

## This Drive & Cartridge Appear to be in Good, *but Perhaps* *Not Perfect*, Condition

### Interpreting the Report of Soft, Firm, and Hard Errors:

**Soft Errors** are just that ... soft. They come and they go, they vary in size and number from one run of TIP to the next. This is completely normal behavior and is not a cause for concern. These soft errors are the result of small defects in the recording media, or various environmental factors affecting the drive like vibration, humidity, and ambient magnetic fields. The troubled sectors can either be re-read or compensated for with the drive's built-in error correcting technologies.

You can think of soft errors like a pen that skips while writing. Some degree of skipping is normal and expected, and you can easily go back and fill-in after the skip. But as the pen begins skipping more and more, you end up being slowed down in your work, and excessive skipping can be an indication of a pending failure. So it's something that's worth keeping an eye on. This is what TIP's "Soft Error" report allows you to do.

As with all things in TIP, there's no hard and fast rule that states exactly when you might be in trouble. But after a while you'll develop a sense for the way your various Iomega drives and cartridges behave, and TIP's reporting of "soft errors" will then provide you with a valuable and extremely sensitive measure of the state of your system.

**Firm Errors** are soft errors that grew so large that the drive became concerned that it might soon be unable to continue recovering and correcting them. So rather than risk losing the sector's data altogether (with a hard error), the drive removed the troubled sector from further use after relocating its data into a spare safe sector.

This automatic defective sector relocation, reported by TIP as a "Firm Error", is completely normal behavior for all Iomega drives, unless it begins happening with great frequency. Please see the "Analysis" section below, for further help with understanding the role and importance of Firm Errors.

**Hard Errors** are a problem. They are sectors that jumped directly from "recoverable" to "unreadable" without giving the drive the chance to rescue their data and them as defective. A healthy cartridge should never have any hard errors, and as with firm errors, a cartridge with many hard errors is a sure sign of significant trouble. The following "Analysis" section will help you to understand the significance of Hard errors.

#### Analysis . . .

A relatively small number of completely correctable (**Soft**) read/write errors occurred during the test, and may have resulted in one or more apparently questionable sectors being taken out of service, as a **Firm Error**.

This can be entirely normal operation for a completely healthy Zip or Jaz drive, particularly if this is the first time that a thorough disk scan of this sort has been performed after the cartridge has been in use for some time.

However, excessive soft errors or repeating firm and hard errors can also be an early indication of drive trouble.

The test should be run again right now to see whether this pattern repeats:

- As was explained above, a moderate number of soft errors is always to be expected and is **NO** cause for alarm. Soft errors will probably always be present. Only the occurrence of a huge number of these should ever be a concern.
- If **NO** additional firm errors occur, you can safely assume that the first pass actually did find and resolved a few true media defects -- which is common and expected behavior.
- **BUT** . . . if rerunning this test AGAIN has apparently located some new firm or hard errors (which the last test "missed", and finds a few more "apparently bad" sectors . . . then you should conclude that this drive and/or cartridge is beginning to show early signs of 'Click Of Death' behavior.

**If impending 'Click Of Death' seems indicated,  
the trick now is to determine whether the  
trouble is with the drive or with the cartridge.**

(Note: If your data on this cartridge is important, this might be a very good time to consider saving this data somewhere else!)

If you have another cartridge you should use it right away with the same drive under TIP to attempt to isolate the cause of the trouble as follows:

- If another cartridge behaves similarly in the same drive, the trouble is more likely with the drive -- since the drive will have been the common element in both tests which were somewhat troubled.
- But if a second cartridge behaves perfectly in the same drive (where the first one never did), then the trouble is more likely to be with the first cartridge -- since replacing the troubled element resolved the problems.
- And if you have access to a second drive, you could try using the original cartridge in this second drive to gather additional objective evidence about the true behavior of the original drive and cartridge.

### **Conclusion:**

As you can see, by using TIP to exercise various combinations of Iomega drives and cartridges, it will be possible for you to reach verifiable conclusions about the condition, behavior, and reliability of your Iomega removable storage products.

**It is my sincere hope that this will result in more effective and satisfying personal computing experiences for everyone, and may help lomega's users to enjoy their products while providing valuable feedback to lomega.**

Please see the **Next** panel in this program (by pressing the 'Next' button below) for information regarding lomega's return policy for in-warranty and out-of-warranty drive products.

Their official spokesman has stated that lomega will stand behind their products and that **any drives will be replaced whether they are in warranty or not!** This is great news for people whose lomega drives have been dying!

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