



AMCC, Areca & LSI Serial RAID Controllers
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Excerpts from Tom's Hardware review of the 3ware 9690SA-8I

Other tested controllers include:

- Adaptec 3805
- Areca ARC-1680ML
- Atto R348
- ICP ICP5085BL
- LSI MegaRAID SAS 8888ELP
- RAIDCore RC5252-8

AMCC 3ware® 9690SA-8I

3ware became popular by offering the first ATA RAID controllers with multiple channels and decent performance. Nowadays, 3ware is part of AMCC and still offers a powerful lineup of SATA RAID controllers for PCI-X (9550SXU) and PCI Express (9650SE). The latter also supports RAID 6 with double redundancy.

For this review we received the 3ware 9690SA, which is a low-profile x8 PCI Express card using the eighth generation StorSwitch architecture. For the first time, AMCC is offering a SAS controller card. It carries an integrated hardware XOR engine not specified in detail by AMCC, and an integrated 512 MB DDR2-533 memory with ECC. Most other vendors use DIMM sockets to allow users to select their own memory size. Memory speed is almost irrelevant, as even old DDR1 memory would be fast enough.

The card has two multi-lane ports, each of which is capable of running four SAS or SATA drives directly, or up to 64 disk drives using multiple SAS expanders. The interface bandwidth of 2 GB/s upstream and downstream is high enough to support RAID arrays with lots of hard drives. Our test sample was the 9690SA-8I, which has eight ports for internal use. Model -8E has two external connectors with four ports each, and -4I4E offers an internal and one external multi-lane connector.

All 9690SA cards support RAID 0 and 1; RAID 10, RAID 5 and 6 and the nested RAID mode 60. There is an optional BBU (battery backup unit), which we strongly recommend, because it will retain the cache content in case of a power outage. A UPS unit (uninterruptible power supply) would, of course, be a more prudent purchase, though.

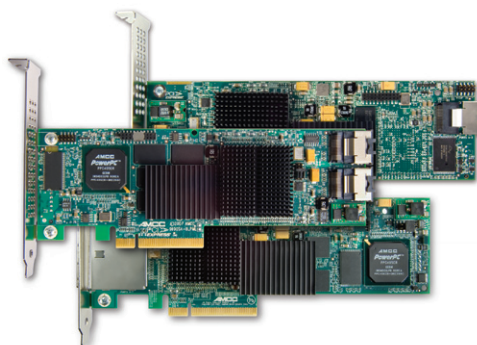
This controller provided high I/O performance across all benchmark patterns, and it was easily capable of moving more than 400 MB/s during out tests. The measurements with the Atto disk benchmark and h2benchw weren't very reproducible — most likely because of the cache memory — which is why we did not include these results. While many controllers provide similar performance in RAID 0, 3ware's card is slightly faster than the others in most RAID 5 tests and especially in RAID 6.

The feature set is very comprehensive and includes handling of multiple arrays, write journaling, hot-swap and hot spares, emergency flash recovery to prevent failed firmware updates, email notification, drive activity LED support, enclosure management via I2C or SES 2.0 and RAID features such as Online Capacity Expansion and RAID Level Migration.

Conclusion

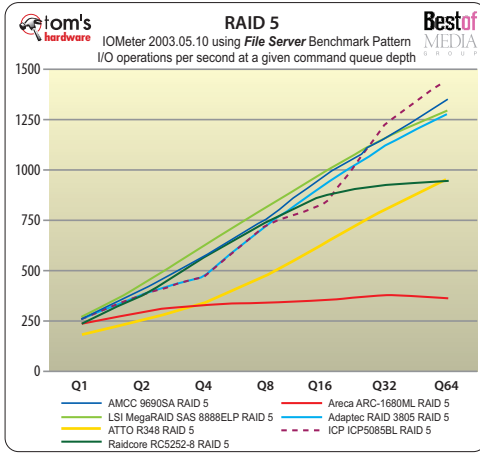
The two clear performance winners in this review are AMCC with the 3ware 9690SA and also LSI Corporation's MegaRAID 8888ELP. Both delivered higher I/O performance across all four benchmark patterns.

Both AMCC and LSI Corporation provide better performance, which will still be available for less-powerful host systems.



System Hardware	
Processors	2x Intel Xeon Processor (Nocona core) 3.6 GHz, FS800, 1 MB L2 Cache
Platform	Asus NCL-DS (Socket 604) Intel E7520 Chipset, BIOS 1005
RAM	Corsair CM72DD512AR-400 (DDR2-400 ECC, reg.) 2x 512 MB, CL3-3-3-10 Timings
System Drive	Western Digital Caviar WD1200JB 120 GB, 7.200 U/Min, 8 MB Cache, UltraATA/100
Mass Storage Controller	Intel 82801EB UltraATA/100 Controller (ICH5) Promise SATA 300TX4 Promise FastTrak TX4310 Driver 2.06.1.310
Network Interface	Broadcom BCM5721 On-Board Gigabit Ethernet NIC
Graphics	On-Board Graphics ATI RageXL, 8 MB
Benchmarks	
Performance Measurements	Atto Diskmark
I/O-Performance	IOMeter 2003.05.10 Fileserver-Benchmark Webserver-Benchmark Database-Benchmark Workstation-Benchmark
System, Software & Drivers	
OS	Microsoft Windows Server 2003 Enterprise Edition, Service Pack 1
Platform Driver	Intel Chipset Installation Utility 7.0.0.1025
Graphics Driver	Default Windows Graphics Driver

RAID 5 Benchmarks



RAID 6 Benchmarks

