EPIC TOF Readout

An Introduction

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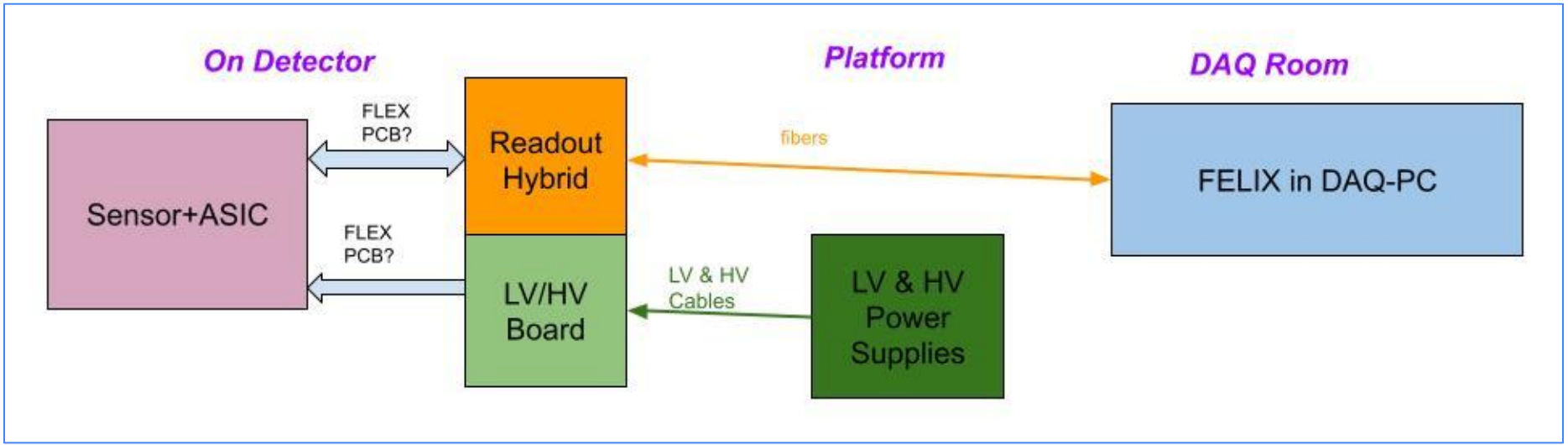
Overview



Sensor+ASIC ⇒ many previous presentations today
FLEX PCBs ⇒ Oskar
Readout Hybrid, LH/HV Board ⇒ Wei
Backend: power supplies, fibers, cables, FELIX, DAQ PCs ⇒ Zhangbu

Ongoing Efforts

- FY24 FLEX PCB/kapton efforts have been funded by eRD109
- FY24 Readout Hybrid (or “pre-Prototoype Readout Board”, ppRDO) funded by eRD109
- Hardware decisions made:
  - no VTRX for TOF (only for SVT & dRICH)
  - no lpGBT for ePIC (apart from very special use by SVT)
- Timing & Clock distribution
  - expectation is that we will use the reconstructed clock from the fiber data (William Gu/Jlab), **Option A**
  - however, we will also *evaluate the direct clock distribution over fiber* on the ppRDO board as **Option B**
- DAQ Streaming practical details are starting to be developed within the DAQ Group
  - we expect a basic protocol to be designed “soon”
  - we also expect a basic design of the Global Timing Unit
  - firmware implementation expected to follow using our ppRDO board as the data source

Issues, comments, observations…

- Outstanding issues
  - We need a better understanding of the full geometry of TOF
    - location of the various entities within the space envelope (e.g. RDOs)
      - also HV & LV cables, fibers (and splicing) and their routing
  - Power distribution particularly problematic
    - how will it look? which regulators do we use? ⇒ effort ongoing within the Project (Tim Camarda/BNL)
    - cooling!? (our weakest spot at the moment)
  - All the above are also needed for simulations → material budget
  - Question: are we 100% sure about our background estimations??
    - really important for electronics choices
- We don't seem to have a crisp decision regarding the readout ASIC for BTOF → should we "formally" claim it's FCFD?
  - Project wants to know…
- The Readout Backend is controlled by the DAQ Group within the Project
  - but we need to communicate any changes to the most important numbers (channel & RDO counts)
- Database requirements need to be communicated to the DAQ Group
  - at least an approximate number & type of entities
  - which variables are we expected to need to monitor ("Slow Controls") → count & type

Conclusion (instead of…)

- NOTE 1: For many (most?) *practical* considerations ETOF & FTOF are 2 separate detectors (IMHO)
- NOTE 2: I didn't mention DAQ/Readout of other detectors using AC-LGADs apart from [EF]TOF ⇒ What are their Electronics/Readout thoughts and plans?