QuickSpecs

Overview

Models

225338-B21
225338-291 (Japan)

- Dual SCSI channels (1 internal/1 external)
- ProLiant Integration
- Reliability
- Ultra3 SCSI
- 64-bit Architecture
- 64-bit PCI Bus Design
- Online Capacity Expansion
- Online RAID level Migration

Introduction

The Smart Array 532 Controller (SA-532) is a 64-bit, 66 MHz dual SCSI channel PCI array controller for entry level hardware-based fault tolerance. Utilizing both SCSI channels (1 internal and 1 external) of the SA-532 allows you to configure up to 28 hard drives to store up to 4.1TB of storage per PCI slot. The SA-532 provides high reliability and increased performance over the Smart Array 431, thus providing excellent value and lowering the total server ownership cost. In addition, the SA-532 is data compatible with all Ultra320, Wide Ultra3 and Wide Ultra2 drives and servers, offering an unparalleled degree of investment protection. Designed and integrated with entry-level and workgroup ProLiant servers, this product provides worry-free data protection.
NOTE: The SA-532 is supported only in 3.3-volt PCI slots of all Ultra2 and Ultra3 servers. The SA-532 is not supported in 5-volt PCI slots.
The SA-532 provides the best performance and capacity for RAID array controllers in entry-level and workgroup ProLiant servers or in any ProLiant server where hardware RAID is needed at an entry-level price point.

What's New

Updated option support list, maximum storage support

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 products. 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 ProLiant server storage.
- **Universal Hard Drive** - form factor is for use across multiple 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** - means 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 ProLiant Server documentation.

Overview

Key Features

Compatibility with all Ultra2, Ultra3, and Ultra320 LVD family products. In addition, a seamless upgrade to next generation HP high performance and high capacity mainstream Ultra3 Smart Array controllers.

Recovery ROM protects against a ROM corruption

Ultra3 SCSI technology delivers high performance and data bandwidth up to 160 MB/s bandwidth per channel

Mix-and-match LVD SCSI compatibility protects your investments and lets you deploy drives as needed

Dual SCSI channels allows for up to 4.1TB of storage per server slot (28 x 146.8GB Ultra320 hard drives)

Software consistency among all Smart Array family products: Array Configuration Utility XE (ACU-XE), Array Configuration Utility (ACU), Insight Manager (IM), Array Diagnostic Utility (ADU) and SmartStart.

64-bit, 66MHz PCI interface boosts bandwidth up to 533 MB/s total transfer rate

64-bit memory addressing supports servers with greater then 4 GB of memory

3.3 Volt Slot Support Only provides the latest in low-voltage, 64-bit support

32MB Memory optimizes performance and data throughput.

NOTE: 32 MB of DRAM used for code, transfer buffers, and non-battery backed read cache

Online Management Features: Online Capacity Expansion, Online RAID Level Migration, Online Stripe Size Migration, Online Spares (Global), User Selectable Expand and Rebuild Priority

Pre-Failure Warranty support for hard disk drives (requires Insight Manager).

NOTE: Pre-Failure Warranty is available on all Compaq Prosignia and ProLiant servers using Insight Manager 2.1 or higher, and covers Pentium® processors, ECC memory and server hard drives (except the 535 MB Fast-SCSI-2 hard drive) using Compaq IDA, IDA-2, Compaq SMART SCSI Array Controllers, Compaq SMART-2 Array Controllers or Compaq Smart Array Controllers. Certain restrictions and exclusions apply. Consult the HP Customer Support Center for details.

Compatibility

Servers

Servers

For up to date compatibility, please see the following URL for complete Smart Array 532 compatibility and support information.

http://www.hp.com/products/smartarray

NOTE: Server must have 3.3 volt PCI slot(s) to support the SA-532 Controller.

Operating Systems

- NT® 4.0 Server
- NT 4.0 Enterprise Edition
- NT 4.0 Terminal Server
- Windows® 2000
- Windows 2000 Advanced Server
- NetWare® 4.x
- NetWare 5.x
- Linux® 32
- Linux 64
- AIX-5L (IA-64)
- UnixWare® 7.x
- OpenServer™ 5.x
- Solaris™
- OS/2

Software Suite

All Smart Array products share a common set of configuration, management and diagnostic tools, including Array Configuration Utility XE (ACU-XE), Array Configuration Utility (ACU), Array Diagnostic Utility (ADU), and 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 the Compaq server storage.

Insight Manager

- Powerful server and server options/storage manager tool
- Monitors over 1200 server parameters

Configuration/Diagnostic Utilities

- Array Configuration Utility XE (ACU-XE)
  - 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 NT v4.0, Windows 2000 and NetWare
- Array Configuration Utility (ACU)
  - Powerful configuration utility for all Smart Array controllers
  - Provides a graphical view of HP drive array configurations
  - Easy to use Wizards for configuration
  - Runs online on NT v4.0, Windows 2000 and NetWare
- Options ROM Configuration for Arrays (ORCA)
  - Rapid configuration during initial install of the OS
- Array Diagnostic Utility (ADU)
  - Powerful diagnostic utility for all Smart Array controllers

Product Highlights

Data Compatibility   Data compatibility among all models of Smart Array Controllers means customers can instantly upgrade their Smart Array products to get to higher performance, capacity and availability. Unlike competitive products, successive generations of Smart Array products understand the data format of other Smart Array controllers, providing investment protection for your HP storage solution.

Performance   HP's High Performance Architecture sets new boundaries of industry performance expectations!
- Wide Ultra3 SCSI (160 MB/s bandwidth) per channel
- High-performance 64-bit architecture
- 64-bit, 66-MHz PCI bus (533 MB/s bandwidth)

Capacity   Given the rapid growth of user data, the SA-532 is a perfect companion to rapid expansion:
- Dual SCSI channels support up to 28 disk drives
- Up to 2 TB of storage per PCI slot

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 Compaq 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 ProLiant Storage System and newer HP storage enclosures.

Fault Tolerance   Keeps data available and server running while a failed drive is being replaced; several fault tolerance configurations are supported including:
- **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**: Up to two spare drives can be installed prior to drive failure. If a failure occurs, recovery begins with an On-Line Spare and data is reconstructed automatically.

NOTE: On-Line Spares can only be used with RAID level 1, 1+0, and 5.

Ease of Use   Consistency and Upgradability 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 storage enclosures

QuickSpecs

HP Smart Array 532 Controller

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/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

HP Care Pack Information Sample part numbers:

3 year, uplift to 5 x 9, Next Day Response	FM-**XHW-36
3 year, uplift to 5 x 9, 4-hour Response	FM-**4HR-36
3 year, uplift to 7 x 24, 4-hour Response	FM-**724-36

** Represents a two-digit, product-specific code

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/

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Options

Hard Drives	**Wide Ultra3 SCSI Universal Drives – Hot Plug**	
	36.4-GB Wide Ultra3 SCSI 15,000 rpm Drive (1")	232916-B22
	18.2-GB Wide Ultra3 SCSI 15,000 rpm Drive (1")	188122-B22
	9.1-GB Wide Ultra3 SCSI 15,000 rpm Drive (1")	188120-B22
	72.8-GB Wide Ultra3 SCSI 10,000 rpm Drive (1")	232432-B22
	36.4-GB Wide Ultra3 SCSI 10,000 rpm Drive (1")	176496-B22
	18.2-GB Wide Ultra3 SCSI 10,000 rpm Drive (1")	142673-B22
	9.1-GB Wide Ultra3 SCSI 10,000 rpm Drive (1")	142671-B22
	36-GB Wide Ultra3 SCSI 10,000 rpm Drives (1"), 10 pack	232617-B21
	18-GB Wide Ultra3 SCSI 10,000 rpm Drives (1"), 10 pack	202352-B21
	Wide Ultra3 SCSI Drives – Non-Hot Plug	
	36.4-GB Wide Ultra3 SCSI 10,000 rpm Drive (1")	176497-B21
	18.2-GB Wide Ultra3 SCSI 10,000 rpm Drive (1")	142674-B21
	9.1-GB Wide Ultra3 SCSI 10,000 rpm Drive (1")	142672-B21
	Ultra320 Universal Drives – Hot Plug	
	36.4GB 10,000 rpm, U320 Universal Hard Drive, 1"	286713-B22
	72.8GB 10,000 rpm, U320 Universal Hard Drive, 1"	286714-B22
	146.8GB 10,000 rpm, U320 Universal Hard Drive, 1"	286716-B22
	18.2GB 15,000 rpm, U320 Universal Hard Drive, 1"	286775-B22
	36.4GB 15,000 rpm, U320 Universal Hard Drive, 1"	286776-B22
	72.8GB 15,000 rpm, U320 Universal Hard Drive, 1"	286778-B22

NOTE: **This is a list of supported hard disk drives** (note that some drives may be discontinued).
NOTE: For complete compatibility information, refer to the SCSI Hard Drive Compatibility table located at:
http://www.compaq.com/products/servers/proliantstorage/drives-enclosures/docs/index.html

Software	**SANWorks Virtual Replicator**	
	NOTE: For additional Virtual Replicator ordering information refer to http://www.compaq.com/products/StorageWorks/swvr/swvrorderinfo.html.	
	License & Media (CD-ROM)	191802-B21

Universal Hot Plug Tape Drives	AIT 50 GB, Hot Plug (Carbon)	215487-B21
	AIT 35 GB, LVD Hot Plug (Carbon)	216886-B21
	20/40-GB DAT, Hot Plug (Carbon)	215488-B21

Storage Enclosures	StorageWorks Enclosure Model 4314T	190210-001
	StorageWorks Enclosure Model 4314T (Int'l)	190210-B31
	StorageWorks Enclosure Model 4314T (Japan)	190210-291
	StorageWorks Enclosure Model 4314R	190209-001
	StorageWorks Enclosure Model 4314R (Int'l)	190209-B31
	StorageWorks Enclosure Model 4314R (Japan)	190209-291
	StorageWorks Enclosure Model 4354R	190211-001
	StorageWorks Enclosure Model 4354R (Int'l)	190211-B31
	StorageWorks Enclosure Model 4354R (Japan)	190211-291

Options

Related Products	HP RAID LC2 Controller	188044-B21
	HP RAID LC2 Controller (Japan)	188044-291
	HP Smart Array 5302/128 Controller	283552-B21
	HP Smart Array 5302/128 Controller (Japan)	283552-291
	HP Smart Array 5304/256 Controller	283551-B21
	HP Smart Array 5304/256 Controller (Japan)	283551-291

Technical Specifications

Protocol	Wide Ultra3 SCSI
SCSI Electrical Interface	Low Voltage Differential (LVD)
Drives Supported	Up to 28 Ultra320, Ultra3, and Ultra2 SCSI hard drives **NOTE**: The SA-532 will support all Ultra2 and Ultra3 servers, storage enclosures, and hard disk drives. The SA-532 does not support Single Ended hard disk drives, but does support Single Ended tape drives. (Single Ended refers to Wide Ultra SCSI and previous generations of the SCSI protocol).
SCSI Port Connectors	One external and one internal SCSI port
Data Transfer Method	64-Bit PCI bus-master
PCI Bus Speed	64-bit, 66-MHz PCI (533 MB/s maximum bandwidth)
PCI	3.3 volt CPI slot compatibility only **NOTE**: The SA-532 is not supported in 5 volt PCI slots.
Simultaneous Drive Transfer Channels	Two
Channel Transfer Rate	320 MB/s total; 160 MB/s per channel
Software upgradeable Firmware	Yes
Cache Memory	32 MB of DRAM used for code, transfer buffers, and non-battery backed read cache
Logical Drives Supported	32
Maximum Capacity	4.1TB (28 X 146.8 GB Ultra320 hard drives)
Memory Addressing	64-bit, supporting servers memory greater than 4 GB
RAID Support	RAID 5 (Distributed Data Guarding) RAID 1+ 0 (Striping and Mirroring) RAID 1 (Mirroring) RAID 0 (Stripping)
Upgradeable Firmware	1-MB Flashable ROM
Disk Drive and Enclosure Protocol Support	Ultra2, Ultra3, and Ultra320
Dimensions (HxWxD)	15.25 x 11.0 x 4.25 in/38.71 x 27.92 x 10.79 cm
Weight	3.06 lb (1.39 kg)
Warranty	Maximum: The remaining warranty of the ProLiant server product in which it is installed (to a maximum three-year limited warranty) Minimum: One-year, on-site limited warranty 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 ProLiant Server Documentation.