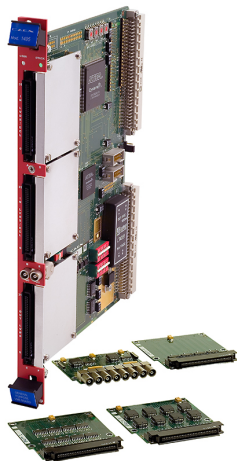# DAQ Update - CM40

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New trigger system for MICE based on CAEN V1495

CAEN V1495 - General Purpose VME Board

1. Spill gate generator
   - All parameter are controlled by the user.
   - Possible to enable/disable all type of events (Start of spill, End of Spill, DAQ event and Calib. event)

2. Particle trigger generator
   - Trigger condition controlled by the user;
   - Trigger condition masks controlled by the user;
   - Pulser trigger with constant frequency;
   - Pulser trigger frequency controlled by the user;
   - Randomly generated pulser triggers.

3. Data recording
   - Trigger pattern and time recorded in a FIFO;
   - FIFO readout through the VME bus.

DAQ test 1 - 6th April

Firs test of a new trigger system for MICE, based on a programmable FPGA logic.

The two trigger systems (old and new) running in parallel. Very simple DAQ setup: outputs (Particle Trigger and Particle Trigger request signals) of the both systems are connected to a TDC for time measurement. Results of the test:

- The integration of the new board into the DAQ readout software has been tested;

- All triggers generated by the old system are presented also in the output of the new system.

- The new system generates $\sim 10\%$ extra triggers, which are not register by the old system.

DAQ test 2 - June 29th

More sophisticated test including the whole DAQ and Reconstruction chain.

- Running the full TOF DAQ.
- Using DATE (testing the integration of the new board with DATE).
- Produces a new TOF calibration.
- Try to reconstruct the collected TOF data by using the new calibration.

DAQ test 2 - June 29th

Results of the test:

- The integration of the new board with the rest of the DAQ has been tested.
- The new TOF calibration has been made and the reconstructed data looks reasonable. However the obtained time resolution is a bit worst of the expected one.
- The wrong setting of the fADC acquisition windows was incriminated for the change in the time resolution. This looks like a very good explanation for the problem, but we need a new data taking test.

DAQ test 2 - June 29th
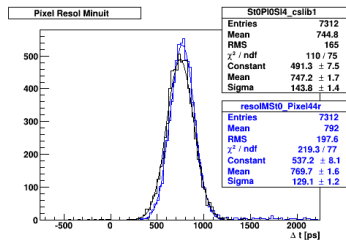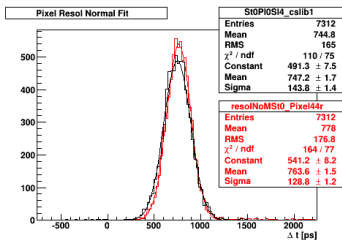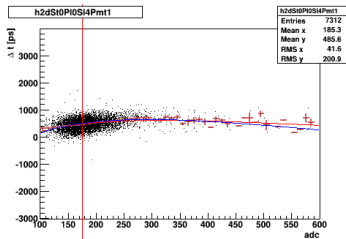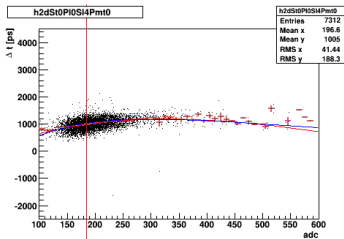
Almost no correlation between the pulse amplitude and the time-walk.

DAQ test 2 - June 29th

Separate issue from this run:

- A continuous problem coming from one of the TDCs has been reported by the shifters. This looks to me as a separate hardware problem in this particular board.
- I am not able to reproduce the problem.

MLCR Hardware

Replacement of the readout computers (miceacqXX).

- 7 new computers have been installed in MLCR.
- SL6.4, CAEN software and DATE 7.60 installed on all new computers + miceraid4 and miceraid5.
- The existing (Date v7.34) Configuration Data Base has been transferred and upgraded.

Automatic tests and spares.

- A system of tests for all the DAQ equipment used by the PID detectors, has been developed.
- This system of tests includes individual test of the boards by using software triggers, but also a integrated test of all the equipments in the crate, when the triggers are provided by the new programmable FPGA trigger logic.
- The test are running everyday and I see persistent problems in three V1724 boards (TOF's fADC) and we have only one spare board.
- We also have the mysterious problem in one of the TDCs reported during the last data taking.

Conclusions

- We need additional data taking test before the final removal of the old trigger system.
- The installation of the new DAQ computers and the migration of the software is finished.
- New automatic test system for the DAQ equipments has been implemented.
- We need spare TDCs and fADCs (V1290 and V1724).