

VMM and the SRS

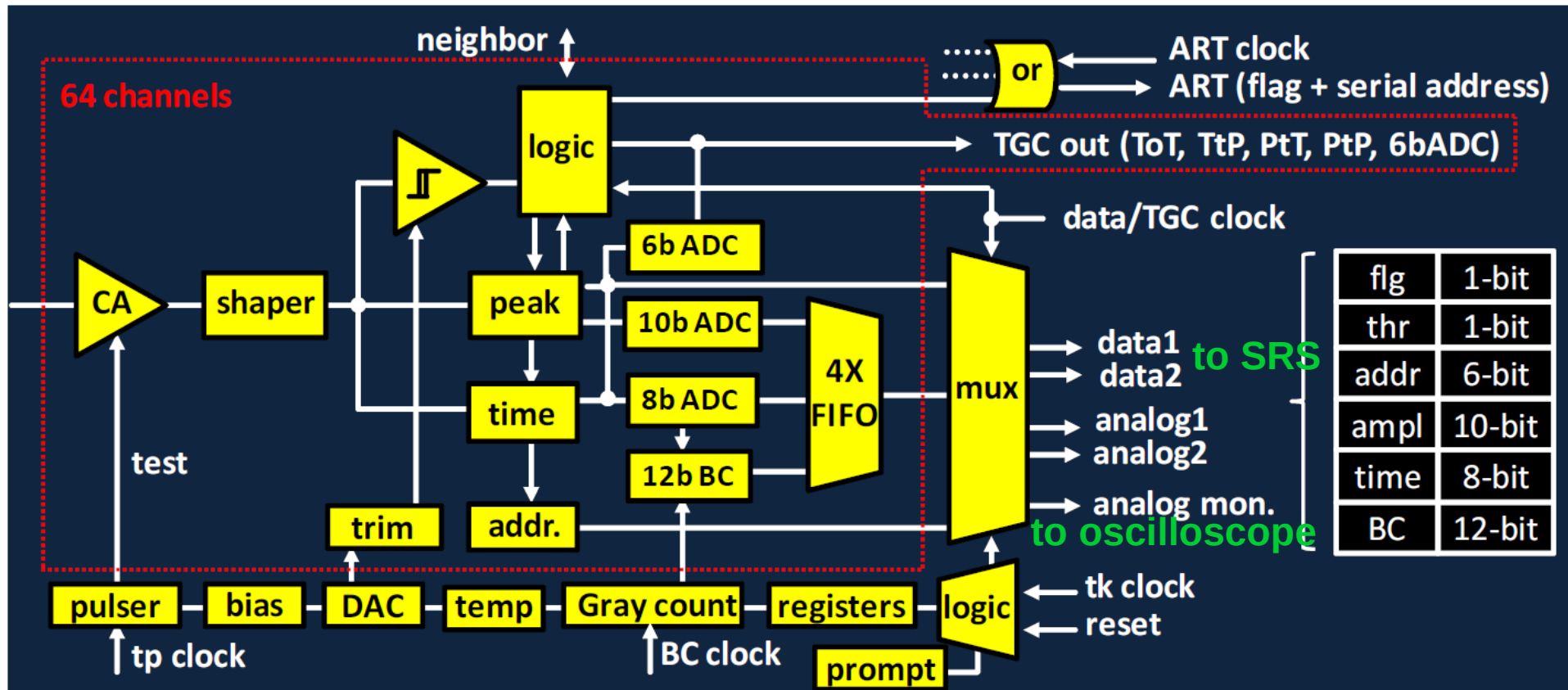
Michael Lupberger

Outline

- Test setup in GDD lab
- SRS DCard
- BGA VMM2 Mini-2.1 hybrid
- Wire-bonded VMM2 Mini-2.1 hybrid

VMM2

- Readout ASIC for MPGDs
- Can replace APV (higher performance)



Test setup in GDD lab

Oscilloscope

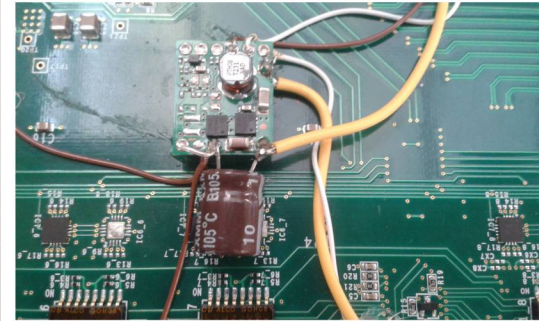
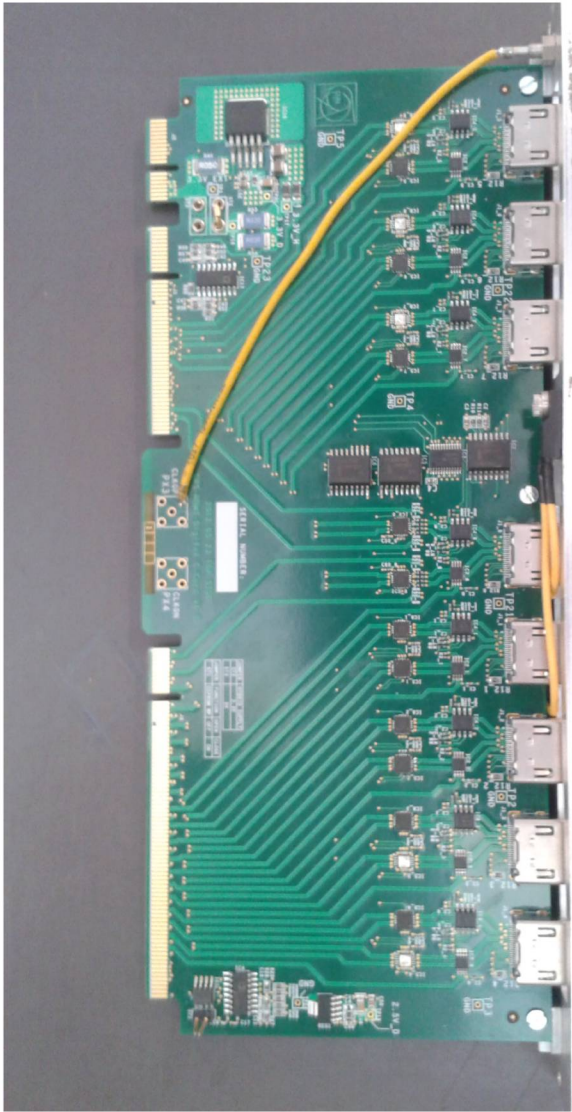
SRS with
DCard

VMM2 hybrid
(2xVMM2)

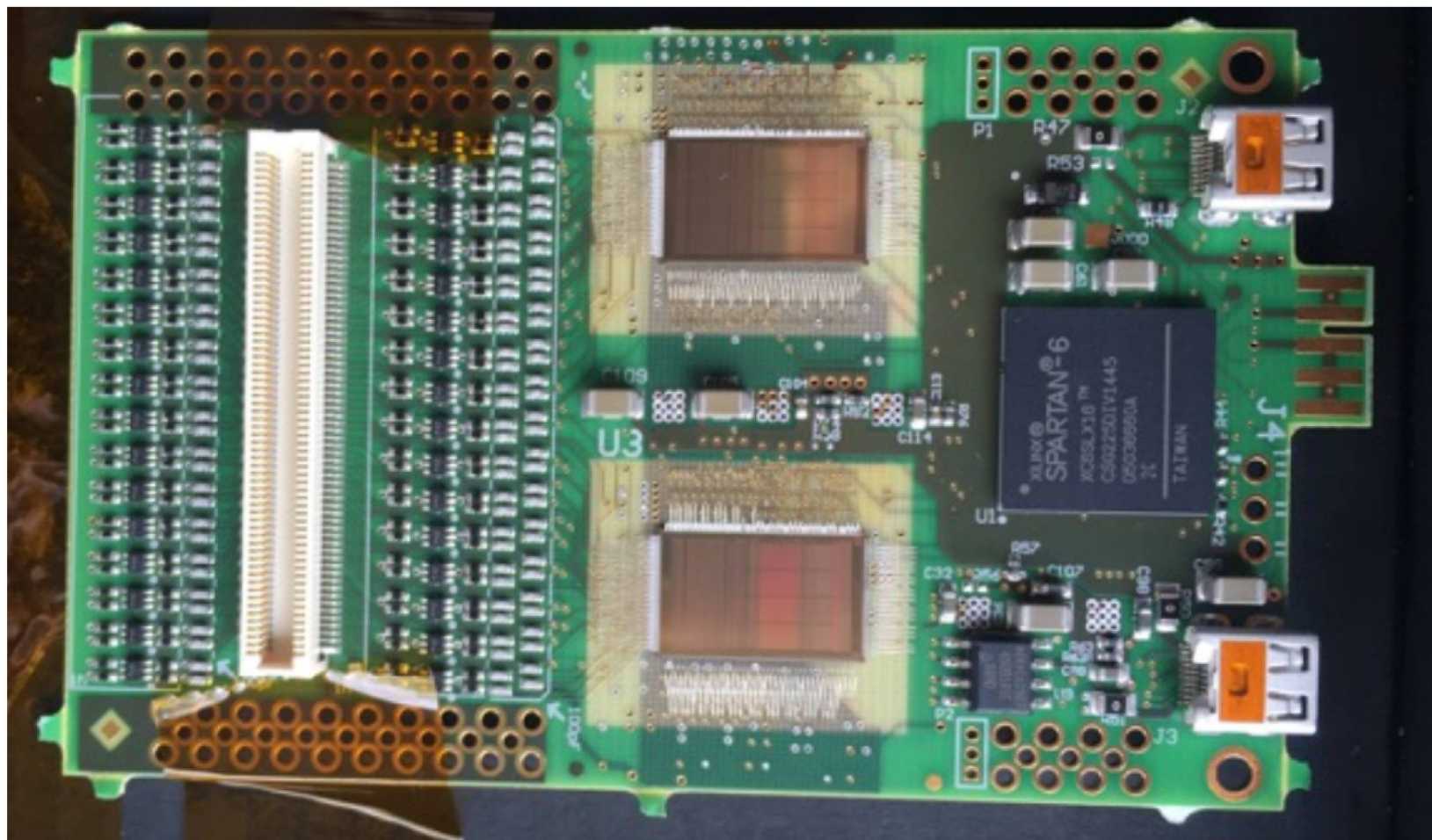
Micromegas
detector



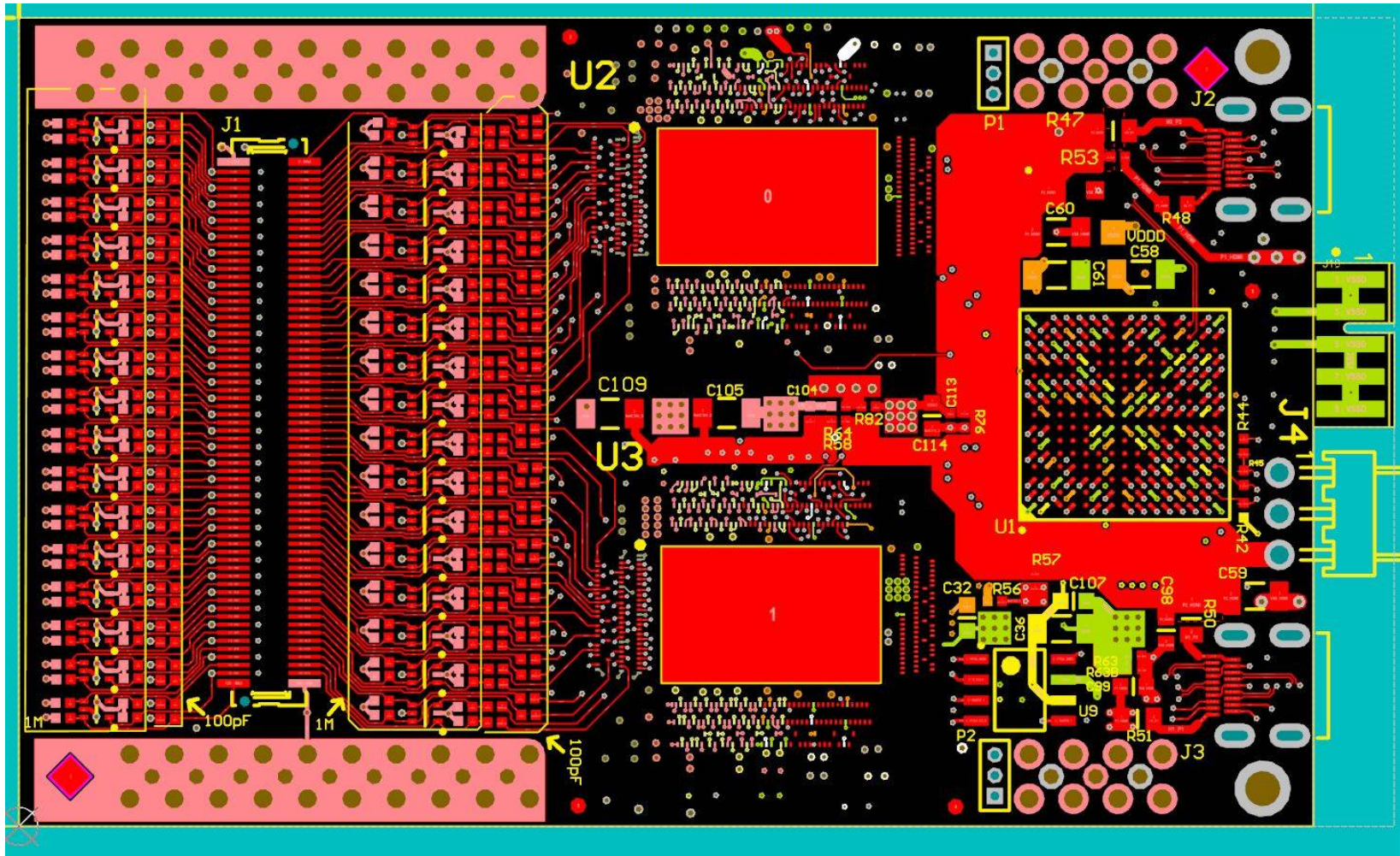
SRS DCard



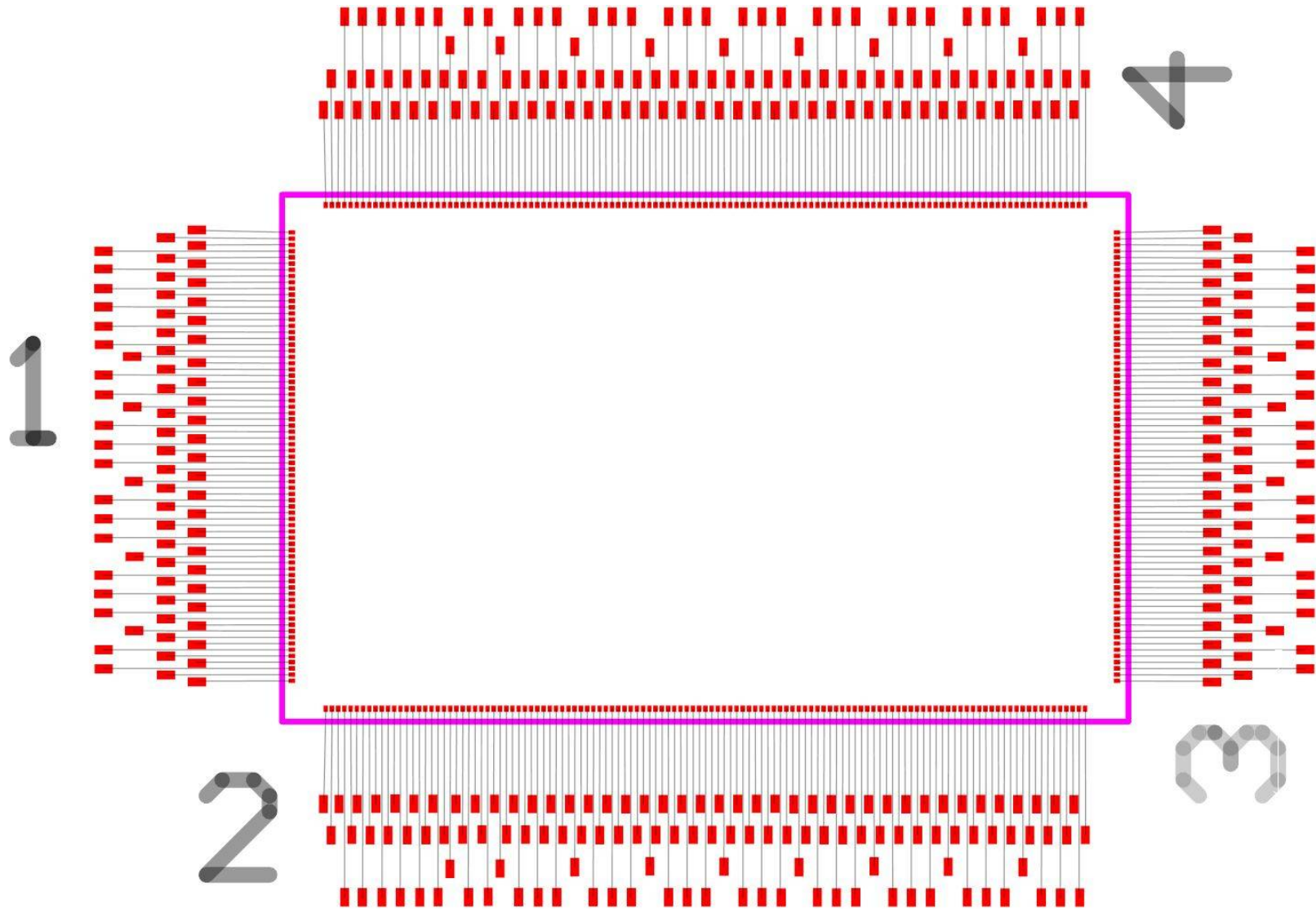
Wire-bonded VMM2 Mini-2.1 hybrid



Wire-bonded VMM2 Mini-2.1 hybrid



Wire-bonded VMM2 Mini-2.1 hybrid

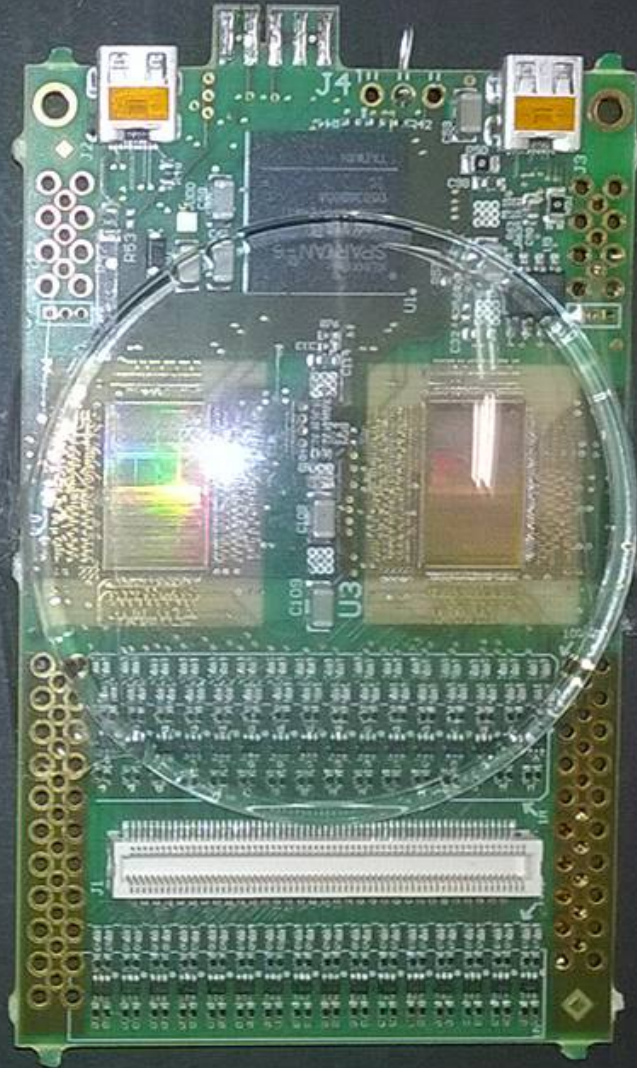


Comparison

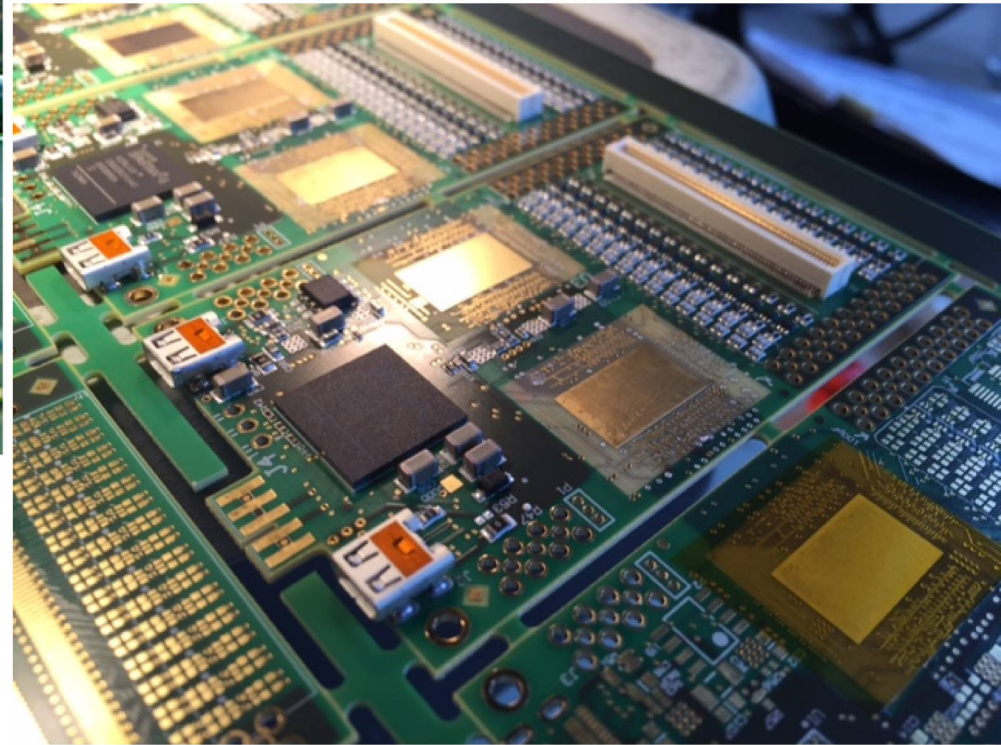
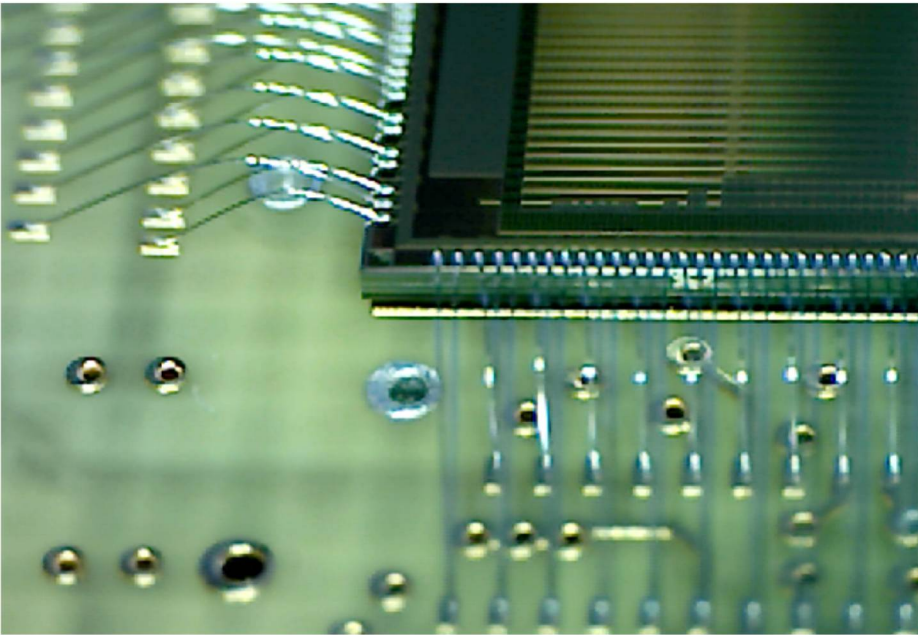
VMM-128 (packaged VMM2)



NEW: VMM-128 (wire bonded VMM2)



Wire-bonded VMM2 Mini-2.1 hybrid



Wire-bonded VMM2 Mini-2.1 hybrid

Programming of on-hybrid Spartan3 FPGA

First signal from the new hybrid

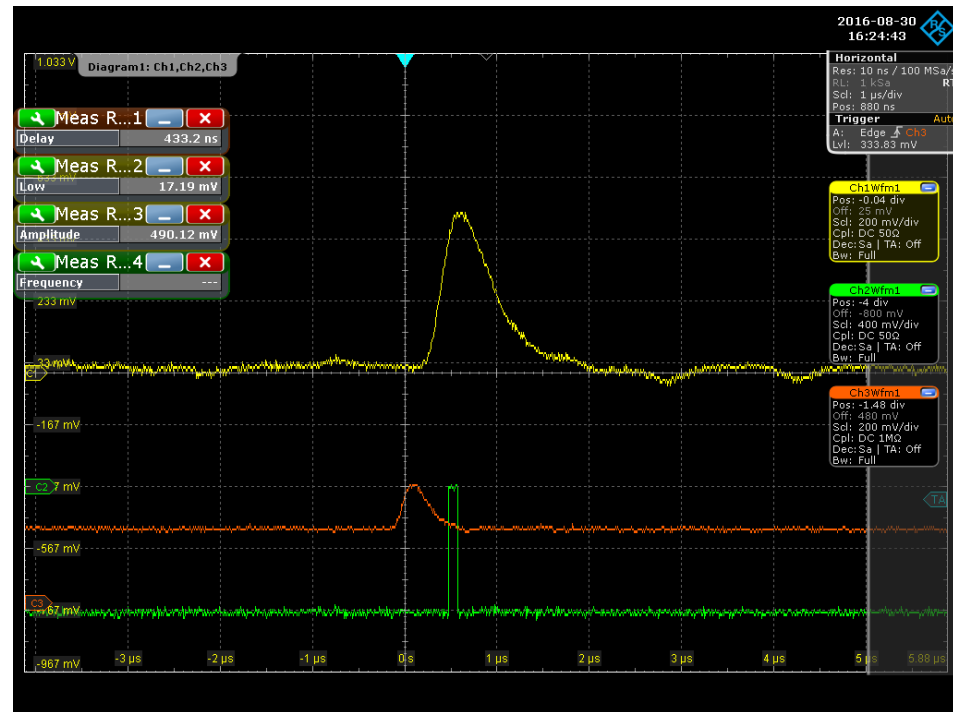
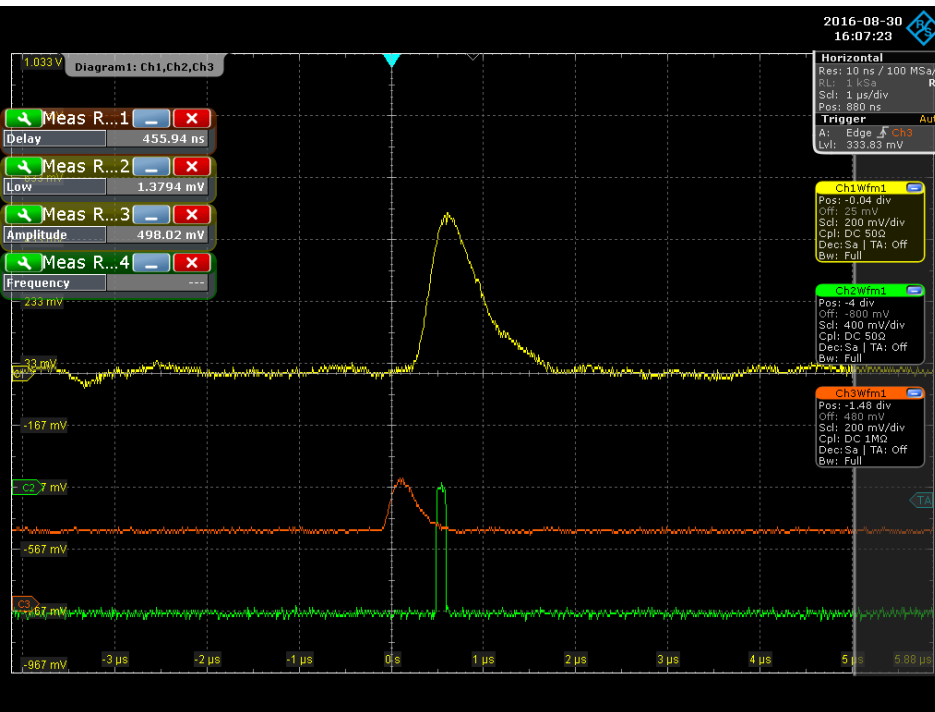


Comparison: Test with MM detector and FE⁵⁵

Analogue signal at hybrid of selected channel

BGA

Wire-bonded

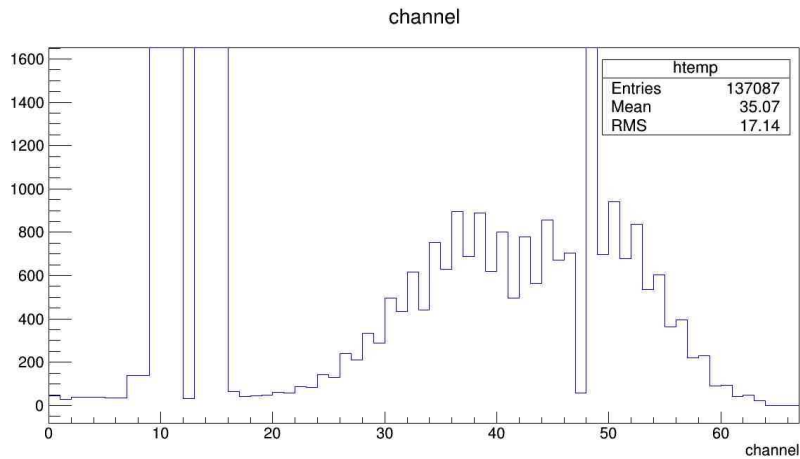


Micromegas Mesh | Trigger | VMM channel on M0

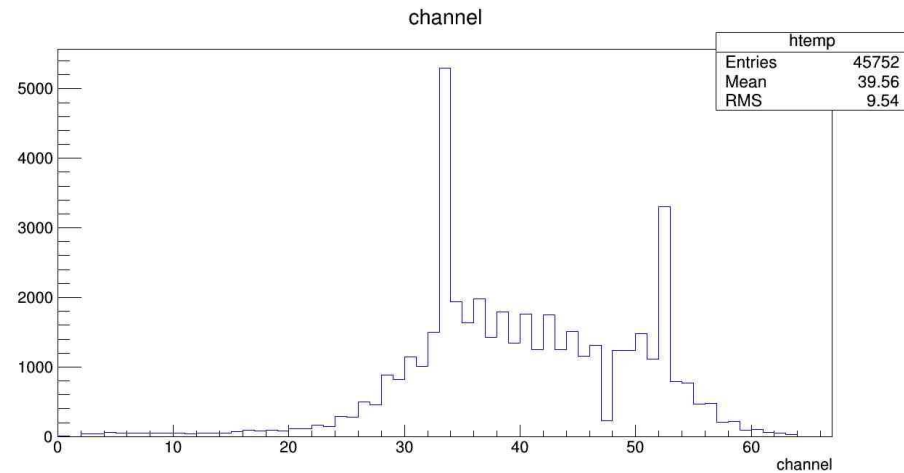
Comparison: Test with MM detector and FE⁵⁵

Digital output: Hit channels

BGA



Wire-bonded



more noisy channels
(old, tortured hybrid?)

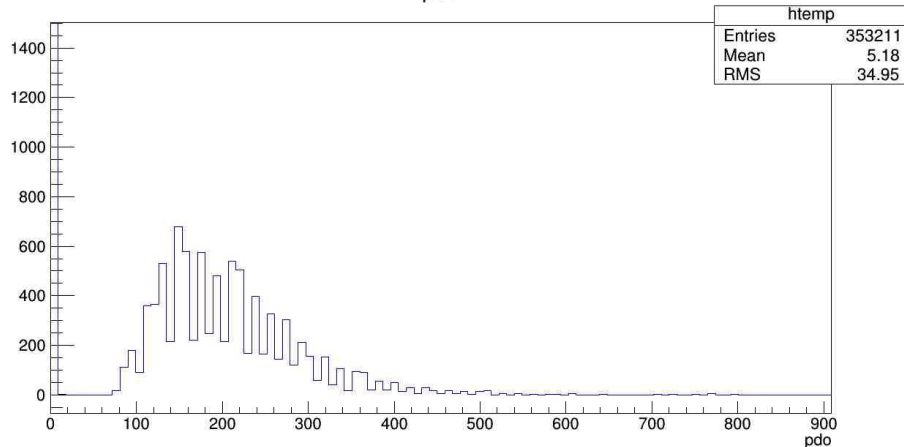
slightly different pedestal => thl 290 <=>260

Comparison: Test with MM detector and FE⁵⁵

Digital output: Pulse height

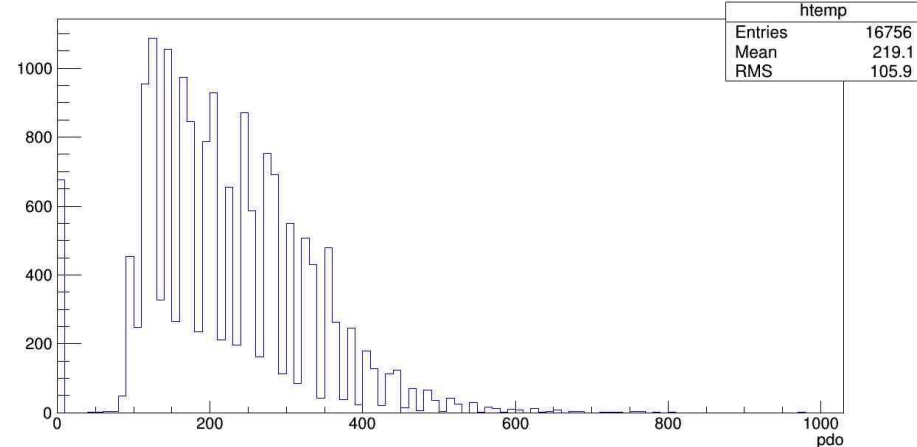
BGA

pdo



Wire-bonded

pdo



more noisy channels

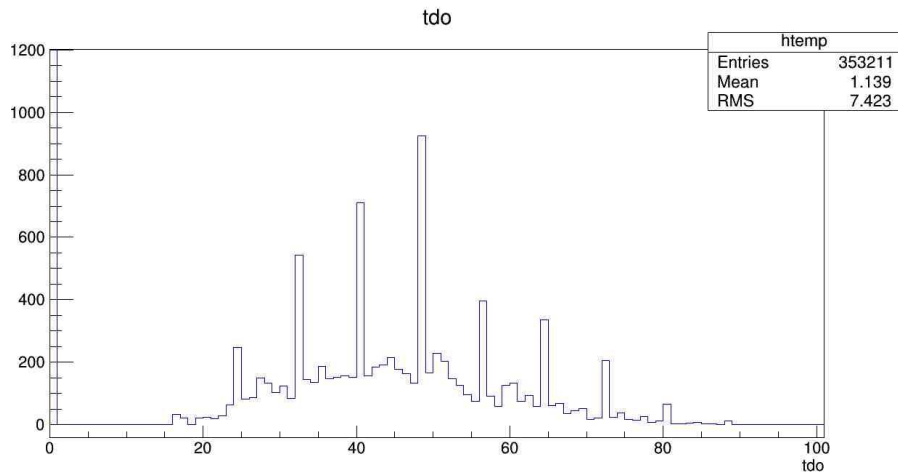
(old, tortured hybrid?)

slightly different pedestal => thl 290 <=> 260

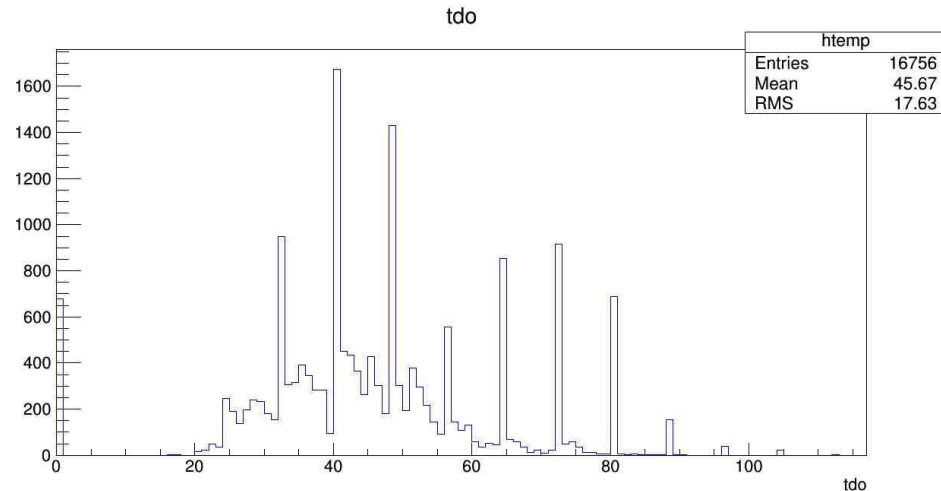
Comparison: Test with MM detector and FE⁵⁵

Digital output: arrival time wrt trigger

BGA



Wire-bonded



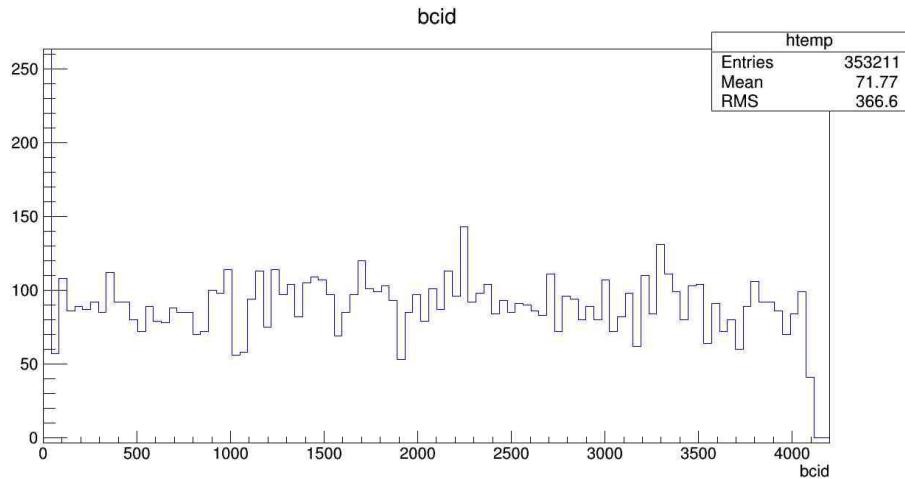
more noisy channels
(old, tortured hybrid?)

slightly different pedestal => thl 290 <=> 260

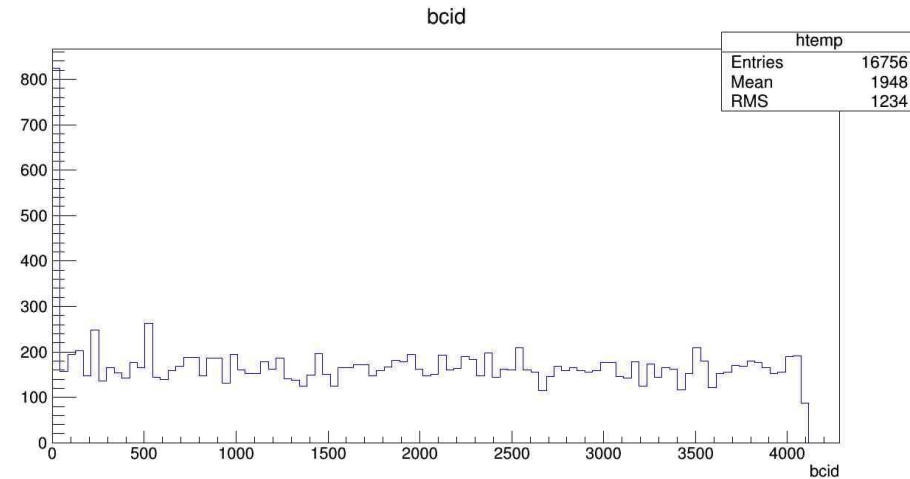
Comparison: Test with MM detector and FE⁵⁵

Digital output: BCID (random)

BGA



Wire-bonded



more noisy channels
(old, tortured hybrid?)

slightly different pedestal => thl 290 <=> 260

Comparison: Test with MM detector and FE⁵⁵

Conclusion:

- Now wire-bonded hybrid works
- Similar results as with BGA hybrid
- Differences smaller than for different BGA hybrids
- Ready to produce more
(3 prototypes finished, 3 more almost ready)

VMM3

Information from Vinnie:

- The VMM3 wafers have been delivered to CERN
- 6 have been diced
- Remaining 25 production wafers have also been delivered but will be diced by the packaging company.
- Some samples arrive today such that Alex can use them to test wire bonding on a (tbd) modified hybrid → **VMM3 hybrid will have new connector!**
FX10A-140S14-SV on Detector, FX10A-140P14-SV1 on hybrid

General conclusion on SRS + VMM

- Permanent test setup in GDD lab
- Powering through SRS DCard is challenging
- New wire-bonded VMM2 hybrid works

Outlook:

- Get ready to read out an ESS prototype detector with VMM at test beam in October
- VMM3: coming, but still needs some time