Overview

HP Smart Array 5i Plus Controller and Battery Backed Write Cache (BBWC) Enabler

Models

Smart Array 5i Plus Controller and BBWC Enabler bundled Option Kit (for ProLiant DL380 G2, ProLiant DL380 G2 Packaged Cluster, DL380 G3 Packaged Cluster)
264030-B21
264030-291 (Japan)
Smart Array 5i Plus Controller and BBWC Enabler bundled Option Kit (for ProLiant ML370 G2)
263697-B21
263697-291 (Japan)
Battery Backed Write Cache Enabler Option Kit (for ProLiant DL360 G2, ProLiant DL580 G2 (1P Model), ProLiant DL380 G3, ProLiant BL p-Class (20p Model))
255514-B21
255514-291 (Japan)

Introduction

The new Smart Array 5i Plus Controller is an intelligent array controller for entry-level, hardware-based fault tolerance for protection of OS, applications, and logs. Dual Ultra3 SCSI channels (one internal and one external) allow you to support all Ultra2, Ultra3, and/or Ultra320 SCSI internal hard disk drives as well as support up to 14 Ultra2, Ultra3, and/or Ultra320 SCSI external hard disk drives using the StorageWorks™ Enclosure 4300 Family. The Smart Array 5i Plus controller provides one of the most cost effective alternatives to software-based RAID in the market today. Designed as a standard on the ProLiant DL580 G2 (2P Models) and as an optional upgrade with the ProLiant ML370 G2, ProLiant DL380 G2, ProLiant DL380 G3, ProLiant DL380 G2 Packaged Cluster, and ProLiant DL380 G3 Packaged Cluster servers, the Smart Array 5i Plus controller and BBWC Enabler bundle provides increased performance and worry-free transportable battery backed write cache data protection for all server internal storage needs, without consuming a PCI slot.

BBWC Enabler optional upgrade for the ProLiant DL360 G2*, ProLiant DL380 G3, ProLiant DL580 G2 (1P Models), and ProLiant BL p-Class (20p Models), servers and provides increased performance and worry-free battery backed write cache data protection for all server internal storage needs.

***NOTE:** The DL360 Generation (G2) servers utilize the embedded Smart Array 5i Controller with 32MB of memory and not the Smart Array 5i Plus.

What's New

Updated server support list

Target Environments

The Smart Array 5i Plus Controller offers superior investment protection to the following environments:
Non-RAID: Current storage operations where, until now, there has not been a perceived need for data protection, security, or performance gains.
Software RAID: Current storage operations using software RAID where growing data storage requirements demand the robustness, efficiency, and performance increases available with entry-level hardware RAID.

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.

  NOTE: You cannot upgrade from the Integrated Smart Array Controller to the Smart Array 5i Controller because the Integrated Smart Array Controller is embedded on the system board and cannot be removed.

However, any hard drives on the Integrated Smart Array Controller can be moved to another server that has the Smart Array 5i Controller and that data would be seamlessly recognized.

- **Consistent Configuration and Management Tools** – across the entire family of Smart Array controllers minimizes 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 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.

Key Products Features

Smart Array 5i Plus

- Increased performance over the Integrated Smart Array Controller and the Smart Array 5i Controller.
- Transportable, hardware-based Wide Ultra3 SCSI RAID controller, with 64MB of memory.
- More robust and easier to use than software-based RAID.
- Available standard on the ProLiant DL580 G2 (2P Models) and as an optional upgrade bundled with the Battery Backed Write Cache Enabler, for the ProLiant ML370 G2, ProLiant DL380 G2, ProLiant DL380 G3, ProLiant DL380 G2 Packaged Cluster, and ProLiant DL380 G3 Packaged Cluster servers.
- Compatibility with all Ultra2, Ultra3, and Ultra320 LVD family products. In addition, a seamless upgrade to next generation HP entry-level or high- performance mainstream Ultra3 Smart Array controllers.
- 32-bit architecture
- Dual SCSI channels (one internal and one external)
- Universal hot-plug tape drive support and native SCSI pass through for tape backup support.
- Recovery ROM protects against a ROM image corruption.

BBWC Enabler

- Battery backed write cache for increased controller performance
- Battery charge of 72 hours and Battery life of 3 years
- Available as an optional upgrade for the ProLiant DL360 G2, ProLiant DL380 G3, ProLiant DL580 G2 (1P Models), and ProLiant BL p-Class (Model 20p) servers.

Compatibility

Servers

Available as an optional upgrade bundled with the Battery Backed Write Cache Enabler, for the ProLiant ML370 G2 and ProLiant DL380 G2 servers.
Also available as an optional upgrade is the Battery Backed Write Cache Enabler Option Kit for the ProLiant DL360 G2, and the ProLiant DL580 G2 (1P Model) servers.

NOTE: For up to date Smart Array compatibility and support information, visit:
ftp://ftp.compaq.com/pub/products/storageworks/array-and-scsi-controllers/SA_hardware_compatibility.pdf

Operating Systems

- NT® 4.0 Server
- NT 4.0 Enterprise Edition
- NT 4.0 Terminal Server
- Windows 2000®
- Windows 2000 Advanced Server
- NetWare® 4.2*
- NetWare 5.x
- Linux® RedHat® 7.0, 7.1
- Caldera® OpenLinux 2.3.1 and 3.1
- UnixWare® 7.x

*__NOTE:__ NetWare 4.11 with SupportPack 9 is supported.

NOTE: Your server may not be supported on all operating systems listed. For an up to date server OS support matrix, please consult:
ftp://ftp.compaq.com/pub/products/servers/os-support-matrix-310.pdf

Software Suite

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

Insight Manager XE

- 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

Software

SmartStart 5.1 – Includes Array Configuration Utility XE (ACU-XE), Array Configuration Utility (ACU) and Insight Manager XE (CIM-XE).

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.

NOTE: You cannot upgrade from the Integrated Smart Array Controller to the Smart Array 5i Controller because the Integrated Smart Array Controller is embedded on the system board and cannot be removed. However, any hard drives on the Integrated Smart Array Controller can be moved to another server that has the Smart Array 5i Controller and that data would be seamlessly recognized.

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 monitor's 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.
- 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:
- **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

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**	
	License & Media (CD-ROM)	191802-B21

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

Related Products	HP Smart Array 532 Controller	225338-B21
	HP Smart Array 532 Controller (Japan)	225338-291
	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
	256MB Battery Backed Cache Module	254786-B21
	NOTE: This 256MB Battery Backed Cache Module supports the Smart Array 5300 series controllers, MSA 1000 and the Smart Array Cluster Storage	

Technical Specifications

Architecture	**Protocol**	Wide Ultra3 SCSI
	Processor	32-bit RISC
	XOR engine	Hardware RAID
	Electrical interface	Low Voltage Differential (LVD)
	Simultaneous Drive Transfer Channels	2
	SCSI Port Connectors	320 MB/s total; 160 MB/s per channel
	Memory	64 MB of DRAM used for code, transfer buffers, and battery backed read cache
	Peak transfer rate	160 MB/s
	Logical Drives Supported	32
	Software Upgradeable Firmware	Yes
	RAID Support	RAID 5 (Distributed Data Guarding
		RAID 1+ 0 (Striping and Mirroring)
		RAID 1 (Mirroring)
		RAID 0 (Stripping)
	Disk Drive and Enclosure Protocol Support	Ultra2, Ultra3, Ultra320

Option Kit Contents (ProLiant ML370 G2, ProLiant DL380 G2, ProLiant DL380 G2 Packaged Cluster, and ProLiant DL380 G3 Packaged Cluster servers)

- Field installable memory board, battery board and cable (installs on server board)
- Support software CD
- User guide
- Warranty card

Option Kit Contents (ProLiant DL360 G2, ProLiant DL380 G3, ProLiant DL580 G2 (1P Models), and ProLiant BL p-Class (Model 20p) servers)

- Field installable battery board and cable (installs on server board)
- Support software CD
- User guide
- Warranty card

Warranty

- **Maximum**: The remaining warranty of the ProLiant server in which it is installed (to a maximum three-year, limited warranty)
- **Minimum**: One-year, on-site limited warranty