KVI

university of groningen

GSI

Status of ASIC board development for Barrel EMC

M. Kavatsyuk, E. Guliyev, P.J.J. Lemmens,
H. Löhner, T.P. Poelman, G. Tambave

ASIC Integration Challenges

- To reduce ASIC power consumption APFEL has no low-ohmic line driver
- The space restriction/density of the ASIC outputs forces to use Kapton flexible flat cable
- Kapton cable has large capacitance

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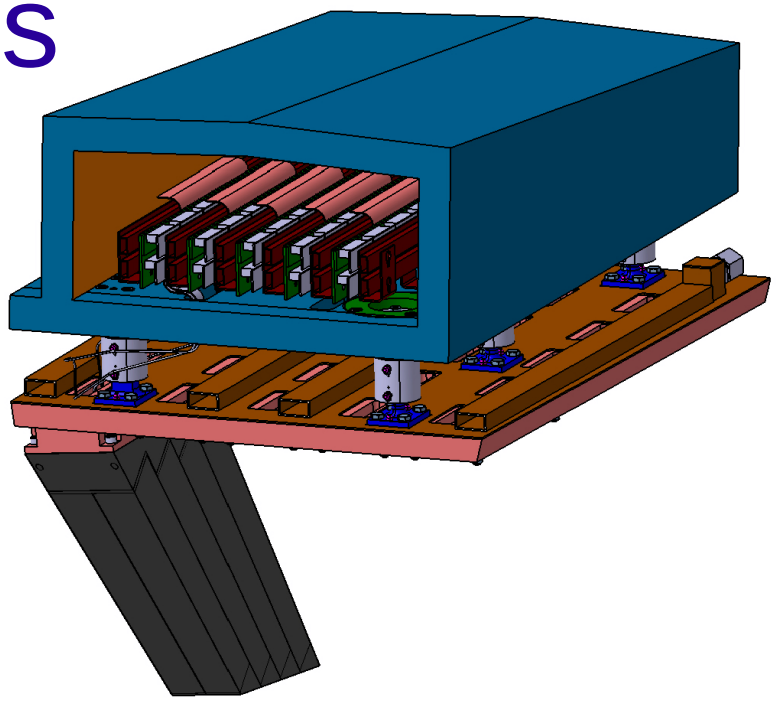
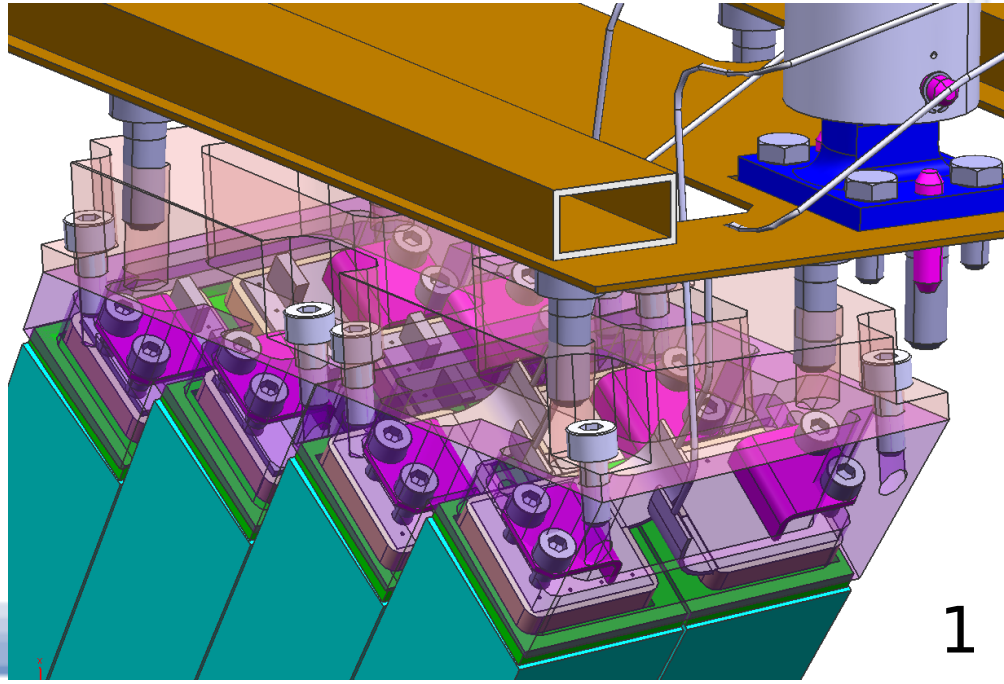
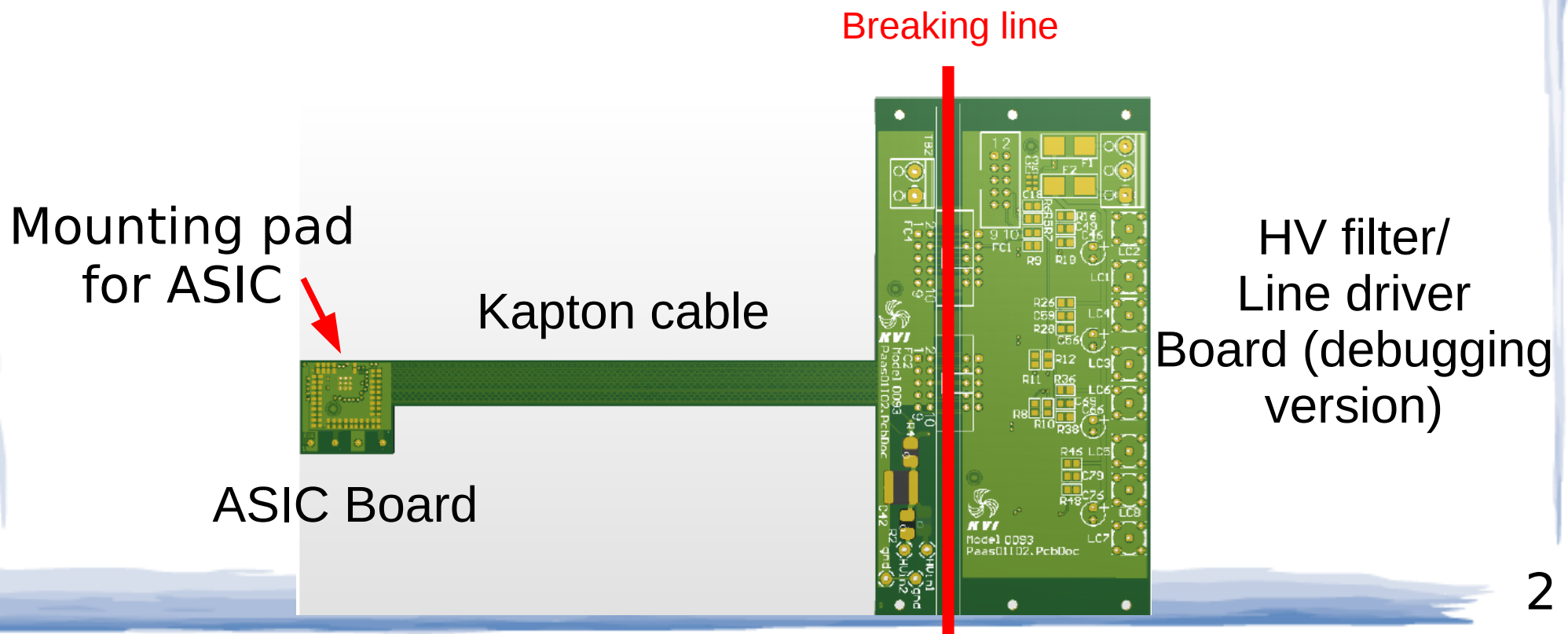
Limited band width





To Be Investigated
(with test ASIC board)

- Performance of the current APFEL ASIC with reasonably long Kapton cable (~100 mm)
- Design of the additional line driver
- The effect of additional cable between the ASIC and line driver



ASIC Board
(current status)

Status:

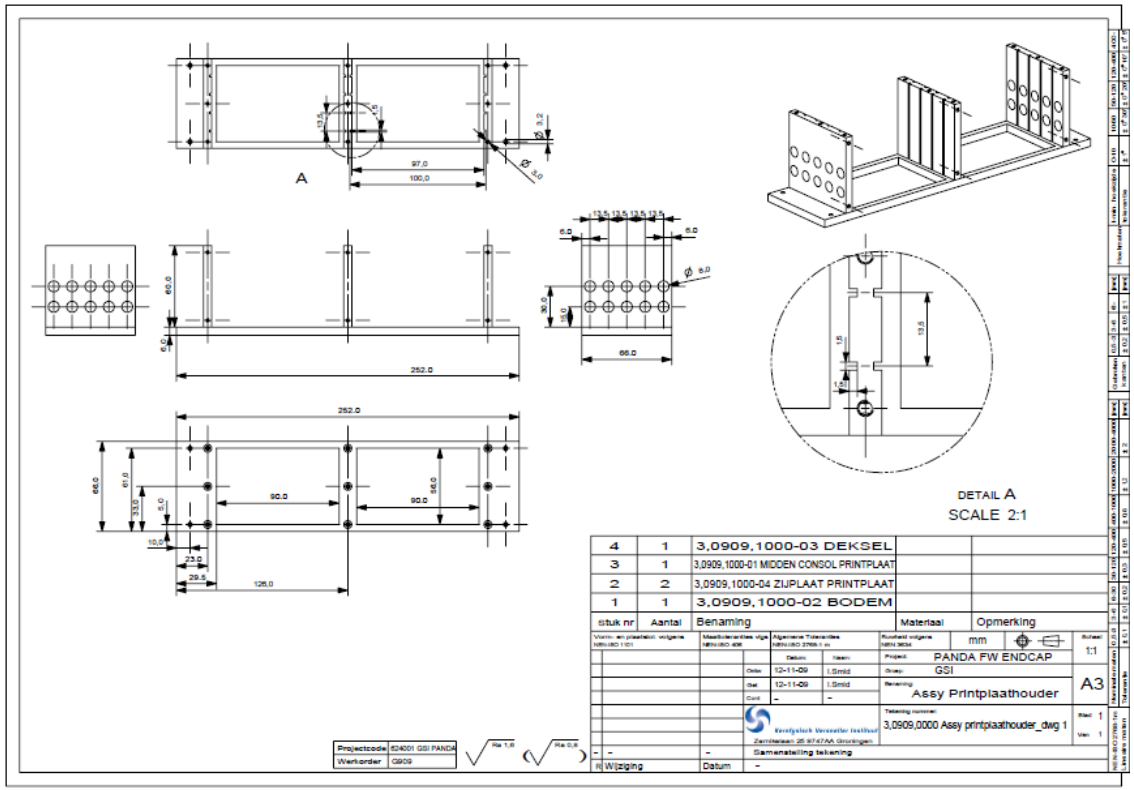
- The design of the board is completed; everything is ready for the order
- Test case for the ASIC footprint is successfully produced by the GS-swiss PCB AG (www.swisspcb.ch)
- → Waiting for the offer

Production issues:

- The bonding pads – 0.1 µm thick immersion gold for Aluminum wire bondings ⇒ ASICs can not be bonded at GSI (1-2 µm thick gold required)
  - To produce thicker gold – galvanoconnections are required (no space in the ASIC board)
- ASICs can be bonded at NIKHEF, The Netherlands (~95 Euro per ASIC)

ASIC Board
(current status)

- Preparation of the Proto16A has started at KVI (16 crystals, 32 LLAPD, 16 APFEL II/III at realistic geometry)



Holding structure for the ASIC line-drivers

ASIC Glob-top test

To protect ASIC/bonding wires glob-top technology may be used

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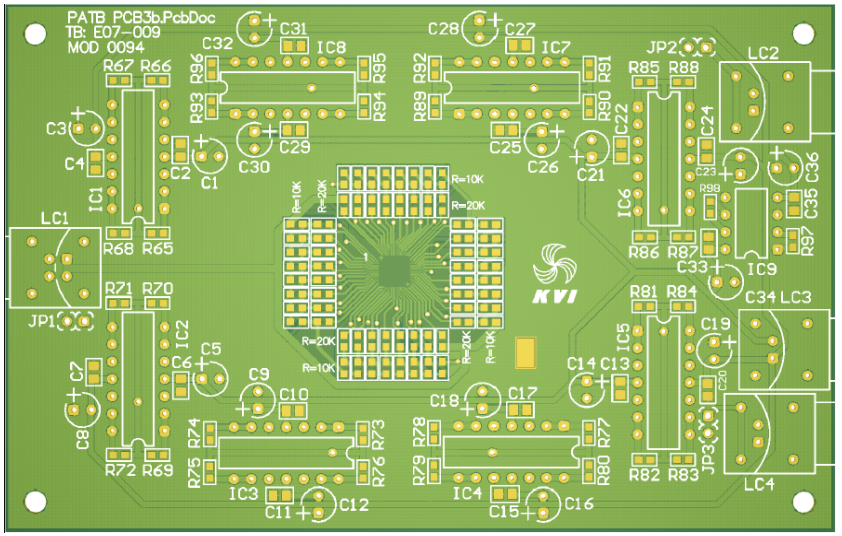
The behaviour at numerous temperature cycles has to be tested (Can shrinking glob-top cut bonding wires?)

<u>Test board designed for:</u>

- Tests in the climate chamber
- Continuous monitoring of the bonding wires connection quality during the tests

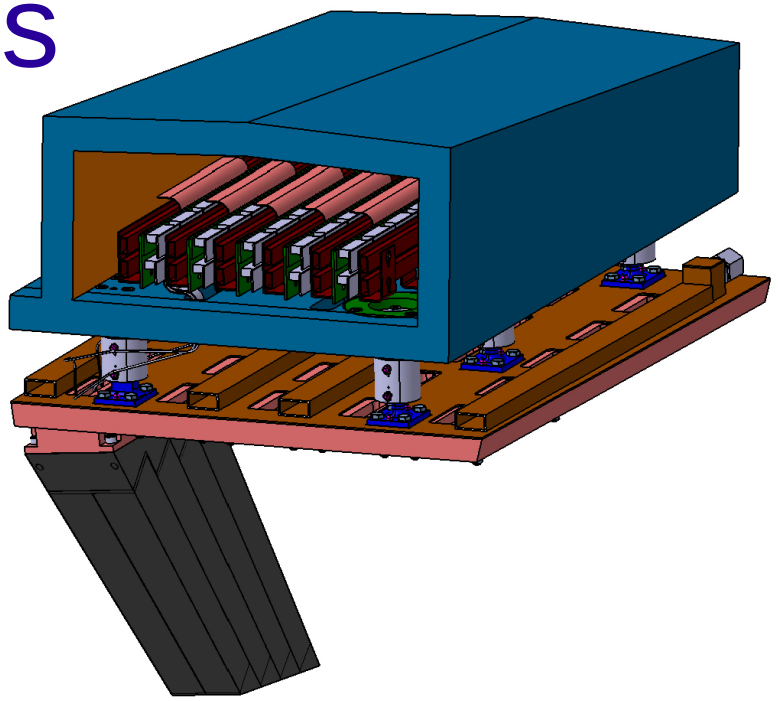


- **ASIC board:** waiting for the offer
- **Glob-top:** test board is going to be produced

Thank You for Your Attention!

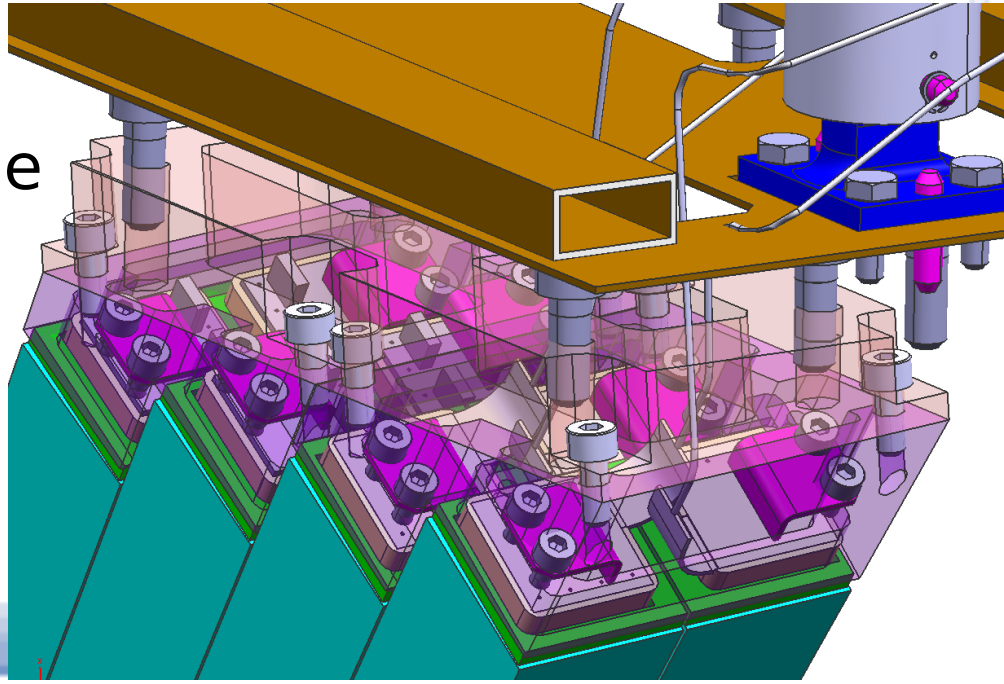
ASIC Integration Challenges

Limited band width

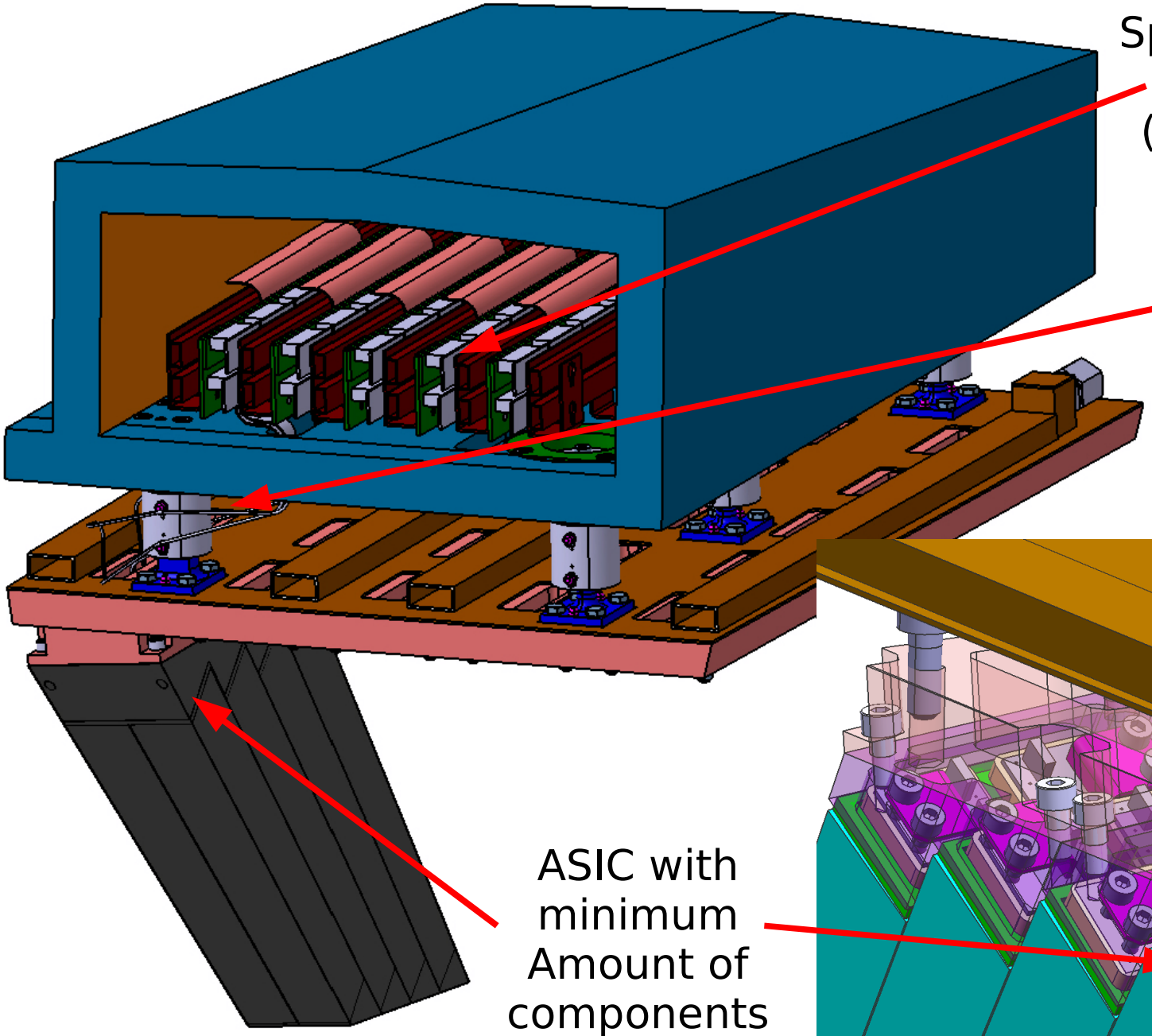


Solutions:

- Reduce length of the Kapton cable and to put additional line driver close to ASIC – no space
- Build low-ohmic line driver into the ASIC – 10× increase of power consumption
- Use different types of the cable between ASIC and SADC – complicated connector in the cold area



Available Space



Space for additional Electronics (line driver/SADC)

Cable ~**300 mm** long

ASIC with minimum Amount of components