

### Overview

## Compaq Smart Array 5300A RAID Controller (3X-KZPDC-DF/BE)

### Models *(for AlphaServer Systems only)*

**Four-Channel PCI-to-SCSI Smart Array 5304A/256 Controller**  
3X-KZPDC-DF

**Two-Channel PCI-to-SCSI Smart Array 5302A/128 Controller**  
3X-KZPDC-BE

### Introduction

The Smart Array 5300A series of high-performance Ultra160 array controllers provide reliable data protection for AlphaServer systems and offers new levels of flexibility due to an innovative modular design and new Advanced Data Guarding (RAID ADG) technology. The Smart Array 5300A controller raises the standard to higher performance levels with several enhancements including a new memory architecture and new RAID engine.

Designed and tested with industry-standard ProLiant Servers for greater reliability and performance, and enhanced to include support for AlphaServers, this controller is ideal for the distributed workgroup server or centralized departmental server.

The 3X-KZPDC-XX controller is supported on the following AlphaServer systems:

<b>AlphaServer DS10</b>	One 3X-KZPDC-XX controller - maximum
<b>AlphaServer DS15</b>	Four 3X-KZPDC-XX controllers - maximum
<b>AlphaServer DS20E</b> (EV67 Pass2.6+ and EV68)	One 3X-KZPDC-XX controller - maximum
<b>AlphaServer DS25</b>	Four 3X-KZPDC-XX controllers - maximum
<b>AlphaServer ES40</b> (EV68)	Six 3X-KZPDC-XX controllers - maximum
<b>AlphaServer ES45</b>	Six 3X-KZPDC-XX controllers - maximum
<b>AlphaServers ES47, ES80, GS80, GS160, GS320, and GS1280</b>	For support on these platforms see the ES47, ES80, GS80, GS160, GS320 and GS1280 QuickSpecs at the following URL: < <a href="http://h18000.www1.hp.com/products/quickspecs/Division/10410.html">http://h18000.www1.hp.com/products/quickspecs/Division/10410.html</a> > <b>NOTE:</b> This Web site is available in English only.

### At a Glance

- Advanced RAID level (3X-KZPDC-DF only) - **Advanced Data Guarding**
- High-performance architecture
- Innovative modular design
- High capacity
- Two-channel models support up to 28 drives
- Four-channel models support up to 56 drives
- Multiple battery-backed cache options
- Support on OpenVMS Version 7.3-1 and later
- Support on Tru64 UNIX V5.1A with PK4 and NHD5 and V5.1B with PK2

### Overview

### Key Features

- High-performance, fifth generation architecture offers the new hardware RAID engine, and a new performance memory architecture for increased performance over previous controllers
- Advanced Data Guarding (RAID ADG) offers breakthrough level of fault protection of RAID volumes up to 2 TB and a total of 56 disk drives in a RAID volume. RAID ADG provides fault protection greater than RAID 1 or RAID 5 and only consumes the capacity of two disk drives for distributed parity data. RAID ADG protects against any two disk drive failures. This higher level of protection is ideal to protect large logical volumes and with high capacity disk drives where a failed drive rebuild time may be significant.  
**NOTE: RAID ADG is a standard feature of the 3X-KZPDC-DF only.**
- Recovery ROM protects against a ROM failure or corruption
- Ultra160 SCSI technology delivers high performance and data bandwidth up to 160 MB/s bandwidth per channel
- Up to four channels provides the highest storage capacity per PCI slot in the industry
- Mix-and-match LVD SCSI compatibility protects investments and lets users deploy drives as needed
- Battery-backed cache protects cached data in the event of a power outage, server failure, or controller failure; redundant, replaceable batteries provide additional protection
- 64-bit, 66-MHz PCI interface boosts bandwidth up to a 533 MB/s total transfer rate
- 64-bit memory addressing supports servers with greater than 4 GB of memory
- Online Management Features Online Capacity Expansion, Online RAID Level Migration, Online Stripe Size Migration, Online Spares, User Selectable Read/Write cache, User Selectable Expand and Rebuild Priority

### Product Highlights

#### Performance

- Wide Ultra160 SCSI (160 MB/s bandwidth) per channel
  - High-performance 64-bit architecture, featuring a super-scalar RISC processor
  - New RAID XOR engine
  - New performance memory architecture providing tri-directional data flow for improved performance
  - 64-bit, 66-MHz PCI bus (533-MB/s bandwidth)
- 

#### Capacity

Given the need for scalable capacity growth of server storage, the SA-5300A family offers up to four SCSI channels for over 16 TB of storage from a single PCI slot:

- Four-channel models support up to 56 hard drives
  - Two-channel models support up to 28 hard drives
- 

#### Availability

Provides increased server uptime by providing advanced storage functionality:

- Online RAID Level Migration
  - Online Capacity Expansion
  - Global Online Hot Spare
- 

#### 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 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 re-maps 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.
- 

#### 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 ADG) – 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. It is a standard feature with the 3X-KZPDC-DF only.
  - 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 the drive array to data and the other half to mirrored data, providing two copies of each file. It is a high-performance RAID.
-

### Product Highlights

#### Fault Recovery

- Minimizes downtime, reconstructs data, and facilitates a quick recovery from drive failure.
- Recovery ROM – provides a unique redundancy feature that protects from a ROM failure. 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 four 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.
- ECC-Protected Cache Memory – Removable, battery-backed cache memory protects data, up to four days, in the event of power failure, server hardware failure or controller failure. In addition, an exclusive design that includes redundant and replaceable batteries for greater cache protection is provided.
- 128-MB and 256-MB cache modules also feature Chip Recovery, protecting the cache memory from a single chip failure and multi-bit errors from any single memory chip.

#### Ease of Use

Consistency and upgrade ability make the Smart Array Controller unique in the industry:

- Common data formatting between generations of products
- Data migration between servers and external storage enclosures

#### Operating Systems Compatibility

- OpenVMS V7.3-1 and later
- Tru64 UNIX V5.1A / TruCluster UNIX V5.1A with PK4 and NHD5 (non-shared)
- Tru64 UNIX V5.1B / TruCluster UNIX V5.1B with PK2 (non-shared)

#### Software Suite

The Smart Array Controllers for AlphaServer systems share a common set of configuration and management tools with Smart Array Controllers for the ProLiant Servers, including Array Configuration Utility XE (ACU-XE) and Insight Manager Storage Agents. 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.

#### Configuration and Diagnostic Utilities

- Compaq Array Configuration Utility XE (ACU-XE)\*
  - Easy to use Wizards for configuration
  - Powerful Web based configuration utility for all Smart Array controllers
  - Provides a graphical view of drive array configurations
  - Allows management of multiple arrays over a secure internet connection from anywhere in the world
  - Runs online on Tru64 UNIX and OpenVMS
- Option ROM Configuration for Arrays (ORCA)
  - Offline configuration utility
- AlphaServer Drive Firmware Upgrade Utility for SmartArray Controllers
  - Ensures selected disk drive firmware is populated with latest version of firmware

\* OpenVMS requires the following minimums: ACU-XE Configuration Utility B0126; HP OpenVMS Management Agent kit V3.02

### Service and Support

**AlphaServer Services** The Smart Array 5300A Raid Controller assumes the same warranty level or service level as the AlphaServer system into which it is installed. HP offers a comprehensive set of AlphaServer services designed to provide customers with the flexibility to select the service solution that best meets their system availability requirements.

---

**Warranty** Hardware maintenance 8-5, M-F, Next Business Day on-site response

---

**Care Packs** Upgraded warranty service packages that include higher levels of on-site response, extended coverage hours, upgraded software services, and other features available in one, three, and five-year terms.

- Care Pack Integrated Hardware / Software Service Packages
- Care Pack Hardware Service Packages
- Care Pack Software Service Packages
- Care Pack Installation Service Packages

---

**Post-Warranty Care Packs** Packaged services for AlphaServers whose warranty has expired; same service offerings and features as the Care Pack services listed above, but priced exclusive of warranty.

---

**Annuity Service Agreements**

- Hardware Maintenance Agreement
- Software Maintenance Agreements
- Installation Service (Per Call Time and Materials)

---

**RAID Setup and Performance Consulting** (via statement of work)

- For additional information on Care Pack descriptions, part numbers, business rules, and pricing, refer to the following: <http://www.hp.com/hps/carepack/>
- Select the One Step Quoting Guide link under the section titled "Selling and Pricing Information."
- For additional information on Annuity Service Agreements or Raid Setup and Performance Consulting, contact your Services Sales Representative.

**NOTE:** This Web site is available in English only.

### Options

<b>Controller Options</b>	256-MB Cache Module for Smart Array 5302A Controller (3X-KZPDC-BE) <b>NOTE:</b> This cache module is battery backed.	254786-B21
---------------------------	---	------------

<b>HP StorageWorks Modular Smart Array 30 Enclosure</b> (formerly known as HP StorageWorks 4400 Enclosure)	The HP StorageWorks Modular Smart Array 30 (MSA 30) Enclosure is an Ultra320 SCSI disk drive storage enclosure. The drive carrier is designed to support Ultra320, Ultra3, and Ultra2 hard drives. StorageWorks 4200 or StorageWorks 4300 may be upgraded to the MSA30. See <b>HP StorageWorks Modular Smart Array 30 Enclosure QuickSpecs</b> for configuration details: <a href="http://h18000.www1.hp.com/products/quickspecs/11738_div/11738_div.HTML">http://h18000.www1.hp.com/products/quickspecs/11738_div/11738_div.HTML</a>	
<b>Model MSA30, Single-bus</b>	Rack-mountable 14-drive enclosure with single bus, dual power supplies	3R-A4075-AA
<b>Model MSA30, Dual-bus</b>	Rack-mountable 14-drive enclosure with dual bus, dual power supplies	3R-A4076-AA

<b>HP StorageWorks 4300 Enclosure</b>	StorageWorks Enclosure 4314R	190209-001 DS-SL13R-AA
	StorageWorks Enclosure 4314R (International)	190209-B31 DS-SL13R-AB
	StorageWorks Enclosure 4314R (Japan)	190209-291 DS-SL13R-AJ
	StorageWorks Enclosure 4354R	190211-001 DS-SL13R-BA
	StorageWorks Enclosure 4354R (International)	190211-B31 DS-SL13R-BB
	StorageWorks Enclosure 4354R (Japan)	190211-291 DS-SL13R-BJ
	Internal Card Cage (DS20E, DS25, ES40, ES45)	BA610-6D

**NOTE:** StorageWorks Enclosures ship with 12-foot VHDCI to VHDCI Cable.

<b>Cables</b>	Cable Assembly, U160 SCSI, VHDCI to VHDCI Connectors, 6 foot length	3X-BC56J-02
	Cable Assembly, U160 SCSI, VHDCI to VHDCI Connectors, 12 foot length	3X-BC56J-03
	Cable Assembly, U160 SCSI, VHDCI to VHDCI Connectors, 24 foot length	3X-BC56J-04
	Cable Assembly, U160 SCSI, VHDCI to VHDCI Connectors, 39 foot length	3R-A0462-AA

### Options

#### Universal SCSI Drives

<b>Ultra 320 Drives</b>	300-GB Pluggable Ultra320 SCSI 10,000 rpm Hard Drive	350964-B22 3R-A4952-AA
	146.8-GB Pluggable Ultra320 SCSI 10,000 rpm Hard Drive	286716-B22 3R-A3841-AA
	72.8-GB Pluggable Ultra320 SCSI 10,000 rpm Hard Drive	286714-B22 3R-A3839-AA
	300-GB Pluggable Ultra320 SCSI 15,000 rpm Hard Drive	411089-B22 3R-A6726-AA
	146.8-GB Pluggable Ultra320 SCSI 15,000 rpm Hard Drive	347708--B22 3R-A4954-AA
	72.8-GB Pluggable Ultra320 SCSI 15,000 rpm Hard Drive	286778-B22 3R-A3851-AA
	36.4-GB Pluggable Ultra320 SCSI 15,000 rpm Hard Drive	286776-B22 3R-A3849-AA

**NOTE:** Ultra 2 and Ultra3 drives are also supported in 4300 configurations.

### Technical Specifications

<b>Electrical Interface</b>	LVD (Low Voltage Differential)
<b>Protocol Support</b>	Wide Ultra160 SCSI (160 MB/s per channel)
<b>SCSI Ports</b>	4-channel model: 4 external/2 Internal shared 2-channel model: 2 external/2 internal shared
<b>Drives Supported</b>	4-channel model: up to 56 drives 2-channel model: up to 28 drives
<b>PCI</b>	PCI 2.2 Compliant (33 MHz/66 MHz and 3.3v/5.0v)
<b>PCI Bus Speed</b>	64-bit, 66-MHz PCI (533 MB/s maximum bandwidth)
<b>Logical Drives</b>	Up to 32 logical drives
<b>RAID Support</b>	RAID ADG (Advanced Data Guarding)* included with model 3X-KZPDC-DF RAID 5 (Distributed Data Guarding) RAID 1+0 (Striping & Mirroring) RAID 0 (Striping)
<b>Cache Memory</b>	128-MB or 256-MB modules ECC protection, battery-backed, and removable
<b>Cache Batteries</b>	Up to four days of redundant battery life, removable for easy replacement
<b>Upgradeable Firmware</b>	2-MB flashable ROM
<b>Disk Drive and Enclosure Protocol Support</b>	Universal Hot Plug U320, Ultra3 and Ultra2 hard drives
<b>Memory Addressing</b>	64-bit, supporting servers memory greater than 4 GB
<b>Dimensions (H x W x D)</b>	18.375 x 8.25 x 4 in (46.67 x 20.95 x 10.16 cm)
<b>Weight</b>	<b>Smart Array 5304A 3X-KZPDC-DF</b> 3.26 lb (1.48 kg) <b>Smart Array 5302A 3X-KZPDC-BE</b> 3.12 lb (1.42 kg)

© Copyright 2007 Hewlett-Packard Development Company, L.P.

The information contained herein is subject to change without notice.

UNIX is a registered trademark or trademark of The Open Group 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.