The HP Smart Array P800 is HP's first 16 port serial attached SCSI (SAS) RAID controller with PCI-Express (PCIe). It is the highest performing controller in the SAS portfolio and provides new levels of reliability for HP servers, through its support of the latest SCSI technology and advanced RAID capabilities. This controller ships standard with RAID 6 (ADG) and supports over 100 hard drives.

Models

| HP Smart Array P800 Controller | HP Smart Array P800/512 BBWC Controller | 381513-B21 |
# QuickSpecs

**HP Smart Array P800 Controller**

## Standard Features

### The Smart Array Advantage

HP's innovative design and integration work within 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

Data Compatibility with all Serial Smart Array controllers allows simple and easy upgrades any time needs for higher performance, capacity, and availability increase.

### 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 HP server storage.

### Universal Hard Drive

A universal hard drive is used across multiple HP ProLiant 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

Pre-Failure Warranty means Systems 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 Centre 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.
- 3G 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.
- Mix-and-match SAS and SATA hard drives, lets you deploy drive technology as needed to fit your computing environment.
- Support for SAS tape products.
- Software consistency among all Smart Array family products: Array Configuration Utility, Systems Insight Manager, Array Diagnostic Utility (ADU) and SmartStart.
- PCI Express 2.5G host interface provides up to 2 GB/s in each direction
- 512 MB 72-bit wide DDR2-533MHz, battery-backed write cache
- Ships standard with two batteries

### Online Management Features

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

### Ports

- Sixteen (16) SAS physical links distributed across 2 internal x4 wide port connectors and 2 external x4 wide port connector.
Performance

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

- 3G SAS (300MB/s bandwidth per physical link)
- 16x 3G SAS physical links (compatible with 1.5G SATA)
- 512 MB 72-bit wide DDR2-533MHz, battery-backed write cache
- x8 2.5G PCI Express host interface provides 2 GB/s maximum bandwidth during burst transfers in each direction 533MHz PowerPC Processor

Capacity

Given the increasing need for high performance and rapid capacity expansion, the SA-P800 offers:

- Up to 5.8 TB of external storage per PCI slot with 4 HP StorageWorks MSA50 enclosures and 40 x 146GB SFF SAS hard drives.
- Up to 28.8 TB of external storage per PCI slot with 8 HP StorageWorks MSA60 enclosures and 96 x 300GB 3.5" SAS hard drives
- Up to 72 TB of external storage per PCI slot with 8 HP StorageWorks MSA60 enclosures and 96 x 750GB 3.5" SATA hard drives

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.

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.
Standard Features

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

- Recovery ROM: This feature provides unique redundancy 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.

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 P800/512MB Controller compatibility and support information:

Operating Systems

- Microsoft Windows 2003 / R2 Standard
- Microsoft Windows 2003 / R2 Standard x64
- Microsoft Windows 2003 / R2 Enterprise
- Microsoft Windows 2003 / R2 Enterprise x64
- Microsoft Windows 2003 / R2 Web
- Microsoft Windows 2003 / R2 SBS
- Novell Open Enterprise Server, NetWare 6.5 SP5
- SCO OpenServer 5.0.7, 6
- SCO UnixWare 7.1.3, 7.1.4

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 and NetWare (CPQONLIN)

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)

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

The warranty for this device is 3 years parts only.

**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 Centre or refer to your HP Server Documentation.

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/hardware/](http://www.hp.com/hps/hardware/)

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.

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.

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/](http://www.hp.com/hps/carepack/)
# Related Options

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

<table>
<thead>
<tr>
<th>Hard Drives</th>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hot Plug SFF SAS Drives</td>
<td>HP 36GB 3G SAS 10K SFF SP HDD</td>
<td>375859-B21</td>
</tr>
<tr>
<td></td>
<td>HP 72GB 3G SAS 10K SFF SP HDD</td>
<td>375861-B21</td>
</tr>
<tr>
<td></td>
<td>HP 146GB 3G SAS 10K SFF SP HDD</td>
<td>431958-B21</td>
</tr>
<tr>
<td>Hot Plug 3.5&quot; SAS Drives</td>
<td>HP 36GB 3G SAS 15K 3.5&quot; SP HDD</td>
<td>375868-B21</td>
</tr>
<tr>
<td></td>
<td>HP 72GB 3G SAS 15K 3.5&quot; SP HDD</td>
<td>375870-B21</td>
</tr>
<tr>
<td></td>
<td>HP 146GB 3G SAS 15K 3.5&quot; SP HDD</td>
<td>375872-B21</td>
</tr>
<tr>
<td></td>
<td>HP 300GB SAS 3.5&quot; 15K SP HDD</td>
<td>431944-B21</td>
</tr>
<tr>
<td>Hot Plug SFF SATA Drives</td>
<td>HP 60GB 1.5G SATA 5.4K SFF HDD</td>
<td>379306-B21</td>
</tr>
<tr>
<td>Hot Plug 3.5&quot; SATA Drives</td>
<td>HP 80GB 1.5G SATA 7.2K 3.5&quot; HDD</td>
<td>349237-B21</td>
</tr>
<tr>
<td></td>
<td>HP 160GB 1.5G SATA 7.2K 3.5&quot; HDD</td>
<td>349238-B21</td>
</tr>
<tr>
<td></td>
<td>HP 250GB 1.5G SATA 7.2K 3.5&quot; HDD</td>
<td>349239-B21</td>
</tr>
<tr>
<td></td>
<td>HP 500GB 1.5G SATA 7.2K 3.5&quot; HDD</td>
<td>395473-B21</td>
</tr>
<tr>
<td></td>
<td>HP 750GB 1.5G SATA 7.2K 3.5&quot; HDD</td>
<td>432341-B21</td>
</tr>
</tbody>
</table>

**NOTE:** Go to the HP Hard Drive Compatibility table for complete drive compatibility information ([http://www.hp.com/products/harddiskdrives](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.

**NOTE:** There is a known compatibility issue with some early 3.5" SATA HDD that will make them unable to be used with the SA-P800 controller. Customers should verify that they are not using hard drive part number 332649-002/003 (spare 353042-001), 332650-002/003 (spare 353043-001), or 356536-002/003 (spare 353044-001).

<table>
<thead>
<tr>
<th>Tape Drives</th>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAS Tape Drives</td>
<td>HP StorageWorks Ultrium 448 SAS Internal Tape Drive</td>
<td>DW085A</td>
</tr>
<tr>
<td></td>
<td>HP StorageWorks Ultrium 448 SAS External Tape Drive</td>
<td>DW086A</td>
</tr>
<tr>
<td></td>
<td>HP StorageWorks Ultrium 920 SAS Internal Tape Drive</td>
<td>EH847A</td>
</tr>
<tr>
<td></td>
<td>HP StorageWorks Ultrium 920 SAS External Tape Drive</td>
<td>EH848A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rack-mount Tape Drive Enclosures</th>
<th>Description</th>
<th>Part Number</th>
</tr>
</thead>
</table>
HP StorageWorks 1U SAS Rack-Mount Kit

**NOTE:** The 1U SAS Rack-Mount Kit can support up to (2) half-height tape drives and is compatible with the Ultrium 448 SAS and Ultrium 920 SAS tape drives.

**NOTE:** Connecting hard drive cage and SAS tape to the same SAS Controller using split cable (supplied with tape drive) deactivates 1 of the hard drive bays. Actual hard drive bay deactivated depends on where split cable plugs into SAS drive connector. Example: 3x SAS cable connector plugged into SAS drive connector (5-8) on the back of the hard drive cage would mean drive bay 8 is deactivated.

### SAS Cables for Tape Drives

2M External Infiniband (SFF8470) to Mini SAS (SFF8088) 1x SAS Cable

**NOTE:** Use this cable to connect HP StorageWorks Ultrium SAS External Tape Drives to SAS Controllers with Infiniband (SFF8470) connectors.

4M External Mini SAS to Mini SAS (SFF8088) 3x/1x External Split SAS Cable

**NOTE:** This split cable connects internally to SAS Hard Drive Cage (3x) and externally to the HP Storage Works 1U SAS Rack-Mount Kit (1x) with other connector going to internal SAS Controller port inside the server. Requires additional PCI slot on server for threading 1x split cable to SAS tape.

4M External Infiniband (SFF8470) to Mini SAS (SFF8088) 1x SAS Cable

**NOTE:** Use this cable to connect HP StorageWorks 1U SAS Rack-mount Kit to SAS Controllers with Infiniband (SFF8470) connectors.

2M External Mini SAS (SFF8088) to Mini SAS (SFF8088) 1x SAS Cable

**NOTE:** Use this cable to connect HP StorageWorks Ultrium SAS External Tape Drives.

4M External Mini SAS (SFF8088) to Mini SAS (SFF8088) 1x SAS Cable

**NOTE:** Use this cable to connect HP StorageWorks 1U SAS Rack-mount Kit.

4M External Mini SAS to Mini SAS (SFF8088) 3x/1x External Split SAS Cable

**NOTE:** This split cable connects internally to SAS Hard Drive Cage (3x) and externally to the HP Storage Works 1U SAS Rack-Mount Kit (1x) with other connector going to internal SAS Controller port inside the server. Requires additional PCI slot on server for threading 1x split cable to SAS tape. Valid only for ProLiant DL360 G5 and ProLiant DL365 servers.

### SAS Internal Cables Option

**NOTE:** The SAS cable supports four drives without an expander. Two cables are required when more than four drives are installed. SAS Internal Cables are typically supplied with the server. Refer to server documentation for details.

- HP Internal SAS/SATA Target Fan Cable
  - **NOTE:** Supports the HP ProLiant ML110 G2, ML310 G2, ML350 G4p SAS/SATA models.

- HP Internal SAS/SATA Multi-Lane 30 in Cable
  - **NOTE:** Supports the HP ProLiant ML350 G4p SAS models.

- HP Internal SAS/SATA Multi-Lane 19 in Cable
  - **NOTE:** Supports the HP ProLiant ML310 G2 SAS/SATA models.

### Mini SAS to Mini SAS Cables

**NOTE:** Cables for use connecting the Smart Array P800 Controller with the HP StorageWorks Modular Smart Array 60.

- Mini SAS 4x 2M Cable
- Mini SAS 4x 4M Cable
- Mini SAS 4x 6M Cable
## Options

### SAS to Mini SAS Cables

<table>
<thead>
<tr>
<th>Cables for use connecting the Smart Array P800 Controller with the HP StorageWorks Modular Smart Array 50.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAS 4x to Mini SAS 4x 1M Cable 419570-B21</td>
</tr>
<tr>
<td>SAS 4x to Mini SAS 4x 2M Cable 419571-B21</td>
</tr>
<tr>
<td>SAS 4x to Mini SAS 4x 4M Cable 419572-B21</td>
</tr>
<tr>
<td>SAS 4x to Mini SAS 4x 6M Cable 419573-B21</td>
</tr>
</tbody>
</table>

### Software

<table>
<thead>
<tr>
<th>StorageWorks Virtual Replicator</th>
</tr>
</thead>
<tbody>
<tr>
<td>License &amp; Media (CD-ROM) 191802-B21</td>
</tr>
</tbody>
</table>

## Technical Specifications

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dimensions</strong> (excluding bracket)</td>
<td>12.3 in x 4.4 in x 0.5 in (31.1 cm x 11.1 cm x 1.2 cm)</td>
</tr>
<tr>
<td><strong>Disk Drive and Enclosure Protocol Support</strong></td>
<td>3G SAS (Serial Attached SCSI)</td>
</tr>
<tr>
<td></td>
<td>1.5G SATA (Serial AT Attachment)</td>
</tr>
<tr>
<td><strong>SAS Connectors</strong></td>
<td>2 internal (SFF8484) x4 wide port connectors &amp; 2 external (Mini SAS) x4 wide port connectors</td>
</tr>
<tr>
<td><strong>PCI</strong></td>
<td>PCI-Express</td>
</tr>
<tr>
<td><strong>PCI Bus Speed</strong></td>
<td>x8 2.5G PCI Express (2 GB/s maximum bandwidth in each direction)</td>
</tr>
<tr>
<td><strong>Memory Bus Speed</strong></td>
<td>DDR2-533MHz and 72-bit wide bus</td>
</tr>
<tr>
<td><strong>PCI</strong></td>
<td>PCI-Express and 3.3 volt PCI compatibility only</td>
</tr>
<tr>
<td><strong>SAS Port Link Rate</strong></td>
<td>3G per physical link and 12G per x4 wide port connector (4 x 3G)</td>
</tr>
<tr>
<td><strong>Software upgradeable Firmware</strong></td>
<td>Yes</td>
</tr>
<tr>
<td><strong>Cache Memory</strong></td>
<td>512 MB Read/Write</td>
</tr>
<tr>
<td></td>
<td>ECC protection, battery-backed, and removable</td>
</tr>
<tr>
<td><strong>Logical Drives Supported</strong></td>
<td>Up to 32 logical drives</td>
</tr>
<tr>
<td><strong>NOTE:</strong></td>
<td>Supports greater than 2 TB logical drives</td>
</tr>
<tr>
<td><strong>Maximum Capacity</strong></td>
<td>81TB (108 x 750GB)</td>
</tr>
<tr>
<td><strong>Memory Addressing</strong></td>
<td>64-bit, supporting servers memory space greater than 4 GB</td>
</tr>
<tr>
<td><strong>RAID Support</strong></td>
<td>RAID 6 (Advanced Data Guarding)</td>
</tr>
<tr>
<td></td>
<td>RAID 5 (Distributed Data Guarding)</td>
</tr>
<tr>
<td></td>
<td>RAID 1 + 0 (Striping &amp; Mirroring)</td>
</tr>
<tr>
<td></td>
<td>RAID 1 (Mirroring)</td>
</tr>
<tr>
<td></td>
<td>RAID 0 (Striping)</td>
</tr>
<tr>
<td><strong>Upgradeable Firmware</strong></td>
<td>4-MB flashable ROM with redundant firmware images</td>
</tr>
</tbody>
</table>

© Copyright 2006 Hewlett-Packard Development Company, L.P.

The information contained herein is subject to change without notice. Microsoft and Windows are registered trademarks or trademarks of Microsoft Corporation in the U.S. and/or other countries. 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.