The Data Acquisition System of the SuperB-SVT Beam Test

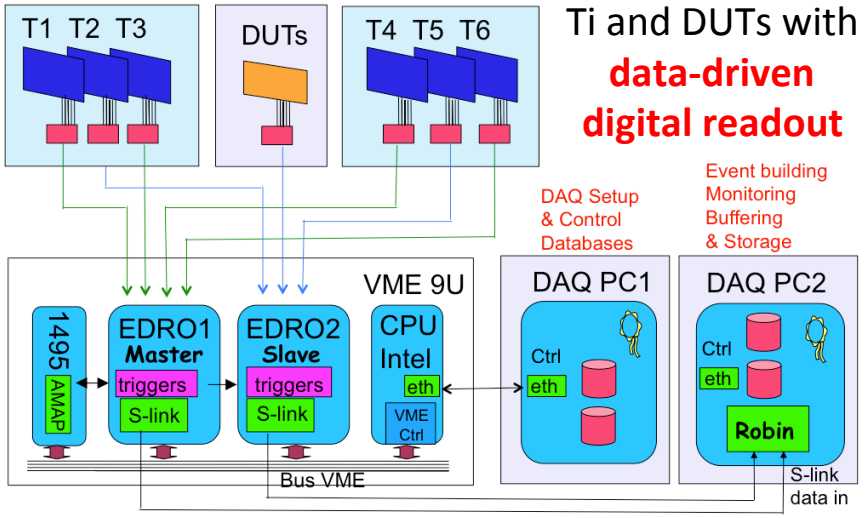
Fall 2011 beam test with a 120 GeV pion beam at CERN-SPS to probe prototype detectors developed by the VIPIX Collaboration for the layer0 of the SuperB-SVT

Detectors Under Test

- High resistivity striplet silicon tracker
- Hybrid pixel detector with 200 μm thick sensor and 4096, 50x50 μm^2 pixels

Telescope

- Six planes of double sided silicon strips
- Used to define impact point of particles at DUTs



Ti and DUTs with **data-driven digital readout**

TDAQ functionalities

- Configure and readout the telescope as well as a variable number (either one or two) of DUTs of different types (striplets/pixel)
- Distribute synchronization clocks and time-stamp to all devices
- Provide triggers to an analog map device having independent readout

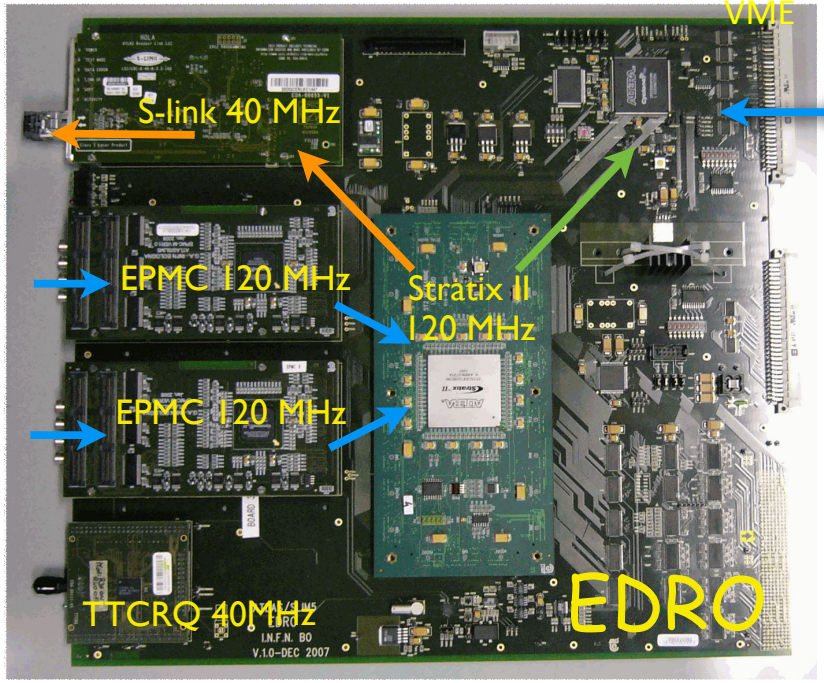
Main Electronics

Two custom-design VME-9U boards called EDRO: fully configurable; two mezzanines to handle inputs (up to 8 Gb/s); a Mezzanine to handle trigger logic (master), format data and dispatch them to an optical link (S-link) with 160 MB/s data bandwidth

- organized as master-slave
- the master distributes triggers to the slave and synchronization clocks to all devices

A Robin PCI card (developed by ATLAS) in a remote PC for fast data reception, event building and buffering

A Caen 1495 VME 6U module to handle triggers from analog maps



Trigger logic

Select events to be output based on:

- Telescope layer multiplicity
- Telescope hit-multiplicity per layer
- Telescope region-of-interest
- Analog-maps trigger to identify their small projection on the telescope planes (region-of-interest to be then used to provide proper trigger to amaps)

Software

- Use ATLAS-TDAQ infrastructure
- SFM transitions
- Configuration and Condition Databases
- Online data analysis
- Histogram presenter
- Elog

Performance

- Max rate 40 MHz
- First half of each spill dead-time free
- Second part limited by data writing to disk
- 550 GB stored data (~50 M striplet and ~350 M pixel events)