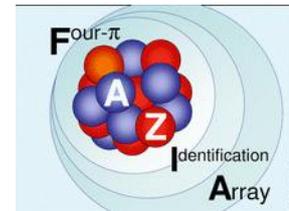


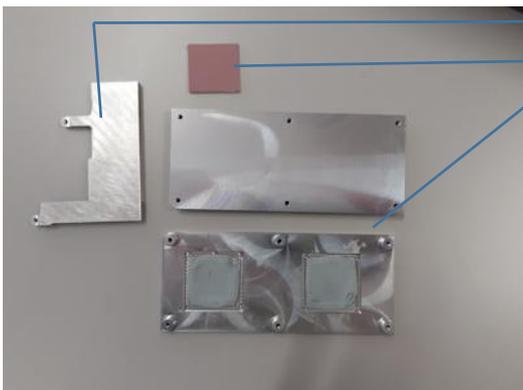
Equipment and tools for initial tests of FEE Cards

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The FEE cards of FAZIA can be tested with some relatively simple tools which are listed here

1. Shelf to be screwed to the FEE for heat dissipation (custom panel, not shown in the pictures below)
2. Metal cover to be screwed on the FEE after insertion of gappad on the side facing the FPGA for special heat dissipation of FPGA (custom part, screwing)
3. Gappad pieces (just cover the FPGA, not adhesive material)
4. Metal cover to cover the DC-DC region of the FEE which could emit too high EM noise (custom part, screwing)
5. a simple air fan to cool the FEE under test (typical temperatures 40-60degreeC). A fan for electronics rack is fine (commercial part)
6. Bias supply modules. The five voltages needed are: +13V,-9V,+5.5V,+5V,-5V. For all these voltages the currents are below 0.5A while for the only 5.5V a large 5A current is requested. Note that 5.5V must be supplied by a separate instrument as it must be switched on 2-3seconds after the others. They are commercial parts
7. A special testbench card TBC built in Orsay
8. cables for TBC connections: a) RS232 to USB (to PC, also directly to RS232 if PC has it)
b) flat cable to FEE 2x34 pin connector.
a) is commercial b) commercial cable and connectors produced by ERNI but we can send you one of these
9. PC linux-debian or other distros
10. Keithley precision voltage meter model 2000. This is the one for which we have the codes prepared and tested. Perhaps any other meter (range at least up to 400V) with a RS232 port and accepting SCPI command protocol might be fine, as well
11. High resistance terminators (100MOhm) to be inserted in the molex FEE connectors (detector side) when testing the current readout after calibration of the FEE. Custom part we can send two of them
12. Xilinx device for FPGA programming. Special cable from the device to the FEE (partially adapted we can give you) (<https://www.xilinx.com/products/boards-and-kits/hw-usb-ii-g.html>)
13. Pic programmer Pickit 3 (perhaps also the 4 now available type is fine) with a commercial cable with usb mini-b connector, partly adapted to connect to the FEE (commercial parts) (<https://www.microchip.com/Developmenttools/ProductDetails/PG164130>)

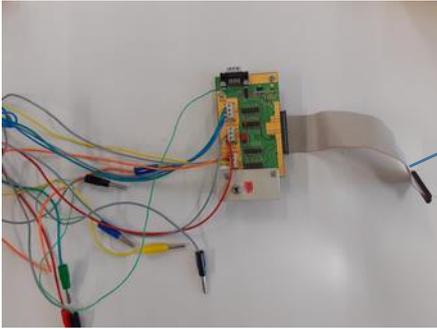


Metal cover for DC-DC shielding (left)

Gappad square as an example

FPGA covers top and back side (with two areas to couple to the FPGA). Old covers were made of copper (see last photo)

Since FPGA are now different perhaps these covers should be modified to fit the new FPGA geometry on the FEE.



Orsay TBC.
On the left the cables to voltages. On the right the ERNI special flat to the FEE. On top the RS-232 port.



The precision multimeter Keithley 2000.



Xilinx programmer for FPGA. The enclosed cable (top) and the adapted cable (middle) to reach the FAZIA FEE connector



Pickit 3 programmer for the PIC. The red cable is a standard usb mini-b adapted at one end.



Flexi terminator with 100MOHM resistance for current measurements

A global view of the desk with FEE, fan for cooling and three bias suppliers.

