H2GCROC3 testing – eRD109

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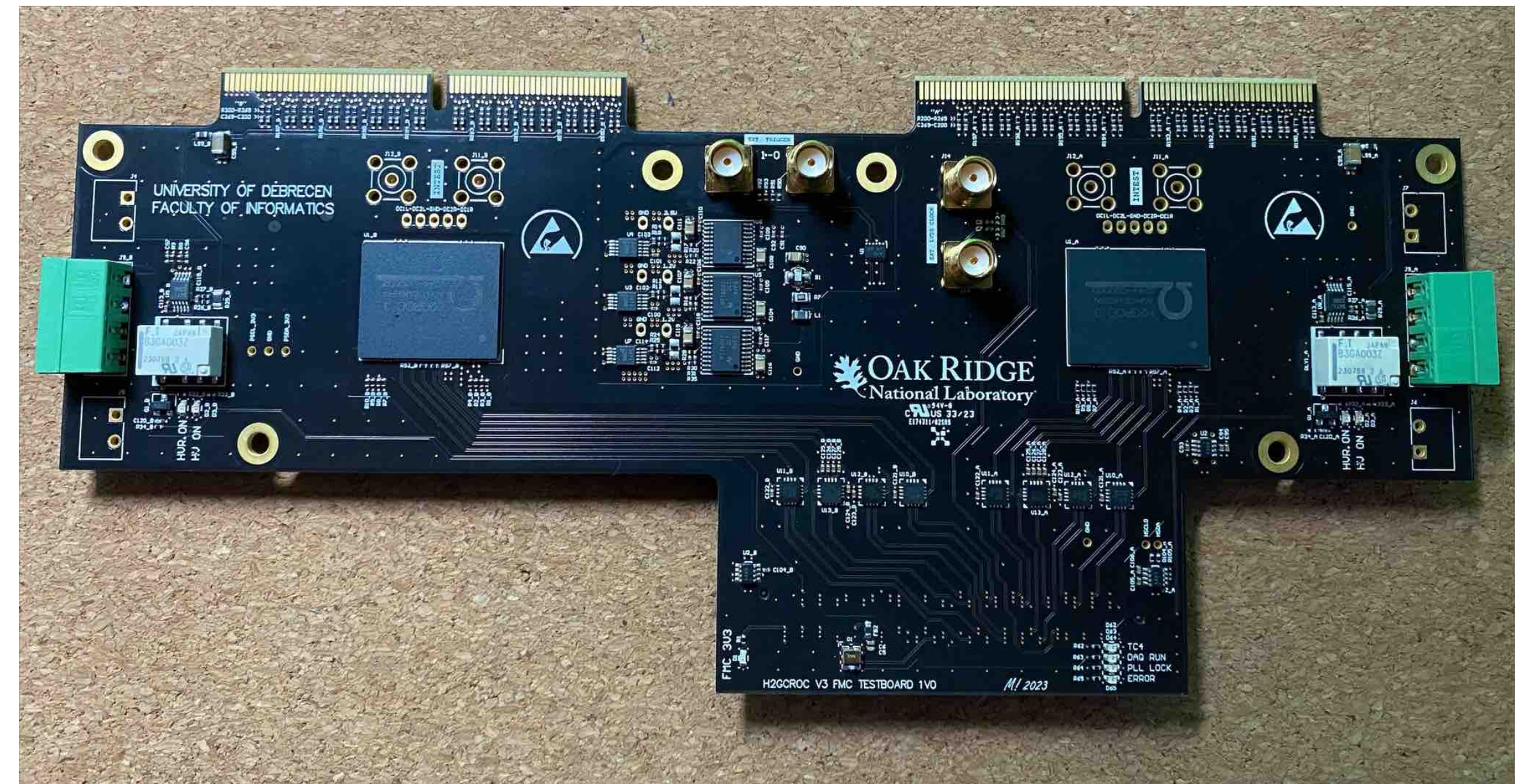
ProtoBoard2.0 production

**So far very good progress with the ProtoBoard1.0**
- Firmware development is more or less done:
  - USB, Eta readout options
  - External, internal (or self-) triggers
  - 64 channel input to match the CAEN board
- Seen physics signals from the LFHCal tiles
- Unfortunately, due to damage, cannot continue the work for now:
  - ORNL technicians are fixing it, but it is slow

New improvements to ProtoBoard2.0:
- Removing the LVDS drivers (costly, hard to get)
- Adding extra channels on the side (8 extra channels)
- HGCROC3:
  - A-type if there is no B-type available:
    - A has still some bugs from the production, B should have it all fixed
  - Need 6-8 weeks for production, 5+1 boards will be produced
- Adding also the LED pulser SMA connector to it

Some of the components got damaged during transport, still waiting for the fix

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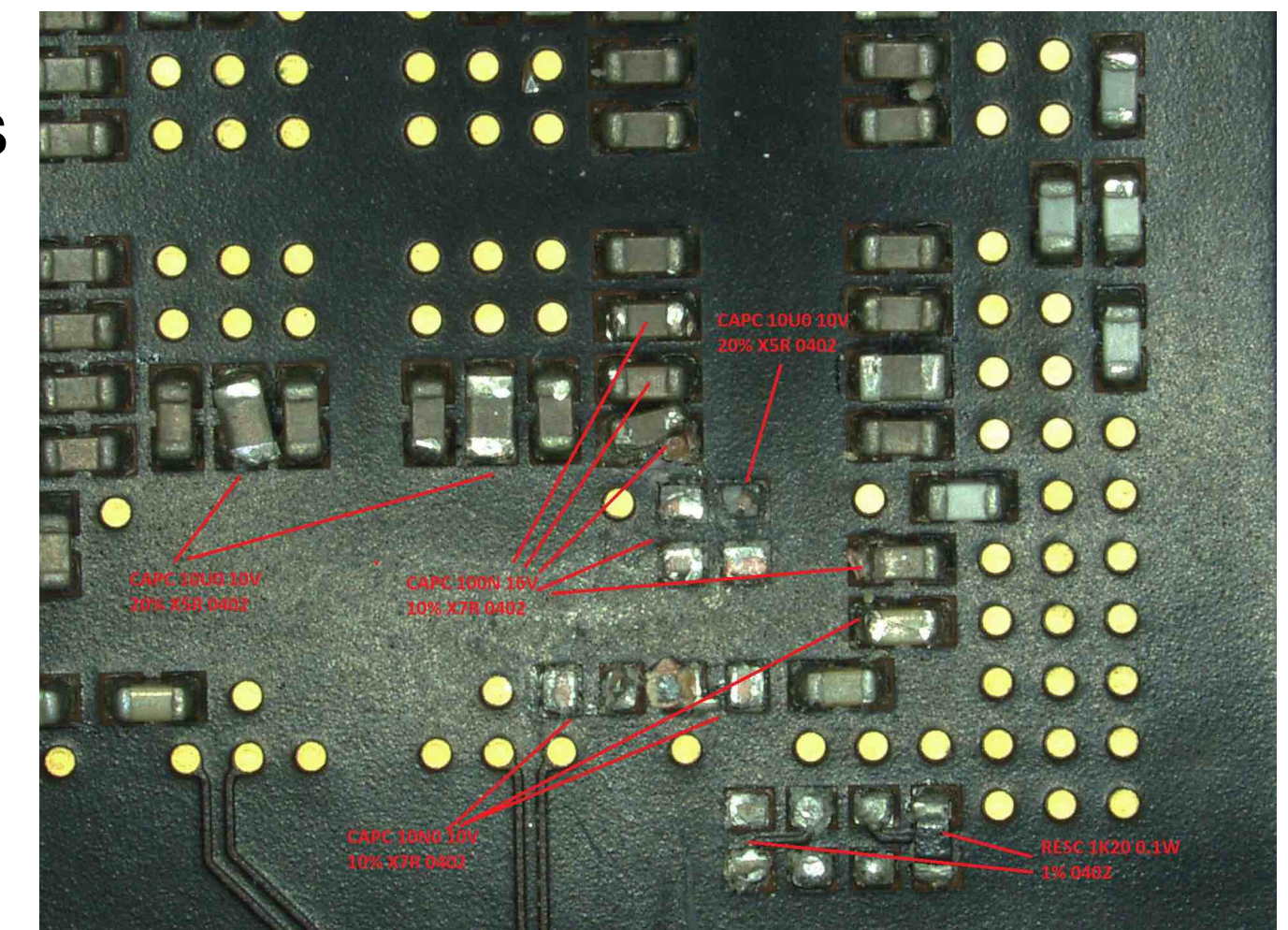
Time line for 2024

Testbeam preparation for LFHCal (May-June):
- Need to produce 5+1 ProtoBoard2.0:
  - Need the H2GCROC3B, or we have to get 12 H2GCROC3A's. The board can accept both
  - Production takes 6-8 weeks, all prepared
- Firmware development:
  - Reading/testing via Ethernet or USB done
  - Extra work is needed for the monitoring devices - power, bias, etc (all on the I2C bus)
  - Calibration prototype in works - also via I2C
- Software/data readout:
  - Very early stage, need more user-friendly environment
  - Might use the rcdaq from Martin or Python code

Summing Board for multiple SiPM:
- We start with the 4x4 array of 3x3mm2 SiPM (used in BIC)
- Systematic approach (Feb-June):
  1. Readout each SiPM separately
  2. Sum 2-4 SiPM's
  3. Test several methods, remeasure the signal shape (will be longer)
  4. Sum up to 16 SiPM's - maximum probably
- Summer: Plan to prepare a test in Argonne with BIC readout (we will have 720 channels, there can be several options of summing)
- September-October: Testbeam at CERN with LFHCal - need summing board also

Question to Project: when can we expect eRD109 money in ORNL?

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