

# Membrane Electronics:

a summary of options for discussion

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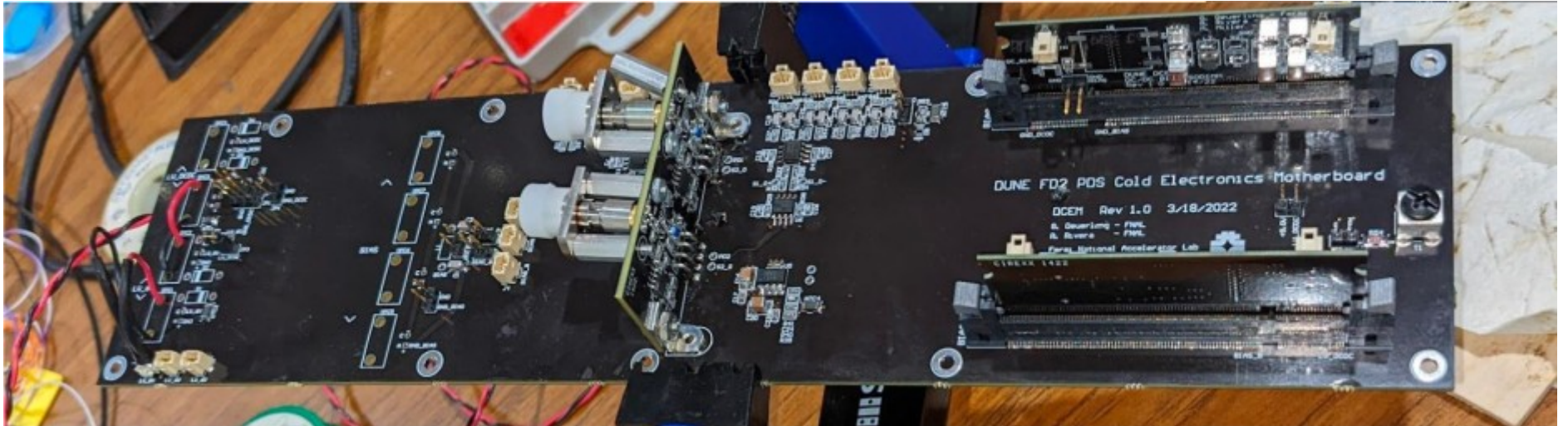
APC - 29/09/2022

# Using SoF (same as cathode)

- 5V and SiPM bias through copper into DCem board (4 lines), 2 fibers out
- Two board options:
  - Same as cathode, without populating PoF nor DCDC
  - DCem 3, but need to produce the adapter board with the amplification stage
- Warm electronics as used in cathode (we'll first use koheron+digitizer and move to DAPHNE when it becomes available)
- Cons:
  - why use fiber when you can use copper?
  - Need power supplies for bias (but probably not a problem, we'll have few detectors)
- Pros:
  - having the same type of signal from all the detector is probably better for analysis.
  - it's the circuit/type of signal we've been using so we know it well

# Using SoF (same as cathode)

- DCem 1 board:
  - Used in coldbox since july
  - PoF and DCDC on board
  - Amplification of the SiPM signal
  - Laser adapter card

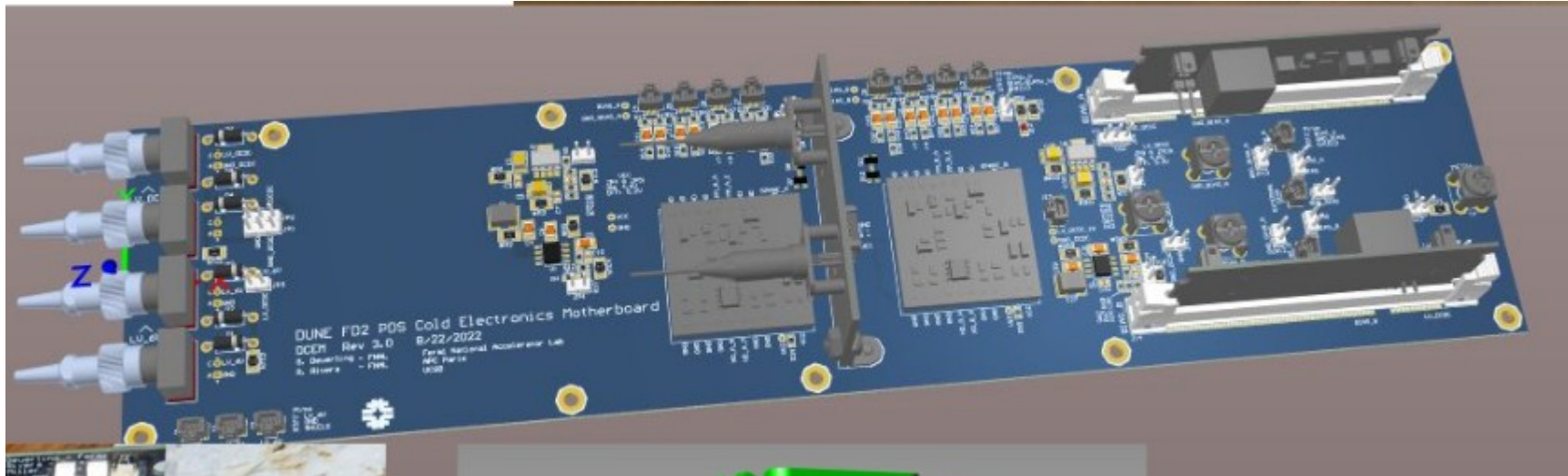


# Horizontal Drift Cold Amplifier

- 3V and SiPM bias through copper. Signal output through same lines as SiPM bias
- DCem 3 board designed with this circuit (default configuration from HD)
  - Layout is ready
  - sent to production but not received yet
- Warm electronics:
  - must it be DAPHNE? Can we use it with a CAEN digitizer + power supply?
  - Can a DAPHNE be shared between this configuration and the cathode one? (need to consider only one single regulator provides 3V for all channels, if we need 5V for the optical receiver...)
- How different are the signals wrt to SoF? Is this an issue?
  - Undershoot (with DAPHNE) is bigger: 20%
  - Bandwidth is 5MHz (noise 0.5nV but not sure if integrated or /sqrt(Hz))

# Horizontal Drift Cold Amplifier

- DCem3 board:
  - Version without PoF nor DCDC?
  - 4x daughter boards: can be HD-cold ampli or anything else
  - Can be used with or without laser adapter card



# Some other thoughts

- **We could consider having both, SoF and HD cold amplifier, to be able to compare** the performance between the two situations: the second might have better S/N, but in the first we have a full system with the same signal characteristics.
- It is hard to consider producing an “alternative” to either of these two, since it would require circuit design and testing. There is no time for anything but minor modifications of the existing circuits
- Using the “signal conditioning” stage of the SoF:
  - We don’t know if it can drive a small signal over long copper cables
  - In general it is better to do this using differential signals (the output of this part of the circuit is single ended)
- Using the HD-cold amplifier as part of SoF:
  - Not straightforward; we might have the parts that in principle could go together but never tested.
  - From experience a second iteration will be needed before production