicators on Rear Panel** (4) | Power Supply/Blower Assembly Fault (1) | |
| | EMU (3): Power; A bus; B bus | |
| **Interface** | Ultra3 SCSI to Hard Drives | |
| | Ultra3 SCSI to Host Servers | |
| **Maximum Number of Drives** | 14, 1-in Ultra320, Ultra3 or Ultra2 Universal Hard Drives (Modular Smart Array 500 cabinet) | |
| **Temperature Range** | **Operating** | 50° to 95° F (10° to 35° C) |
| | **Shipping** | -2° to 122° F (-0° to 50° C)<br>**NOTE:** Rated 1°C per 1000 feet of elevation to 10000 ft. |
| **Relative Humidity** | **Operating** | 10% to 90% |
| | **Non-operating** | Up to 95% |
| **Input Power Requirements** | **Rated Input Voltage** | 100 to 240 VAC |
| | **Rated Input Frequency** | 50 to 60 Hz |
| | **Rated Input Current** | 2.3 A at12 VAC typical, 6A Maximum |
| | **Input Power** (max) | 549 W* |
| **Heat Dissipation** (maximum) | 1876 Btu/hr* | |
| | *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. | |
| **2-Port SCSI I/O Module** | **Ports** | 2 VHDCI Ultra3 SCSI ports |
| | **Dimensions** | 4.5 x 1.375 x 9.5 in (11.4 x 3.5 x 24.1 cm) |
| | **Weight** | 1.3 lb (0.6 Kg) |
| **Modular Smart Array 500 Cabinet** | 4U Rack Form Factor | |
| | **Dimensions** (H x W x D) | 6.9 x 19 x 20.5 in (17.5 x 48.3 x 52.1 cm) |
| | **Weight** (Net) | 50 lb (22.5 kg) |
| **Shipping Packaging** | **Dimensions** (L x W x D) | 33.7 x 14.8 x 33.8 in (85.6 x 37.5 x 85.9 cm) |
| | **Weight** (Gross) | 70 to 105 lb (31.5 kg) |

# QuickSpecs

*Technical Specifications*

## Modular Smart Array 500 Controller

| | |
|---|---|
| **User Interface** | Controller Display with Status Indicators (2) and Push Buttons (4)<br>Status Indicators on front of Controller (16) |
| **Electrical Interface** | LVD (Low Voltage Differential) |
| **Protocol Support** | Wide Ultra3 SCSI (160 MB/s per channel) |
| **SCSI Ports** | 2 external VHDCI connectors standard. Optional 4-Port Shared Storage Module with 4 VHDCI connectors. |
| **Drives Supported** | Up to 14 drives |
| **Maximum Capacity** | 2.0 TB (14 drives x 146.8GB) |
| **Logical Drives** | Up to 32 logical drives |
| **RAID Support** | RAID ADG (Advanced Data Guarding)<br>RAID 5 (Distributed Data Guarding)<br>RAID 1+0 (Striping & Mirroring)<br>RAID 1 (Mirroring)<br>RAID 0 (Striping) |
| **Cache Memory** | Standard 128 MB Read/Write Cache<br>Up to 512 MB Read/Write<br>ECC protection, battery-backed, and removable<br>NOTE: The Modular Smart Array Controller allows the following cache configurations:<br>1 x 128 MB; 2 x 128 MB; 1 x 256 MB; 2 x 256 MB.<br>NOTE: When redundant controllers are installed, the cache configurations in both controllers must be identical. |
| **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** | Ulltra320, Ultra3 and Ultra2 SCSI 1-inch Universal drives |
| **Packaging** | **Dimensions** (L x W x D)  14.5 x 11.5 x 3.1 in (36.8 x 29.2 x 8 cm)<br>**Weight** (Gross)  6 lb (2.72 kg) |

## 4-port Shared Storage I/O Module (option)

| | |
|---|---|
| **Connector Type** | VHDCI Ultra3 SCSI |
| **Ports** | 4 Ultra3 SCSI |
| **Bandwidth** | 160 MB/s per port |
| **Protocols/HBA Supported** | Ultra320, Ultra3 and Ultra2 SCSI/Smart Array 532, Smart Array 5i adapters |
| **Packaging** | **Dimensions** (L x W x D)  14.5 x 11.5 x 3.1 in (36.8 x 29.2 x 8 cm)<br>**Weight** (Gross)  6 lb (2.72 kg) |

## MSA500 High Availability Kit (option)

| | |
|---|---|
| **Contents** | MSA500 Controller, 4-port Shared Storage I/O Module, 2 6ft. SCSI Cables, 2 SA-532 Adapters, and Smart Array Multipath Software 2.0 |
| **Packaging** | **Dimensions** (L x W x D)  22.6 x 18.6 x 12.4 in (57.5 x 47.3 x 31.4 cm)<br>**Weight** (Gross)  14.2 lb (6.5 kg) |

*Technical Specifications*