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Scope of the documentation

This documentation is prepared solely for the LArg experts who would need it in case the LArg-L1 expert is not available. More information will be added based on the experience we get with the system. Please contact me (chaouki_at_mail.cern.ch) for any suggestions/comments/mistakes.

- Enable the L1MON_A and L1MON_C resources.
- Make sure that L1Gain plugin is enabled.
- Gains are set from the DB, and this can be set through the USBController configuration files. In "SetGain" section of the configuration file put "1" for SetGsOnAllCrates = 1 and 0 for the remanining.

The most important functionality of the receivers would affect the L1 triggering is the gain setting. The problems that might occur are:

- Gains could not be set on one whole receiver, possible causes are:
  - ♦ A blown up fuse.
  - ♦ A Serial Combiner Data Board (SCDB) does not work.
- Gains could not be set on one particular receiver channel, possible causes are:
  - ♦ A bad transformer.
  - ♦ A bad Variable Gain Amplifier (VGA) channel.

To debug most of the problems we use the receiver monitroing system. This includes the use of a PC (PCATLLARL1MON) connected to two osciloscopes, one spectrum analyzer and two multiplexers. The signals are multiplexed in two steps:

- Multiplex signals from the receivers to the monitoring boards, using the receiver control single board computer (SBCs) namely: sbc-lar-mon-l1-01 and sbc-lar-mon-l1-02. Then these signals are sent to the multiplexers through differential cables connected from the monitoring boards to transformers where the differential signal is converted into single-ended signal which propagates through lemo cables to the multiplexers.
- From multiplexers, the signals are sent to the ADCs/Oscilloscopes/Spectrum Analyzer.
- Since the debugging step is not part of the data taking, the ADCs can run in standalone mode. Also, the spectrum analyzer is run remotely (rdesktop PCATLLARL1MON -u Administrator -p Pelu-seme)

L1 rate blow up, would occur when noise starts showing up.

- First we need to pin point to TT(s) responsible for the noise (using the L1Calo Java panel).
- Use a tool (which would be provided by the L1Calo colleagues) to kill dynamically the TT.
- Then, one has to get the information of the ft/feb/feb-channels connected to this TT, using a tool which is being developed based on the L1Calo Java Panel.
- Now, we need to find out if this is detector problem or an L1Calo problem. There are tools which can help diagnose this problem. First, we route the corresponding receiver channel to the spectrum analyzer to see shape the noise spectrum. It will be very easy to see if the problem is indeed coming from the detector by looking at the shape of the noise frequency spectrum. If the problem is not coming from the detector, then the channel need to be masked for further in depth debugging. This needs expert work. On the other hand, if the frequency spectrum reveal noise peaks, high noise etc... then the noise is coming from the detector and probably it would be wise to pin point the problematic channels by making a binary search while looking at the frequency spectrum. It is understood that the problematic channels will reveal themselves by looking at the offline monitoring plots, but it will take time before the plots are available. Once the problematic channels are found, a mask must be set in the DB and the TT is again enabled for the next run.

-- ChaoukiB - 22 Jan 2009

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