



Muon g-2 Calibration system data flow



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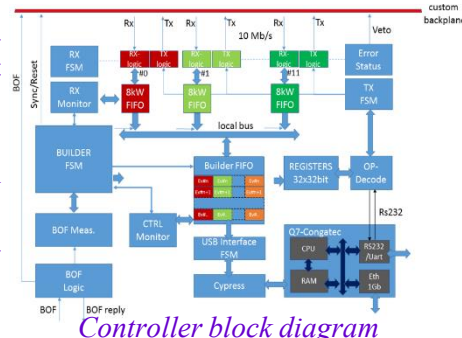
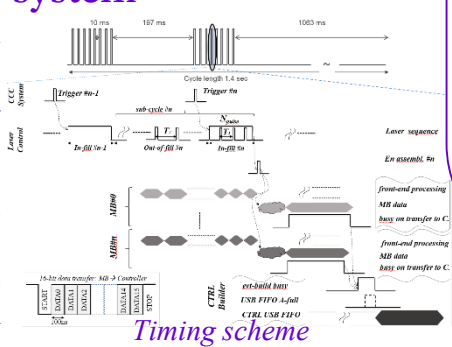
Laser Calibration System

- It provides a reference signal to calorimeter elements;
- The stability of the light distribution systems (Source and Local) are monitored at 10^{-4}
- Specialized electronics has been developed to manage signal processing and data readout.
 - ✓ MB module: preamplifier circuit, shaper and ADC conversion
 - ✓ Controller board collects the slave data by using a custom bus and sends them to the online farm.

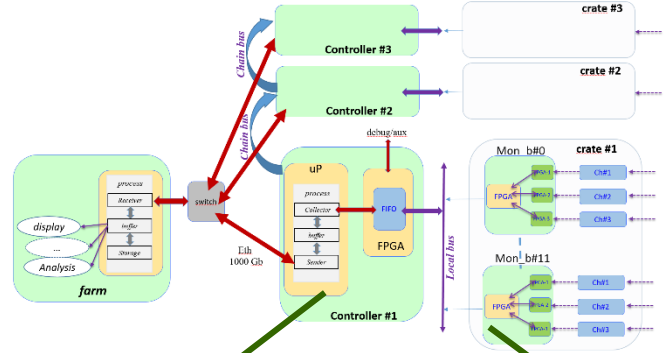
The data readout system

The data readout is able to accommodate several calibration modes in terms of pulse and data rate

- In-Fill/Out-of-fill and simulation mode with a pulse rate in a large range (Hz ÷ MHz)
- Readout chain with a trigger-driven algorithm.
- With new trigger → MB board performs frame assembling and data transfer
- Controller performs the sub-frames collection, checks the data integrity and stores reconstructed frame in a local FIFO
- Data size for each pulse = 10 byte/ch; data from MB over a serial link (Start/16-bit word/Stop) using 10 MHz reference
- An embedded CPU reads the data from USB device and sends them to the on-line farm over 1Gb Ethernet;
- A real-time monitoring is accomplished in a hardware without additional overhead on the CPU activities



DAQ based on a multiple crate system



Controller board



QMx6 quad-core

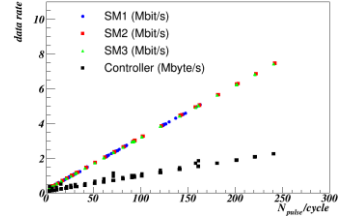


Monitoring board

Test results

A slice of the DAQ system was assembled at the Naples laboratory in order to integrate and test all the DAQ components under real conditions.

Data rate study



Linear behavior of the data transfer: SM and Controller measurements are carried out inside the Controller. The maximum value of slave data transfer is ~ 8 Mb/s. By design the peak value is about 9 Mb/s.