

Granite Storage Newsletter

Letter from the President

Over two years ago we pioneered a revolutionary technology that protects data. This technology tells you things are going to go wrong before your data is lost. How? All the newer drives that have been produced in the last couple of years have a micro-processor that monitors many of the drive functions. Should one of these parameters exceed the manufacturer's limit, an error is reported. Most of the time this error occurs before there is actual damage to your data, but it represents a concern that the drive is beginning to show signs of what could be a major problem. So it's kind of like an insurance policy is built into each drive. If you pay attention you can recover from the problem before you lose anything. That's what S.M.A.R.T. is all about. What we do is monitor this information and let you know when these errors occur, giving you time to save your data. Now this technology is even more affordable because we are having a Holiday Special SALE. All of our Hot-Swap S.M.A.R.T. systems are reduced for the season.

On a newer front, SATA continues to offer cost effective data storage solutions. In this issue I have outlined the differences between SATA I, SATA II, and eSATA. All of these flavors of SATA offer unique features and benefits and I have explained them in detail.

Frank Gabrielli, President

Volume 10 Fall 2005

Granite

D.O.I.G.I.O.T.A.O.L

Providing Data Storage Integrity

S.M.A.R.T. Hot-Swap

The Granite SMART FireWire Hot-Swap Drive is one of the most versatile storage systems on the market. The low cost of IDE hard drives make it affordable to use hard drives to backup your computer, transport large amounts of data, dedicate drives for projects, and completely eliminate the need for tape drives and other archival systems. It is the ideal solution for your removable storage needs, and it is faster than most other types of archival systems.

The key to our SMART FireWire Hot-Swap Drive System is our low cost

S.M.A.R.T. Hot-Swap

hard drive trays. These affordable trays hold low cost IDE hard drives.

Both Macintosh & Windows XP, 2000, ME, and 98SE are completely supported without the need of any software or additional drivers...just plug it in and you are up and running.

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The Hot-Swap Drive with a technician built in.



Hot-Swap FireWire System with Drive Tray Half Removed

Trays holds any 3.5" IDE/ATA hard drive



Standard Tray



SMART Tray with LCD Display

SMART Hot-Swap features and benefits:

- Supports ATA-6 drives up to 2 TeraBytes.
- S.M.A.R.T. support can predict drive failures before losing data.
- Built-in LCD display for reliability monitoring - no host software needed.
- Our patent pending technology guarantees you state-of-the-art products.
- Uses standard IDE/ATA drives; allows you to choose a drive based on size, speed or cost.

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S.M.A.R.T. JBOD/RAID

S.M.A.R.T. JBOD/RAID

S.M.A.R.T. JBOD/RAID



SMART Hot-Swap JBOD/RAID Systems

**Holiday Special
Save up to
30%**

The Granite SMART FireWire JBOD (just a bunch of drives) / RAID (redundant array of independent drives) Systems are designed to offer the safest environment available for your data. Using S.M.A.R.T. technology, over 70% of drive failures can be predicted. This means there is time to back up your data before the drive stops functioning... no more data loss!

In combination with this extra data integrity, our SMART FireWire JBOD / RAID Solutions also add "Hot-Swapable Bays" so that information can easily be shared or a damaged drive can be replaced. The Hot-Swap Bays also incorporate our LCD Display that offers a full suite of drive functions and testing. Drive monitoring is done right on the LCD display.

Now for the best part...the price. Our systems are some of the most affordable on the market. Additional standard drive trays are only \$29.95 each and SMART trays are only \$49.95 each. Now a storage system is available that offers unlimited, affordable storage capabilities. Our SMART Bridge Technology combined with the cost effective IDE Drives give a storage solution that cannot be beat!

SPECIFICATIONS:

- **DRIVES:**
2-BAY 1000gig - ATA 100 7200rpm
4-BAY 2000gig - ATA 100 7200rpm
8-BAY 4000gig - ATA 100 7200rpm
RACK 4000gig - ATA 100 7200rpm
- **BUS TYPE :**
FireWire 1394, second generation bridge technology.
- **PERFORMANCE :**
Up to 40 MB/s
- **RAID SUPPORT (optional) :**
RAID 0, RAID 1 Mac & Win
- **SUPPORTED OS's :**
Macintosh OS 9.1xx & OS 10.x
- standard drive support
Windows 98SE, ME, 2000, XP
- standard drive support
- **POWER CHARACTERISTICS :**
2 Bay - 115/230 vac 50-60 hz
65 watts universal input
4 Bay - 115/230 vac 50-60 hz
200 watts switchable input
8 Bay - 115/230 vac 50-60 hz
300 watts switchable input
RACK - 115/230 vac 50-60 hz
300 watts switchable input
- **WEIGHT & DIMENSIONS :**
2 Bay -- 7.1w x 11d x 6.5h
20 Lbs Std /23 Lbs Hot-Swap
4 Bay -- 7w x 14.1d x 10.3h
25 Lbs Std /30 Lbs Hot-Swap
8 Bay -- 7w x 15.6d x 17h
45 Lbs Std /55 Lbs Hot-Swap
RACK - 18.5w x 18d x 6.5h
65 Lbs Std /75 Lbs Hot-Swap

Part #	Description	Holiday Special
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1012	SMART Hot-Swap Case Kit (includes 3' Cable and 1 SMART Tray)	199.00
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Drives Trays Systems

1690	2 Drive Hot-Swap Sys (no drives)	399.00
1153	2 Drive Hot-Swap Rack (no drives)	499.00
2090	4 Drive Hot-Swap Sys (no drives)	799.00
5012	8 Drive Hot-Swap Sys (no drives)	1599.00
6500	8 Drive Hot-Swap Rack Sys (no dr)	1719.00

1027	SMART LCD Hot-Swap Tray ONLY	49.95
1075	Standard Hot-Swap Tray ONLY	29.95

6710	120 Gig ATA 100 7200rpm	99.95
4651	250 Gig ATA 100 7200rpm	199.95
1088	400 Gig ATA 100 7200rpm	399.95
5320	500 Gig ATA 100 7200rpm	499.95

System Prices Include Drive Installation and Burn-In Testing

SATA I vs. SATA II

Many customers have asked if SATA II is necessary for them and if it's worth the extra cost. In most cases the answer is NO... there is little difference between SATA I and SATA II with smaller systems. Where SATA II really shines is when using a large RAID host adapter and the increase in bandwidth, 1.5Gbps vs. 3.0Gbps can be utilized. In most situations, however, the real increase in speed is usually not all that significant. There are other features in SATA II that do justify its cost, but these features are mainly used with bigger applications.

"Native Command Queuing" is a SATA II feature designed to improve performance and reliability. NCQ gives the drive the ability to re-arrange the completion of commands in order for the drive to reduce its mechanical workload. For this performance increase to be achieved the host adapter must also support NCQ. With both drive and host supporting NCQ, performance levels can increase by up to 10%. Again, these performance increases are better seen in larger systems.

SATA I vs. SATA II

The second feature that SATA II employs is called a "Port Multiplier". This feature allows each SATA channel to connect up to 15 drives. The controllers that support this feature address significantly more capacity. This truly increases performance because the 3Gbps transfer level can now be addressed with only 6 drives on a channel. This feature is not important for smaller systems but for larger multi-terabyte systems port multiplier is very useful.

The next feature, "Staggered Spin-up" is used when many drives are connected to a system at one time. Staggering the spin-up reduces the large current load when all the drives start at the same time. Larger systems with lots of drives can damage power supplies with a large current load and this reduces the load allowing for longer power supply life.

Similar to the Port Multiplier feature, the Port Selector feature supports multiple host adapters for fault tolerant systems that have controller redundancy. Large systems that would use this technology are guaranteed that even if one controller stops working another can take over the operation.

Lastly, the support for longer cables and external applications is specified in SATA II. This electrical specification supports a new "m" type PHY that allows 2 meters of cable length and also specifies external cable characteristics. These new shielded cables are used in external systems. This feature is also available in SATA I systems because many system integrators, like Granite Digital, have already designed shielded cables for external use. More on the subject of eSATA will be described in the next section, "What is eSATA?".

What is eSATA?

eSATA (external SATA) is the newest standard for external data storage solutions. It offers improved performance over today's FireWire and USB storage systems. Speed is an important ingredient in any time critical application like DV (digital video), AV, or large backups. At the heart of eSATA are the specifications for shielded cables that allow connections from the host adapter to be used with an external enclosure. These new



3' Shielded SATA I Cable

All Granite external cables are shielded and gold plated. We also offer a variety of cable lengths.

specifications include connectors that can be inserted over and over again and cables that provide ESD (electrical static discharge) protection and EMI (electro magnetic interference) shielding. This is not new, our SATA external cables have always been shielded but there was no standard... until now.

The real beauty of this technology is that eSATA provides external solutions that are faster and more affordable than other types of storage solutions. Since there is not any electronics (bridge boards) our SATA Hot-Swap Systems cost less than FireWire. Add the benefit that is associated with KISS (keep it simple stupid) and you also get a system that has less to go wrong. The only thing between the drive mechanism and the PCI host adapter is an external and internal cable with their matching connectors. There are no electronics to update or that may get damaged or that may stop working.

What is eSATA?



8 Bay SATA Hot-Swap System

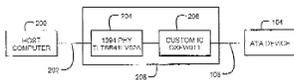
Our 8 Bay SATA Hot-Swap Systems connect to the PCI Host Adapter via 8 small eSATA cables.

eSATA, when combined with SATA II Port Multiplier specifications will also allow for faster transfer rates on each channel. The port multiplier will allow up to 15 drives to be connected to each eSATA channel. With this increase in drives per channel higher sustained data transfer rates per channel can be achieved. 3Gbps is the theoretical rate which means that a large system configured correctly using this technology is as fast as much more expensive Fiber Channel and SCSI systems... at a fraction of the cost.

Currently Granite Digital are also working on other eSATA cable technologies designed to work with larger systems. Multi-Lane is a shielded cable design that incorporates 4 channels into one external cable. The advantage is that there is less cabling in the rear of the enclosure and since the connector is small, it takes up less space, making it easier to get more channels out the rear of a PCI Host Adapter. We will soon be offering this cable technology with all of our larger SATA systems. The outcome will be larger SATA systems and PCI Host Adapters with up to 16 channels. When combined with Port Multiplier, a capacity of $16 \times 15 \times 500 \text{ Gigs} = 120 \text{ Terabytes}$ is possible !!!! WOW !!!

Patent Approved

Granite has been issued its first storage patent #6,892,267. We have done much engineering in the storage marketplace over the last 20 years and are very proud that our innovations have been recognized, approved and our patent granted. We will continue to develop new products that are unique and continue to use our engineering capabilities to keep our products "state of the art". Getting a patent is a long process and it takes considerable work to protect your designs and intellectual property. Storage is an area where changes occur quickly. Staying on top of those changes and pioneering new designs will continue to be on the forefront of our engineering team.



Today we are working on a variety of technology innovations that will be introduced in the future. Many of these designs will improve storage capabilities and performance. Our new designs will continue to be the heart of our company. We look forward to sharing these innovations with our loyal customers. We hope that the hard work that we do continues to provide our customers with the latest and greatest products in the marketplace. Storage continues to evolve with time and this exciting business is at the center of every computer system.

D2D Backups

Disk to Disk backup is quickly becoming the archival solution of choice for many businesses and institutions. The reasons are varied but most come down to those listed below.

- Fastest backup method
- Bootable backups
- Easy restore of data
- Affordable duplication
- RAID reliability

Our Hot-Swap systems are the perfect solution for D2D (disk to disk) backups. They are simple to install, offer fast data transfer rates, and can be easily removed and stored in a safe place. The heart of our Hot-Swap systems are the trays that hold the drives. These trays allow the drives to be removed while protecting them from damage. But the true beauty of



Hot-Swap Tray being inserted into padded case

these Hot-Swap Systems is their versatility. They can be configured as simple JBOD (just a bunch of drives) drives where you can duplicate any data to individual drives and remove them for safe keeping. Also they can be configured into a RAID (redundant array of inexpensive drives) configuration that would be capable of backing up all the required data, if an

D2D Backups

emergency occurs to the primary storage unit, this RAID can take over while the primary storage unit is being restored. Finally, a combination of JBOD and RAID can be set up which would allow some of the drives to be part of a RAID while others could be dedicated to duplicating or distributing large amounts of data, quickly and safely.

These storage solutions also have the ability to duplicate the boot drive and store it in a safe place... off line. Should anything go wrong with the boot drive the backup could quickly be installed and be used to boot the computer... something that tape drives simply can't offer.

Backup software can also treat hard drives as they would a tape drive. Using their proprietary file compression routines our trays can be inserted as if they were tapes. Then labels can be created to make them part of an unlimited storage set. The advantage however is how long the backup and recovery take. Hard drives copy from 10 to 100 times faster than tape drives making the backup and recovery a much quicker and easier task.

Our most popular backup systems are the two-drive models which allow for a cost effective solution that can backup, duplicate, and archive data.



SATA Hot-Swap 2 Bay System costs only \$289.00

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