New DAQ of TOF system status

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Brief description

The new TOF DAQ is intendend to readout all TOF information in one place instead of current situation when the TOF data readout is scattered in numerous places.

Signals to be digitized: 22-24 gates – front and end time measurement, 110 to 126 individual signals – front time measurement, 81-231 coincendences with gates – signal history and counts. Time measurement is to be done by 2 to 3 CAEN VME TDC V767A (1 available). Signal history digitization and counting is to be done by 3 to 8 H1 PTL2000 VME modules (6 available).

It is planned that the TOF readout will put data into multi-event buffer located in a DPM. Subsystem 101 processor will then read TOF data via VSB link and transmit the data to the Branch 10 VME-taxi. Part of the data (i.e. not for every event) will be transmited to TOF slowcontrol PC.

Current situation

Benchmarks of VME access have been done: reading the TDC in MBLT64 – 150ns/word, writing to DPM in BLT32 – 270ns/word, block mover overhead – 60 μs, single VME access around – 1 μs/word. CPU IRQ overhead around 45us (70us total).

First experience with PTL, TDC, RIO2, have been collected. Readout of VME modules; PEn, L2K syncronization; transfer of data via ethernet is almoust done.

Problems

PTL2000 can be readout only by single D16 VME accesses – 100us/board with 13 time-slices and 32 32-bit scalers.

RIO2 + LynxOs + LEMO driver interrupt response is also not very fast: 20us IRQ input to "handler" call + 25us thread switch + 34us – L3Reject case will be not easy one.

Gate signals have to be prescaled/dead timed because of TDC overflow at such (10MHz) rates.

One TDC glitch found: reset logic becomes screwed up after hardware reset pulse overlaps with a hit in one of the channels. Probably TDC interface module should be modified to disable hits during reset (end of the PEn false state).

Plans

Further tests of TDC.

Think about how to overcome TDC problems with the aid of special electronic modules.

In January-February start to work with Subsys. 101 DAQ experts with the aim of integration of the new TOF DAQ into H1 DAQ.