



JRA1 Activities at Bristol

David Cussans, January 2007



Outline

- People
- Interfacing LCFI sensors to EUDET telescope.
- TLU status
- Thoughts on Data Format



People

- Scott Mandry has joined the Bristol group and will be working on interfacing the LCFI readout/DAQ to JRA1 beam telescope.



Interfacing LCFI sensors

- Working initially on interfacing LCFI (CCD , ISIS) sensors to TLU
- Then will interface to JRA1 DAQ (should be better defined by then)



TLU Status

- One TLU at Bonn, Geneva, and DESY, two in Bristol.
- New discriminator boards (from H. Kruger, Bonn) fitted to units at Bonn and Bristol. Working well.



TLU Status

- Tests of TLU carried out in Geneva and Bonn. Attempted use with tracker at DESY (Prague group)
 - Many thanks to all who have taken the time to be “first users” of TLU.



TLU Status: Geneva

- Working stably on the bench. Was tried in a “beam test” type environment.
 - Problems with fake triggers. No time to investigate.
 - Probable cause - electrical noise (no shielding, no twists in LVDS pair)
 - Possible fixes:
 - Remove electrical interference (should do this anyway!)
 - Specify minimum trigger pulse length to allow rejection of glitches.
 - A reminder that we need to specify a way for the detector to flag busy without receiving a trigger.



TLU Status: Bonn

- Problems communicating with TLU via USB
- Looks like a problem with Nvidia chipset in PC and Cypress EZ-USB (same problem visible with Xilinx USB programming cable).
- Conclusion: at the moment **DON'T USE A PC WITH NVIDIA CHIPSET TO COMMUNICATE WITH TLU**



TLU Status: Bristol

- Two TLUs at Bristol ear-marked for Strasbourg and Ferrara.
- Shipment halted when problems with fake triggers and USB surfaced.
- Now it looks like problems understood will proceed with shipment.



TLU Status: Firmware

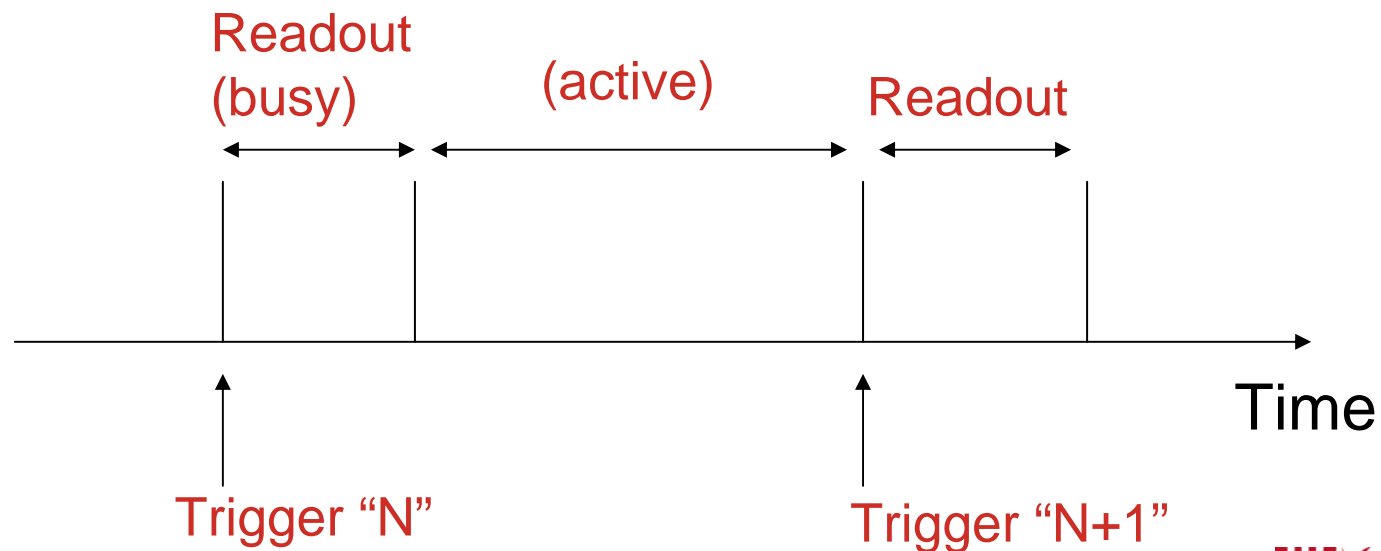
- Current TLU firmware works, but work remains:
 - Check operation of trigger number transfer to DUT (written but not tested)
 - Allow use of external clock for trigger time-stamp counter.
 - Asynchronous trigger logic to give fixed-latency triggers (needed for use with tracker)



Thoughts on Data Format

- For demonstrator (low rate DESY beam),
current plan is to use:

- one-trigger = one event = one data-block





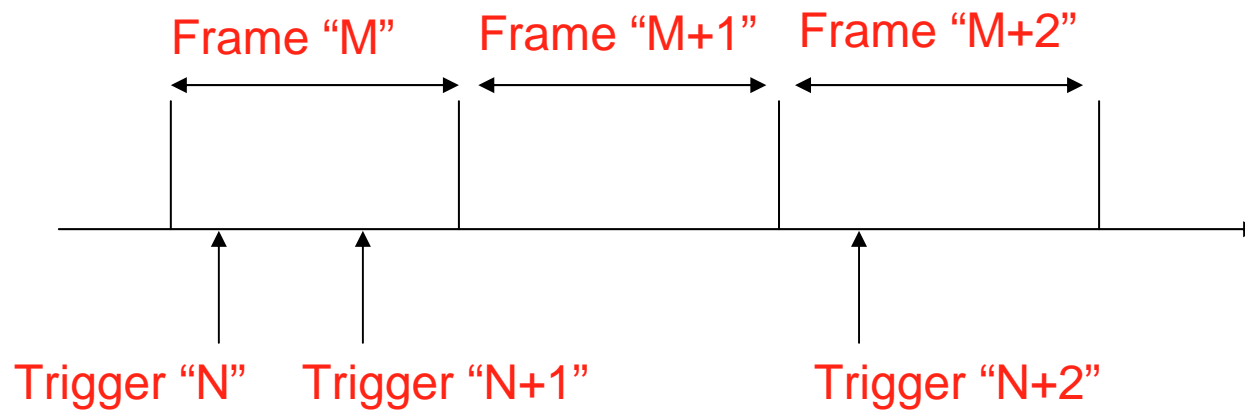
Data format

- In future won't be operating with one-particle=one-event=one-data-block
 - Some detectors (e.g. CPCCD) readout continuously during bunch train (20 times per train)
 - Some detectors (e.g. ISIS, FPCCD) readout during "quiet" interval.
 - In either case, one readout "frame" corresponds to a variable number of particles - and particles can arrive at different times.



Data Format

- In longer term (2008?) need concept of a readout “frame” that can be linked to zero, one or more events.
 - Talk to LCIO experts?





Multiple Events per Frame: Interface to TLU

- For test-beams with more than one trigger per readout-frame:
 - Keep existing physical interface to TLU.
 - Trigger sent out to DUT for each particle.
 - DUT keeps a record of triggers associated with a frame and passes this to DAQ together with frame
 - DUT and telescope can have different frame readout rates/modes.
 - ... but ... a big hassle for DAQ (?)



Summary

- EUDET funded post has been filled and working on interfacing LCFI readout/DAQ for use with EUDET telescope.
- First use of TLU outside Bristol/Geneva has been useful test.
- TLU firmware continues to be developed and tested.
 - At least one tracker group (CU) willing to use TLU. Would provide more users to find bugs (a good thing) and facilitate joint vtx/tracker operation
- Existing TLU hardware can also be used for multiple triggers per frame readout mode - but serious implication for DAQ