



Status of the EUDET Prototype

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for the AHCAL developers





Outline

Status of Modules' developments:

- Flexible Interconnection Foils
(POWER, SIGNAL)
- Prototype Cassette
- Reflector Foils
- POWER
- CALIB
- HBU
- DIF firmware

Timeline issues



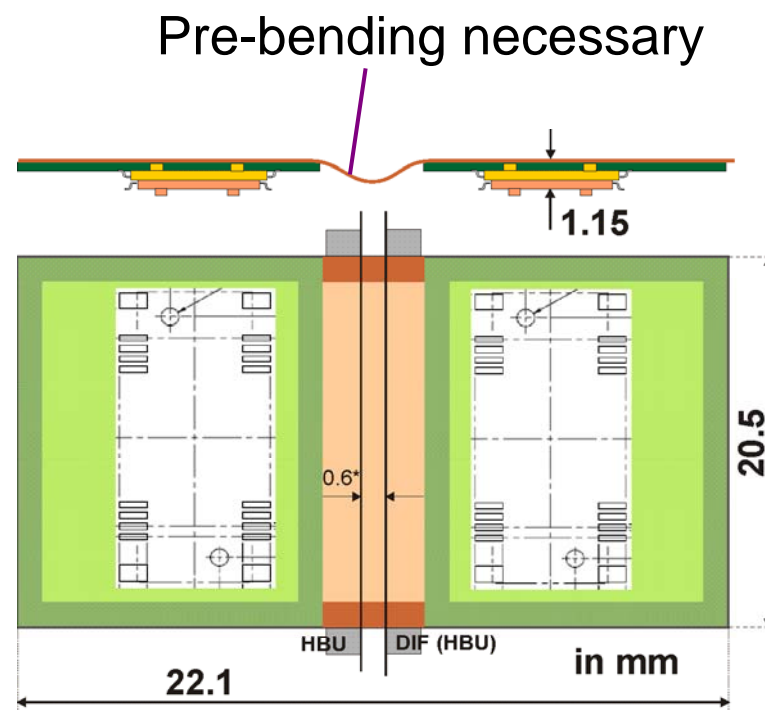
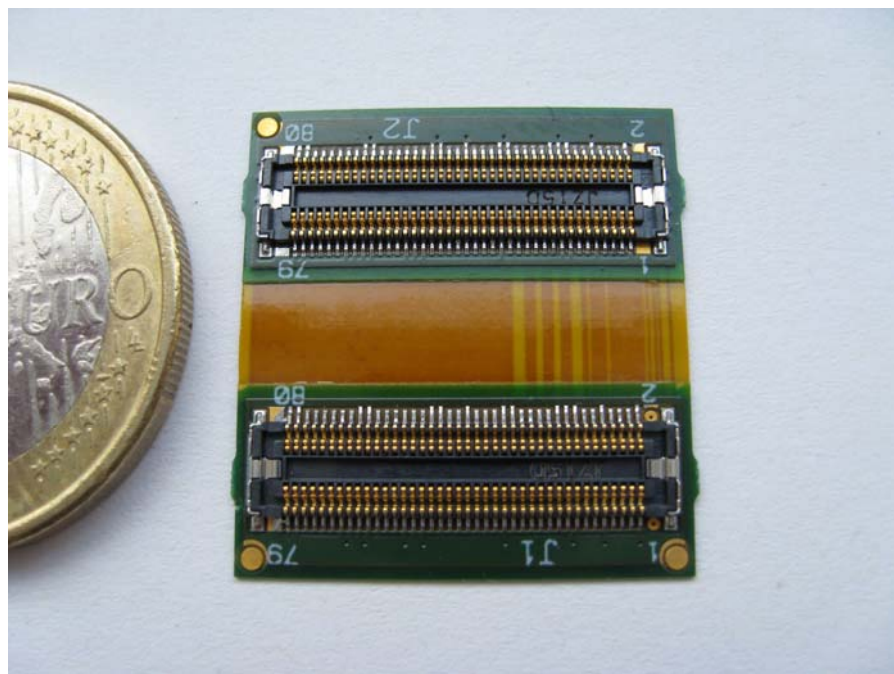
HBU Interconnect

Flexleads finished (20 pieces of each type).

Tests can be performed when HBU arrives.

Interconnection between the 6 HBUs of a slab, and between HBU0 and the DIF.

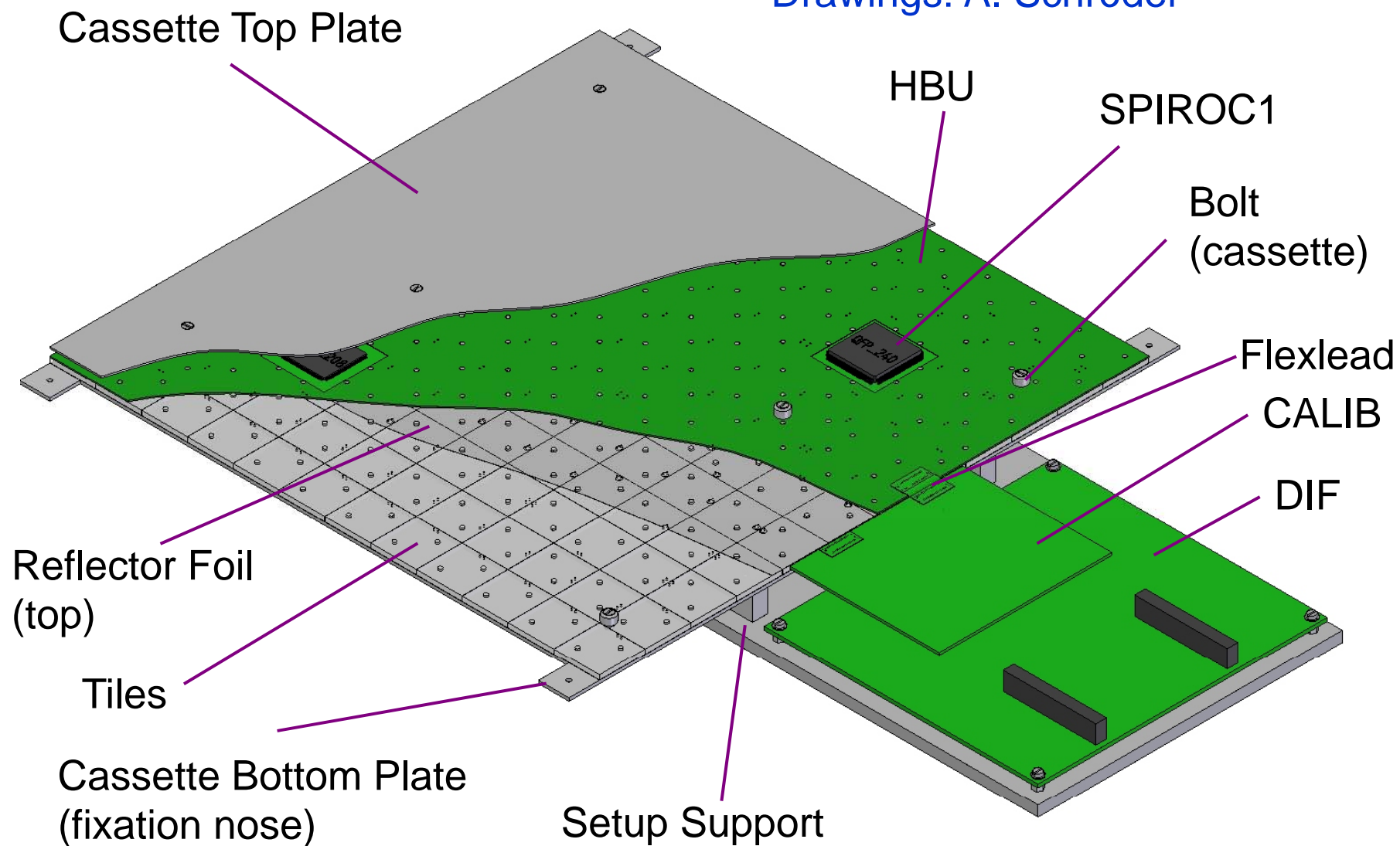
2 types have been realized: SIGNAL and POWER flexleads.





Prototype Cassette & Setup

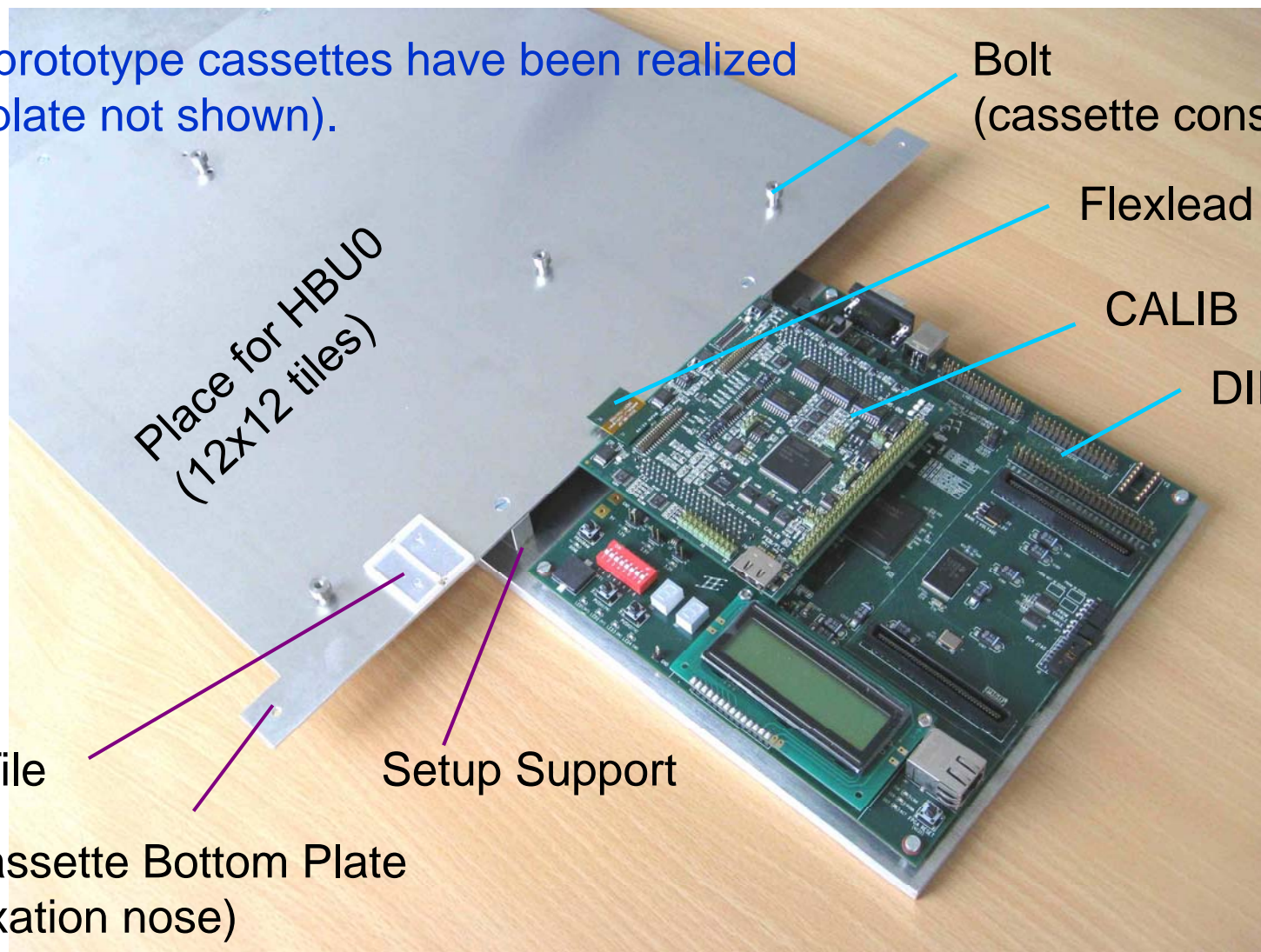
Drawings: A. Schröder





Prototype Cassette & Setup

Two prototype cassettes have been realized (top plate not shown).



Bolt
(cassette construction)

Flexlead

CALIB

DIF

Place for HBU0
(12X12 tiles)

Tile

Setup Support

Cassette Bottom Plate
(fixation nose)

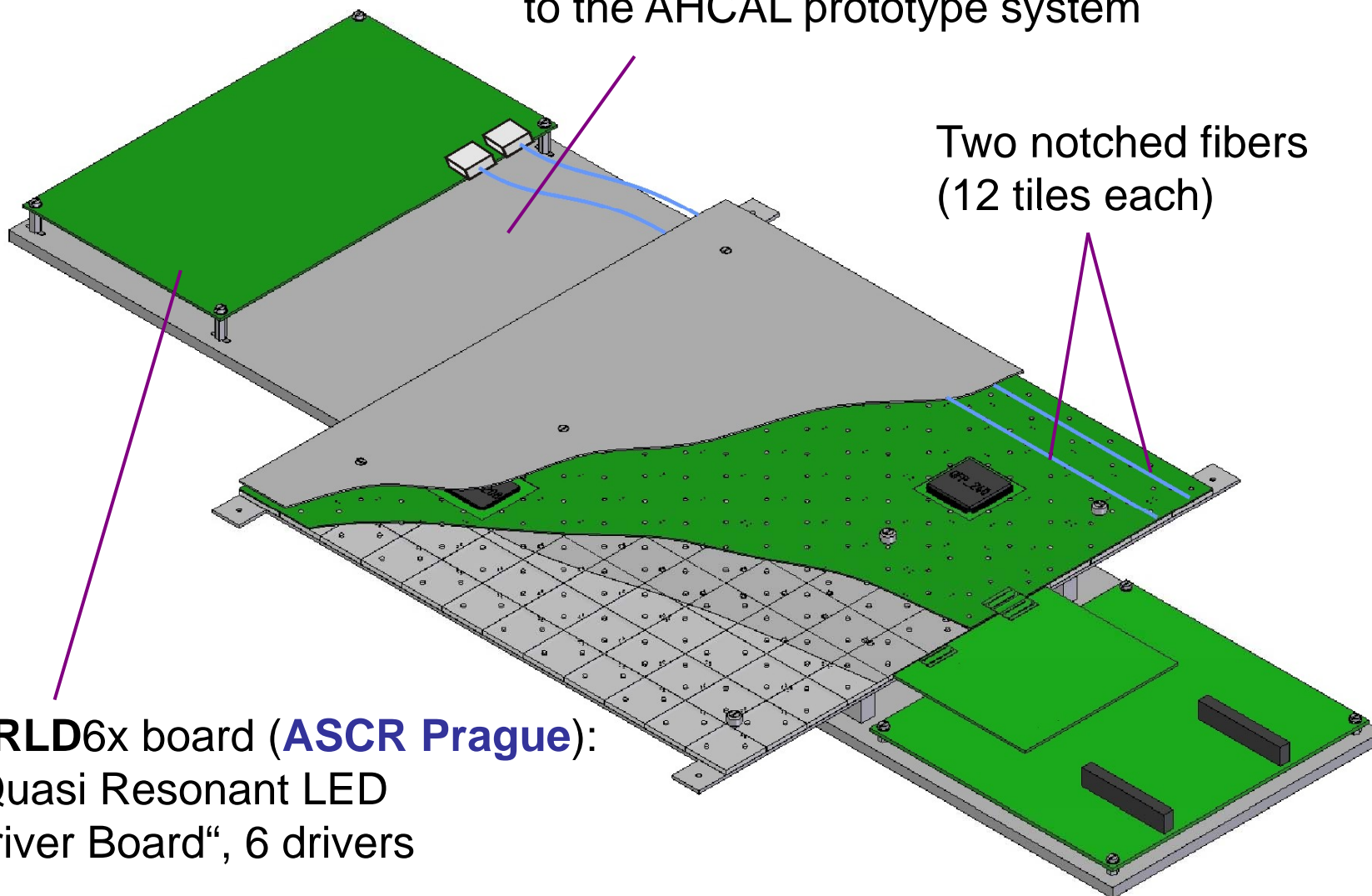


Light Calibration ,Fibre Based‘

Connection of the QRLD board
to the AHCAL prototype system

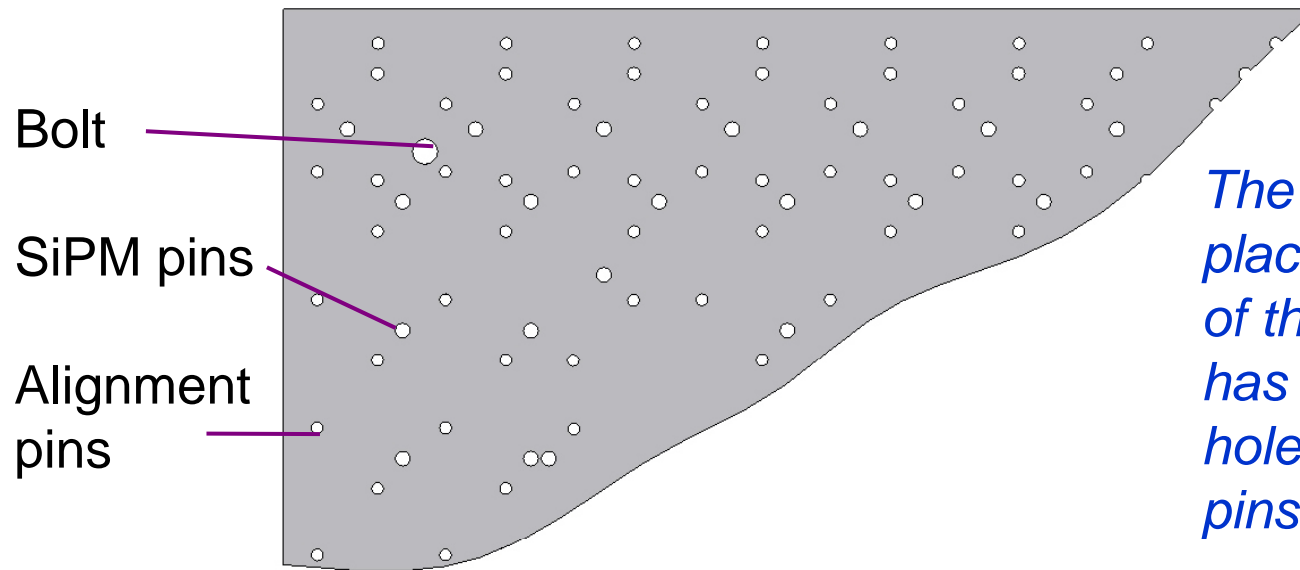
Two notched fibers
(12 tiles each)

QRLD6x board (ASCR Prague):
„Quasi Resonant LED
Driver Board“, 6 drivers





Reflector Foils



The reflector foils are placed below and on top of the tiles. The upper foil has about 500 laser-cut holes (alignment pins, SiPM pins, cassette construction).

Reflector Foils arrived at DESY mid Jan.

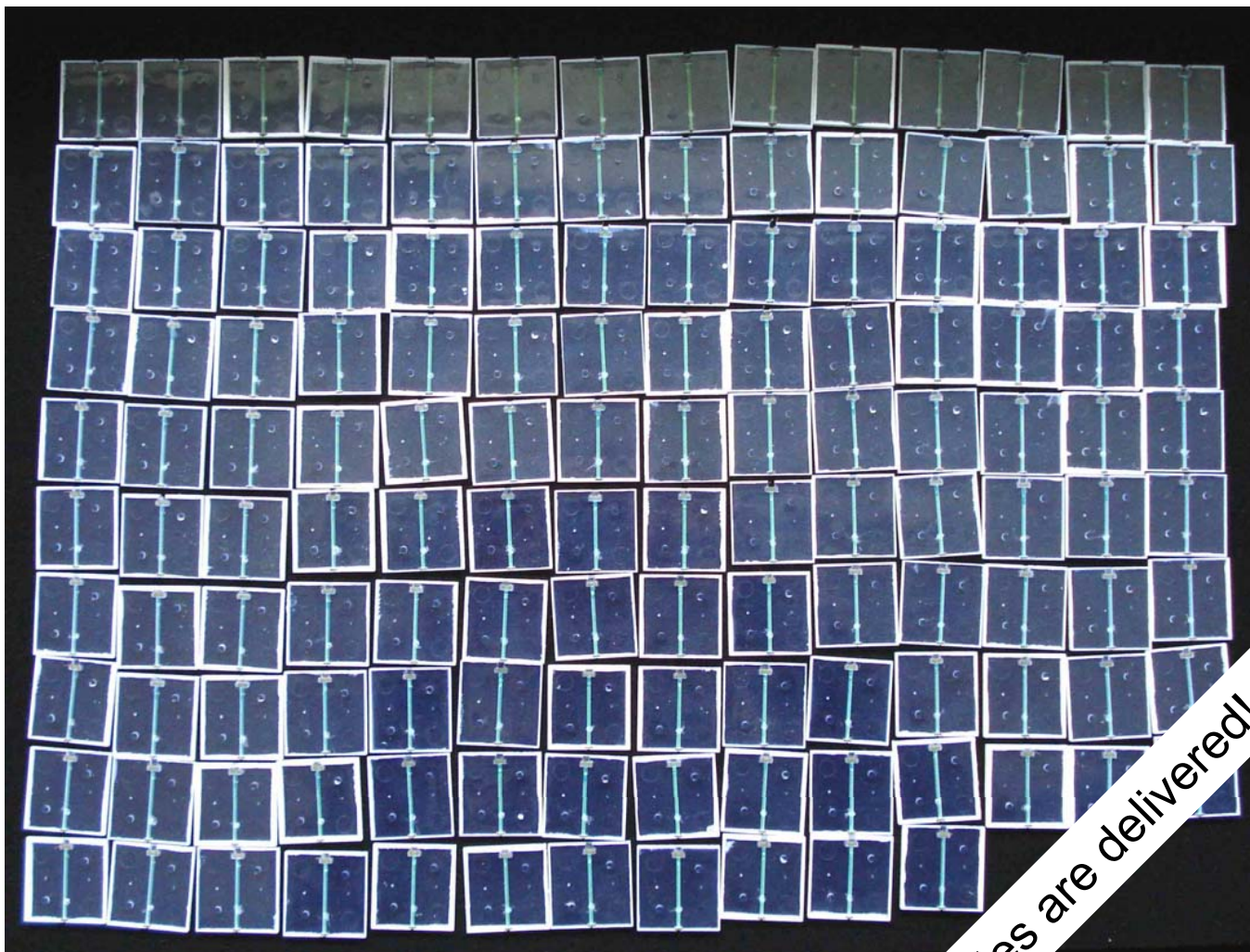
Problems: Foils are curled, reason is unknown up to now (moisture?).

⇒ Foil must be glued to PCB with high accuracy (holes in PCB and foil must fit)





Tiles



Tiles are delivered!



POWER module

System can be operated without POWER module
(bench-top power supplies) => production shifted to early 2009

Schematic is finished.

Layout: starting within these days, similar shape as CALIB module.

The POWER module carries the power regulators for the AHCAL electronics. It enables the ILC power-cycling of the inner-detector electronics as well as the current- and voltage sensors.



CALIB module

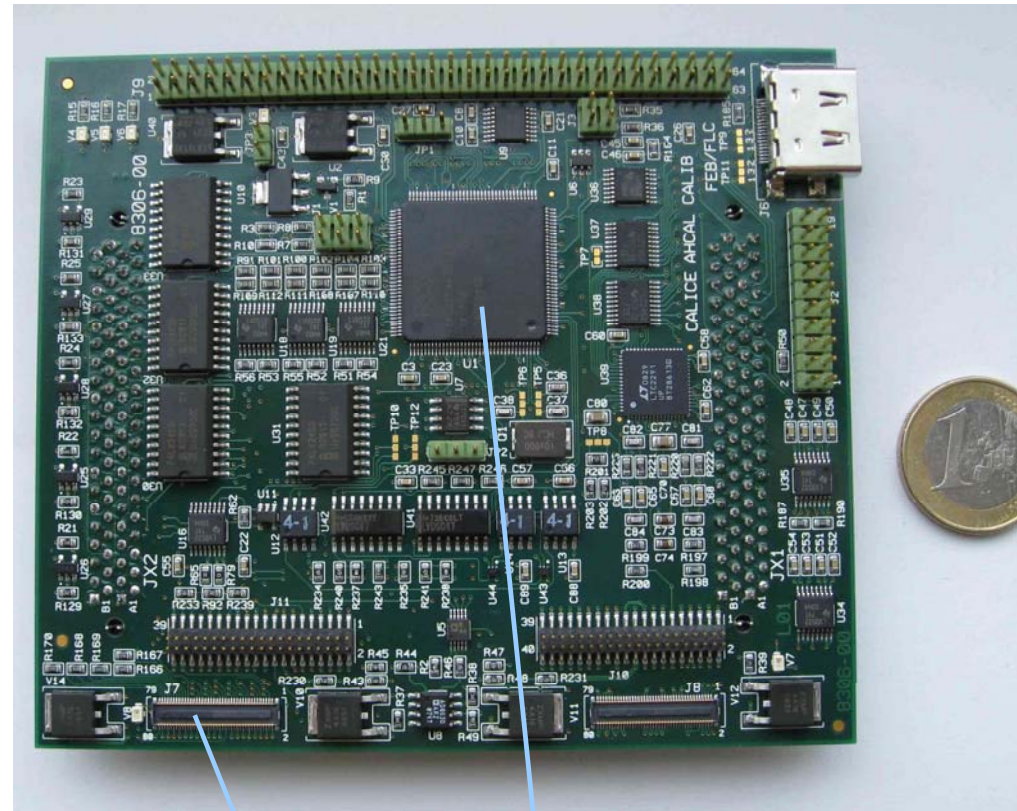
CALIB Module finished (4 pieces)

μ C programming in progress.

Tests are currently ongoing
in stand-alone mode.

For final tests the HBU is needed.

*The CALIB module operates the
AHCAL specific light calibration
system and the readout of the
temperature and voltage/current
sensors.*

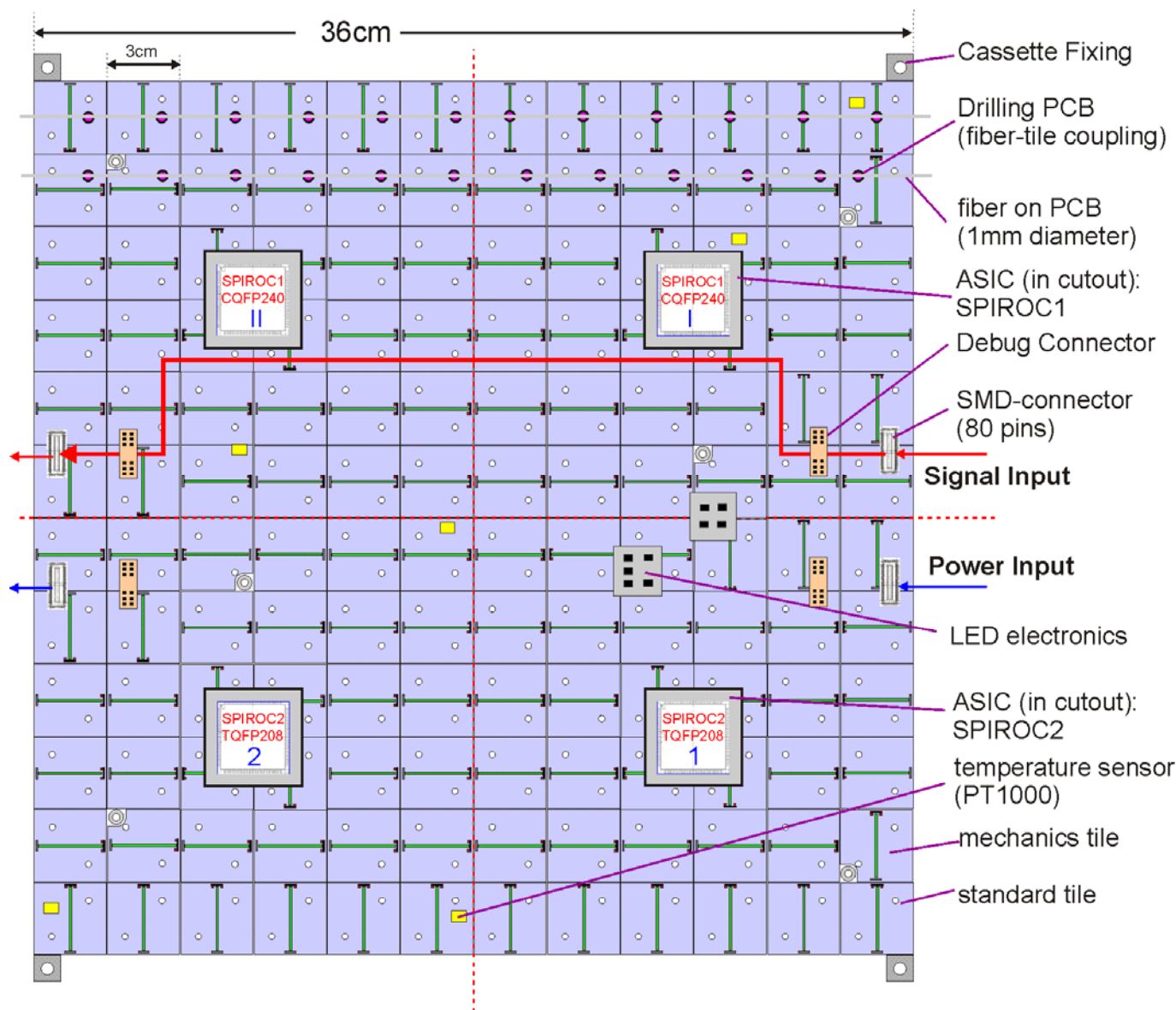


ARM7 μ Controller

Interface to HBU (flexleads)

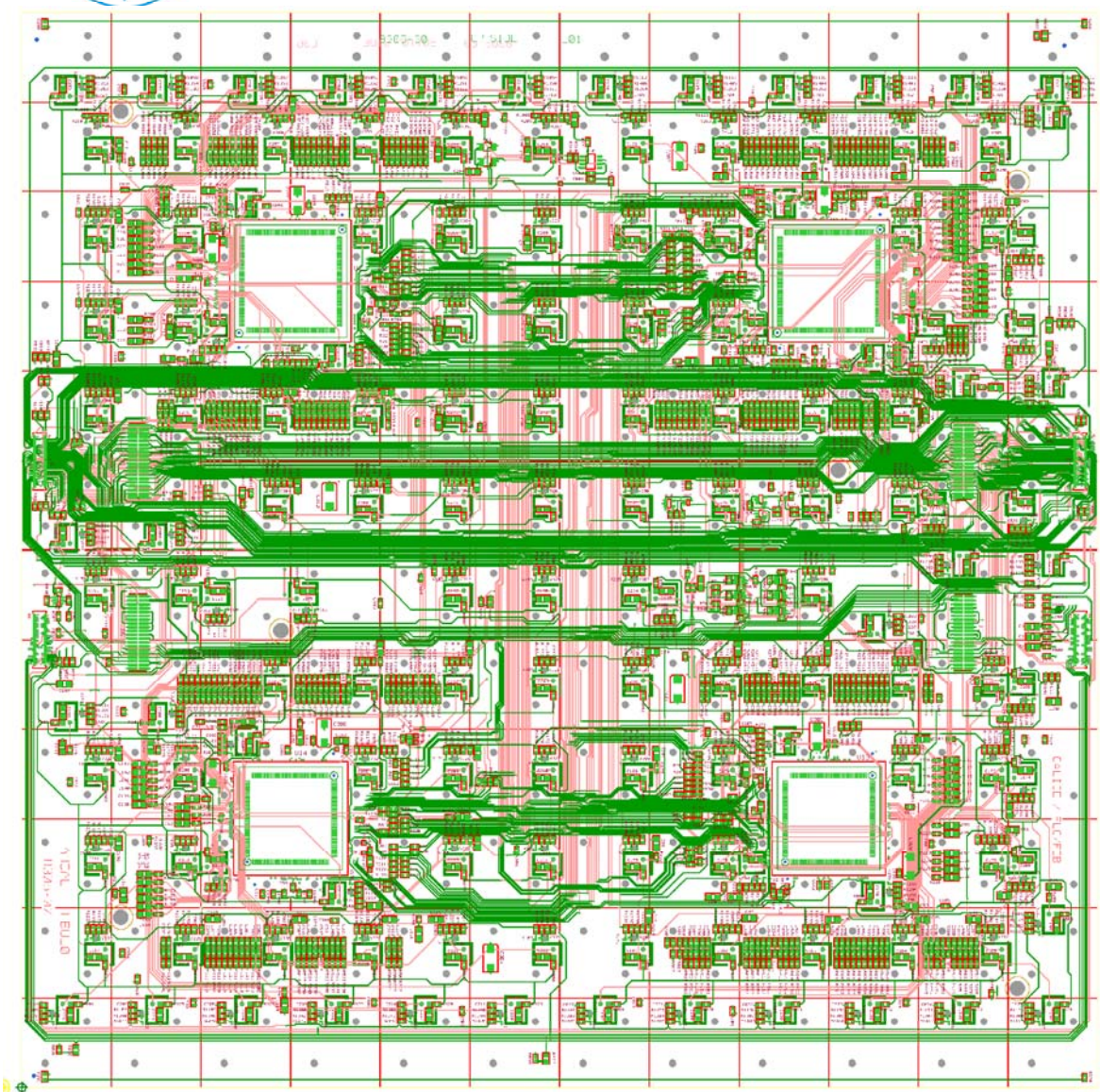


HBU0 module (old view)





HBU0 module



PCBs are in production.

PCB has 6 layers (only 2 layers shown), with cutouts for SPIROCs.

Typical size: 36x36cm²
(144 detector channels)

The HBU integrates 144 scintillating tiles with MGPDs together with 4 SPIROCs and the AHCAL light calibration system (2 types)



DIF Firmware

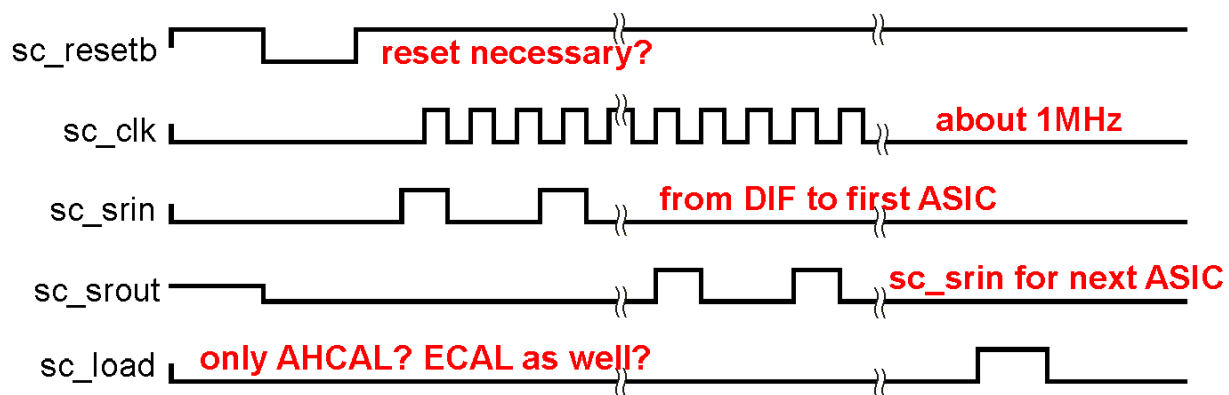
DIF-DAQ interface defined within DIF task force, see:
http://adweb.desy.de/~reinecke/DIF_Firmware_vers1_9.pdf

AHCAL: USB-DIF interface has been set up first (Labview),
LDA follows afterwards.

Timing diagrams DIF-ASICs (SPIROCs) have been developed
in a preliminary version

First system with basic operations expected beginning of March.

Example: Sequence
from DIF after a
slow-control config.-
command from DAQ.





Timeline Issues

The HBU0 / HBU modules determine the timelines:

- HBU0 PCB expected early March., ordered at 2 companies (PCB complexity)
- HBU0 tiles have been produced (ITEP).
- ASICs (SPIROC1 and SPIROC2, packaged) should arrive end of Feb.
- Assembly within 2 weeks (SMD components, tiles)

Challenging timeline for the modules' redesigns (EUNET ,layer-module'), minimum required:

- HBU: only one type of ASICs. HBU0 test results define redesign. HBU redesign needs input of tile shape and SPIROC pinout.
- DIF (replace commercial board). Firmware development has to take place ,step-by-step' in parallel to DAQ-DIF setup.

Flexleads, CALIB and POWER could be used for final setup (to be discussed).



Conclusions

- Timeline is challenging for EUDET layer module:
 - timeline does not include perhaps necessary redesigns.
- Prototype system, based on USB control, expected beginning of April
- Redesigns for ‚Layer Module‘ require preconditions fulfilled:
 - successful prototype-operation,
 - mechanical boundaries within and at the end-face of the absorber structure,
 - DAQ operation of the detector,
 - (the new) tile-dimensions, ASIC’s pinout.(=> minimize number of redesigns?).