

Special Streaming Workshop: ePIC DAQ and Electronics on Protocols/Interface/Timing and Clock Distribution

(December 9th @ CFNS – Stoney Brook)

Detector / ASIC interface requirements and open questions	Mr Chris Cuevas et al.	09:00 - 09:15
C-120, CFNS		
ePIC ASIC update/status	Fernando Barbosa	09:15 - 09:25
C-120, CFNS		
Radiation effect and consideration	Pietro Antonioli	09:25 - 09:45
C-120, CFNS		
Discussion	Alexandre Camsonne et al.	10:15 - 10:30
C-120, CFNS		
Requirements and open questions regarding functional protocols	Jeff Landgraf	11:45 - 12:00
C-120, CFNS		
Streaming Protocol for Alice	Joachim Schambach	12:20 - 12:35
C-120, CFNS		
Streaming Protocol for JLAB experiments	William Gu	12:35 - 12:50
C-120, CFNS		
Streaming Protocol for sPHENIX	Martin Purschke	12:50 - 13:05
C-120, CFNS		
Timing, clock and data requirements and open questions	Joachim Schambach	14:30 - 15:00
C-120, CFNS		
Discussion	Alexandre Camsonne et al.	15:00 - 15:30
C-120, CFNS		

Sessions on FEB/RDO interface, Functional Interface, and Timing.

Idea was to center on the discussion. Talks were supposed to prompt discussion.

Raw Notes posted:
<https://indico.bnl.gov/event/17452/attachments/44285/76399/RawNotes.pdf>

Summary of Points Raised (1)

- We need better Documentation Systems in DAQ and within the collaboration
 - General Conclusions from Studies via internal papers (“ePIC Notes”)
 - Interface Controls
 - Electronics Files
 - Firmware (git?, but might not fit well with software & computing assumptions)
 - Detector constraints and envelopes
- Radiation
 - ECCE/Athena not fully consistent – use worse case for now
 - Need table of locations / dose / estimated effect
 - Need to incorporate radiation testing for prototypes
 - SEE (Single event effects) not SEU (Single event upsets). Also total dose effects might be important
 - Estimate for dRICH – 1 SEU / 4 days. But many channels
 - Radiation IS an issue for EPIC even if “small” doses
- RDO Locations
 - Need to define them soon, detector by detector.
 - Cable lengths, Cable sizes, distances affect choices in FEB (need for fiber etc...)
 - Rack space vs on-detector affects form factors

Summary of Points Raised (2)

- RDO Aggregation
 - Estimate 16-32 ASICS / RDO.
 - Limitations include transceivers, connector real-estate, serial limitations (affected by distances/cabling), buffering (but not expected to be main limit).
- RDO will drive ASICs, so electronics protocols highly specific to detector.
- Common mode noise always an issue (grounding, support for dealing with it, RDO location)
- We had a detailed, low level overviews of fiber protocols for timing at JLAB from William Gu, and of the details of gbt from Jo. The GBT discussion was centered on ALICE which has aspects of their information protocol intermixed with the timing features
 - Directions for Timing Subgroup to discuss
 - Arguments for both GBT on FPGA, as well as custom protocol development. To be settled by further discussion and by testing.

Summary of Points Raised (3)

- The common platform spec from collider is currently “better than V124” = “better than 8ps”.
- We need fine timing control by ASIC as common support within the RDO. 20-30ps was suggested though may be challenging
- Time frame semantics, packetization of data between RDO and DAM, and data format requirements in terms of multiplexing channel / time information is an issue:
 - Many different ideas at the moment
 - Many complexities arise from ASIC assumptions, need for data volume efficiency, need for assuring data consistency, and flow control mechanisms
 - Need individuals / small groups to provide written plans to present to full group