A DAQ system for FOOT

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Outline

- TDAQ Structure
- First procurements
- Next steps
- CDR writing

DAQ Structure

- ## Distributed system with
  - 1 run control PC: DAQ control, shifter PC
  - 1 main storage PC: event building and final storage
    - → (special PC!)
      - Collects data from optical fibers & eth; writes on a RAIDx NAS
  - 1 main monitoring PC: system-wide monitoring
  - N sub-detector monitoring PC
    - Subdetector specific; Provided, used and controlled by subdetector groups
  - 1-2-3 VME Crate (6U/9U) for electronic board readout (a 64 bit Single Board Computer on board)
  - 1 optical fiber infrastructure
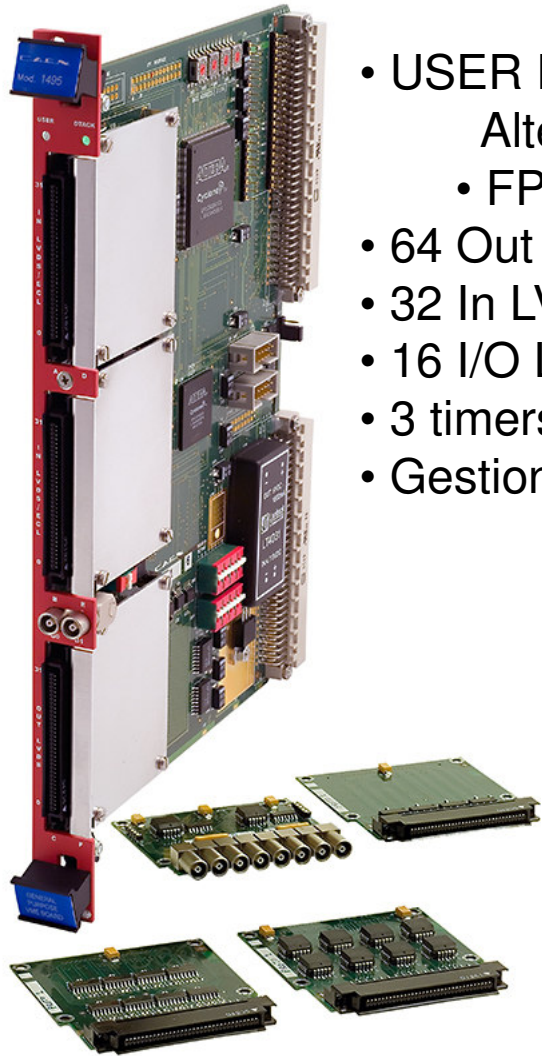 - 1 ethernet infrastructure for DAQ

First Procurements

- ## Main PC for data registration
  - 64 bit PC, 64 GB ram, 1 TB raid 1, 1 TB SSD, slot PCI 32 bit, 3 slots PC-express, USB 3.0

    Already in our lab

- ## DAQ Control PC

  (control and SW, FW development)
  - PC standard 64 bits, 32 GB ram, 1 TB

    acquired

Trigger: CAEN 2495 board

- USER FPGA
  - Altera Cyclone 20k
    - FPGA VME
- 64 Out LVDS
- 32 In LVDS
- 16 I/O LEMO
- 3 timers
- Gestione Clock

- Handling of **trigger**, **gates**, **busy** and synchronization signals

- NIM electronic reduction

Acquired!

TDAQ Next steps

From now till end of 2017

- SW installation:
  - SLC6, TDAQ, MYSQL, elog, LibreOffice/OpenOffice, ROOT, gcc, python, …
- Simple TDAQ system configuration
  - TDAQ, MYSQL, elog   and much more in standalone
- Software trigger tests
- Procurement of a Single Board Computer for VME
- Firmware and software update for caen 2495 trigger module
- Software update for FADC, TDC, QDC CAEN
- Tests in hardware trigger mode on cosmics and pulsed events
- First «simple» data taking
- MIMOSA Chip simulation in DAQ
- DAQ from fiber and ethernet sources
- Other device integration in test mode
  (ideal: 1 piece per detector)
- FOOT monitoring software integration

CDR writing – 1.5/3 pages

Not yet in the repository

4 DAQ and Trigger

3 pages (Mauro)

> Most of what is written here depends on what is present in the detector descriptions. Need a cross check.

4.1 Data acquisition limiting conditions and principles

The FOOT detector will be equipped with a DAQ system designed to acquire the largest sample size with high accuracy in a controlled and online-monitored environment. For a proficent system few guidelines will be considered in the design:

- The maximum acquisition rate should depend on the beam characteristics and/or on the slowest detectors in the experiment. Along the DAQ chain there should be no bottleneck that limits the rate.

- The system should work in different laboratories and in different acquistion conditions: the DAQ should be parametrizable and it should store detector data (RAW data files) as well as configuration data in databases or text files.

- The DAQ system should allow an online monitoring of the data taking and a fast quality assessment of the acquired data.

- The storage system should be reliable and the data should be transferred as soon as possible to the analysis centers.

The end