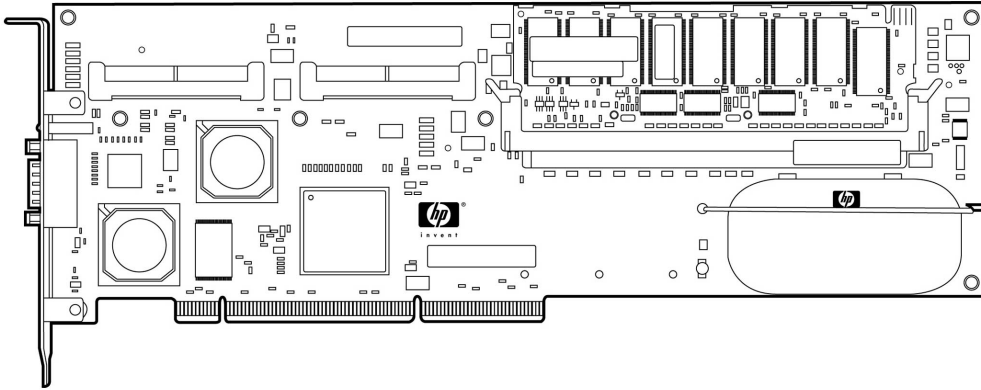


### Overview

The HP Smart Array P600 serial attached SCSI (SAS) controller provides new levels of performance and reliability for HP servers, through its support of 3Gb/s SAS technology and advanced RAID capabilities. The SA-P600 raises the standards of performance offering twice the bandwidth of a 4-channel U320 array controller.



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### Models

HP Smart Array P600	HP Smart Array P600/256 BBWC Controller	337972-B21
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### Upgrade Options

Cache Upgrade	512 MB Battery-Backed Cache Upgrade	372538-B21
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### Standard Features

**NOTE:** For a brief, printer friendly data sheet that describes this product and informs you of the essential capabilities and specifications, please visit: <http://h71028.www7.hp.com/ERC/downloads/4AA0-0705ENW.pdf>.

#### The Smart Array Advantage

HP's innovative design and integration work of the Smart Array family of products creates customer value that is unmatched in the industry. Use of Smart Array products across multiple applications results in a much lower Total Cost of Ownership (TCO) than any other server storage RAID product. The HP Smart Array family brings an unparalleled return on investment through:

**Data Compatibility** among all models of Smart Array controllers allows simple and easy upgrades any time needs for higher performance, capacity, and availability increase. Even successive generations of Smart Array controllers understand the data format of other Smart Array Controllers.

**Consistent Configuration and Management Tools.** All Smart Array products utilize a standard set of management and utility software. These tools minimize Total Cost of Ownership (TCO) by reducing training requirements and technical expertise necessary to install and maintain the HP server storage.

**Universal Hard Drive** form factor is for use across multiple HP servers, disk enclosures and storage systems. With compatibility across many enterprise platforms, you are free to deploy and re-deploy these drives to quickly deliver increased storage capacity, migrate data between systems, and easily manage spare drives.

**Pre-Failure Warranty** means HP Insight Manager not only reports when a drive is going to fail but allows replacement of failing drives prior to actual failure. For complete details, consult the HP Support Center or refer to your HP Server documentation.

#### Key Features

- Seamless upgrades to next generation HP high performance and high capacity Serial Attached SCSI Smart Array controllers.
- Recovery ROM protects against a ROM corruption.
- 3Gb/s SAS technology delivers high performance and data bandwidth up to 300 MB/s per physical link and contains full compatibility with 1.5G SATA technology.
- Modular, easy-to-upgrade design lets you optimize performance by upgrading from 256 to 512MB battery-backed cache (BBWC).
- Mix-and-match SAS and SATA hard drives, lets you deploy drive technology as needed to fit your computing environment.
- Software consistency among all Smart Array family products: Array Configuration Utility, Systems Insight Manager, Array Diagnostic Utility (ADU) and SmartStart.
- 64-bit, PCIX 133-MHz host interface provides 1 GB/s maximum bandwidth during burst transfers.
- 256 MB 72-bit wide DDR266, battery-backed write cache (upgradeable to 512 MB)

#### Online Management Features

- Online Capacity Expansion
- Online RAID Level Migration
- Online Stripe Size Migration
- Online Spares (Global)
- User Selectable Expand and Rebuild Priority

#### Ports

- Eight (8) SAS physical links distributed across 2 internal x4 wide port connectors and 1 external x4 wide port connector. One of the internal x4 wide port connector shares 4 physical links with the external x4 wide port connector. When the shared internal x4 wide port connector is in use, the shared external x4 wide port is disabled.

### Standard Features

#### Performance

HP's High Performance Architecture sets new boundaries of industry performance expectations!

- 3Gb/s SAS (300MB/s bandwidth per physical link)
- 8x 3Gb/s SAS physical links (compatible with 1.5G SATA)
- 256 MB 72-bit wide DDR266, battery-backed write cache (upgradeable to 512 MB)
- 64-bit, PCIX 133-MHz host interface provides 1 GB/s maximum bandwidth during burst transfers
- 440 PowerPC Processor

#### Capacity

Given the increasing need for high performance and rapid capacity expansion, the SA-P600 offers:

- Up to 38TB of total storage with 38 x 1TB SATA 3.5" MDL hard drives.
- Up to 2.920TB of external storage per PCI slot with 2x HP StorageWorks MSA50 SAS enclosures and 20 x 146GB SAS SFF hard drives.

**NOTE:** Support for greater than 2TB in a single logical drive.

#### Availability

Provides increased server uptime by providing advanced storage functionality:

- Online RAID Level Migration (between any RAID level)
- Online Capacity Expansion
- Logical Drive Capacity Extension
- Global Online Spare
- Pre-Failure Warranty

#### Fault Prevention

The following features offer detection of possible failures before they occur, allowing preventive action to be taken:

- S.M.A.R.T.: Self Monitoring Analysis and Reporting Technology first developed at HP detects possible hard disk failure before it occurs, allowing replacement of the component before failure occurs.
- Drive Parameter Tracking monitors drive operational parameters, predicting failure and notifying the administrator.
- Dynamic Sector Repairing continually performs background surface scans on the hard disk drives during inactive periods and automatically remaps bad sectors, ensuring data integrity.
- Smart Array Cache Tracking monitors integrity of controller cache, allowing pre-failure preventative maintenance.
- Environment Tracking for External Storage System: Monitors fan speed and cabinet temperature of StorageWorks Modular Smart Array Enclosures.

### Standard Features

#### Fault Tolerance

Keeps data available and server running while a failed drive is being replaced; several fault tolerance configurations are supported including:

- Advanced Data Guarding (RAID 6): 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.
  - Distributed Data Guarding (RAID 5): This allocates parity data across multiple drives and allows simultaneous write operations. It is recommended for up to 14 hard drives.
  - Drive Mirroring (RAID 1, 1+0): This allocates half of the drive array to data and the other half to mirrored data, providing two copies of every file. It is a high-performance RAID.
- 

#### Fault Recovery

Minimizes downtime, reconstructs data, and facilitates a quick recovery from drive failure

- Recovery ROM: This new feature provides a unique redundancy feature that protects from a ROM image corruption. A new version of firmware can be flashed to the ROM while the controller maintains the last known working version of firmware. If the firmware becomes corrupt, the controller will revert back to the previous version of firmware and continue operating. This reduces the risk of flashing firmware to the controller.
  - On-Line Spares: There is no limit to the number of spare drives that can be installed prior to drive failure. If a failure occurs, recovery begins with an On-Line Spare and data is reconstructed automatically.
  - DRAM ECC corrects against single bit data and address corruption.
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#### Ease of Use

Consistency and Upgradeability make the Smart Array family unique in the industry:

- GUI based configuration, management and diagnostic software tools
- Common data format between generations of products
- Data migration between servers and external StorageWorks Modular Smart Array enclosures

### Compatibility

**Servers** For up to date compatibility, please see the following URL for complete Smart Array P600 Controller compatibility and support information:  
<http://h18006.www1.hp.com/products/servers/proliantstorage/arraycontrollers/index.html>

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**Operating Systems** Microsoft® Windows® 2000 (Server/Adv Server)  
Microsoft Windows 2003 Standard  
Microsoft Windows 2003 Enterprise  
Microsoft Windows 2003 Web  
Microsoft Windows 2003 SBS  
Microsoft Windows 2003 Standard x64  
Microsoft Windows 2003 Enterprise x64  
Microsoft Windows Server 2008  
Novell NetWare 6.5 SP3  
Novell NetWare 5.1  
Novell Open Enterprise Server 1.0  
Red Hat Enterprise Linux  
SUSE Linux Enterprise Server  
Solaris 10

**NOTE:** For more Linux OS support & certification information, please visit our the ProLiant & BladeSystem Server Linux matrix: <http://h18004.www1.hp.com/products/servers/linux/hplinuxcert.html>

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### Software Suite

All Smart Array products share a common set of configuration, management and diagnostic tools, including Array Configuration Utility, Array Diagnostic Utility (ADU), and Systems Insight Manager. This software consistency of tools reduces the cost of training for each successive generation of product and takes much of the guesswork out of troubleshooting field problems. These tools lower the total cost of ownership by reducing training and technical expertise necessary to install and maintain HP server storage.

#### Systems Insight Manager

- Powerful server and server options/storage manager tool
- Monitors over 1200 system wide parameters
- Configuration/Diagnostic Utilities

#### HP Array Configuration Utility (ACU)

- Powerful Web based configuration utility for all Smart Array controllers
- Provides a graphical view of HP drive array configurations
- Allows for management of multiple arrays over a secure internet connection from anywhere in the world
- Easy to use Wizards for configuration
- Runs online on Windows 2000, Windows 2003, Linux, and NetWare

#### HP Option ROM Configuration for Arrays (ORCA)

- An alternative method for easily viewing, creating, and deleting multiple arrays and logical volumes during system power up
- For advanced array configurations use ACU

#### HP Array Diagnostic Utility (ADU)

## Compatibility

- In depth diagnostic and reporting utility for all Smart Array controllers

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

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**Warranty** The warranty for this device is 3 years parts, labor and onsite.  
**Pre-Failure Warranty:** Drives attached to the Smart Array Controller and monitored under Insight Manager are supported by a Pre-Failure (replacement) Warranty. For complete details, consult the HP Support Center or refer to your HP Server Documentation.

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

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**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  
**NOTE:** For additional hardware installation and maintenance information, please refer to the URL: <http://www.hp.com/hps/hardware/>

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**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  
Warranty upgrade options can come in the form of Care Packs, which are sold at the HP System level this product attaches too.

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**HP Care Pack Information** HP Care Pack is defined as an upgrade to the product warranty attribute, available for a specific duration and hours of coverage. Care Packs for this option is sold at the system level this option attaches too.  
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:** 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/>

### Related Options

**NOTE:** This is a list of supported options. Some may be discontinued.

#### Hard Drives

**NOTE:** Transfer rates of drives are dependent on the maximum transfer rate supported by the HBA or Controller. Refer to the HBA or Controller technical specifications for details.

#### SAS Hot Plug SFF Enterprise (ENT) Drives

HP 300GB 6G SAS 10K SFF DP ENT HDD	507127-B21
HP 300GB 3G SAS 10K SFF DP ENT HDD	492620-B21
HP 146GB 6G SAS 15K SFF DP ENT HDD	512547-B21
HP 146GB 3G SAS 15K SFF DP ENT HDD	504062-B21
HP 146GB 6G SAS 10K SFF DP ENT HDD	507125-B21
HP 146GB 3G SAS 10K SFF DP ENT HDD	418367-B21
HP 146GB 3G SAS 10K SFF SP HDD	431958-B21
HP 72GB 3G SAS 15K SFF DP ENT HDD	418371-B21
HP 72GB 3G SAS 15K SFF SP HDD	431935-B21
HP 72GB 3G SAS 10K SFF DP ENT HDD	384842-B21
HP 72GB 3G SAS 10K SFF SP HDD	375861-B21
HP 36GB 3G SAS 15K SFF DP ENT HDD	418369-B21
HP 36GB 3G SAS 15K SFF SP HDD	431933-B21

#### SAS Non-Hot Plug SFF Enterprise (ENT) Drives

HP 300GB 6G SAS 10K SFF DP NHP ENT HDD	537809-B21
HP 146GB 6G SAS 10K SFF DP NHP ENT HDD	537807-B21
HP 72GB 6G SAS 15K SFF DP NHP ENT HDD	537805-B21

#### SAS Hot Plug 3.5" Enterprise (ENT) Drives

HP 450GB 3G SAS 15K 3.5" DP ENT HDD	454232-B21
HP 400GB 3G SAS 10K 3.5" DP ENT HDD	459508-B21
HP 300GB 3G SAS 15K 3.5" SP HDD	431944-B21
HP 300GB 3G SAS 15K 3.5" DP ENT HDD	416127-B21
HP 146GB 3G SAS 15K 3.5" SP HDD	375872-B21
HP 146GB 3G SAS 15K 3.5" DP ENT HDD	384854-B21
HP 72GB 3G SAS 15K 3.5" SP HDD	375870-B21
HP 72GB 3G SAS 15K 3.5" DP ENT HDD	384852-B21

#### SAS Non-Hot Plug 3.5" Enterprise (ENT) Drives

HP 450GB 3G SAS NHP 15K 3.5" DP ENT HDD	454234-B21
HP 400GB 3G SAS NHP 10K 3.5" DP ENT HDD	508232-B21
HP 300GB 3G SAS NHP 15K 3.5" DP ENT HDD	417950-B21
HP 300GB 3G SAS 15K NHP 3.5" SP HDD	431950-B21
HP 146GB 3G SAS NHP 15K 3.5" DP ENT HDD	417855-B21
HP 146GB 3G SAS 15K NHP 3.5" SP HDD	432093-B21
HP 72GB 3G SAS 15K NHP 3.5" SP HDD	432095-B21

#### SAS Hot Plug SFF Midline (MDL) Drives

HP 500GB 6G SAS 7.2K SFF DP MDL HDD	507610-B21
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### Related Options

#### SAS Hot Plug 3.5" Midline (MDL) Drives

HP 1TB 3G SAS 7.2K 3.5" DP MDL HDD 461137-B21

HP 750GB 3G SAS 7.2K 3.5" DP MDL HDD 461135-B21

#### SATA Hot Plug SFF Midline (MDL) Drives

HP 500GB 3G SATA 7.2K 2.5in MDL HDD 507750-B21

HP 160GB 3G SATA 7.2K 2.5in MDL HDD 530888-B21

#### SATA Non-Hot Plug SFF Midline (MDL) Drives

HP 500GB 3G SATA 7.2K 2.5in NHP MDL HDD 507753-B21

HP 160GB 3G SATA 7.2K 2.5in NHP MDL HDD 530891-B21

#### SATA Hot Plug 3.5" Midline (MDL) Drives

HP 1TB 3G SATA 7.2K 3.5" MDL HDD 454146-B21

HP 750GB 3G SATA 7.2K 3.5" MDL HDD 458930-B21

HP 500GB 3G SATA 7.2K 3.5" MDL HDD 458928-B21

HP 250GB 3G SATA 7.2K 3.5" MDL HDD 458926-B21

#### SATA Non-Hot Plug 3.5" Midline (MDL) Drives

HP 750GB 3G SATA 7.2K NHP 3.5" MDL HDD 462595-B21

HP 500GB 3G SATA 7.2K NHP 3.5" MDL HDD 458941-B21

HP 250GB 3G SATA 7.2K NHP 3.5" MDL HDD 458939-B21

#### SATA Hot Plug SFF Entry (ETY) Drives

HP 250GB 3G SATA 5.4K SFF ETY HDD 460355-B21

HP 120GB 1.5G SATA 5.4K SFF ETY HDD 458924-B21

#### SATA Non-Hot Plug SFF Entry (ETY) Drives

HP 250GB 3G SATA 5.4K NHP SFF ETY HDD 460357-B21

HP 120GB 1.5G SATA 5.4K NHP SFF ETY HDD 459357-B21

#### SATA Hot Plug 3.5" Entry (ETY) Drives

HP 160GB 3G SATA 7.2K 3.5" ETY HDD 458945-B21

#### SATA Non-Hot Plug 3.5" Entry (ETY) Drives

HP 160GB 3G SATA 7.2K NHP 3.5" ETY HDD 458947-B21

#### Small Form Factor (SFF) SATA Hot Plug Drives

HP 60GB 1.5G SATA 5.4K SFF HDD 379306-B21

#### 3.5" SATA Hot Plug Drives

HP 80GB 1.5G SATA 7.2K 3.5" HDD 349237-B21

#### 3.5" SATA Non-Hot Plug Drives

HP 80GB 1.5G SATA 7.2K NHP 3.5" HDD 383410-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.

### Related Options

#### HP StorageWorks Modular Smart Array

#### MSA SAN Storage Arrays

HP StorageWorks 50 Modular Smart Array 364430-B21

**NOTE:** Please see the Modular Smart Array 50 QuickSpecs for additional information including configuration steps and additional options needed for a complete solution at: [http://h18000.www1.hp.com/products/quickspecs/12245\\_na/12245\\_na.html](http://h18000.www1.hp.com/products/quickspecs/12245_na/12245_na.html)

HP StorageWorks 60 Modular Smart Array 418408-B21

**NOTE:** Please see the Modular Smart Array 60 QuickSpecs for additional information including configuration steps and additional options needed for a complete solution at: [http://h18000.www1.hp.com/products/quickspecs/12627\\_na/12627\\_na.html](http://h18000.www1.hp.com/products/quickspecs/12627_na/12627_na.html)

HP StorageWorks 70 Modular Smart Array 418800-B21

**NOTE:** Please see the Modular Smart Array 70 QuickSpecs for additional information including configuration steps and additional options needed for a complete solution at: [http://h18000.www1.hp.com/products/quickspecs/12652\\_na/12652\\_na.html](http://h18000.www1.hp.com/products/quickspecs/12652_na/12652_na.html)

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#### SAS External Cable Options

**NOTE:** These cables are for use with HP Smart Array controllers.

1 Meter SFF8470 to SFF8470 External Wide SAS Cable 389665-B21

2 Meter SFF8470 to SFF8470 External Wide SAS Cable 389668-B21

4 Meter SFF8470 to SFF8470 External Wide SAS Cable 389671-B21

### Technical Specifications

Dimensions	18.375 x 8.25 x 4 in (46.67 x 20.95 x 10.16 cm)
Disk Drive and Enclosure Protocol Support	3Gb/s SAS (Serial Attached SCSI) 1.5Gb/s SATA (Serial AT Attachment)
SAS Connectors	2 internal (SFF8484) x4 wide port connectors & 1 external (SFF8470) x4 wide port connector
Data Transfer Method	64-bit wide, PCIX 133 MHz (1 GB/s maximum bandwidth)
PCI Bus Speed	PCIX-133 and 3.3 volt PCI compatibility only
Memory Bus Speed	DDR-266 and 72 bit wide bus
PCI	PCI-X and 3.3 volt PCI compatibility only
Simultaneous Drive Transfer Ports	2 x4 Wide SAS Ports
SAS Port Link Rate	12 Gbps per x4 wide port connector (4 x 3 Gb/s)
Software upgradeable Firmware	Yes
Cache Memory	256 MB Read/Write (512-MB module upgrade available); ECC protection, battery-backed, and removable
Logical Drives Supported	Up to 32 logical drives Up to 2.2 TB per logical drive
Maximum Capacity	5.548TB (38 x 146GB) <b>NOTE:</b> Support for greater than 2TB in a single logical drive.
Memory Addressing	64-bit, supporting servers memory space greater than 4 GB
RAID Support	RAID 6 (Advanced Data Guarding) RAID 5 (Distributed Data Guarding) RAID 1+0 (Striping & Mirroring) RAID 0 (Striping)
Upgradeable Firmware	4-MB flashable ROM with redundant firmware images

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Environment-friendly Products and Approach	<b>End-of-life Management and Recycling</b>	Hewlett-Packard offers end-of-life HP product return, trade-in, and recycling programs in many geographic areas. For trade-in information, please go to <a href="http://www.hp.com/go/green">http://www.hp.com/go/green</a> . To recycle your product, please go to: <a href="http://www.hp.com/go/green">http://www.hp.com/go/green</a> or contact your nearest HP sales office. Products returned to HP will be recycled, recovered or disposed of in a responsible manner.
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The EU WEEE directive (2002/95/EC) requires manufacturers to provide treatment information for each product type for use by treatment facilities. This information (product disassembly instructions) is posted on the Hewlett Packard web site at: <http://www.hp.com/go/green>. These instructions may be used by recyclers and other WEEE treatment facilities as well as HP OEM customers who integrate and re-sell HP equipment.

### *Technical Specifications*

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