Scalable Readout System

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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.
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 with preamplifier, shaper, peak detector, several ADCs
- Sensitive to positive and negative polarity
- Digital block with 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

For each channel:

- Input
- Peak Amplitude
- Time
- Clock with Counter

Event Flag

Over threshold flag

Conversion done, memory latch, channel reset
TDC Calibration

Input Delay
Analysis of TDC
• 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