

UUB DAQ status

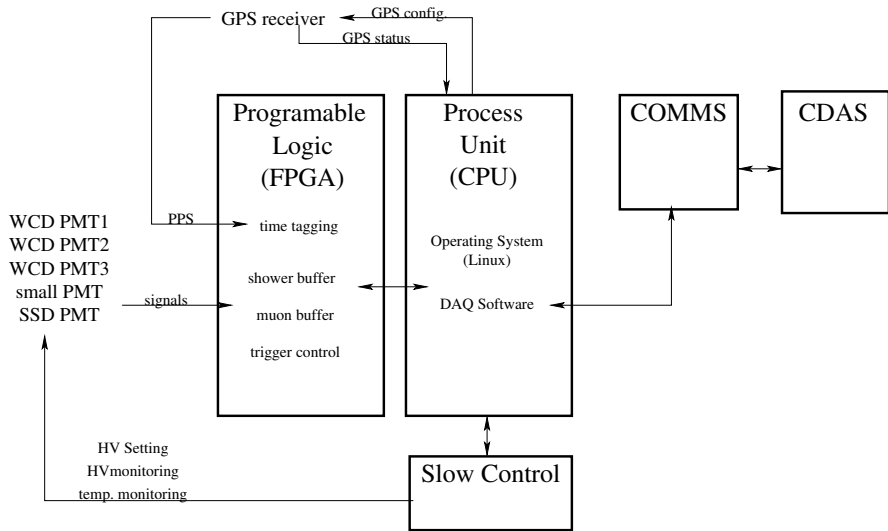
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- Introduction
- Current Status
 - UUB Programable Logic (FPGA)
 - UUB DAQ
- T3 Events Content.
- What is still missing.
- Version.
- Others
- Summary.

Introduction



- Slow Control - Karl-Heinz Becker
- Programmable Logic - David Nitz
- Linux (Operating System) - Roberto Assiro
- DAQ Software - Ricardo Sato
- COMMS - mostly using the existing communication system.
- CDAS - Xavier Bertou

- Compatible mode shower trigger
 - Implemented in a way which would be compatible with the trigger implemented in the UB.
 - implemented only for the WCD PMTs.
 - The ADC signals pass a digital filter before been evaluated by the trigger algorithms.
 - List of triggers:
 - Single Bin Trigger (Threshold trigger) - T1 - running in the field
 - TOT - running in the field
 - TOTD - implemented, but it still not running in the field
 - MOPS - Not implemented yet.
- Additional shower trigger.
 - Full Band Width Single Bin Trigger. It is the only trigger which can trigger by the SSD module, independent of the WCD PMTs.
- Muon Buffer Implemented as Full Band Width Single Bin Trigger.

- Time resolution.
 - mostly understanded (Stations Clais Jr.(22) and Trak Jr.(20)) with the synchronization cable (Rob Halliday).
 - with shower front, it is still under study (Sonya Schröder)
 - The parameter “nanosecond” is still set to 0, but the time may be calculated with Sawtooth corrections. It is not implemented in CDAS.
 - The time of the event is done in similar way as in the UB (**At the end of trace**).
- Triggers:
 - Compatibility Single Bin Trigger (T1) - running.
 - Compatibility TOT - running since 2018/Jul.
 - Compatibility TOTD - implemented in the software, but still not running in the field. The trigger rate looks to be too low for similar parameters used in the UB (Under study).
 - Full Band Width Single Bin Trigger - implemented (activate by configuration parameter).

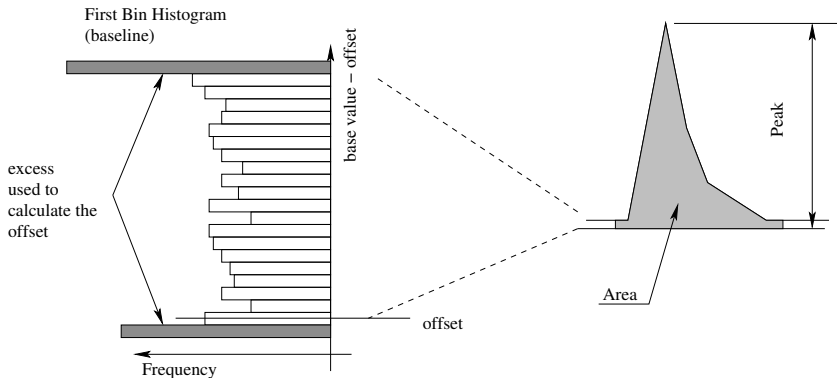
- Muon Buffer.
 - used to construct histograms to identify the values of VEM (for WCD) and MIP for SSD.
 - it has many short traces of high gain channels.
 - generates histograms of Peak, Area and baseline.
 - For Stations with SiPM (using calibration channel)
 - Cristian(59) - from Jul, 2018
 - Svenja(1733) - from Jul, 2018 to Sep, 2018
 - Pichi-Peni-Hue Jr.(41) - still not working
 - The Charge histogram is alternate histogram of calibration channel and high gain SSD channel. Some additional parameters use the Shape.

- Monitoring
 - It is reporting only Slow control parameters
 - Calibration parameters. Still need to be better definition.

- 10 ADC channels:
 - 2048 values of 12 bits (values from 0 to 4095) each channel.
 - The bin 0 does not corresponds to the start of the trace. The parameter “TraceStarts” indicates the start of the trace.
- 3 filtered signals (2048 values of 12 bits each) used internally by the FPGA to implement the Compatibility mode triggers.
- Trigger type: “Type1” and “Type2”.
- time information of the event. It has all parameters related with two consecutive seconds (the second previous to the event and the second which event appear).

T3 Event Content - muon histogram

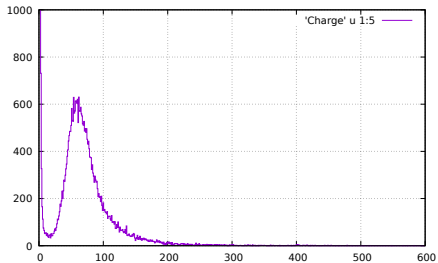
- muon histogram: Baseline, Peak, Charge; And Signal Shape.



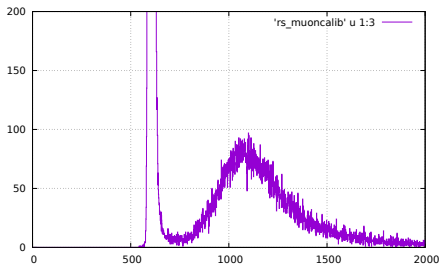
T3 Event Content - SSD MIP Histogram

Would we change the “offset” and histogram scale (today is 1/8)?

Today



Complete information



- Few calibration parameters (Since Jul, 2018).
 - transferred in Extra Parameters (Fine to verify, but not keep in this way).
 - amount of triggers in the last minute (at the beginning of acquisition, it maybe few seconds): T1, T2, TOT.
 - tube mask
 - Baseline and its deviation (for all the 10 channels).
 - VEM Peak
 - VEM Area
 - T70Hz rate.
 - HG/LG ratio, including the SSD - calculated in almost similar was as Dynode/Anode ratio for UB.

What is still missing

- Calibration data as a Monitoring stream (there are only slow control parameters).
- Small PMT calibration information (Torino Group people are working to understand and implement a algorithms).
- Calibration parameters for SSD. What would be?
- Others calibration parameters?
- Improve the calculation algorithms in some cases it does not have enough data to compute properly a particular parameter.
- SSD only trigger would be required? How to control the trigger?
- RADIO. Still need to look how will be the interaction of UUB with RADIO detector system.
- Need to implement communication with AMIGA (T3 event request).

- Version for the components:
 - firmware
 - it is just one particular file. It is using the compilation date.
 - DAQ Software
 - It is composed of many peaces (Trigger, Calibration, histogram, ...)
 - consider one version for each part? (bigger amount of parameters).
 - Linux: in principle, it would not change with time.
 - slow control: it can not be modified remotelly. Probably it will be not necessary.
- Where to report (IkLog, T3 Event, Monitoring, ...)?

- Trigger parameters (active triggers, threshold, configurations). Would also be reported?
- The T3 transfer spend few minutes (normally it is fine for OffLine), but there are groups which is requiring data much faster. Probably it may improve up to few tens seconds delay, considering first transmission of few event parameters (not more than 100 bytes). Separate event information file.

- Most important trigger implemented, but there are still missing TOTD and MOPS.
- Monitoring parameters: some implemented. What would be the others?
- SSD trigger, monitoring parameters: Some ideas?
- small PMT, is under study.
- RADIO/AMIGA - in implementation or need more details.
- Version - what/how/where?
- More issues?