

BIC ESB-CALOROC Session

BIC Workshop June 16, 2026

Aram's talk:

- Negative pulse cannot be connected to HGCROC. Aram: I have a circuit to flip it. Use investing input to sum. Aram has special board that is positive and it works.
 - Diode option is most promising but needs optimization and hope to be ready for August beam test.
 - Round Spring probe on end of scope. To see if xtalk is even less. xtalk slide shows 100->2.5 mV (SiPM vs pickup in a subsequent pin).
 - KNU slides were shown by Aram. 3 different summing schemes.

Zisis: plans? All stuff is at JLab. Early arrival to test Aram's board; all options have pros and cons. Power consumption, linearity, dynamic range, : form performance matrix for all options. Parallel option: throw it out. Hybrid, active, Aram's options.

Norbert to Elke: power 10x reduction from Gerard's discrete. Elke can check this. Forward ECAL has none. Discrete on board, then bring analog out with fibers.

Adam: sent opamp specs.

check out ground springs for scope probes <https://www.amazon.com/LICHIFIT-Ground-Oscilloscope-Torsion-Tektronix/dp/B0B7BMLJ4T?th=1>

also this opamp, its current feedback but low power and fast <https://www.analog.com/media/en/technical-documentation/data-sheets/ad8014.pdf>

Aram: look at input bias offset

Norbert's talk:

- H2GCROC (CMS/LHC requires a trigger) and CALOROC update
 - CALOROC 1B is the focus of (switch gain ADC); stop HGCROC work.
 - Noise comes mainly from the Omega test boards - solvable
 - Normal with 4 samples 100 kHz max readout rate. This should be tested with calorimeter and its boards to make sure 4 samples is enough. BIC does not have high multiplicity (as compared to detectors closer to the beam pipe).
 - FEBs/RDO 25 Gps from RDO to DAM/Felix

- 2x38 channels on chip is enough; 3rd can be added. Divide shower max into 2 different channels/chips.
- LpGBT communication debugging.
- New HGCROC board has all radiation-hard components.
- New CALOROC board awaits JLab funding to start production.
- gRDO is also ready for production - used in final production. Has many different connector types on it, for testing. Waiting for money. (ORNL-JLab communication) . 3 of these giant cards are needed to BIC. Might share a crate with barrel HCal;
- bPOL48 is only 4mm tall. Good up to 4T. Need to figure out current for ETC a.o. 70-80% efficiencies.
- Adam: 1.8V, 1.2 V and 1.0 V for FPGA and ASICs needed. LDOs (Low-drop out regulator). Astropix HV and regulating? Ask Manoj.
- Delta function in simulations of CALOROC 1B? Peak charge vs total charge (in dynamic range). Norbert: preamp before ADC, 1.47 nC vs 4 nC (2V common pulses, Aram mentioned).
- Elke: timing resolution? How does it compare to 200ps requirement? H2GROC was 150 ps (measured - TOA circuit stays the same).
- Elke: comes 200 ps position resolution. Why do we need it? Astropix is a pixel detector. Jeff: ability to VETO as being the same hit as astropix.
- Jeff: double-hit for CALOROC is 100s ns. 2-ended readout.

- Zisis: timelines assuming t0=money arrival? Norbert: I have 5 CALOROCs; 150 of each produced and sitting in Paris untested. Interface board that mezzanine sits on for readout. Chips from Omega in mid July and production in September.
- Zisis: mechanical support for mezzanine.
- Adam: where do the Gbits come from? LpGBT feature: idle words are also transmitted.
- Jeff: BIC is one of the highest channel rate detectors.