



HARDWARE RAID CONTROLLERS

3ware® Product Guide

Spring / Summer 2007

**AMCC**  
STORAGE





AMCC Headquarters in Sunnyvale, CA

- **Industry leading 3ware® Serial ATA RAID controllers for performance, capacity and peace of mind**
- **Leading<sup>1</sup> supplier of SATA II hardware RAID controllers and solutions to premier channel partners**
- **Over 2.5 million SATA ports shipped**

<sup>1</sup> 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, 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](http://www.3ware.com), or [www.amcc.com](http://www.amcc.com).



### APPLICATIONS FOR 3WARE CONTROLLERS



Servers



Security/  
Surveillance



Pro  
Video



Super  
Computing



NAS



Video  
On-Demand



Pro  
Audio



Disk-to-Disk  
Backup

# 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 and WEEE compliant



### 3ware 9650SE Series Selection Guide

	9650SE-2LP	9650SE-4LPML	9650SE-4LPME	9650SE-8LPML	9650SE-12ML	9650SE-16ML	9650SE-24M8
<b>Form Factor</b>	Low profile	Low profile	Low profile	Low profile	Full height	Full height	Full height
<b>Port Count</b>	2	4	4	8	12	16	24
<b>PCI Express Lanes</b>	1	4	4	4	8	8	8
<b>RAID Levels</b>	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
<b>Onboard Memory</b>	128MB DDR2 533	256MB DDR2 533	256MB DDR2 533	256MB DDR2 533	256MB DDR2 533	256MB DDR2 533	512MB DDR2 533
<b>Connector Type</b>	Discrete	Multi-lane	Multi-lane (external)	Multi-lane	Multi-lane	Multi-lane	Multi-lane
<b>BBU Support</b>	No	Yes	Yes	Yes	Yes	Yes	Yes

# 3ware® 9550SX

## High Performance PCI-X to Serial ATA II RAID Controllers

### High Performance PCI-X RAID Solution of Choice

The 3ware 9550SX 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 9550SX, available in 4, 8, 12, and 16-port configurations, is the most compelling PCI-X solution available.

### 3ware 9550SX 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 and WEEE compliant



### 3ware 9550SX Series Selection Guide

	9550SXU-4LP	9550SXU-8LP	9550SXU-12	9550SXU-12MI	9550SXU-12ML	9550SXU-16ML
<b>Form Factor</b>	Low profile	Low profile	Full height	Full height	Full height	Full height
<b>Port Count</b>	4	8	12	12	12	16
<b>Host Interface</b>	PCI-X	PCI-X	PCI-X	PCI-X	PCI-X	PCI-X
<b>Host Interface Speed</b>	64-bit/133MHz	64-bit/133MHz	64-bit/133MHz	64-bit/133MHz	64-bit/133MHz	64-bit/133MHz
<b>RAID Levels</b>	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
<b>Onboard Memory</b>	128MB	128MB	256MB	256MB	256MB	256MB
<b>Connector Type</b>	Discrete	Discrete	Discrete	Multi-lane	Multi-lane	Multi-lane

**NOTE:** A "U" has been added to 9550SX part numbers to denote RoHS 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
  - 3TB of external storage when loaded with 750GB drives (not included)
  - Front panel LED status indicators
- RoHS 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](http://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 3TB?

	Data	Quantity
Movie=1GB	Movies	3,000
Digital Photo=5MB	Digital Photos	600,000
Song=3MB	Songs	1,000,000
Spreadsheet=100KB	Spreadsheets	30,000,000

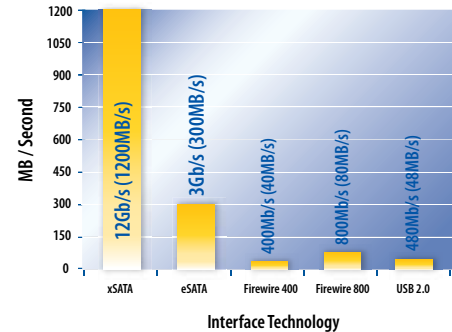
### xSATA vs. eSATA, Firewire and USB

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 SATA Cable and Connector System

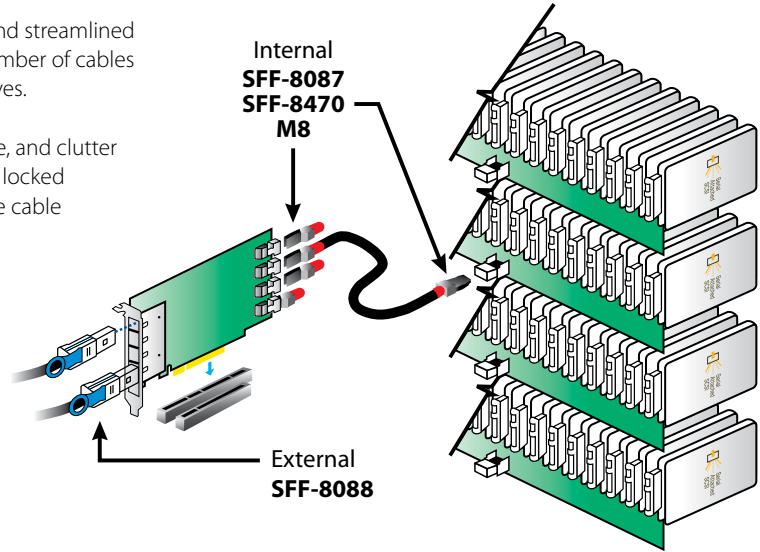
### Get Connected via the Multi-lane™ Expressway

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

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

### Multi-lane Benefits

- Four lanes of high speed SATA traffic through a single cable
- Increased system reliability
- Reduced cable count
- Streamlined storage
- Locked connections
- Improved airflow



*Multi-lane SFF-8087, SFF-8470, 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 the 3ware Sidecar.*

*NOTE: End-to-end Multi-lane connectivity requires a Multi-lane backplane*



## Multi-lane SATA Cable and Connector Systems

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



**3ware Controller Model #**  
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)

**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)

**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)

**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)

**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)

*\*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 above*



## 3ware Controller/Cable Matrix

Controller	Connector to Connector Options		Cable P/N Options	Cable Description	Where Used
	To Controller	To Drives / Backplane			
<b>3ware 9650SE Internal RAID Controllers</b>					
<b>9650SE-2LP</b> 	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)
<b>9650SE-4LPML, -8LPML, -12ML, -16ML</b> 	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)		
<b>9650SE-24M8</b> 	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
<b>3ware 9650SE with External Connectivity (3ware Sidecar Only)</b>					
<b>9650SE-4LPME</b> 	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

**3ware 9550SXU Internal RAID Controllers**

<b>9550SXU-4LP, -8LP, -12</b> 	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	
<b>9550SXU-12MI</b> 	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)	
<b>9550SXU-12ML, 16ML</b> 	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**

<b>9500S-4LP</b> 	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	
	SFF-8470	SFF-8470	CBL-OCR-18	0.5 meter reverse breakout cable	Connects the controller's SFF-8470 Multi-lane (MI) connector(s) to the backplane's SFF-8087 Multi-lane (ML) connector(s)
CBL-OCR-10M			1.0 meter reverse breakout cable		
<b>8006-2LP,</b> 	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	—

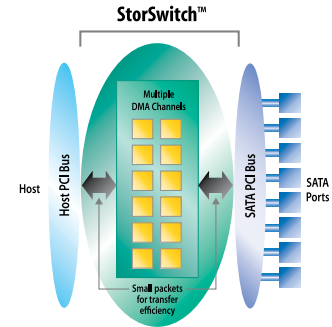
## 3ware features and benefits

<b>StorSwitch™</b> 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.	<b>Performance</b>
<b>StorSave</b> Powerful reliability enhancements	Achieves unmatched data protection while maximizing performance in critical RAID modes when data availability, accessibility, and data protection are most needed.	<b>Data Protection</b>
<b>StreamFusion</b> Intelligent cache algorithm	Maximizes application performance under heavy loads by dynamically allocating controller cache for maximum bandwidth	<b>Performance</b>
<b>Multi-lane™</b> Award-winning connector system	Dramatically increases subsystem reliability by radically reducing cable count and improves airflow	<b>Reliability &amp; Convenience</b>
<b>RAID 6</b> (On select 3ware 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.	<b>Data Protection</b>
<b>On-board PowerPC processor and G133 RAID engine (True Hardware RAID)</b>	Frees the host CPU to maintain overall system and application performance by managing all RAID IO processing requirements	<b>Performance</b>
<b>3Gb/s transfer speed</b> 3ware Sidecar and SATA II controllers	Doubles available drive-side bandwidth to exploit scalability features	<b>Performance</b>
<b>Native Command Queuing (NCQ)</b> 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.	<b>Performance</b>

# 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.



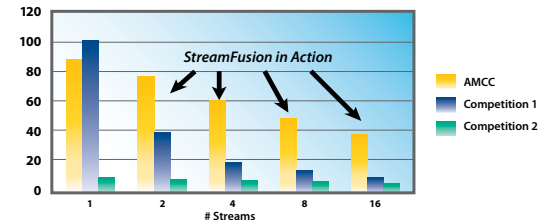
**StorSave optimizes data protection and performance** — StorSave's revolutionary combination of powerful reliability enhancements and a battery backup unit (BBU) maximize data protection and system reliability without sacrificing controller performance. StorSave permits 3ware controllers to use both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



- 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 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.

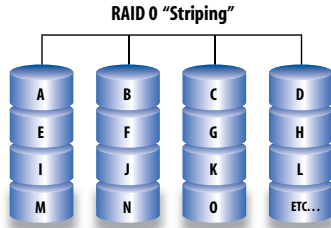
StreamFusion Performance vs. Competition



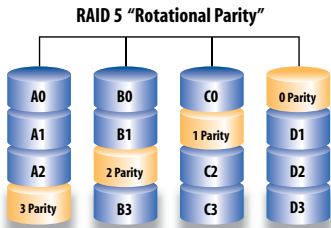
**StreamFusion assures scalable high performance**  
 Iometer 2004.07.30dual Xeon 2.6 Ghz/1GB system/WinXP SP2/HDS722525VLSA80/ff  
 V360A60A/64KB stripes/RAID 5/all other settings at default

# Common RAID Levels

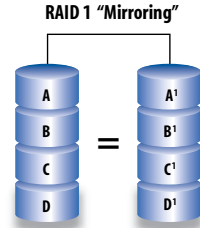
## RAID 0, 1, 5, 10 and JBOD



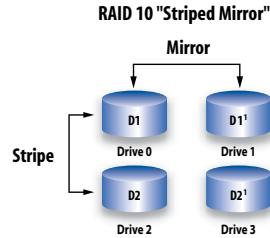
- Applications requiring high bandwidth performance but no fault tolerance
- Video production/editing
- Pre-press applications



- 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

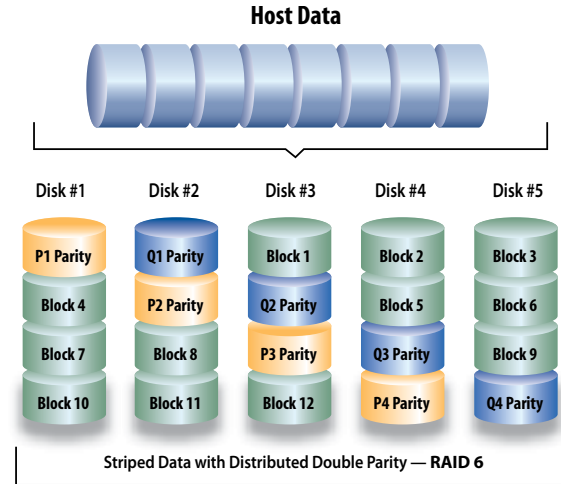
## The fastest RAID 6 available

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 9650SE controllers deliver unequaled 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

- 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.*

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

# 3ware RAID Controller Part Number Matrix

## 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-ZLP	64-bit/66MHz	2	0, 1, Single Disk, 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: <a href="http://www.3ware.com/support/OS-support">www.3ware.com/support/OS-support</a>
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	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)
BATT-SPARE-02	Replacement battery for BBU-MODULE-03
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

# Worldwide 3ware Distributors and Sales Offices

## 3ware Distributors

### North America

**Bell Micro** (US and Canada)  
[www.bellmicro.com](http://www.bellmicro.com)

**Synnex** (US and Canada)  
[www.synnex.com](http://www.synnex.com)

**D&H** (US)  
[www.dandh.com](http://www.dandh.com)

### Latin America

**Bell Micro**  
[www.bellmicro.com/latinamerica](http://www.bellmicro.com/latinamerica)

### Europe, Middle East and Africa

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### Asia Pacific

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[www.ask-corp.co.jp](http://www.ask-corp.co.jp)

**Digicor** (Australia)  
[www.digicor.com.au](http://www.digicor.com.au)

**Epecom Graphics** (Singapore)  
[www.epecomgraphics.com.sg](http://www.epecomgraphics.com.sg)

**Synnex K.K.** (Japan)  
[www.synnex.co.jp](http://www.synnex.co.jp)

**THC** (China)  
[www.thcsy.com](http://www.thcsy.com)

**Upmost Technology Corp.**  
(Taiwan)  
[www.upmost.com.tw](http://www.upmost.com.tw)

## 3ware Sales Offices

### Company Headquarters (USA)

215 Moffett Park Drive  
Sunnyvale, CA 94089

Tel: +1-408-542-8771  
+1-877-883-9273

Email: [3waresales@amcc.com](mailto:3waresales@amcc.com)

### Europe

+44-161-232-6360

### Asia/Pacific

+65-6826-3381

### Japan

+0800-123-9273

### China

+86-10-6581-4916

[www.3ware.com](http://www.3ware.com)

The logo for AMCC, consisting of the letters 'AMCC' in a bold, blue, sans-serif font.



### Sales Offices for 3ware Products:

215 Moffett Park Drive  
Sunnyvale, CA 94089

Tel: +1-408-542-8771  
+1-877-883-9273

Email: [3waresales@amcc.com](mailto:3waresales@amcc.com)

Europe: +44-161-232-6360

Asia/Pacific: +65-6826-3381

Japan: +0800-123-9273

China: +86-10-6581-4916

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