Interface Electronics

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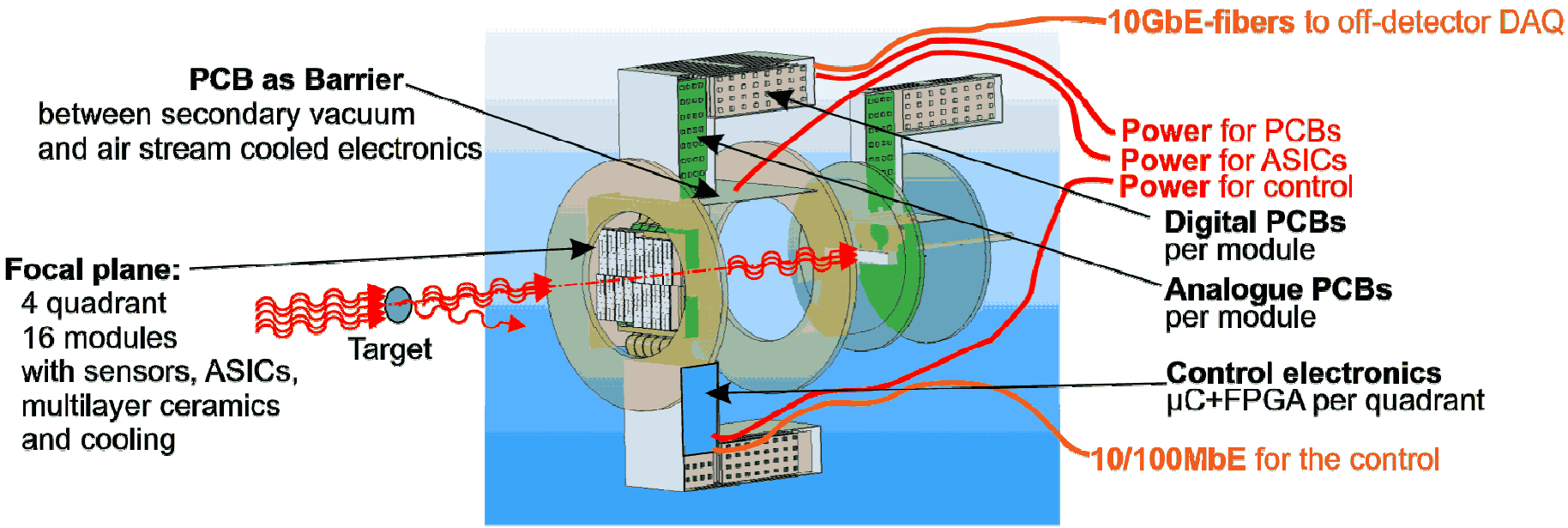
HELMHOLTZ ASSOCIATION

DESY

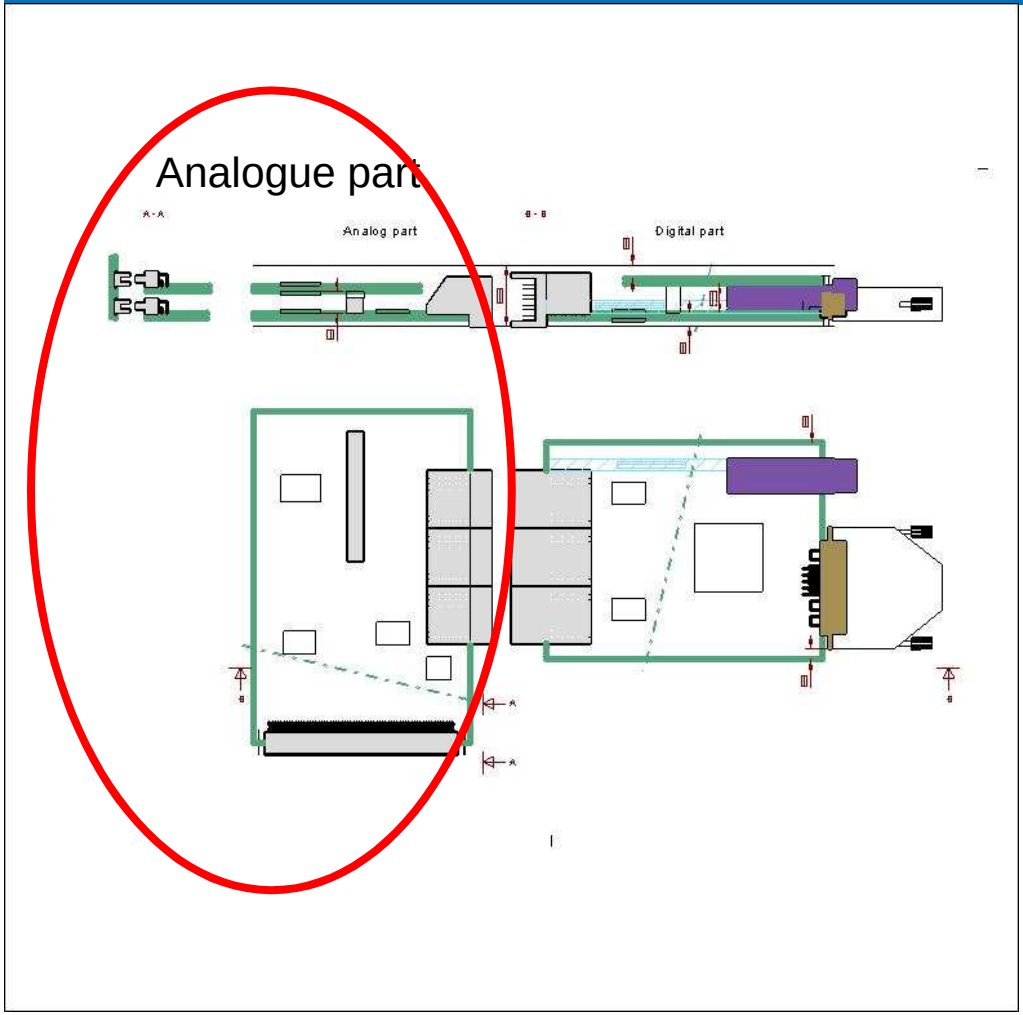
Outline

- Hardware status
- Firmware….. Q. Xia
- Next steps

General Concept



Analogue PCBs



Mother board for 32 inputs

- 7 with new gain
- 3 prototypes

Daughter card

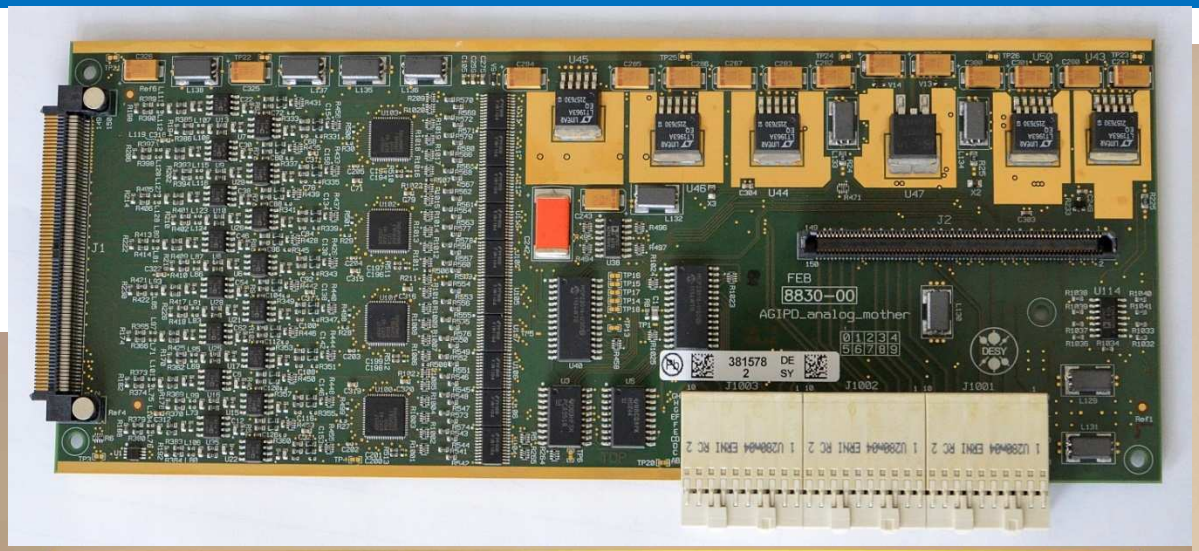
- 10 cards in hand

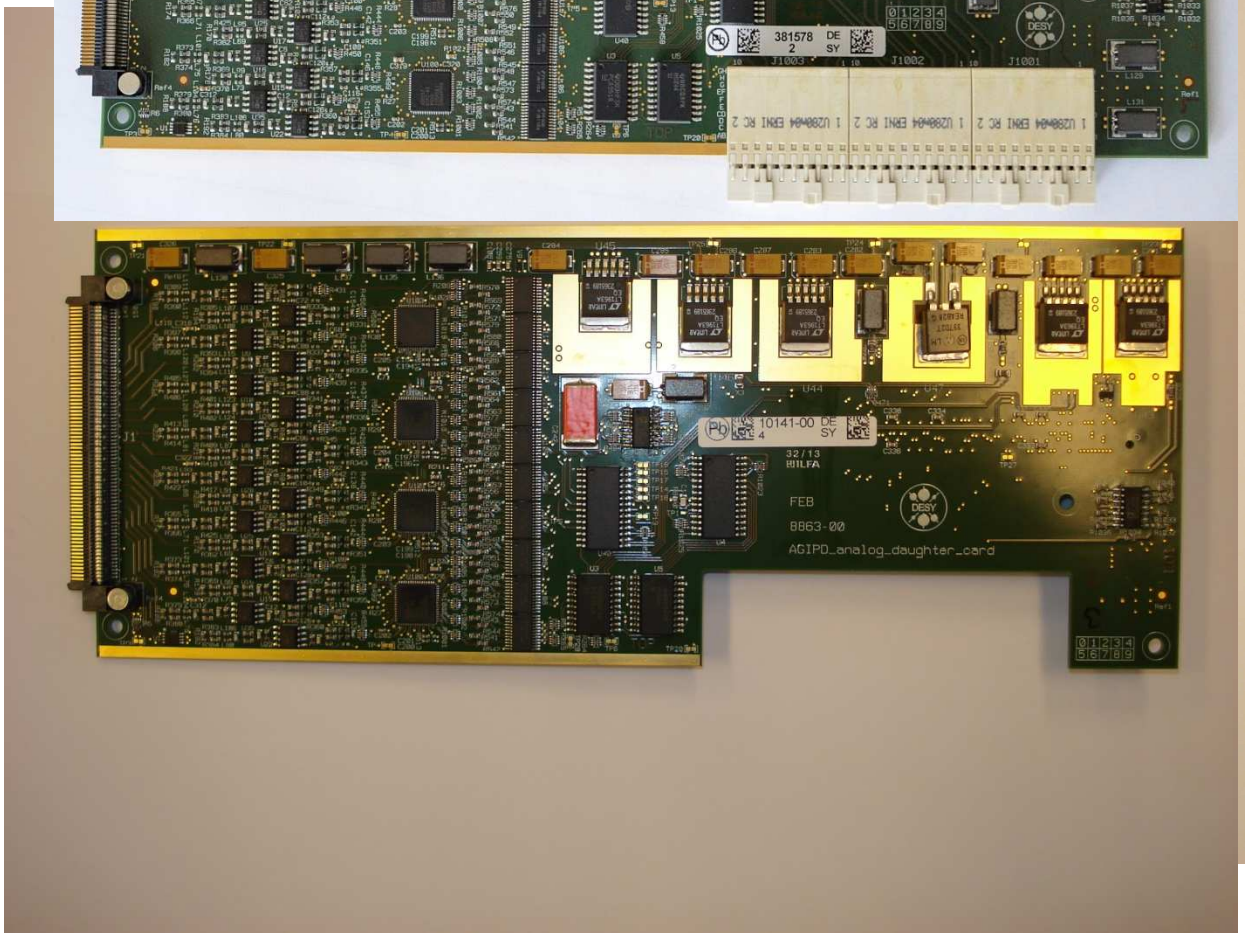
One minor tests done
No problems seen I operating
Individuals within the
“common test”

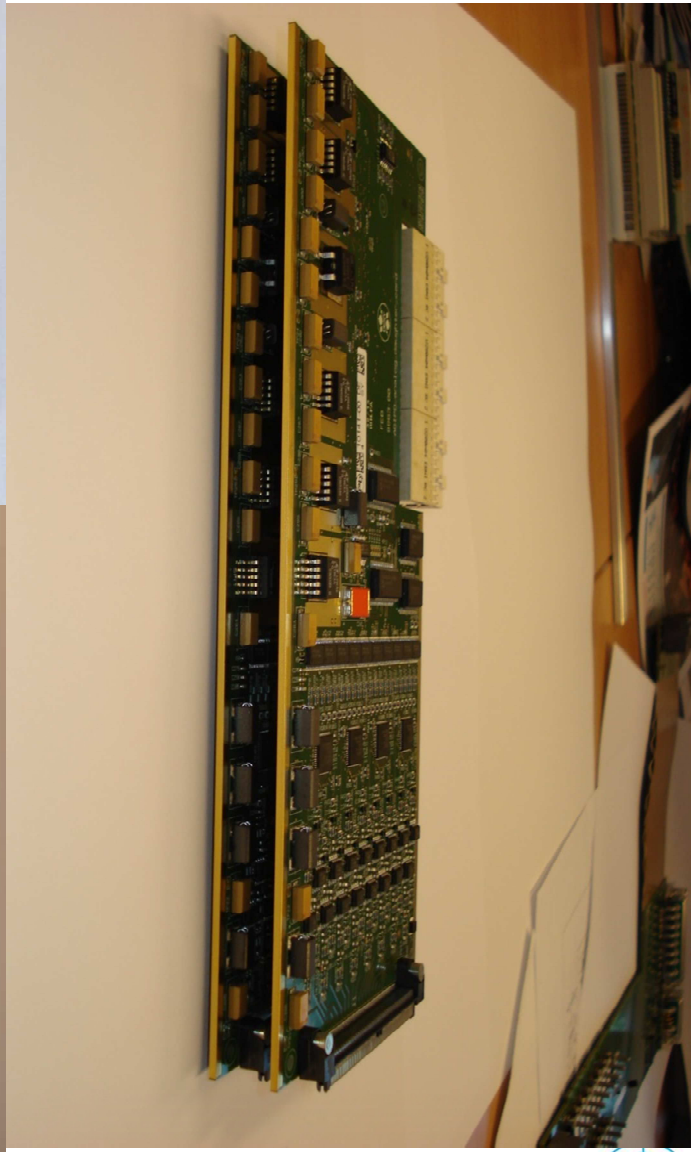
See Q.Xia for digital

- 3 carriers in hand
- ~ 10 digital mezzanine

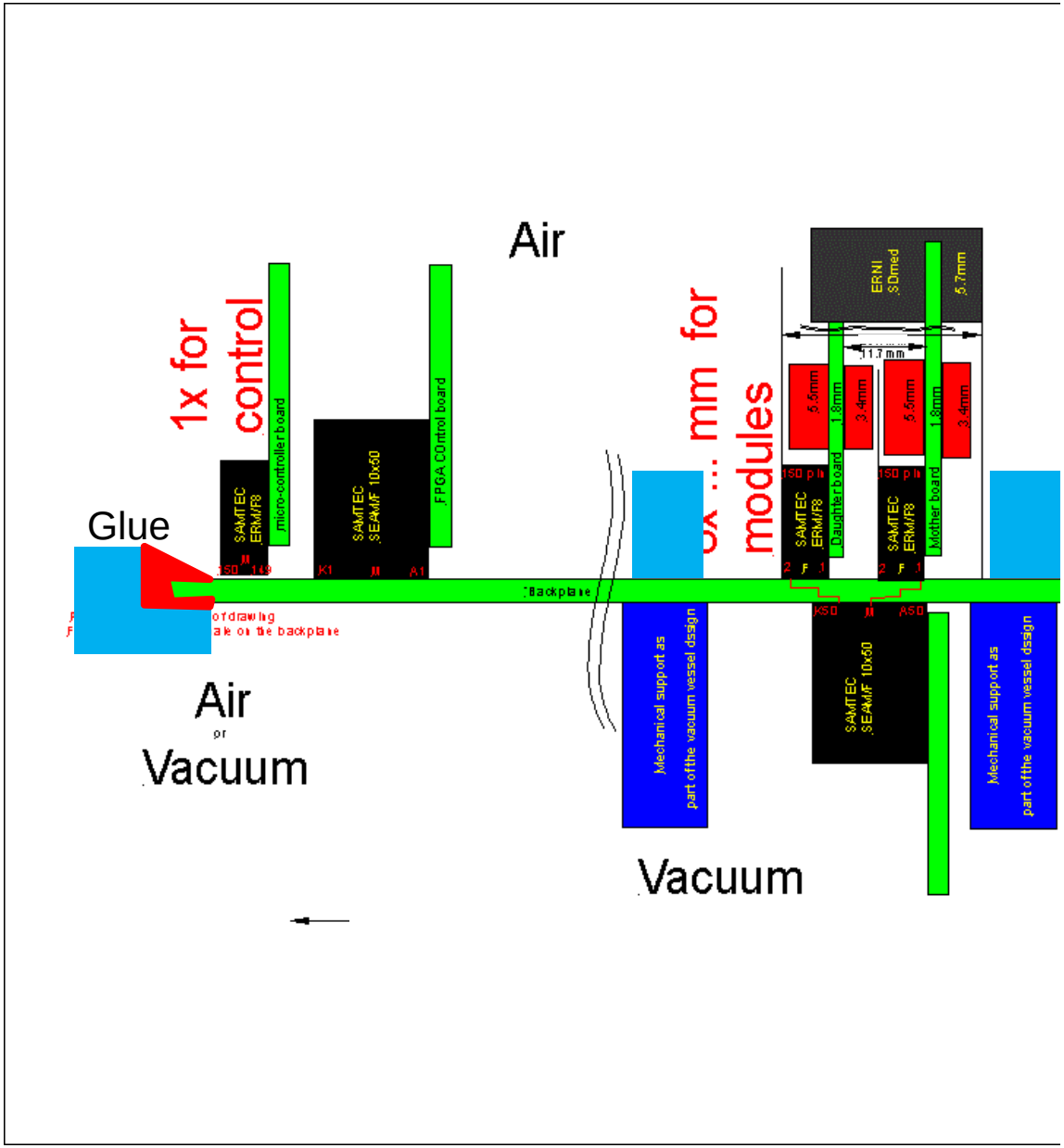
Analogue part: Pictures







Backplane: Module connectivity



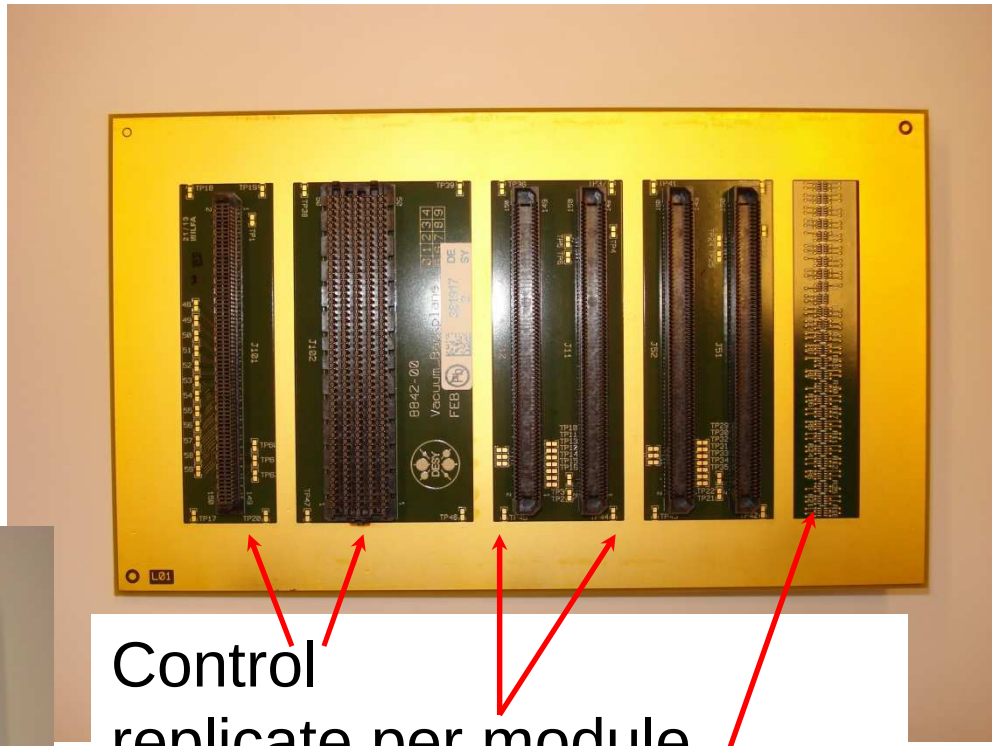
3 two slot backplanes in hand. (one two faults for analogue channels)

Minor modifications for next production done

- Solder-stop below 500-pin connector in vacuum. Still keeping most of the array pure cupper/gold
- Readjust internal alignment pins of one connector.

- Next Layout of 8-slot

Backplane: Pictures



Control
replicate per module
disappear for 8-slot

Control electronics

Test stand operates with

- cable connection of module FPGA to backplane instead of the FPGA-control board
- Need of the micor-controller is only to operate the chip-select. Start with PC-USB-I2C.

Designs follow on experience.

Firmware

Talk from Q.Xia

Reminders for integration

EMI:

- Good planning of current guides helps to minimize debugging and final complicated modifications
- Compromises means NOT, them things will not perform

Infrastructure and slow control is given as WP2.5 to Eu-XFEL.

Mechanical work and Software from DESY-FE
is only for allowing our own work.

Making the construction independent of currents in the GND system
EMI-zoning Main conceptional system issue!!!!

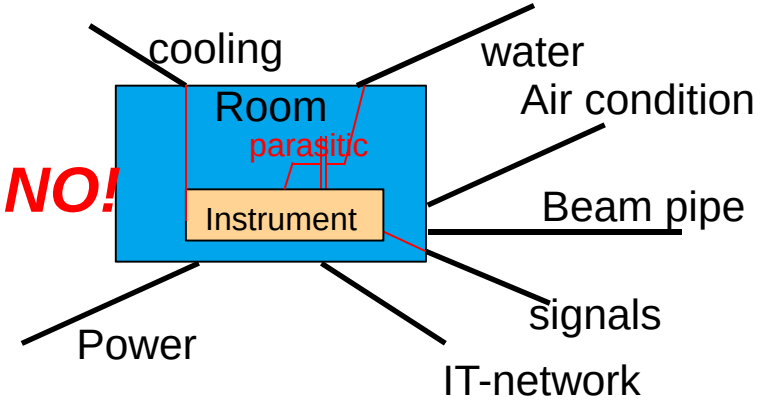
From Talk to EU-XFEL
My 3rd, 2013

Goal: minimize the coupling between different areas, functions

- Minimize Z_K
- Maximize Z_E

Minimize Z_K (room planning)

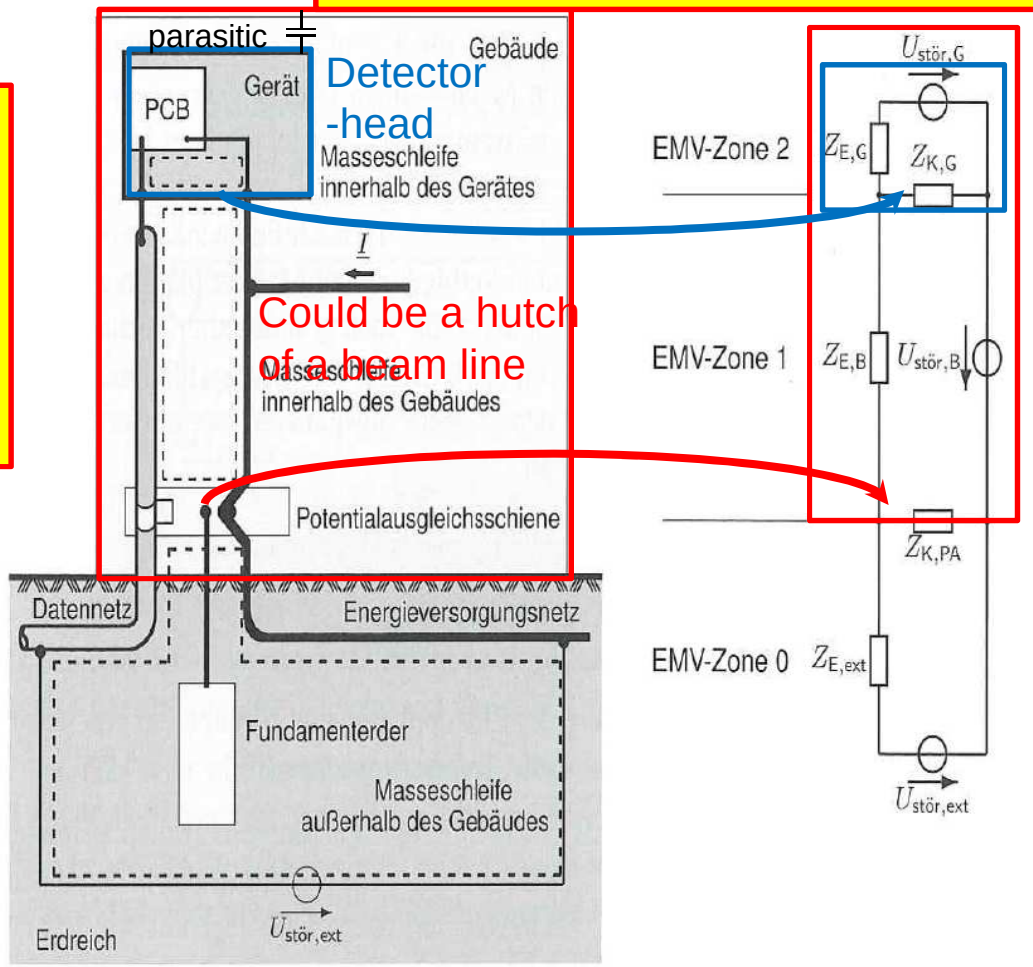
- All conductive connections at ONE point to instrument, to room, to building Afterwards/before distances to limit crosstalk
- Hard to get, than apply filters



Why not?

- Isolations for cooling, water, air, IT
- Short distance power, signals at ENTRANCE, not full length

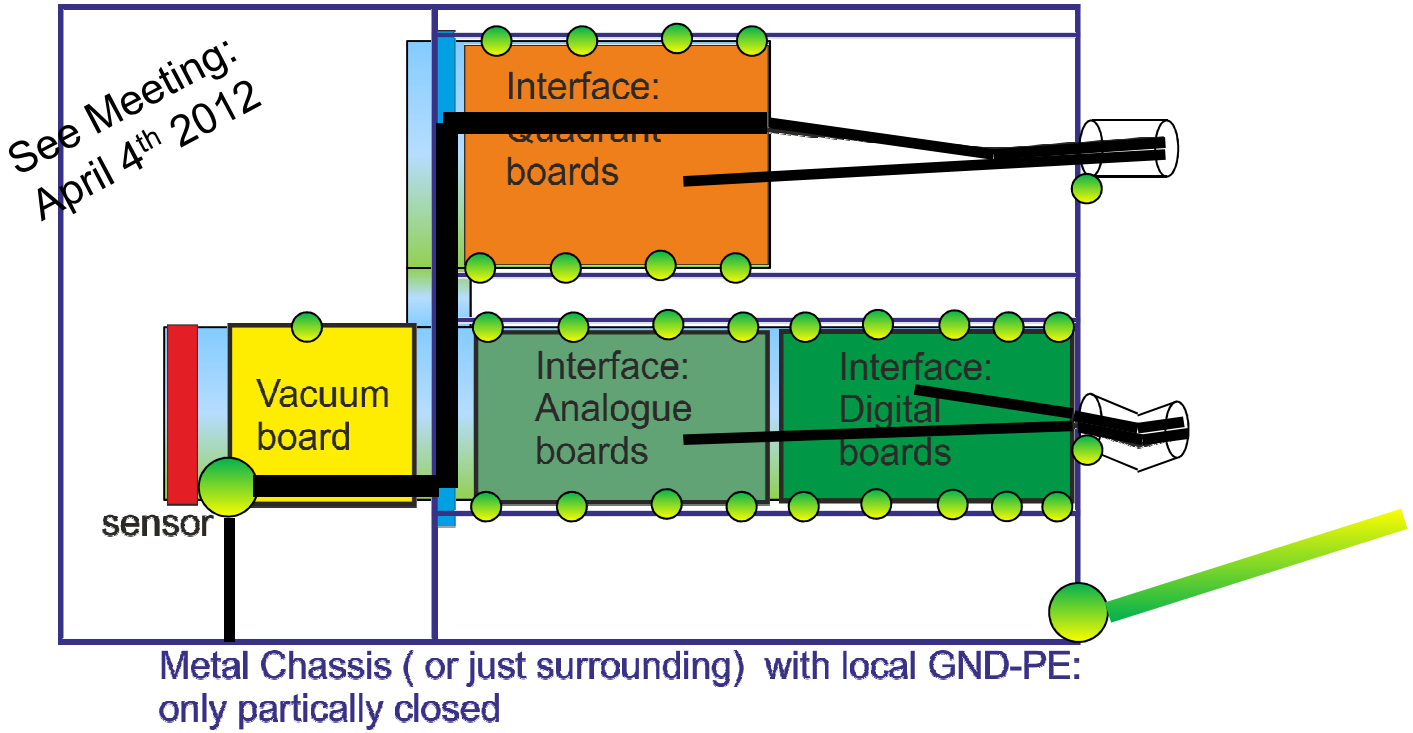
Multiple zoning: "parasitic coupling"
The hutch can already be a good shielding, if free of current



J. Franz, EMV, ISBN 978-3-8348-0893-6

Bild 7.32: Masseschleifen in einer Anlage und ESB

Reminder: Grounding/EMI: Step by step



6. GND connections to external

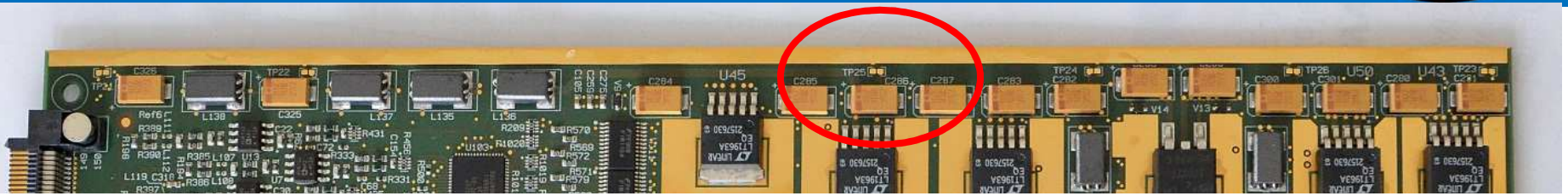
General: Cable connections are planned for the back panel

Getting there and only there with additional GND-PE-connections

Could it be the general rule?

Benefit by that: Low frequency currents are kept out of the detector head.

Prepared on Interface electronics



Analogue part has both sides row of metal with jumpers to electronic GND every few cm's

Digital part has only single sided….. May be improved by next design.

Jumpers on the air-side off the backplane.

Mechanical integration possible?.... To be looked at.

Infrastructure

XFEL has done example-software f or WIENER MPOD (as far as I know no formal decision to use it)

Ordered from DESY for AGIPD

- 1 large crate
- 2 mini crates to get two independent modules powered
- Modules to get two independent modules powered or plug all into one large crate

Goal: See performance with “final” system at test modules.

Discussions on cables: Distance detector-power has grown: approx. 30-40m

Firmware

Talk from Q.Xia

Wishes for debugging:

- Time synchronized operation of logic-analyse and scope
  Need de-multiplexed ADC data on header strip.
-
-
-
-
-

Your growing list: Now and dynamically

Early formulating helps to prepare and integrate well

Will happen: Just by in-time experience: We need to see this and that now.

Summary

- Hardware (backplane+analogue+digital)
  in hand for minimum of two test stands

- First trials to get full chain including sensor and vacuum boards into operation.

- Mechanical integration: I am open to get asked

- Integration with XFEL on cables etc. : Discussions.

Next
- Getting how many pieces?
- Defining modification
- Getting the designs for 8 slot and control.