

Status of the Barrel frontend electronics

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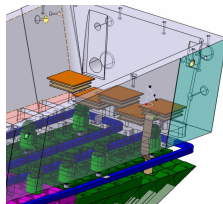
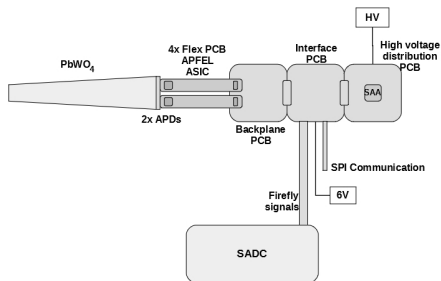
for the \bar{P} ANDA Collaboration

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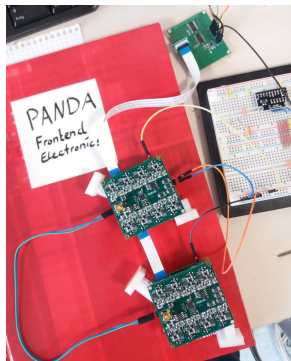
Frontend

The frontend electronics of the Barrel EMC:

- APFEL-ASIC preamplifier and shaper
- Triple PCB sandwich:
 - top PCB (HV-Board): HV regulation, serial adapter
 - middle PCB (interface PCB): control in/data out
 - bottom PCB (backplane): APFEL connection, differential buffers

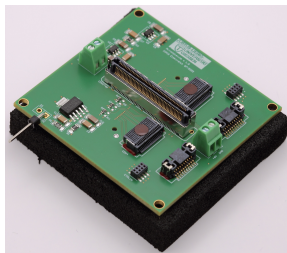
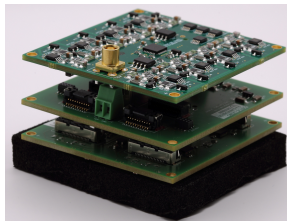


Current version



New close-to-final versions of the HV-board and the middle PCB were produced.

Tests indicate, that everything works properly as by now.

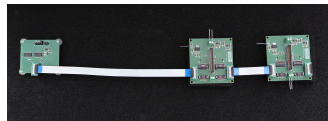
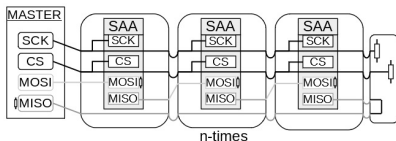
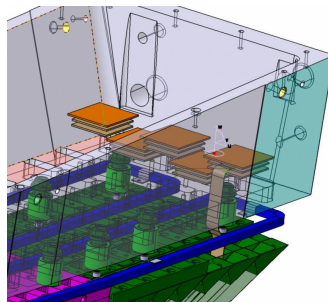


Daisy chain

Many cables are guided through the whole slice. Problems with space constraints and heat distribution get more severe with every additional cable.

Possible solution:

Daisy chain either 5 or 10 triple PCBs, effectively saving 4/5, or 9/10 of the control line cables.



Daisy chain

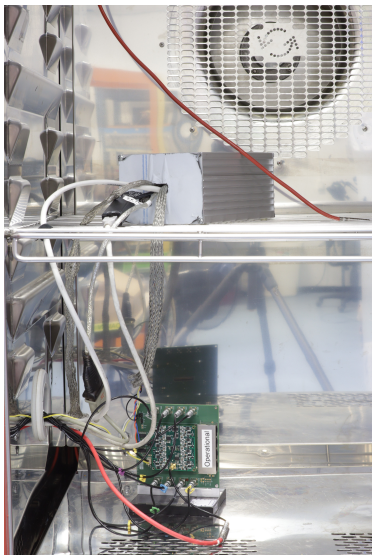
The current version of the EPICS Phoebus interface is already updated to handle daisy chained triple PCB.
First tests were very promising.

The screenshot displays the EPICS Phoebus interface for a daisy chain of five boards. Each board panel contains the following information:

- Board 0:** HV-Board: 21 °C, Backplane Temp: -40.501 °C, Backplane Hum: -1 %
- Board 1:** HV-Board: 22 °C, Backplane Temp: -29.267 °C, Backplane Hum: 22 %
- Board 2:** HV-Board: NaN °C, Backplane Temp: NaN °C, Backplane Hum: NaN %
- Board 3:** HV-Board: NaN °C, Backplane Temp: NaN °C, Backplane Hum: NaN %
- Board 4:** HV-Board: NaN °C, Backplane Temp: NaN °C, Backplane Hum: NaN %
- Board 5:** HV-Board: SAA51M751, Backplane Temp: SAA5 SHT21

Each board panel also includes controls for APPEL 1-4, Autocalibrate AI, Software Autocalibrate AI, AI Low Gain, AI High Gain, and HV-Control. The interface includes a menu bar (File, Applications, Window, Help), a toolbar, and a status bar with an 'Update' button.

Test station



Upcoming mass production of PCBs calls for a swift testing procedure.

A corresponding test station was planned and is currently in assembly.

A few tests with the station were conducted and successful.



Beamtime

Beamtime at MAMI to test the current frontend electronics is in planning and preparation.

Planned setup is as follows:

- 18 wrapped PWO-II crystals with APDs and APFEL
- 5 complete Triple-PCB-Sandwiches (first use of Firefly-dataline)
- 2 PANDA-SADCs for DAQ

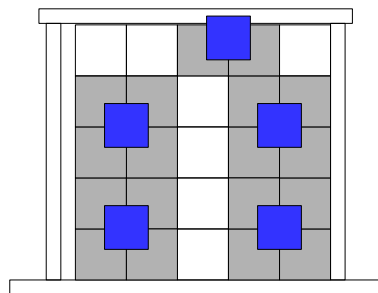


Figure: Experiment scheme: Gray blocks are PWO-crystals, blue blocks are representations of corresponding triple PCBs. Gaps (white blocks) will be filled with dummies

Summary

- New, close-to-final versions of HV- and interface-board are produced and tested.
- A small daisy chain with these boards was built and tested successfully.
- A test station for the mass production tests of the triple PCBs is currently assembled
- The current version of the complete frontend electronics will be tested in a dedicated beamtime this summer at MAMI A2

Addendum