

Hypothesis for barrel cylindrical MPGD layer

- 120 256-channel on-detector FEBs
 - 4 64-channel ASICs
- Conservative hypothesis
 - Copper 8-lane FireFly twinax cable per FEB
 - 12 mm wide x 20 mm long x 8 mm high
 - 5-6 m long for good signal integrity at ~1 Gbit/s link
 - 4 FireFly interfaces per RDO
- 30 RDOs
 - 15 at each side of the barrel
- Data
 - 12-bit per sample; 50 MSPS; 10-20% overhead at ASIC and FEE levels
 - 10 kHz channel hit rate
 - 2 kHz physics x 5 safety factor for background / noise
 - Signal shape ZS:
 - 500 ns readout window = 25 samples
 - 64-channel ASIC : 230 Mbit/s
 - 256-channel FEB : 1 Gbit/s
 - 1024-channel RDO : 4 Gbit/s
 - Peak finding ZS: factor 10 less
 - amplitude and time readout
 - Calibration : on-demand full non-ZS readout
 - Calibration data requested every 100 Hz
 - 50 consecutive sample readout
 - 50 x 1000 samples per channel
 - 256-channel FEB: ~25 Mbit/s
 - 1024-channel RDO : ~100 Mbit/s
- Work in progress to simplify RDO-FEB-ASIC interface
 - Potentially higher FEB / RDO concentration factor
 - Potentially optical FEB – RDO links : no restriction on RDO location

