Cooling Channel Serial Communication Investigations.

Problems:-

Data time out (Lakeshore 218,625)

This is where the reading on the display screen turns white. This is caused by the equipment not replying to a request for data or returning it in the wrong format. On the lakeshore equipment this was vastly improved by adding a delay between requests. When contacted Lakeshore recommended a delay needs to be used. This made the dropouts very infrequent but the lakeshore 218's could still return the wrong data causing occasional spikes in the archive data. To remove any spikes the data is also filtered in the EPICS database removing spurious readings.

Delays were also added to the compressors which also reduced the time outs.

Ramp to zero (Lakeshore 625)

The lakeshore PSU has been seen to ramp to zero without a request to do so. This is believed to be due to the query and set commands being too similar. If set current query command is corrupted by one character it will be interpreted as a set to zero command. To stop this set current is only read after a set command. This problem could also be related to the unit requiring a delay which is now implemented.

Communication Errors (AMI 420)

This is an error reported back from the PSU itself but does not seem to affect operation. An error would be reported approx every 1 minute. When looking at the serial data it was found that the serial line was very busy to the point that if any delay was added it would stop working. It was decided to remove unnecessary read back commands. This reduced the errors to a low level.

Conclusions

Serial communications cannot be guaranteed to be 100% reliable. Most of the problems seen have been caused by the equipment not being able to always respond to a request. The modifications made have reduced the failed communications to an acceptable level filtering then further reduces data errors to zero.