Online - CM43

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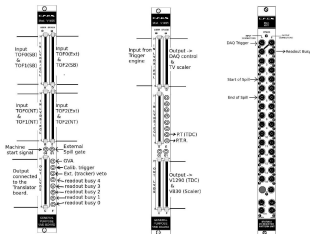
UNIGE - DPNC

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Trigger

- The trigger was routinely operated during the last three ISIS user cycles.
- No issues were found.
- Big step forward comparing to the previous situation when the trigger was the most fragile component of the DAQ system.

Documentation of the Trigger system is completed.

Register name	Address	Addr. size	Data size	Read/Write
Event readout buffer	base + 0x0000-0FFC	A32	D32	R, BLT
Module reset*	base + 0x800A	A32	D32	W
GEO*	base + 0x202C	A32	D32	R/W
Status	base + 0x1030	A32	D32	R
User firmware version*	base + 0x1008	A32	D32	R
Number of triggers	base + 0x1034	A32	D32	R
Number of data words	base + 0x1038	A32	D32	R
Number of spills	base + 0x103C	A32	D32	R
Software cycle start	base + 0x1040	A32	D32	R
Busy times 0,1	base + 0x1060	A32	D32	R
Busy times 2,3	base + 0x1064	A32	D32	R
Busy times 4,5	base + 0x1068	A32	D32	R
Part. Tr. veto lenght	base + 0x100C	A32	D32	R/W
Spill Gate open delay	base + 0x1010	A32	D32	R/W
Spill Gate Close delay	base + 0x1014	A32	D32	R/W
Spill Gate Gen. Ctrl	base + 0x1018	A32	D32	R/W
Part. Tr. Gen. Ctrl	base + 0x1028	A32	D32	R/W
TOF0 Mask	base + 0x101C	A32	D32	R/W
TOF1 Mask	base + 0x1020	A32	D32	R/W
TOF2 Mask	base + 0x1024	A32	D32	R/W

* This register is available also for the Translator board.

Table 1: Address Map

Spill Header

Trigger Event

Spill Trailer

The whole document is available at
http://micewww.pp.rl.ac.uk/projects/online/wiki/DAQUserManuals

Automated checks of the datataking readiness

- A system of shell scripts for automated tests is under development.
- The system provides an early detection and diagnostics of the possible problems occurring during the shutdown periods.

Typical output of the tests on miceacq15. All tests OK case:

Printouts of the tests in different cases of equipment failures

```
miceacq15  --- Testing V1724 (BA: 210E0000)  /-----x----/  1 test FAILED
```
The equipment has been tested 10 times.
One of the tests has failed.

A case of a single failure. Does not necessarily indicate a real problem.

```
miceacq15  --- Testing V1724 (BA: 210E0000)  /xxxxxxxxxx/  10 tests FAILED
```
The equipment has been tested 10 times.
All tests have failed.

A case of a massive failure. Definitely shows a problem.

When the test system is active, the tests can be executed on a daily basis
and the results will be send to a list of authorised persons by email.
Currently the VLSBs are not covered by the tests.
The whole Documentation of the datataking readiness tests is available at
http://micewww.pp.rl.ac.uk/projects/operations/wiki/DAQ

Tracker DAQ

New Readout code

- Substantial reduction in code quantity.
- The new code is easy to understand and maintain.
- Tracker is implemented entirely as MICE DAQ Equipment, following the design patterns of the DAQ framework.
- Tested with beam during the last ISIS user cycle.
- Data Checks
  - ▶ VLSB status register are checked.
  - ▶ Corrupted data is to be deleted by the readout.
 - ▶ Not finished implementation/testing.

Tracker DAQ

Standalone Tracker readout

- Used for processing calibration/pedestal data.
- Calibration of Biases/ADCs is handled using pyROOT scripts/GUIs.
- Reading into pyROOT is handled using TrDAQReader module.
- DAQ changes are transparent to calibration codes
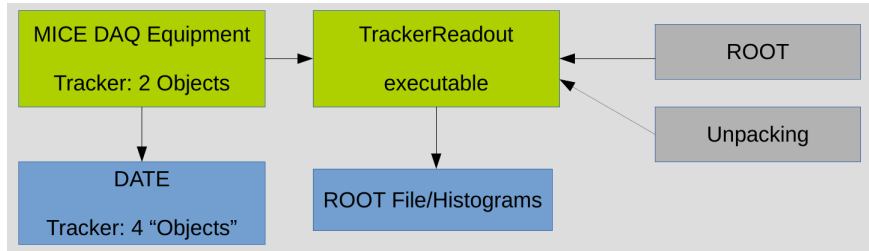
Tracker readout Soak Test

- "Soak tested" for two weeks of "continuous" readout.

  - Gaps are causes by manually pausing the readout and software errors.

- Checked data for corruption and errors from the electronics

  - Found none

- Monitored pedestals & gain of each channel →

- Gain is very stable

- Pedestal drifts considerably.
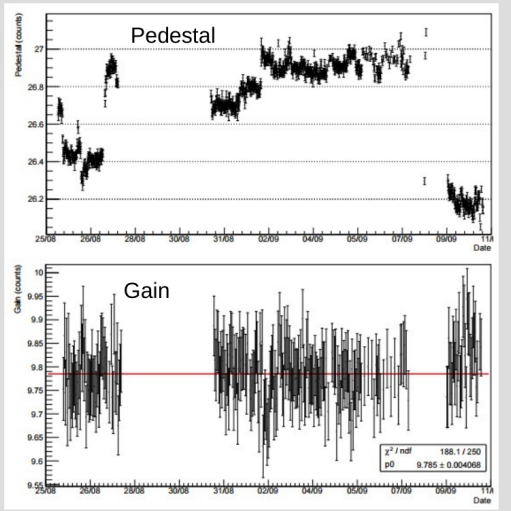
Online Monitoring
New Tracker plots

- Mean and RMS over the pedestal per channel.
- Dist. of mean per channel.
- Primarily for automatic checking of tracker data.
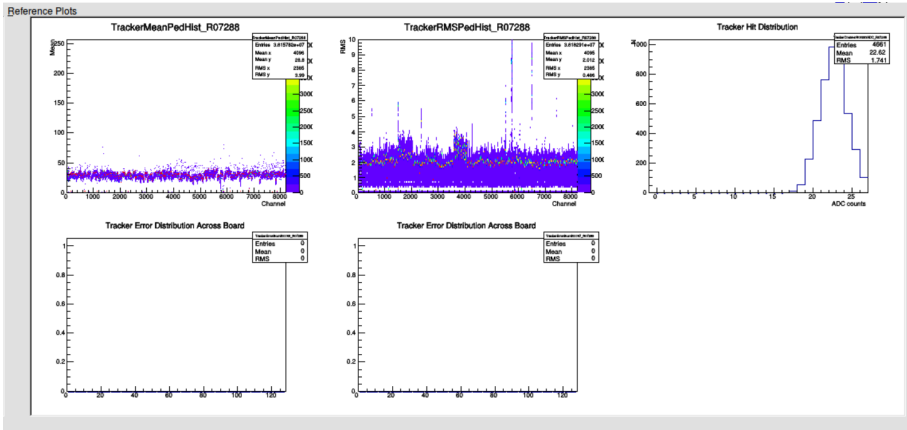
Online Monitoring - work in progress

1. Some bugs have to be addressed.
2. EPICS communication
   - A prototype of the Online Monitoring/EPICS communication is running.
   - Currently ends error signals in case of unpacking exception.
   - The logic has to be improved.
3. Automatic Checks
   - Data comparison will soon be ready.
   - Have been waiting for data sets from StepIV in order to test.
   - Reference data will be stored in 1 root file.
   - Selectable by expert through GUI or command line option when running the script

Short term plans and Conclusion

- The overall DAQ system is in a good shape and is ready for Step IV.
  - ▶ Implement a more sophisticated and robust system for software version control for the DAQ software, including a development branch and an official release.
  - ▶ Develop a procedure for rolling back to a stable version of the readout code in case of emergency.
- New tracker readout code has been written and tested.
  - ▶ Some features still to be added
- Soak test has demonstrated tracker readout over extended period.
- OnMon needs debugging.
- Tracker monitoring/auto checks have to be implemented in MLCR by end of November.
- OnMon to EPICS interface has to be finalised.