Scalable Readout System

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RD51 (EP-DT-DD)

Gaseous Detector Development Group

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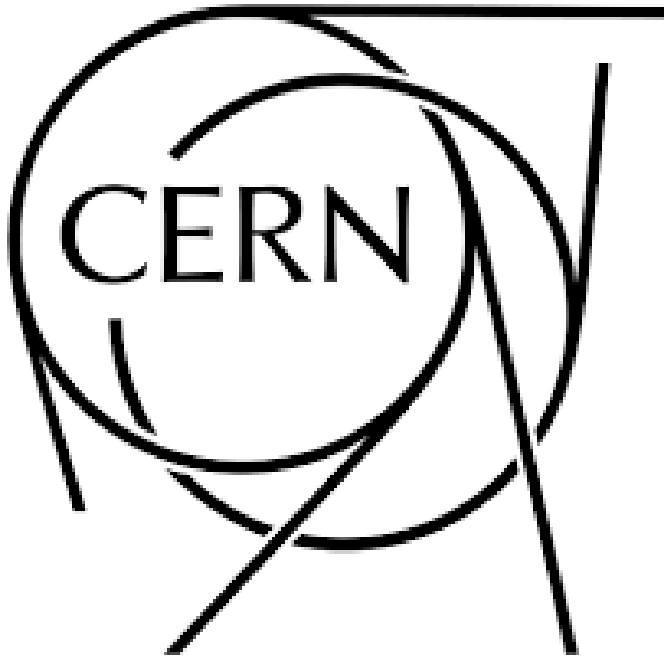
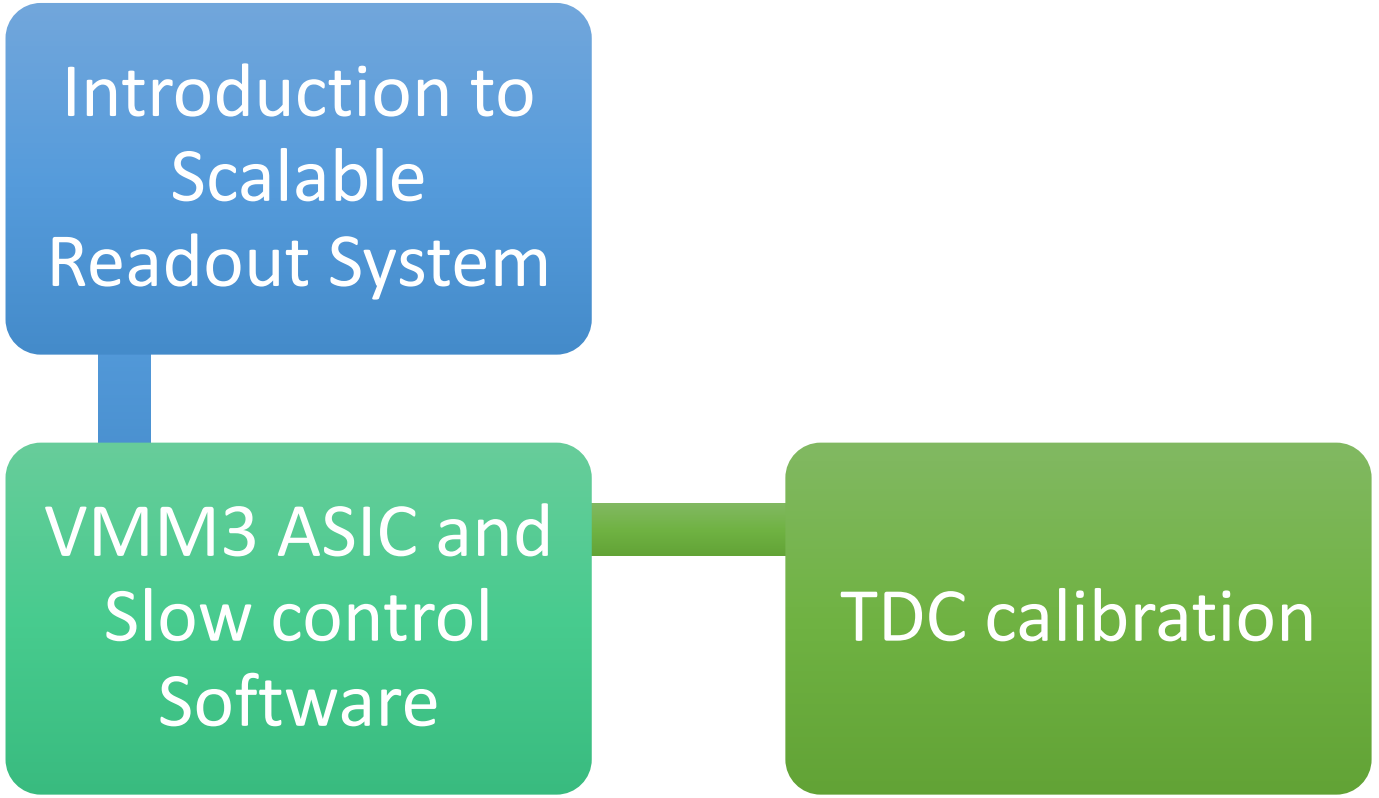


Overview


Introduction to Scalable Readout System
VMM3 ASIC and Slow control Software
TDC calibration

From Electrical Signals To Scientific Data

Different types of detectors at Cern.

Detector specific readout systems.

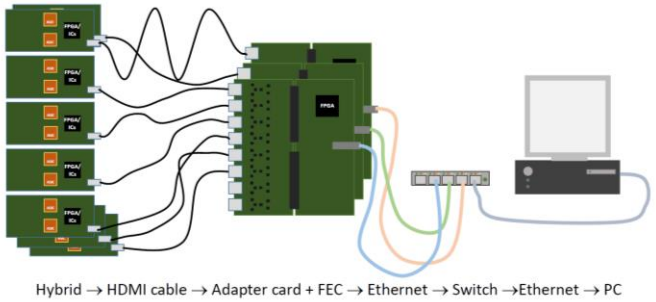
Scalable Readout System (SRS).

Common back end and detector specific front end.

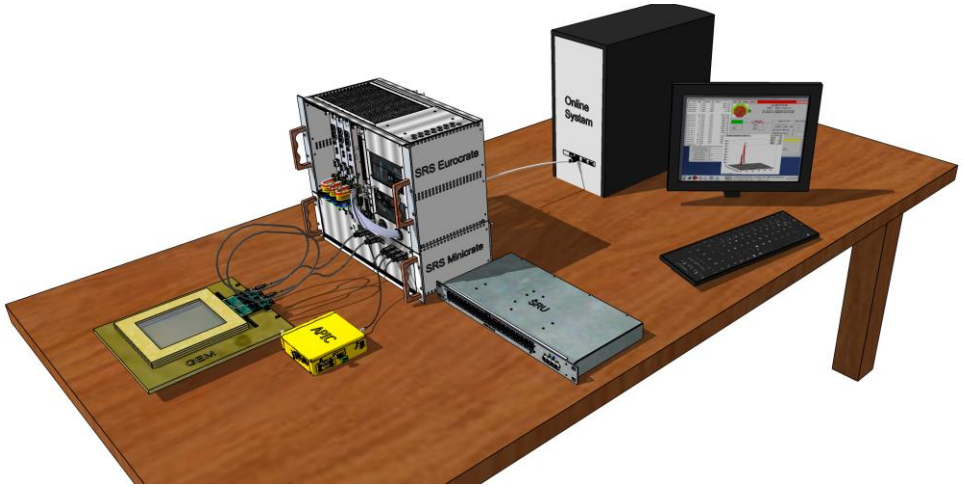
Commercially available components.

Supported detectors range from table top to rack based systems.

Reduces cost and man power.



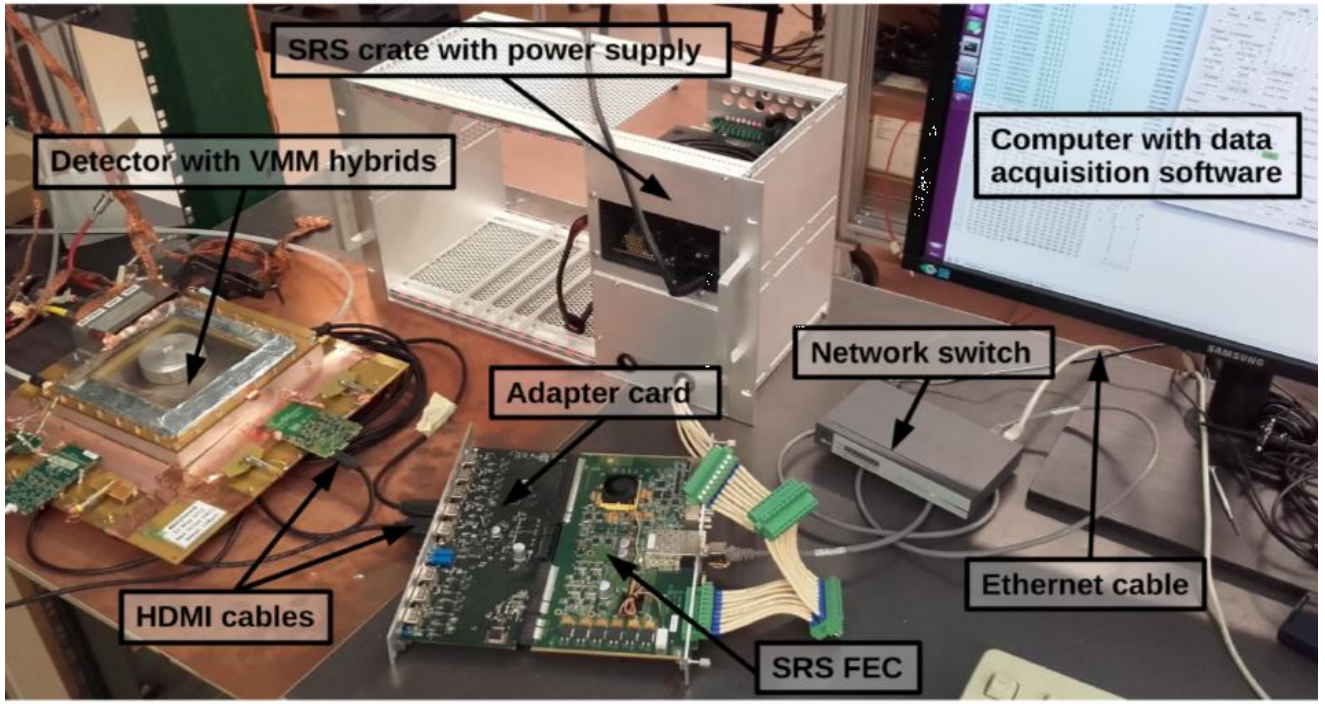
Hybrid → HDMI cable → Adapter card + FEC → Ethernet → Switch →Ethernet → PC



Scalable Readout System

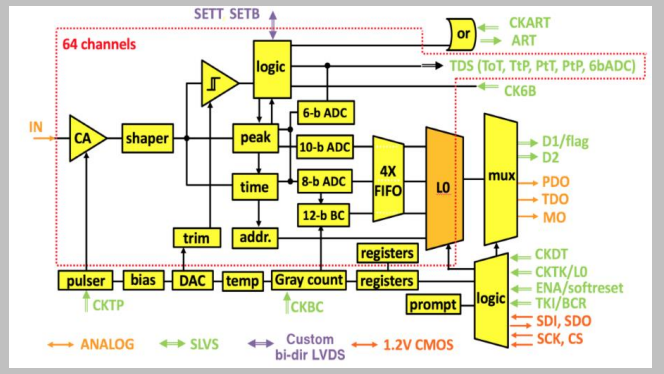
SRS Prototype

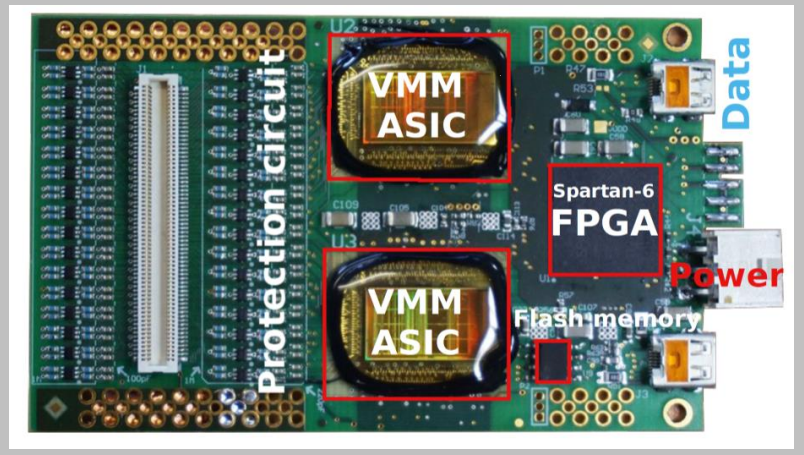
- A generic readout system for laboratory and detector instrumentation developed and supported by the RD51 Collaboration
- Front-end ASICS implemented in SRS:APV25, VFAT, Timepix, Beetle,Timepix3, VMM

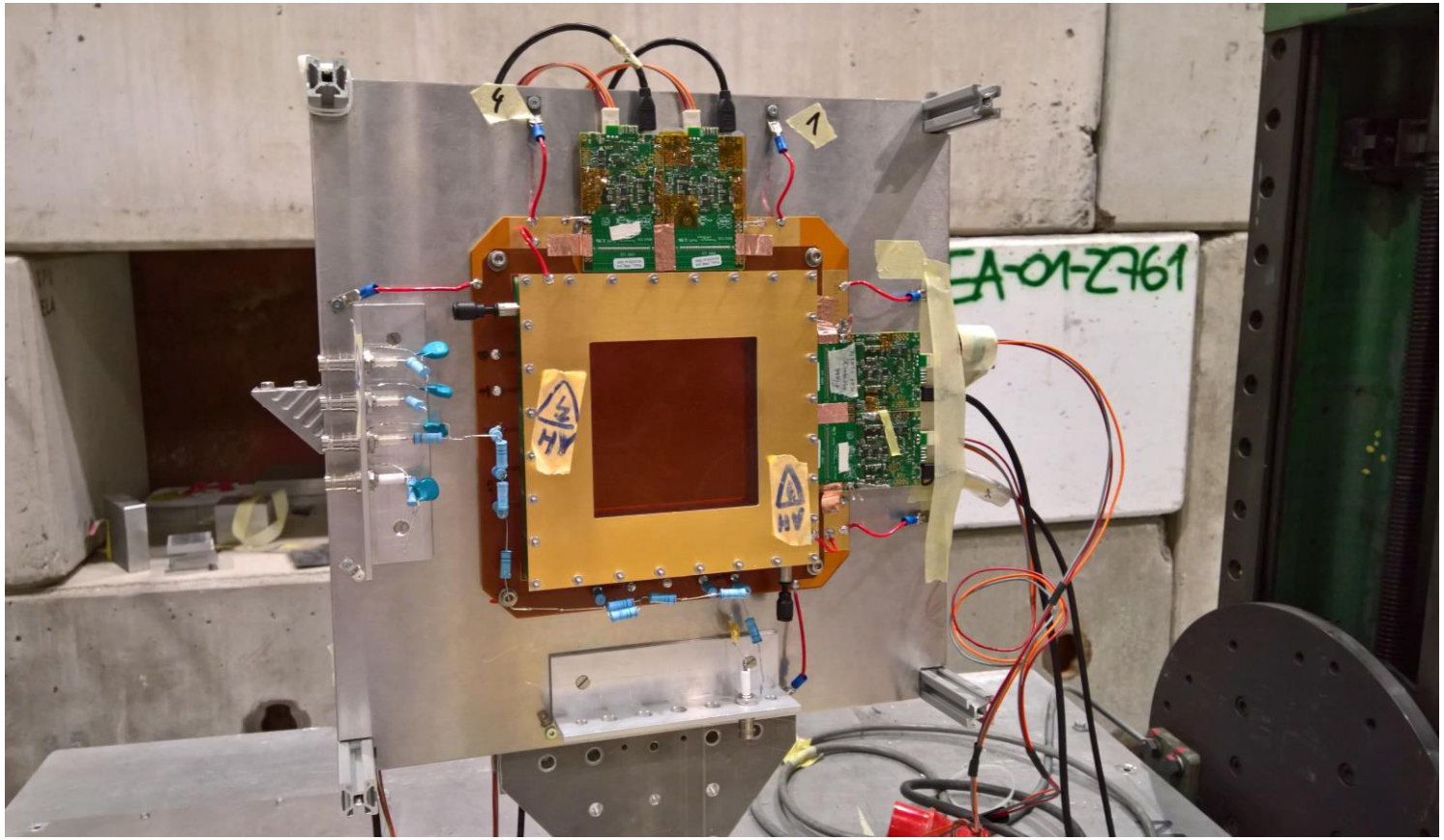


VMM 3 ASIC

- 130 nm CMOS technology
- 64 input channels, each w/preamplifier, shaper, peak detector,several ADCs
- Sensitive to positive and negative polarity
- Digital block w/ neighbouring logic, FIFO , multiplexer
- Adjustable gain 0.5 — 16 mV/fC
- Adjustable shaping time from 25 ns — 200 ns
- Input capacitance from few pF — 1nF
- Input charge acceptance range from 0.1pC to 2pC
- Internal test pulser with adjustable amplitude
- Global threshold & adjustment per channel
- Self-triggered, zero suppressed
- 38 bit per hit (if input charge goes over threshold)

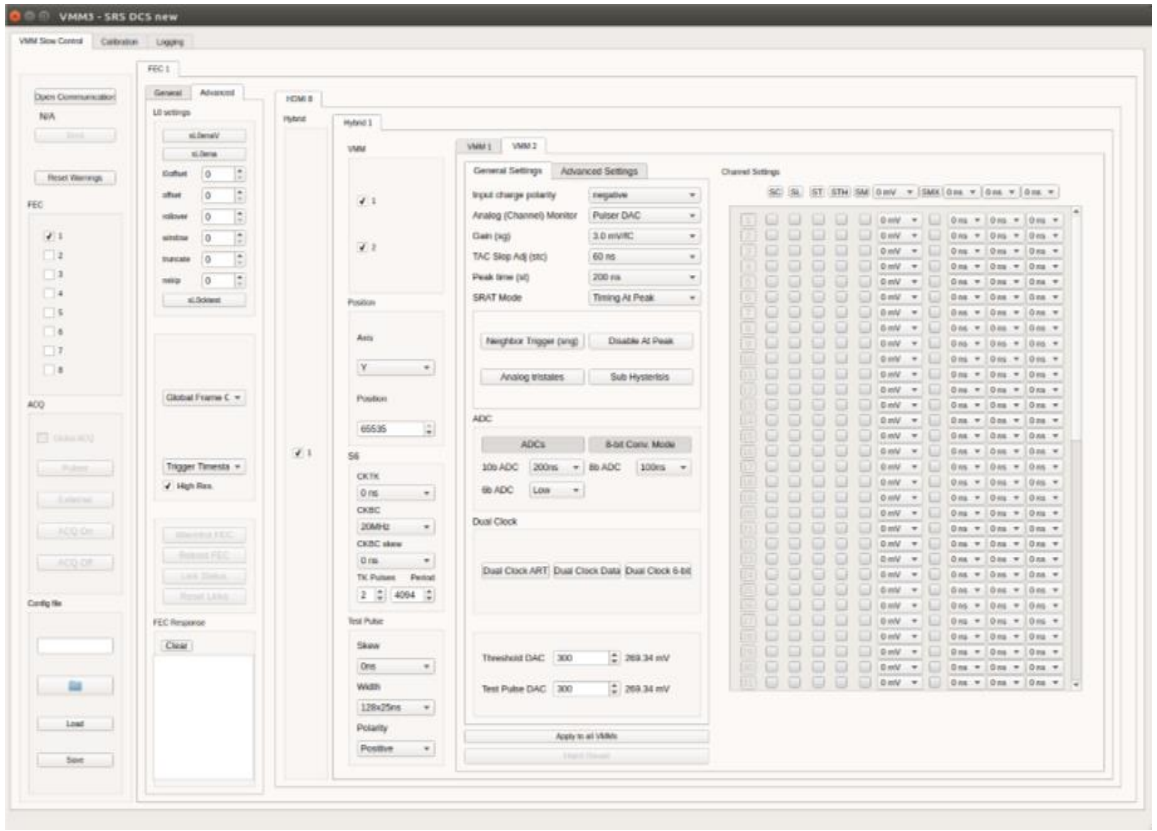


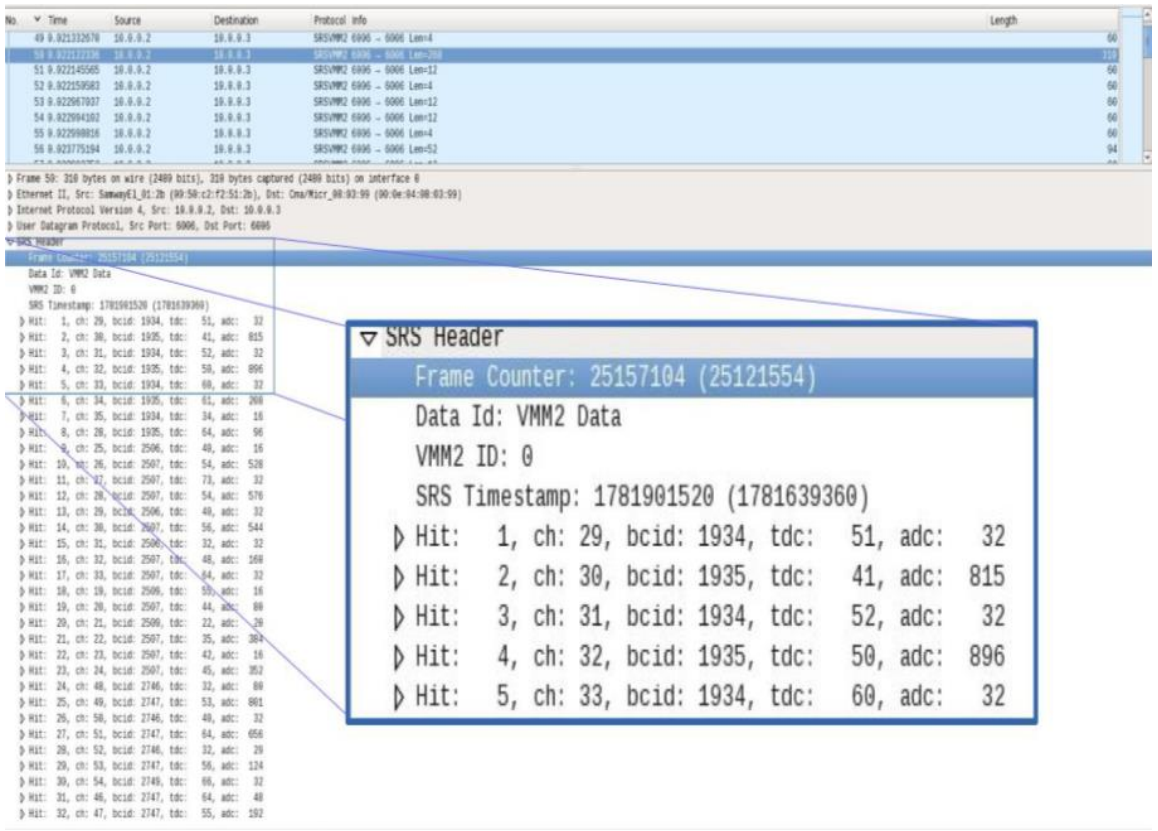




Experimental Setup

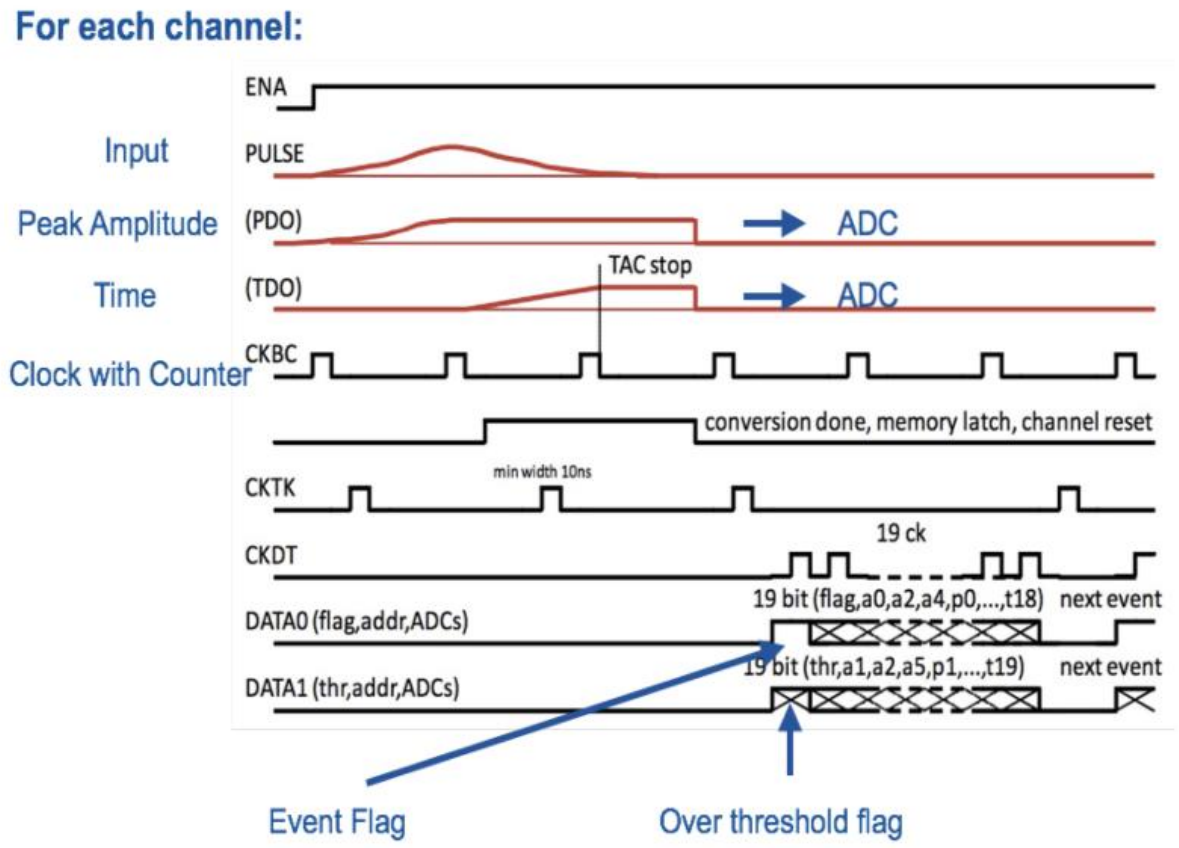
- Standard GEM detector with four Hybrids containing eight VMM3s
- Muon or Pion beam from SPS in North Area



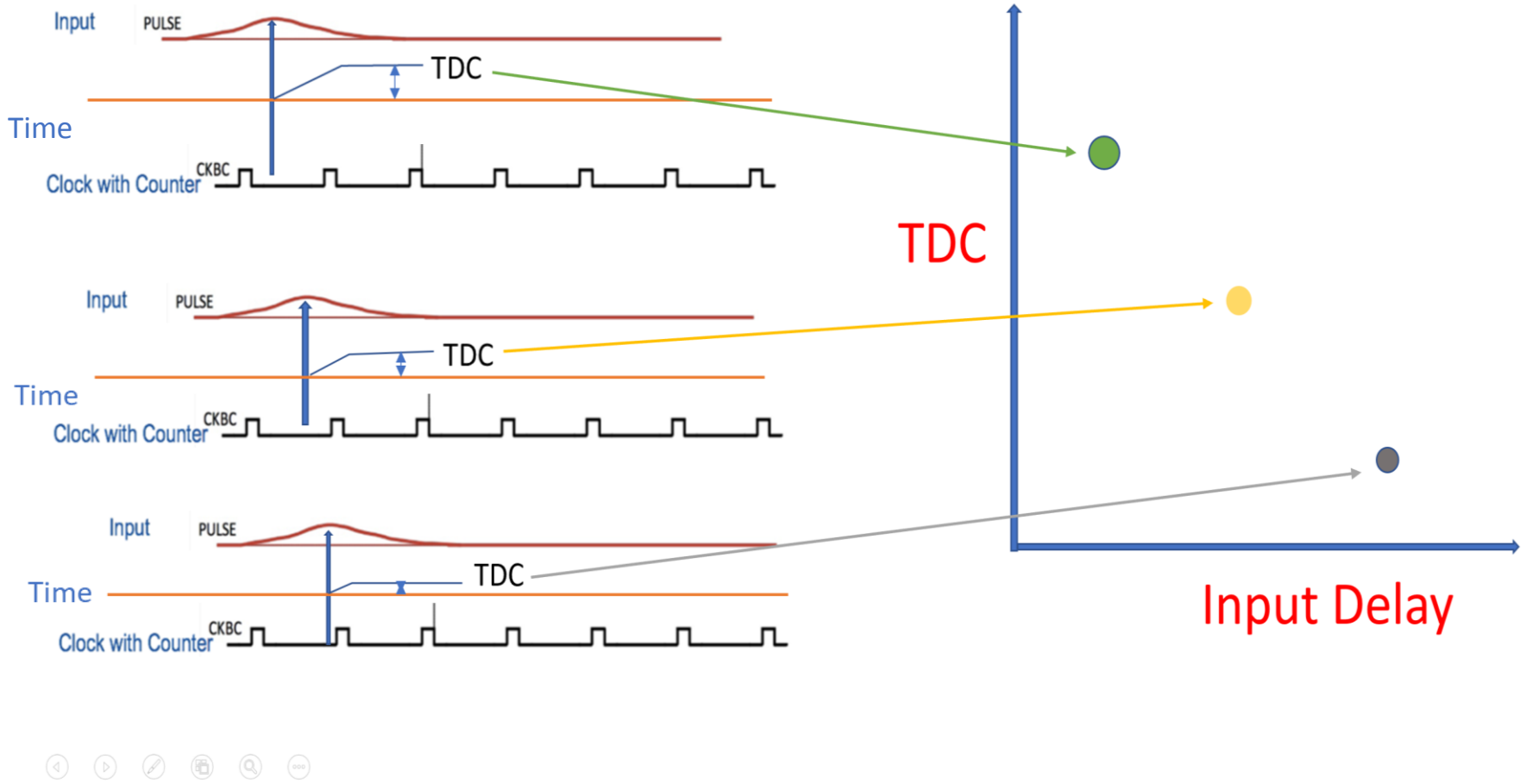


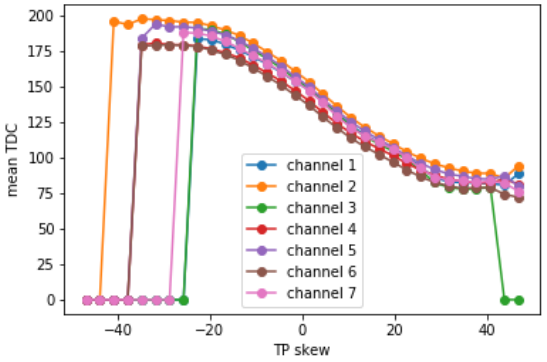
Slow Control software Readout Format

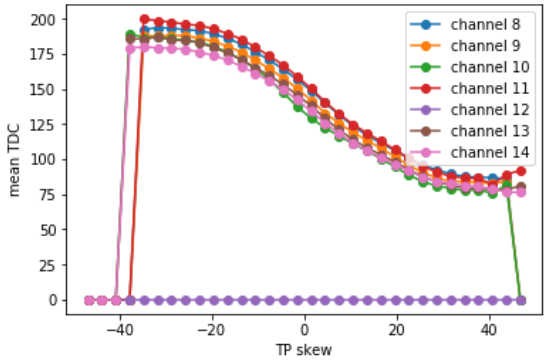
Time Measurement

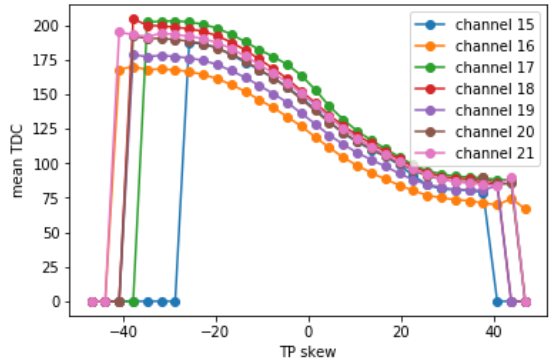


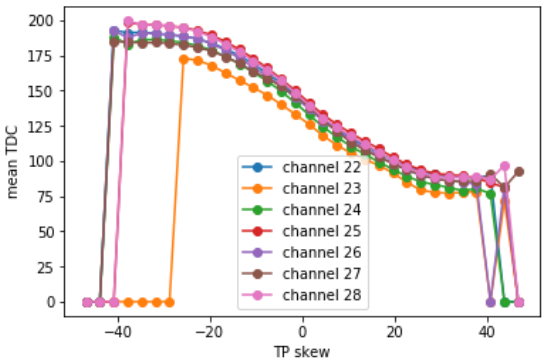
TDC Calibration





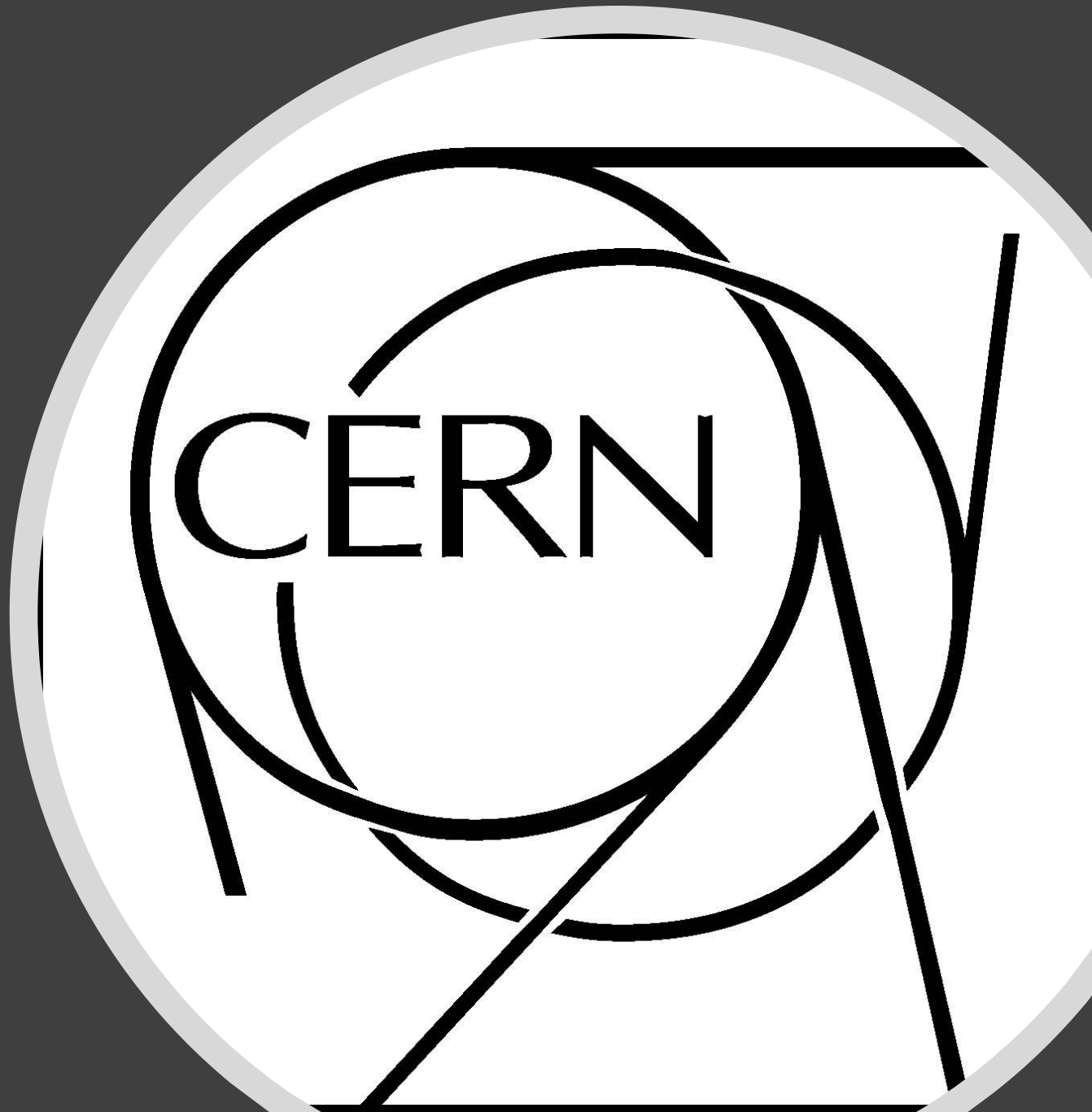






Analysis of TDC

RD51 Work
Under progress

- Test of VMM3a with test beam is going on right now.
- Slow control software is being upgraded. Trying to implement automated calibration.
- Convert to web based interface for RD51 collaborators.

Thankyou