

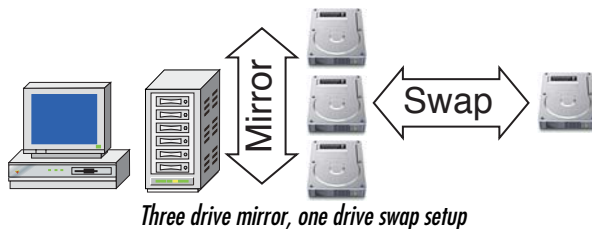
SoftRAID 3.0 for Mac OS X — “mirrored” disk based backups

The goal: Create a three-disk mirrored volume on an external, removable drive bay so that you don't have to *think* about backups *and* you can very easily remove one of the drives and take it home with you at night.

The Ingredients: 1 Mac, 4 external ATA drives in a Granite Digital FireVue removable drive enclosure, SoftRAID drive mirroring and striping software (if you need to know what striping and mirroring means, we've covered that extensively in *The Backup Book*, pp 439-454).

In its simplest sense, mirroring two hard drives together ensures that whatever is written to one hard drive is written to the second. However, this doesn't get either one of the hard drives off site in case something happens to the building such as fire, flood, vandals, etc. You need a bit of a *twist* to the scenario – a third drive in the mirror so that you can leave two drives intact (maintaining a mirror for maximum data integrity) while taking the third drive *out* of the mirror to an offsite location for security.

The *fourth* drive is the **rotation** drive, meaning that at any given time there are three drives in the mirror, with the fourth drive kept off site. The reason that we are using four drives instead of three is that we want to maintain the dual-drive integrity of the mirror at all times while allowing an additional drive to be swapped in and out, with one of the spare drives being kept off site at all times.

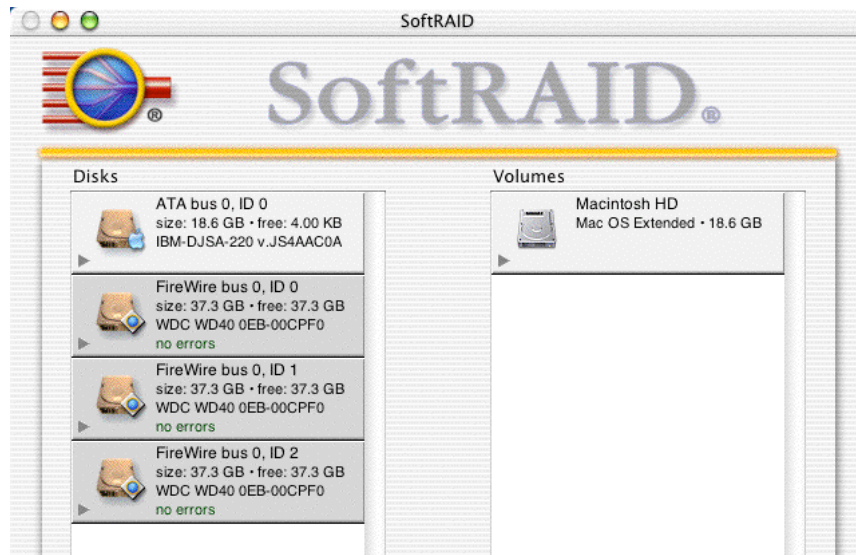


Three drive mirror, one drive swap setup

Let's take a look at the key ingredients in a little more detail. SoftRAID, from the company of the same name, is an outstanding Mac OS X disk striping and mirroring application. It took a matter of seconds for me to perform a low level initialization of one of my external disk drives and also allowed me to “take over” the RAID format of the other two existing drives. In other words, SoftRAID is both fast *and* efficient.

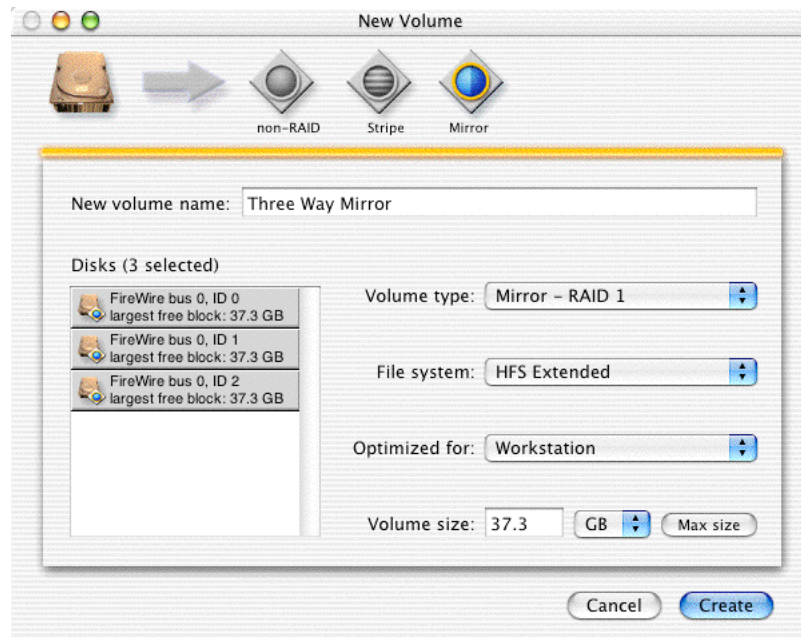
Setting up the volume

Below is a diagram showing the SoftRAID application with my Boot drive on top (managed by Apple with the small blue Apple logo next to it) followed by my three external FireWire drives that are managed by SoftRAID.



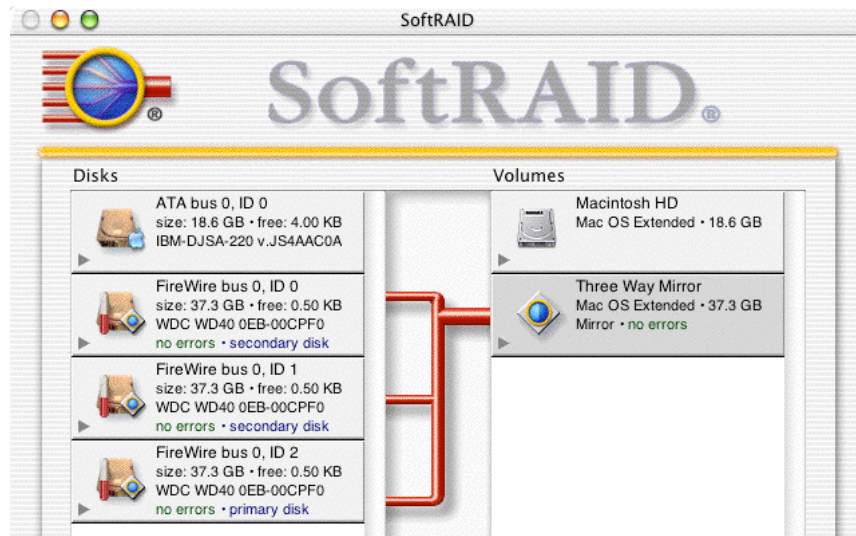
SoftRAID basic window

My goal in using SoftRAID was to create a custom the three-way mirror for my Granite Digital FireVue SMART drive case. Creating a three-way mirror is very easy in SoftRAID. Simply select **New** from the **Volume** menu, click on each of the disks to be included in the mirror, give the new mirrored volume a name, the file system to use (HFS+ or HFS, but not Journaling), the type of optimization (whether for server, workstation, video editing, etc.) and set the volume size (ours is set to the maximum).



Creating the three way mirror

Once SoftRAID has finished configuring the mirrored volume, the interface will allow you to click on the volume and see which physical drives feed into it.



Our three-way mirrored volume

Your external case system

The reason that I write about the Granite Digital external case systems is that they are the only SMART compliant external FireWire drive enclosures for the Mac OS X community that has hot swappable bays. The cases either hold two or four ATA/IDE drives and each drive bay tray is equipped with its own SMART sensor, fan, and lock.

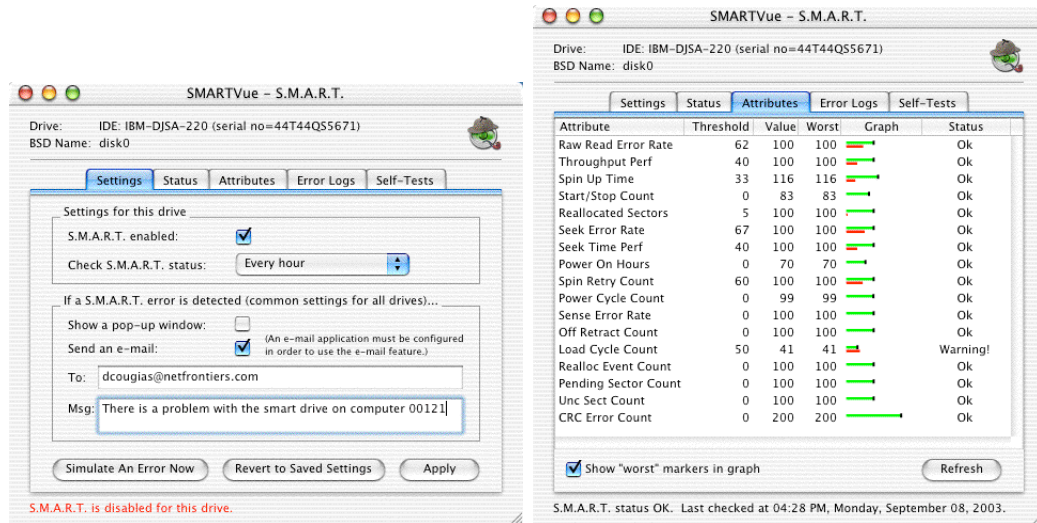


Granite Digital JBOD/RAID enclosure and SMART drive tray

The drive enclosures support either the standard ATA or ATA-6 large capacity drives and allow plug-and play adding of drives as well as hot-swap ability for moving drives in and out of the enclosures. The hot-swap bays also incorporate menu driven and microprocessor controlled SMART LCD technology that reports potential drive problems before your data is lost. While this is great for looks, you'll want to add their SMARTVue SMART software for e-mail notification if your drives are going south on you. We've found through experience that a SMART monitoring application will start picking up the hints of a drive on its way out anywhere from one month down to one week before "dead"-line.

As far as I know, Granite Digital is the only company to offer SMART monitoring of external FireWire drives. They do this by adding a self-

designed SMART-FireWire bridge board to the drive bays that lets the SMART software then communicate with each drive individually.

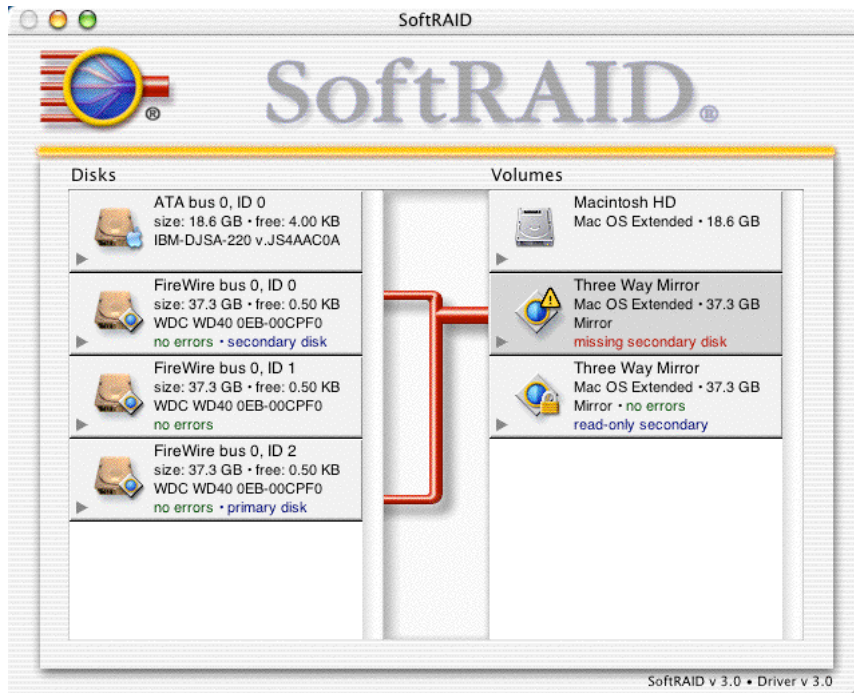


Granite Digital's SMARTVue setup and the drive's SMART attributes

Once configured, you can have the SMARTVue software running at all times and then alert you via e-mail if something goes wrong with the drive. Having the e-mail alerts is great for consolidating all e-mail alerts to one account.

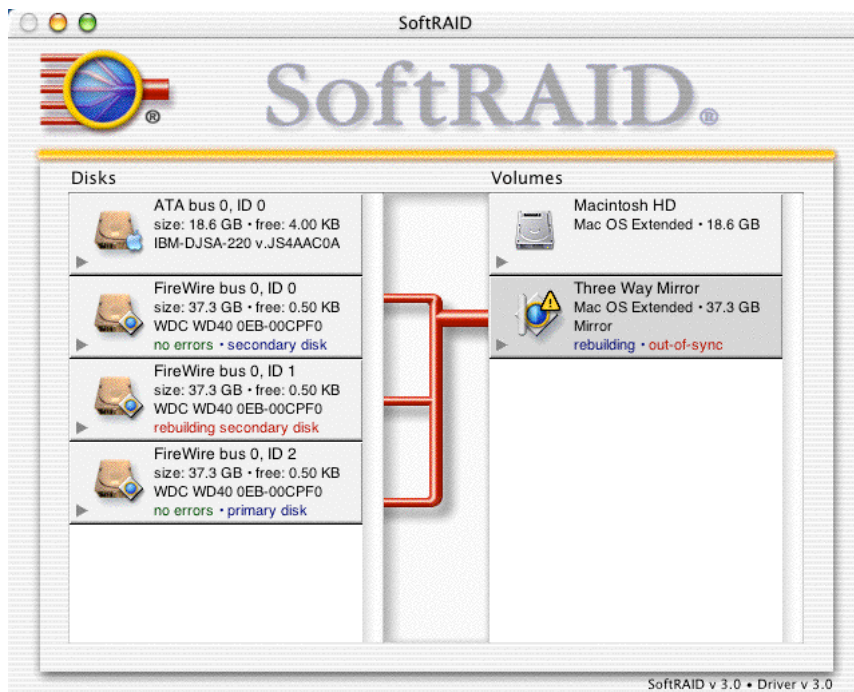
The "Backup" process

Once everything is connected and you've got your three drives mirrored, the process of removing a drive is to simply select the mirrored volume and instruct SoftRAID to split the mirrored volume by creating a Read-Only secondary volume as shown in the diagram below. With the mirror split, there are now three volumes temporarily on your desktop—your original boot volume, your mirrored volume, and now a read-only version of the mirrored volume. As far as I know, SoftRAID is the only product that will create a split, read-only volume from a mirror.



Splitting the mirror

You can now safely unmount your read-only volume and take it home at the end of the night. The “Backup” process begins when you add that fourth drive to the set using SoftRAID’s add secondary disk command. This is accomplished by selecting the volume and instructing the software to do exactly that; add the fourth drive as a secondary (in this case it becomes the third) drive in the mirror. The software will then rebuild the mirror and synchronize all three of the drives.



Rebuilding the mirror

The reason that you want to do this at night is because the volumes have to be rebuilt bit-by-bit and this takes some time and some horsepower. Allowing your drives to be rebuilt during the night when you are gone ensures that when you come in the next morning, everything is hunky-dory and you are ready to go.

When you are ready to swap your drives again, simply select the mirror, tell it to create a read-only secondary again, remove the drive, and then swap the drive that was offsite back into the three-way mirror, allowing it to rebuild and continue on its merry way.