



H A R D W A R E R A I D C O N T R O L L E R S

3ware® Product Guide

Fall / Winter 2007



AMCC
STORAGE



PCI
EXPRESS





AMCC Headquarters in Sunnyvale, CA

- Industry leading 3ware® Serial Attached SCSI and Serial ATA RAID controllers for performance, capacity and peace of mind
- Leading¹ supplier of SATA II hardware RAID controllers and solutions to premier channel partners
- Over 2.5 million SATA ports shipped

¹ Source: Gartner Dataquest Host Bus RAID Controllers Report (September 2006)

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About 3ware RAID Controllers

3ware RAID controllers and storage solutions deliver full-featured true hardware RAID to servers, workstations and storage systems. 3ware controllers are available in 2, 4, 8, 12, 16, and 24-port configurations, and are the most compelling RAID solutions available.



Advanced RAID features, SAS and SATA II connectivity, and powerful 3ware performance architecture make 3ware controllers ideal for vertical applications that require the highest levels of sustained write and read performance.

The company is headquartered in Sunnyvale, California with offices throughout the world.

For more information, visit www.3ware.com.



APPLICATIONS FOR 3WARE CONTROLLERS



Servers



Security/
Surveillance



Pro
Video



Super
Computing



NAS



Video
On-Demand



Pro
Audio



Disk-to-Disk
Backup

Expand Your Horizon with SAS Connectivity, Data Protection and Performance.

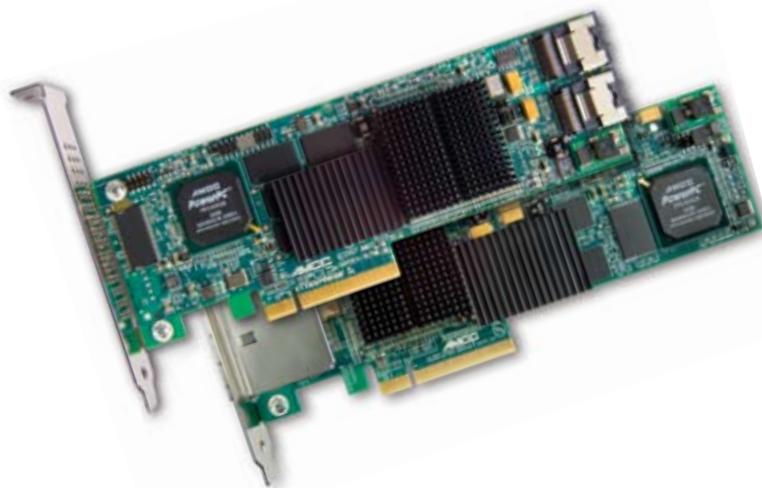
3ware® 9690SA High Performance Serial Attached SCSI (SAS) RAID Controllers

AMCC builds on established 3ware SATA RAID leadership to introduce the 3ware 9690SA SAS controller, the new standard in Serial Attached SCSI RAID. As SATA and SAS technologies converge, users look to 3ware SATA for price and performance and to SAS for SAS/SATA connectivity with expansion up to 128 devices. The 3ware 9690SA delivers accelerated SAS performance and the flexibility of internal and external connectivity.



3ware 9690SA Specifications

- Scalable to 128 SAS and/or Serial ATA devices
- PCI Express eight lane (x8) host interface
- Configuration flexibility with eight internal ports, or eight external ports, or four internal/four external ports
- SAS, SATA, and SATA II features, including 3Gb/s and NCQ
- Low profile form factor
- 512MB DDR2 533 fixed memory
- RAID levels 0, 1, 5, 6, 10, 50 and Single Disk
- RoHS 6 of 6 and WEEE compliant



3ware 9690SA Series Selection Guide

	9690SA-8I	9690SA-8E	9690SA-4I4E
Form Factor	Low profile	Low profile	Low profile
SAS Ports	8 Internal	8 External	4 Internal/4 External
PCI Express	x8	x8	x8
RAID Levels	0, 1, 5, 6, 10, 50, Single Disk	0, 1, 5, 6, 10, 50, Single Disk	0, 1, 5, 6, 10, 50, Single Disk
Onboard Memory	512MB DDR2 533	512MB DDR2 533	512MB DDR2 533
Connector Type	SFF-8087 mini-SAS	SFF-8088 mini-SAS	SFF-8087/SFF-8088 mini-SAS
BBU with Remote Battery Support	Yes	Yes	Yes

3ware® 9650SE

High Performance PCI Express to Serial ATA II RAID Controllers

The best keeps getting better with red hot RAID 6

AMCC's 3ware 9650SE SATA II hardware RAID controllers deliver industry-leading RAID 6 and RAID 5 performance, robust fault tolerance, and multi-terabyte capacities. A PCI Express host interface, Multi-lane™ connectivity, StorSwitch™ architecture, and sophisticated SATA II features drive this unrivaled performance.

3ware 9650SE Specifications

- PCI Express x1, x4, x8 configurations
- Serial ATA II advanced features
 - 3Gb/s transfer speed
 - Native Command Queuing
- Low profile form factor
 - 2, 4, 8-port configurations
- Full height form factor
 - 12, 16, 24-port configurations
- RAID levels: 0, 1, 5, 6, 10, 50, Single Disk, JBOD (see chart below)
- RoHS 6 of 6 and WEEE compliant



3ware 9650SE Series Selection Guide

	9650SE-2LP	9650SE-4LPML	9650SE-4LPME	9650SE-8LPML	9650SE-12ML	9650SE-16ML	9650SE-24M8
Form Factor	Low profile	Low profile	Low profile	Low profile	Full height	Full height	Full height
Port Count	2	4	4	8	12	16	24
PCI Express	x1	x4	x4	x4	x8	x8	x8
RAID Levels	0, 1, Single Disk, JBOD	0, 1, 5, 10, Single Disk, JBOD	0, 1, 5, 10, JBOD	0, 1, 5, 6, 10, 50, Single Disk, JBOD	0, 1, 5, 6, 10, 50, Single Disk, JBOD	0, 1, 5, 6, 10, 50, Single Disk, JBOD	0, 1, 5, 6, 10, 50, Single Disk, JBOD
Onboard Memory	128MB DDR2 533	256MB DDR2 533	256MB DDR2 533	256MB DDR2 533	256MB DDR2 533	256MB DDR2 533	512MB DDR2 533
Connector Type	Discrete	Multi-lane	Multi-lane (external)	Multi-lane	Multi-lane	Multi-lane	Multi-lane
BBU Support	No	Yes	Yes	Yes	Yes	Yes	Yes

3ware® 9550SXU*

High Performance PCI-X to Serial ATA II RAID Controllers

High Performance PCI-X RAID Solution of Choice

The 3ware 9550SXU SATA II RAID controller delivers performance, robust fault-tolerance, and multi-terabyte capacities. Combined with an advanced RAID management feature set that includes web-based, command-based, and API software components, the 9550SXU, available in 4, 8, 12, and 16-port configurations, is the most compelling PCI-X solution available.

3ware 9550SXU Specifications

- PCI-X 1.0b (and PCI 2.3) compliant
 - 64-bit/133/100/66MHz bus master
- Serial ATA II advanced features
 - 3Gb/s transfer speed
 - Native Command Queuing
- Low profile (4 and 8-port) and full height form factors
- 4, 8, 12, and 16-port configurations
- RAID levels: 0, 1, 5, 10, 50, Single Disk, and JBOD (see chart below)
- RoHS 6 of 6 and WEEE compliant



3ware 9550SXU Series Selection Guide

	9550SXU-4LP	9550SXU-8LP	9550SXU-12	9550SXU-12MI	9550SXU-12ML	9550SXU-16ML
Form Factor	Low profile	Low profile	Full height	Full height	Full height	Full height
Port Count	4	8	12	12	12	16
Host Interface	PCI-X	PCI-X	PCI-X	PCI-X	PCI-X	PCI-X
Host Interface Speed	64-bit/133MHz	64-bit/133MHz	64-bit/133MHz	64-bit/133MHz	64-bit/133MHz	64-bit/133MHz
RAID Levels	0, 1, 5, 10, Single Disk, JBOD	0, 1, 5, 10, 50, Single Disk, JBOD	0, 1, 5, 10, 50, Single Disk, JBOD	0, 1, 5, 10, 50, Single Disk, JBOD	0, 1, 5, 10, 50, Single Disk, JBOD	0, 1, 5, 10, 50, Single Disk, JBOD
Onboard Memory	128MB	128MB	256MB	256MB	256MB	256MB
Connector Type	Discrete	Discrete	Discrete	Multi-lane	Multi-lane	Multi-lane

*A "U" has been added to all 9550SX part numbers to denote RoHS 6 of 6 compliance

3ware® Sidecar

High-Performance Hardware RAID Storage for PC and Apple Workstations

Think Outside the Box

The 3ware® Sidecar featuring true hardware RAID is the only external storage choice for PCs, Apple® Mac Pro and Power Mac® G5 when capacity, performance, data protection, and ease of use are the goals.

Broad OS support including Mac OS X, Windows, and Linux, an easily configurable RAID controller teamed with an intuitive management suite, and Multi-lane connectivity make the 3ware Sidecar as easy to use as 1-2-3.

3ware Sidecar Features

- High performance 4-port PCI Express to SATA II RAID controller for real hardware RAID
 - RAID levels 0, 1, 5, 10 and JBOD
 - 256MB DDR2 533 memory with ECC protection
 - BBU Support
- Complete configuration management suite
 - 3ware Disk Manager 2 (3DM®2)
 - Command Line Interface (CLI)
- 4-bay external Serial ATA desktop enclosure
 - Hot-swap and hot-spare support for easy maintenance
 - 4TB of external storage when loaded with 1TB drives (not included)
 - Front panel LED status indicators
- RoHS 6 of 6 and WEEE compliant (lead free)



PCI EXPRESS®



Operating System Support

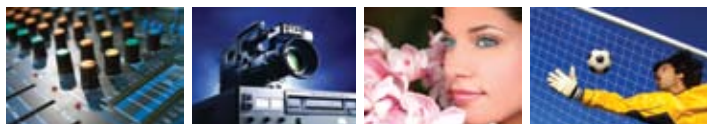
- Microsoft Windows 2003/XP/2000 (32/64-bit)
- Microsoft Windows Vista (32/64-bit)
- Red Hat Linux, SuSE Linux, Fedora Core (32/64-bit)
- Linux Kernels 2.4, 2.6 (32/64-bit)
- FreeBSD (32/64-bit)
- Mac OS X (G5: 10.4.6+, Mac Pro: 10.4.8)

For complete OS listing, go to: www.3ware.com/support/OS-support

3ware Sidecar Minimum System Requirements

- PC workstation, or Apple Mac Pro, or Apple Power Mac G5
- Available PCI Express slot (x4 minimum)
- Supported operating system

Note: Power Mac G5 with PCI-X is not supported



How Much is 4TB?

	Data	Quantity
Movie=1GB	Movies	4,000
Digital Photo=5MB	Digital Photos	800,000
Song=3MB	Songs	1,500,000
Spreadsheet=100KB	Spreadsheets	40,000,000

xSATA vs. eSATA, FireWire and USB

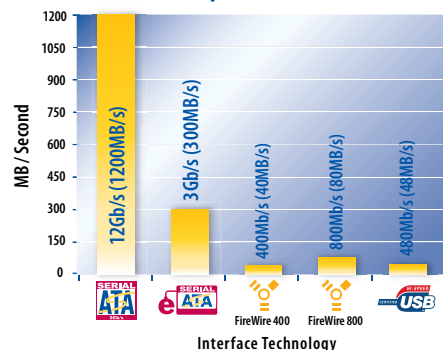
xSATA offers significantly faster transfer speeds, better scalability, and improved cabling options than eSATA, FireWire and USB interfaces.

Interface	Interface Speed
xSATA	12Gb/s (1200MB/s)
eSATA	3Gb/s (300MB/s)
FireWire 800	800Mb/s (80MB/s)
FireWire 400	400Mb/s (40MB/s)
USB 2.0	480Mb/s (48MB/s)

Note: These interfaces use 8b/10b encoding



xSATA up to 28x FASTER!



xSATA has a TOTAL speed-matching bandwidth of 1.2GB/s (300MB/s X 4-lanes!)

eSATA Solutions share the 300MB/s bandwidth among the available lanes (300MB/s ÷ 4 lanes)

Multi-lane™

High-Performance SAS and SATA Cable and Connector System

Get Connected via the Multi-lane™ Expressway

AMCC's award winning Multi-lane design enables highly reliable and streamlined enterprise-class SAS and SATA storage solutions by greatly reducing the number of cables needed to connect controllers, backplanes, and standard SAS/SATA drives.

The Multi-lane SATA cable/connection system is fast, secure, simple, and clutter free. It combines the RAID controller's multiple SAS/SATA ports into single locked connections. Multiple 3Gb/s lanes of SAS/SATA traffic travel through just one cable from the RAID controller to the system backplane or to multiple hard drives with a breakout cable.

Multi-lane Benefits

- Multiple lanes of high speed SAS and/or SATA traffic through a single cable
- Increased system reliability
- Reduced cable count
- Streamlined storage
- Locked connections
- Improved airflow

Multi-lane SAS and SATA Cable and Connector Systems

SFF-8088 to SFF-8088
(Multi-lane external SAS)



3ware Controller Model #
9690SA (-8E, -4I4E)

3ware order #
CBL-SFF8088SAS-10M (1.0 m)
CBL-SFF8088SAS-20M (2.0 m)

SFF-8088 to SFF-8470
(Multi-lane external SAS converter cable)



3ware Controller Model #
9690SA (-8E, -4I4E)

3ware order #
CBL-SFF8088IB-10M (1.0 m)
CBL-SFF8088IB-20M (2.0 m)

SFF-8087 to SFF-8482
(Forward SAS breakout cable w/ drive power connectors)



3ware Controller Model #
9690SA (-8I, -4I4E)

3ware order #
CBL-SAS8087OCF-06M (0.6 m)

SFF-8087 to SFF-8087
(Multi-lane internal)



3ware Controller Model #
9690SA (-8I, -4I4E)
9650SE (-4LPML, -8LPML, -12ML, -16ML)
9550SXU (-12ML, 16ML)

3ware order #
CBL-SFF8087-05M (0.5 m)
CBL-SFF8087-06M (0.6 m)

SFF-8087 to Discrete
(Forward breakout cable)*



3ware Controller Model #
9650SE (-4LPML, -8LPML, -12ML, -16ML)
9550SXU (-12ML, -16ML)

3ware order #
CBL-SFF8087OCF-05M (0.5 m)
CBL-SFF8087OCF-06M (0.6 m)
CBL-SFF8087OCF-10M (1.0 m)

Discrete to SFF-8087
(Reverse breakout cable)*



3ware Controller Model #
9550SXU (-4LP, -8LP, -12)
9500S-4LP

3ware order #
CBL-SFF8087OCR-05M (0.5 m)
CBL-SFF8087OCR-06M (0.6 m)
CBL-SFF8087OCR-10M (1.0 m)

SFF-8087 to SFF-8470
(Bi-directional Multi-lane hybrid cable)



3ware Controller Model #
9650SE (-4LPML, -8LPML, -12ML, -16ML)
9550SXU (-12ML, -16ML)
(SFF-8087 on controller)

3ware order #
CBL-SFF8087IB-05M (0.5 m)
CBL-SFF8087IB-06M (0.6 m)

M8 to SFF-8087
(Multi-lane internal "Y" cable)



3ware Controller Model #
9650SE-24M8

3ware order #
CBL-M8ML-06M (0.6 m)

M8 to Discrete
(Forward breakout cable)*



3ware Controller Model #
9650SE-24M8

3ware order #
CBL-M8OCF-06M (0.6 m)
CBL-M8OCF-10M (1.0 m)

Discrete SATA
(Standard, point-to-point SATA cable)



3ware Controller Model #
9650SE-2LP
9550SXU (-4LP, -8LP, -12)
9500S-4LP
8006-2LP

3ware order #
CBL-SATA-39 (39"/1 m)

Discrete to SFF-8470
(Reverse breakout cable)*



3ware Controller Model #
9550SXU (-4LP, -8LP, -12)
9500S-4LP

3ware order #
CBL-OCR-18 (0.5 m)
CBL-OCR-10M (1.0 m)

SFF-8088 to SFF-8088
(Multi-lane external)



3ware Controller Model #
(3ware Sidecar)

3ware order #
CBL-SFF8088-20M (2.0 m)

SFF-8470 to SFF-8087
(Bi-directional Multi-lane hybrid cable)



3ware Controller Model #
9550SXU-12MI

3ware order #
CBL-SFF8087IB-05M (0.5 m)
CBL-SFF8087IB-06M (0.6 m)

SFF-8470 to SFF-8470
(Multi-lane internal)



3ware Controller Model #
9550SXU-12MI

3ware order #
CBL-IB-05M (0.5 m)
CBL-IB-10M (1.0 m)

SFF-8470 to Discrete
(Forward breakout cable)*



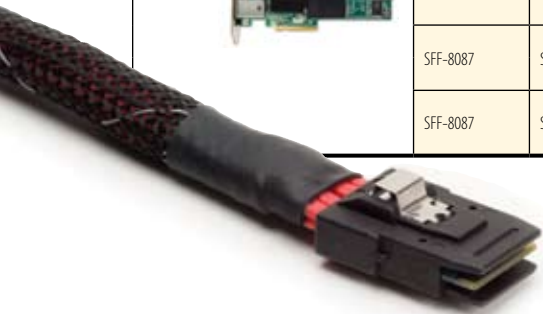
3ware Controller Model #
9550SXU-12MI

3ware order #
CBL-OCF-18 (0.5 m)
CBL-OCF-10M (1.0 m)

* Breakout cables have a Multi-lane connector on one end and discrete connectors on the other end
• Forward breakout cables have a Multi-lane connector on the controller end and discrete connectors to the drives
• Reverse breakout cables have discrete connectors on the controller end and a Multi-lane connector to the backplane
Note: Cable color may differ from colors shown

3ware Cable Matrix

Controller	Connector to Connector Options		Cable P/N Options	Cable Description	Where Used
	To Controller	To Drives / Backplane			
3ware 9690SA SAS/SATA RAID Controllers					
 9690SA-8E	SFF-8088	SFF-8088	CBL-SFF8088SAS-10M	1.0 meter cable	Connects the controller's SFF-8088 Multi-lane connector(s) to the enclosure's Multi-lane SFF-8088 connector(s)
			CBL-SFF8088SAS-20M	2.0 meter cable	
	SFF-8088	SFF-8470	CBL-SFF8088IB-10M	1.0 meter cable (converter cable)	Connects the controller's SFF-8088 Multi-lane connector(s) to the enclosure's Multi-lane SFF-8470 connector(s)
			CBL-SFF8088IB-20M	2.0 meter cable (converter cable)	
 9690SA-8I	SFF-8087	SFF-8087	CBL-SFF8087-05M	0.5 meter cable	Connects the controller's SFF-8087 Multi-lane connector(s) to the backplane's Multi-lane SFF-8087 connector(s)
			CBL-SFF8087-06M	0.6 meter cable	
	SFF-8087	SFF-8482	CBL-SAS8087OCF-06M		Connects the controller's SFF-8087 Multi-lane connector(s) to up to four individual SAS or SATA drives; includes individual drive power connectors
 9690SA-4I4E	SFF-8088	SFF-8088	CBL-SFF8088SAS-10M	1.0 meter cable	Connects the controller's SFF-8088 Multi-lane connector(s) to the enclosure's Multi-lane SFF-8088 connector(s)
			CBL-SFF8088SAS-20M	2.0 meter cable	
	SFF-8088	SFF-8470	CBL-SFF8088IB-10M	1.0 meter cable (converter cable)	Connects the controller's SFF-8088 Multi-lane connector(s) to the enclosure's Multi-lane SFF-8470 connector(s)
			CBL-SFF8088IB-20M	2.0 meter cable (converter cable)	
	SFF-8087	SFF-8087	CBL-SFF8087-05M	0.5 meter cable	Connects the controller's SFF-8087 Multi-lane connector(s) to the backplane's Multi-lane SFF-8087 connector(s)
			CBL-SFF8087-06M	0.6 meter cable	
	SFF-8087	SFF-8482	CBL-SAS8087OCF-06M		Connects the controller's SFF-8087 Multi-lane connector(s) to up to four individual SAS or SATA drives; includes individual drive power connectors



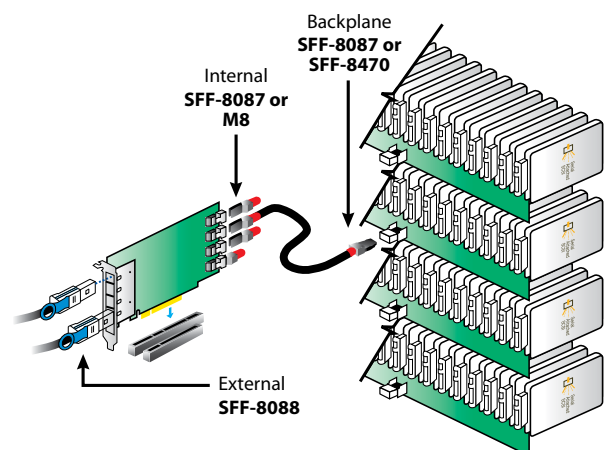
3ware 9650SE Internal RAID Controllers					
9650SE-2LP 	Discrete	Discrete	CBL-SATA-39	39" (1m) standard, discrete, point-to-point SATA cable	Connects a controller's discrete SATA port(s) to the drives' or backplane's discrete SATA connector(s)
9650SE-4LPML, -8LPML, -12ML, -16ML 	SFF-8087	SFF-8087	CBL-SFF8087-05M	0.5 meter cable	Connects the controller's SFF-8087 Multi-lane connector(s) to the backplane's SFF-8087 Multi-lane connector(s)
			CBL-SFF8087-06M	0.6 meter cable	
	SFF-8087	Discrete	CBL-SFF8087OCF-05M	0.5 meter forward breakout cable	Connects the controller's SFF-8087 Multi-lane connector(s) to the drives' or backplane's discrete SATA connector(s)
			CBL-SFF8087OCF-06M	0.6 meter forward breakout cable	
			CBL-SFF8087OCF-10M	1.0 meter forward breakout cable	
	SFF-8087	SFF-8470	CBL-SFF8087IB-05M	0.5 meter converter cable (internal hybrid)	Connects the controller's SFF-8087 Multi-lane (ML) connector(s) to the backplane's SFF-8470 Multi-lane (MI) connector(s)
CBL-SFF8087IB-06M			0.6 meter converter cable (internal hybrid)		
9650SE-24M8 	M8	SFF-8087	CBL-M8ML-06M	0.6 meter "Y" cable	Connects the controller's M8 Multi-lane connector(s) to the backplane's SFF-8087 Multi-lane connector(s)
	M8	Discrete	CBL-M8OCF-06M	0.6 meter forward breakout cable	Connects the controller's M8 Multi-lane connector(s) to the drives' discrete SATA connectors
			CBL-M8OCF-10M	1.0 meter forward breakout cable	
3ware 9650SE with External Connectivity (3ware Sidecar Only)					
9650SE-4LPME 	SFF-8088	SFF-8088	CBL-SFF8088-20M	2.0 meter cable	Connects the controller's SFF-8088 Multi-lane connector to the 3ware Sidecar's SFF-8088 Multi-lane connector

Controller	Connector to Connector Options		Cable P/N Options	Cable Description	Where Used
	To Controller	To Drives / Backplane			
3ware 9550SXU Internal RAID Controllers					
9550SXU-4LP, -8LP, -12 	Discrete	Discrete	CBL-SATA-39	39" (1m) standard, discrete, point-to-point SATA cable	Connects the controller's discrete SATA port(s) to the drives' or backplane's discrete SATA connector(s)
	Discrete	SFF-8087	CBL-SFF8087OCR-05M	0.5 meter reverse breakout cable	Connects the controller's discrete SATA port(s) to the backplane's SFF-8087 Multi-lane connectors
			CBL-SFF8087OCR-06M	0.6 meter reverse breakout cable	
			CBL-SFF8087OCR-10M	1.0 meter reverse breakout cable	
	Discrete	SFF-8470	CBL-OCR-18	0.5 meter reverse breakout cable	Connects the controller's discrete SATA connector(s) to the backplane's SFF-8470 Multi-lane connector(s)
			CBL-OCR-10M	1.0 meter reverse breakout cable	
9550SXU-12MI 	SFF-8470	SFF-8470	CBL-IB-05M	0.5 meter cable	Connects the controller's SFF-8470 Multi-lane connector(s) to the backplane's SFF-8470 Multi-lane connector(s)
			CBL-IB-10M	1.0 meter cable	
	SFF-8470	Discrete	CBL-OCF-18	0.5 meter forward breakout cable	Connects the controller's SFF-8470 Multi-lane connector(s) to the drives' or backplane's discrete SATA connector(s)
			CBL-OCF-10M	1.0 meter forward breakout cable	
	SFF-8470	SFF-8087	CBL-SFF8087IB-05M	0.5 meter converter cable (internal hybrid)	Connects the controller's SFF-8470 Multi-lane (MI) connector(s) to the backplane's SFF-8087 Multi-lane (ML) connector(s)
			CBL-SFF8087IB-06M	0.6 meter converter cable (internal hybrid)	
9550SXU-12ML, 16ML 	SFF-8087	SFF-8087	CBL-SFF8087-05M	0.5 meter cable	Connects the controller's SFF-8087 Multi-lane connector(s) to the backplane's SFF-8087 Multi-lane connector(s)
			CBL-SFF8087-06M	0.6 meter cable	
	SFF-8087	Discrete	CBL-SFF8087OCF-05M	0.5 meter forward breakout cable	Connects the controller's SFF-8087 Multi-lane connector(s) to the drives' or backplane's discrete SATA connector(s)
			CBL-SFF8087OCF-10M	1.0 meter forward breakout cable	
	SFF-8087	SFF-8470	CBL-SFF8087IB-05M	0.5 meter converter cable (internal hybrid)	Connects the controller's SFF-8087 Multi-lane (ML) connector(s) to the backplane's SFF-8470 Multi-lane (MI) connector(s)
			CBL-SFF8087IB-06M	0.6 meter converter cable (internal hybrid)	

3ware 9500S and 8006 Internal RAID Controllers					
9500S-4LP 	Discrete	Discrete	CBL-SATA-39	39" (1m) standard, discrete, point-to-point SATA cable	Connects the controller's discrete SATA port(s) to the drives' or backplane's discrete SATA connector(s)
	Discrete	SFF-8087	CBL-SFF8087OCR-05M	0.5 meter reverse breakout cable	Connects the controller's discrete SATA port(s) to the backplane's SFF-8087 Multi-lane connectors
			CBL-SFF8087OCR-06M	0.6 meter reverse breakout cable	
			CBL-SFF8087OCR-10M	1.0 meter reverse breakout cable	
8006-2LP 	Discrete	Discrete	CBL-SATA-39	39" (1m) standard, discrete, point-to-point SATA cable	Connects a controller's discrete SATA port(s) to the drives' or backplane's discrete SATA connector(s)

Multi-lane Quick Reference Chart

Cable/connector	Controller P/N Suffix	Connectivity	Also Known as
SFF-8470	MI	Internal	InfiniBand
SFF-8087	ML	Internal	Mini SAS 4i, Mini SATA Internal, iPass
SFF-8088	ME	External	Mini SAS 4x, Mini SATA External, iPass
M8	M8	Internal	—



Multi-lane SFF-8087 and M8 cables provide internal connectivity from the controller to drives or the backplane.
Multi-lane SFF-8088 cables provide external connectivity from the controller to external enclosures.

3ware features and benefits

StorSwitch™ Non-blocking switch fabric architecture	Maximizes controller throughput by allowing concurrent communications with all attached SATA drives through a pool of 32 direct memory access (DMA) channels.	Performance
StorSave Powerful reliability enhancements	Achieves unmatched data protection while maximizing performance in critical RAID modes when data availability, accessibility, and data protection are most needed.	Data Protection
StreamFusion Intelligent cache algorithm	Maximizes application performance under heavy loads by dynamically allocating controller cache for maximum bandwidth	Performance
Multi-lane™ Award-winning connector system	Dramatically increases subsystem reliability by radically reducing cable count and improves airflow	Reliability & Convenience
RAID 6 (On select 3ware 9690SA and 9650SE controllers)	Two sets of parity are simultaneously calculated, written, and rotated across all the drives. This allows the array to survive up to two drive failures without losing data, for significantly improved fault tolerance.	Data Protection
On-board PowerPC processor and G133e RAID engine (True Hardware RAID)	Frees the host CPU to maintain overall system and application performance by managing all RAID IO processing requirements	Performance
3Gb/s transfer speed SAS and SATA II controllers and 3ware Sidecar	Doubles available drive-side bandwidth to exploit scalability features	Performance
Native Command Queuing (NCQ) 3ware Sidecar and SATA II controllers	Improves performance of queued workloads by minimizing mechanical positioning latencies on the drive. 32 outstanding commands can be reordered before reading or writing the data.	Performance

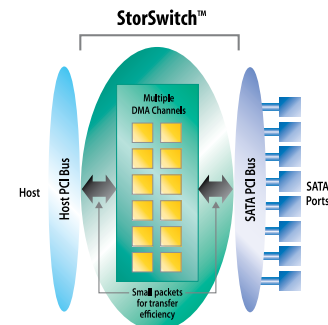
Putting the Pieces Together

Advanced 3ware RAID Features and Performance Architecture

StorSwitch™ maximizes controller throughput — StorSwitch is a unique non-blocking switch fabric architecture that allows 3ware controllers to concurrently communicate to all attached SATA drives through a pool of 32 direct memory access (DMA) channels for unparalleled performance and data availability. The result is superior overall system performance compared to non-scalable hub-based systems that share the bandwidth of a single DMA channel.

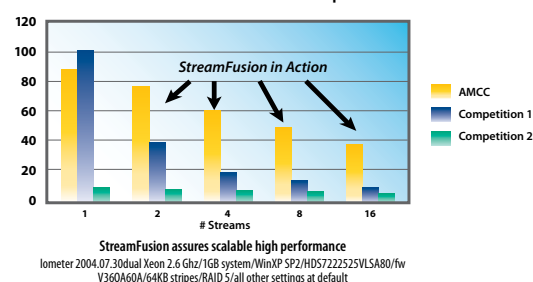
StorSave optimizes data protection and performance — StorSave's revolutionary combination of powerful reliability enhancements and a battery backup unit (BBU) maximize data protection and system reliability without sacrificing controller performance. StorSave permits 3ware controllers to use both controller cache and disk cache during SATA RAID operations. This strengthens array performance during optimal usage, as well as during degraded RAID 5 and RAID 6 operations which means faster rebuild times. StorSave Profiles allow user-specified levels of protection vs. performance (9690SA, 9650SE, 9590SE and 9550SXU only).

StreamFusion maximizes application performance under multiple loads — An intelligent cache algorithm dynamically optimizes RAID 5 and RAID 6 disk accesses and efficiently manages data through controller cache for guaranteed bandwidth. As the number of data streams increases, the total bandwidth is divided equally among them. Application performance will not suffer during heavy traffic or when multiple applications are accessing data simultaneously. 3ware RAID controllers are not the performance bottleneck, as is often the case with software RAID and other hardware RAID controllers.



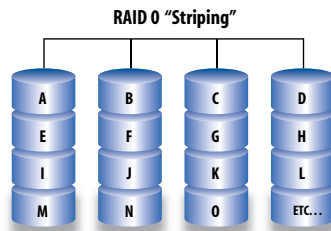
- Protects drive and controller cached writes in the event of a power loss
- Uses controller and drive write cache in all modes
- Dual caching for faster rebuild times

StreamFusion Performance vs. Competition

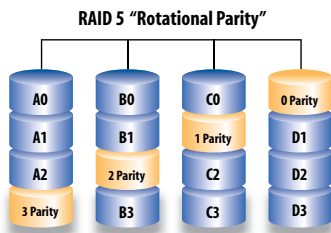


Common RAID Levels

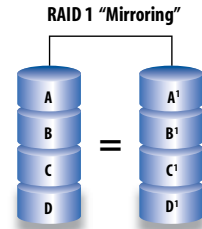
RAID 0, 1, 5, 10 and JBOD



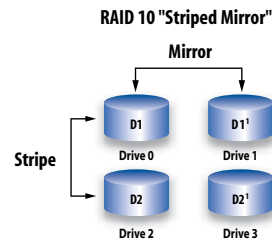
- Applications requiring high bandwidth performance but no fault tolerance
- Video production/editing
- Pre-press applications



- Most versatile RAID level providing performance, fault tolerance and storage efficiency
- Video production/editing
- File and applications servers
- Database servers
- Email servers
- News servers
- Internet/Intranet



- Provides fault tolerance and a read speed advantage over non-RAID disks
- Applications requiring high availability
- Accounting
- Payroll
- Financial



- Data is first mirrored, then striped across across the drives to provide double drive failure protection without the parity calculation performance penalty of RAID 5 and RAID 6. The mirror provides the redundancy.
- Ability to recover from a drive failure in either mirrored set

JBOD = Just a Bunch of Disks

JBOD refers to an unconfigured disk attached to a RAID controller

- No fault tolerance

Hardware vs. Software RAID

All AMCC 3ware RAID controllers incorporate onboard processors to deliver true hardware RAID. Software RAID schemes use the system's processor, exploit host memory, compromise reliability and potentially rob the system of as much as 60% of its CPU cycles just to process RAID calculations.

Red Hot RAID 6

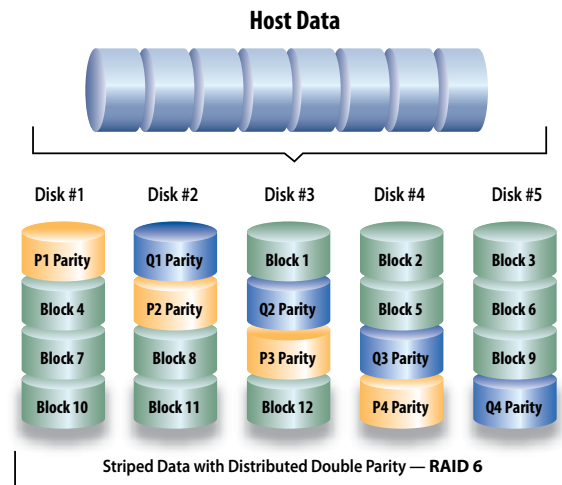
The fastest RAID 6 available

RAID 6 eliminates the risk of data loss if a second hard disk drive fails while the RAID array is rebuilding. In a 3ware RAID 6 system, two sets of parity are calculated, written, and rotated across all the drives. This second simultaneous P + Q parity calculation allows the array to survive up to two drive failures without losing data, for significantly improved fault tolerance. RAID 6-enabled 9690SA and 9650SE controllers deliver unequalled RAID 6 performance.

RAID 6 represents a sea change in the RAID landscape. It provides the industry with higher levels of data protection, data availability and fault tolerance than RAID 5. By assuring data availability following a second drive failure, users can rest assured that they are enjoying maximum data protection, both in normal and degraded modes. And, with RAID 6-enabled 3ware controllers, RAID 6 will not cripple performance.

RAID 6 Enabled 3ware Controllers

- 9690SA-8I
- 9690SA-8E
- 9690SA-4I4E
- 9650SE-8LPML
- 9650SE-12ML
- 9650SE-16ML
- 9650SE-24M8



3ware RAID 6: Two sets of parity data, P + Q, are striped across disks. RAID 6 safeguards against data loss during rebuild mode by allowing up to two consecutive drive failures for maximum fault tolerance.

RAID 6 is recommended for:

- High capacity systems with eight or more high capacity drives
- Enterprise/mission critical installations

3ware RAID Controller Part Number Matrix

3ware 9690SA SAS/SATA Hardware RAID Controllers

Model Number	Host Interface	Ports	RAID Levels	Controller Connector	Footprint	RoHS
9690SA-8I	PCI Express x8	8 Internal	0, 1, 5, 6, 10, 50, Single Disk	SFF-8087 mini-SAS	Low profile	6/6
9690SA-8E	PCI Express x8	8 External	0, 1, 5, 6, 10, 50, Single Disk	SFF-8088 mini-SAS	Low profile	6/6
9690SA-4I4E	PCI Express x8	4 Internal/4 External	0, 1, 5, 6, 10, 50, Single Disk	SFF-8087 / SFF-8088 mini-SAS	Low profile	6/6

3ware 9650SE PCI Express-to-Serial ATA II Hardware RAID Controllers

Model Number	Host Interface	Ports	RAID Levels	Controller Connector	Footprint	RoHS
9650SE-2LP	PCI Express x1	2	0, 1, Single Disk, JBOD	Discrete	Low profile	6/6
9650SE-4LPML	PCI Express x4	4	0, 1, 5, 10, Single Disk, JBOD	Multi-lane (SFF-8087)	Low profile	6/6
9650SE-4LPME	PCI Express x4	4	0, 1, 5, 10, JBOD	Multi-lane (SFF-8088)	Low profile	6/6
9650SE-8LPML	PCI Express x4	8	0, 1, 5, 6, 10, 50, Single Disk, JBOD	Multi-lane (SFF-8087)	Low profile	6/6
9650SE-12ML	PCI Express x8	12	0, 1, 5, 6, 10, 50, Single Disk, JBOD	Multi-lane (SFF-8087)	Full height	6/6
9650SE-16ML	PCI Express x8	16	0, 1, 5, 6, 10, 50, Single Disk, JBOD	Multi-lane (SFF-8087)	Full height	6/6
9650SE-24M8	PCI Express x8	24	0, 1, 5, 6, 10, 50, Single Disk, JBOD	Multi-lane custom hybrid	Full height	6/6

3ware 9550SX PCI-X-to-Serial ATA II Hardware RAID Controllers

Model Number	Host Interface	Ports	RAID Levels	Controller Connector	Footprint	RoHS
9550SXU-4LP	64-bit/133MHz	4	0, 1, 5, 10, Single Disk, JBOD	Discrete	Low profile	6/6
9550SXU-8LP	64-bit/133MHz	8	0, 1, 5, 10, 50, Single Disk, JBOD	Discrete	Low profile	6/6
9550SXU-12	64-bit/133MHz	12	0, 1, 5, 10, 50, Single Disk, JBOD	Discrete	Full height	6/6
9550SXU-12MI	64-bit/133MHz	12	0, 1, 5, 10, 50, Single Disk, JBOD	Multi-lane (SFF-8470)	Full height	6/6
9550SXU-12ML	64-bit/133MHz	12	0, 1, 5, 10, 50, Single Disk, JBOD	Multi-lane (SFF-8087)	Full height	6/6
9550SXU-16ML	64-bit/133MHz	16	0, 1, 5, 10, 50, Single Disk, JBOD	Multi-lane (SFF-8087)	Full height	6/6

3ware 9500S PCI-to-Serial ATA Hardware RAID Controllers

Model Number	Host Interface	Ports	RAID Levels	Controller Connector	Footprint	RoHS
9500S-4LP	32/64-bit/66MHz	4	0, 1, 5, 10, Single Disk, JBOD	Discrete	Low profile	5/6

3ware 8006 PCI-to-Serial ATA Hardware RAID Controller

Model Number	Host Interface	Ports	RAID Levels	Controller Connector	Footprint	RoHS
8006-2LP	64-bit/66MHz	2	0, 1, JBOD	Discrete	Low profile	5/6

3ware Controller Specifications

Operating Systems	Microsoft® Windows® 2003/XP/2000, Red Hat Linux, SuSE Linux, Fedora Linux, 2.4 Linux kernel, 2.6 Linux kernel, FreeBSD, 32/64-bit support, Mac OS X (10.4.6 and above) For complete OS listing, go to: www.3ware.com/support/OS-support
PCI Compliance	PCI Express 1.1, PCI-X 1.0b, and PCI 2.3 compliant (64-bit/133/100/66MHz bus master)
Serial Interface	SATA and SATA II (1.5/ 3 Gb/s)
RAID Features	RAID 6 on select 3ware 9650SE controllers, RAID Level Migration, online capacity expansion, hot swap/hot spare, S.M.A.R.T. disk drive monitoring, multiple card support, multiple logical volumes and RAID levels, remote management, alert notifications and more
SCSI Features	Scatter/gather, command queuing, command reordering, elevator seek, dynamic sector repair, background media scanning and more
SATA II Features	3Gb/s, Native Command Queuing, OOB Staggered Spin-up (compliant with the SATA 2.6 specification)
Kit Contents	SAS/SATA II/SATA RAID controller and cables, CD including driver, 3ware Disk Manager 2 (3DM®2), Command Line Interface (CLI), User Guide, Printed Installation Documentation
Warranty	3 years
Support	Free technical support, advanced replacement option

3ware Controller Accessories

Model Number	Description
BBU-MODULE-03	Battery Backup Unit for 3ware 9650SE/9590SE/9550SX(U)
BBU-MODULE-04	Battery Backup Unit for 3ware 9690SA/9650SE/9590SE/9550SX(U); Includes remote battery mounting kit
BATT-SPARE-02	Replacement battery for BBU-MODULE-03 and BBU-MODULE-04
BBU-9500S-01	Battery Backup Unit for 3ware 9500S
BATT-9500S-SPARE	Replacement battery for BBU-9500S-01
RDC-400-SATA	SATA internal drive cage
RDC-TRAY-SATA	SATA drive tray (to be used with the RDC-400-SATA)
RDE-TRAY-01	Spare drive tray for 3ware Sidecar
CABLES	Please reference the cable datasheet

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