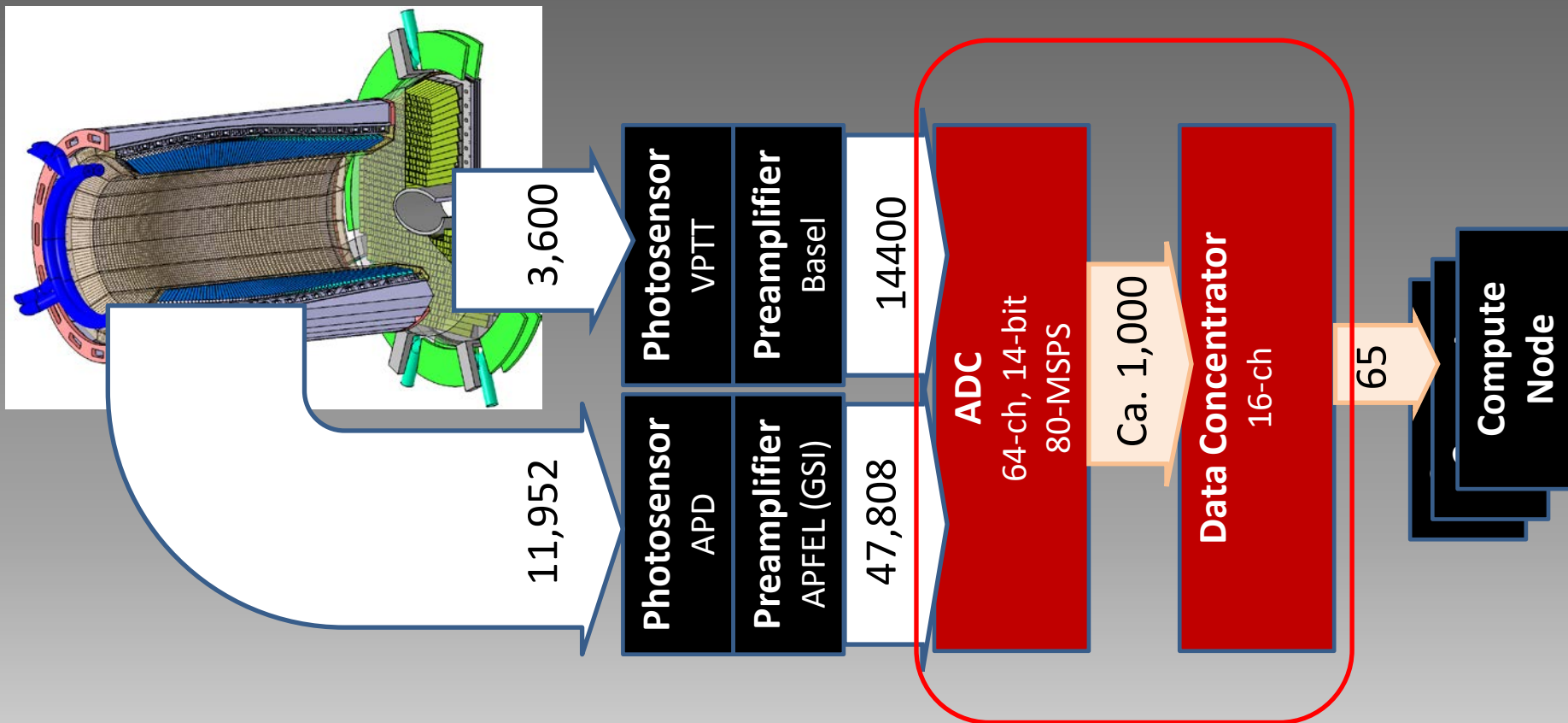
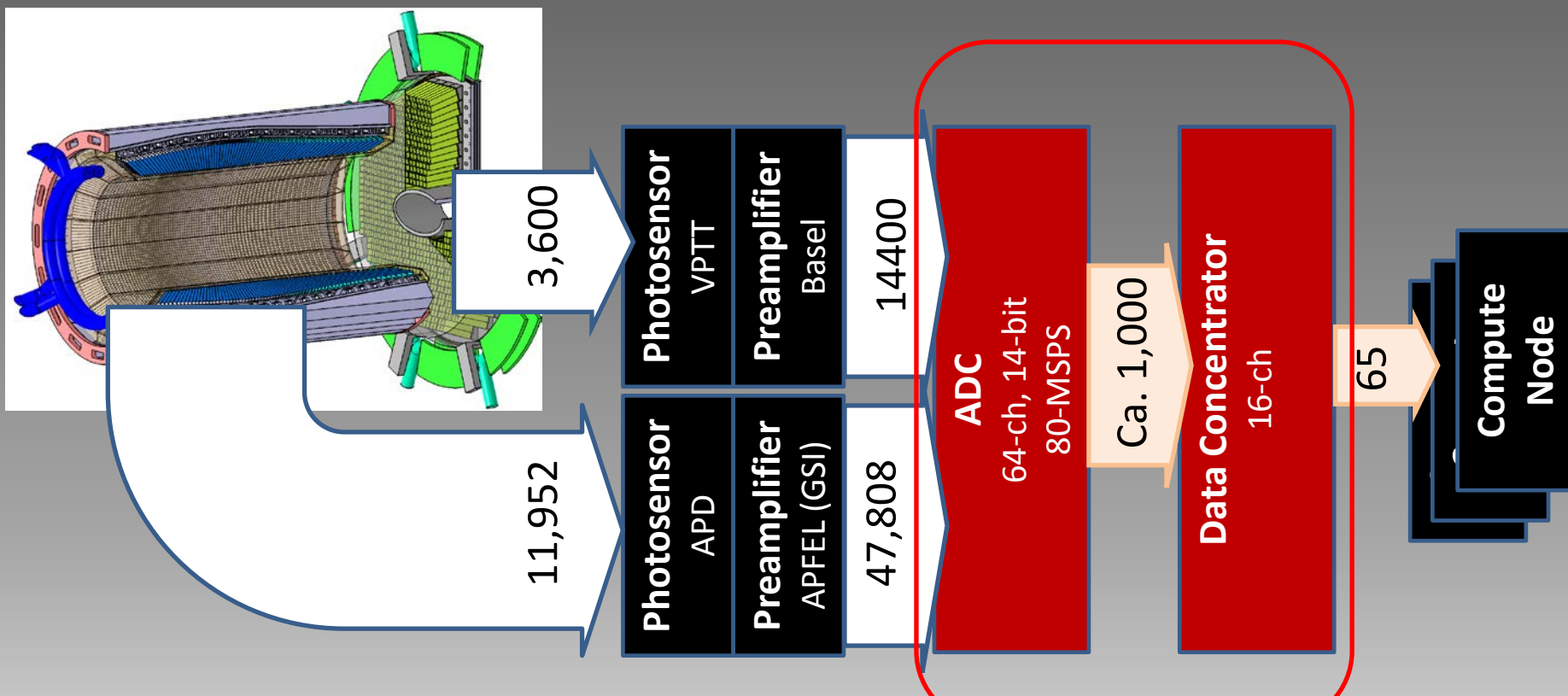


- PANDA EMC Readout System



- PANDA EMC Readout System

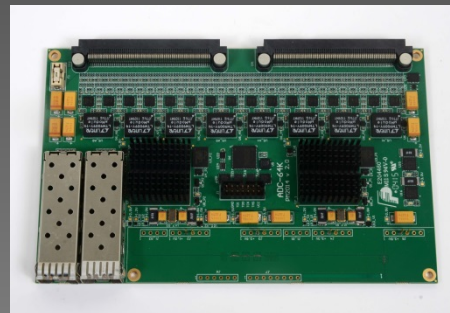


Swedish Research Council has recently approved an investment of ca
3 M€ for the **EMC Readout System**
as a part of the swedish contribution to FAIR

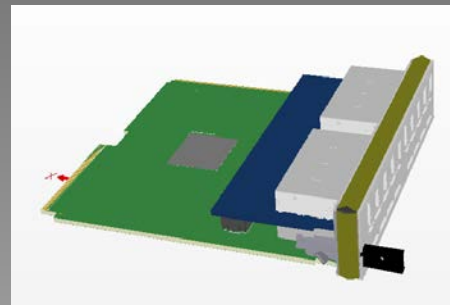


- PANDA EMC Readout Electronics

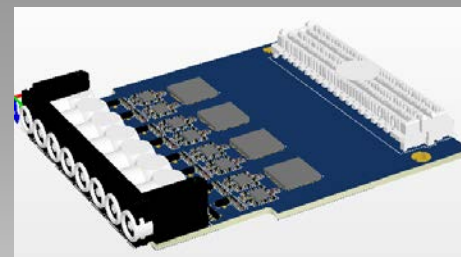
EMC SADC



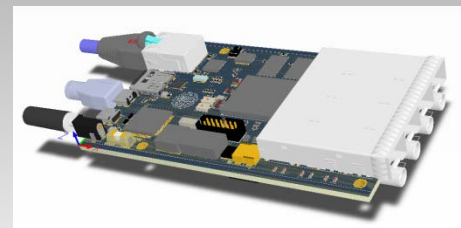
EMC Data Concentrator



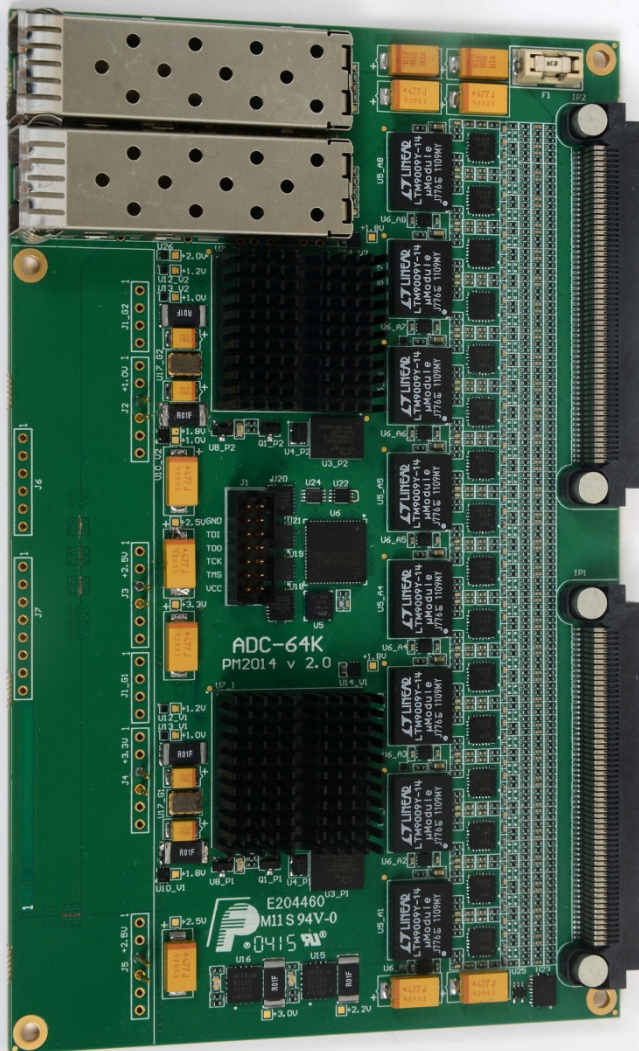
Shashlyk ADC



Stand Alone Data Concentrator



ADC 64K 2

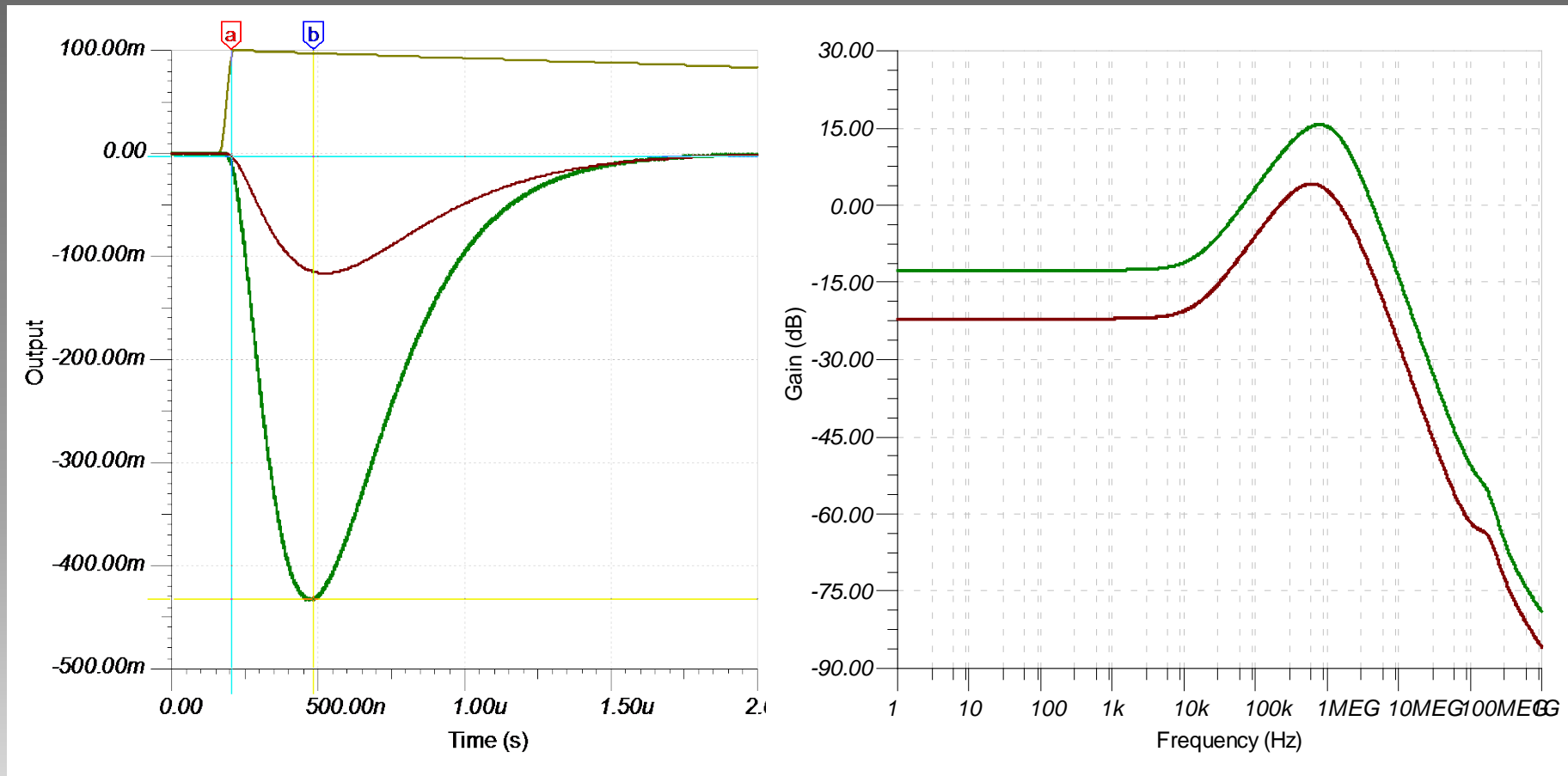


List of recent changes/improvements

1. Overall error correction
2. Input can be galvanically de-coupled from the ground
3. Improved analog/digital ground separation
4. All low-voltage power supplies can be distributed via backplane connectors
5. Space optimization
6. Baseline shifting (?)

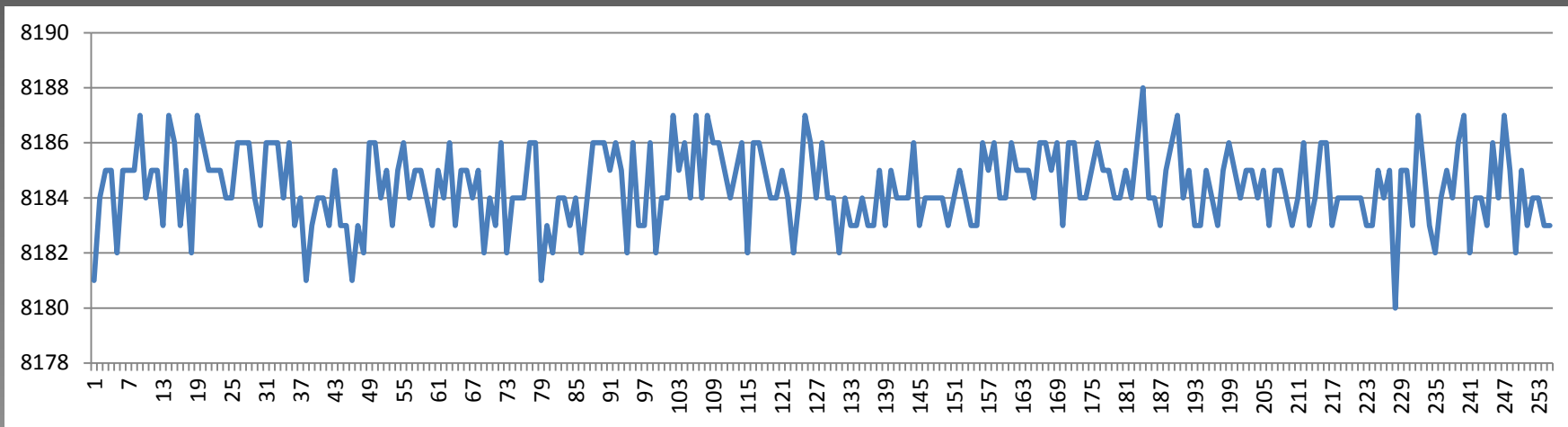


ADC_64K_2 input

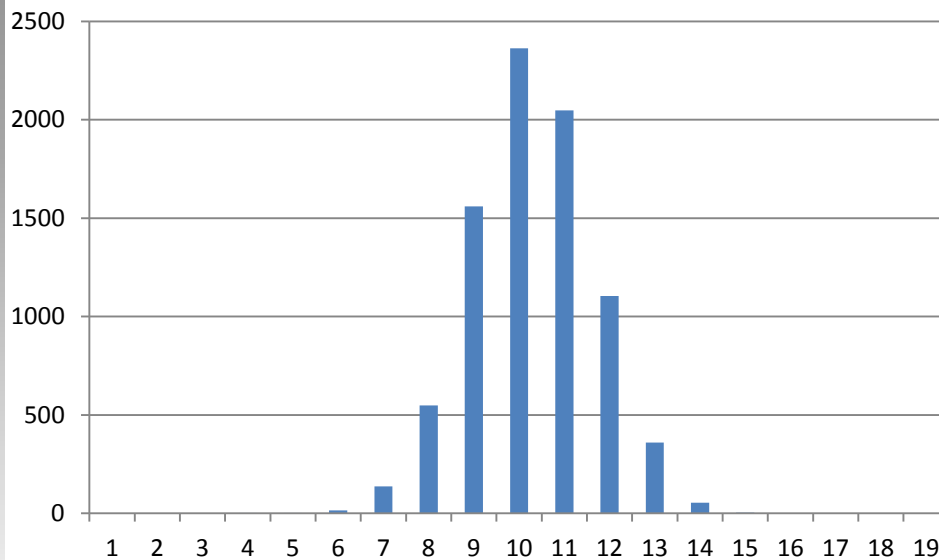




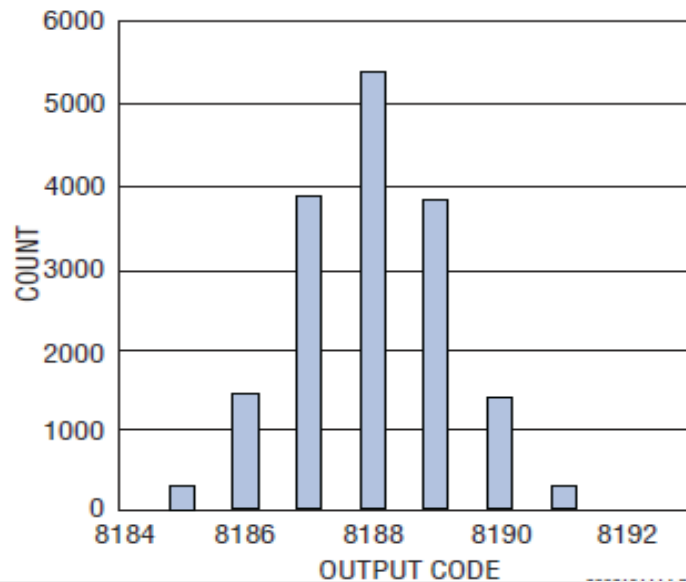
Noise Track

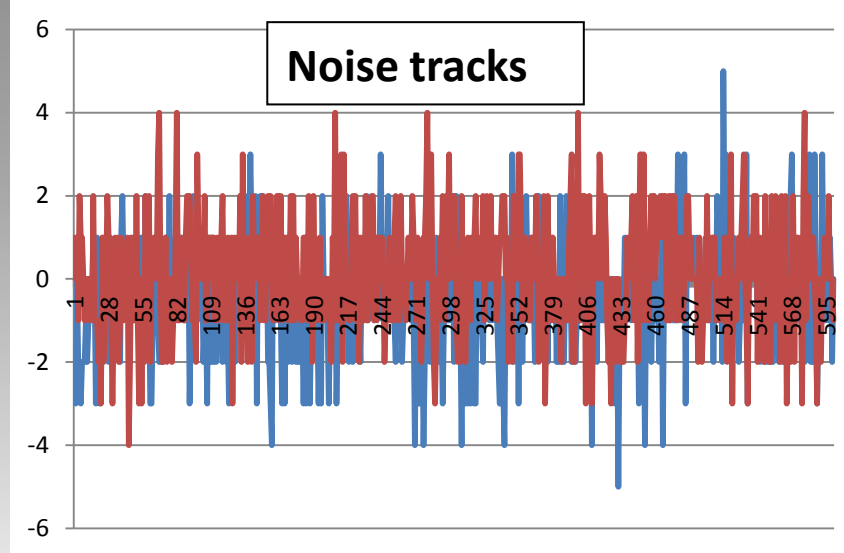
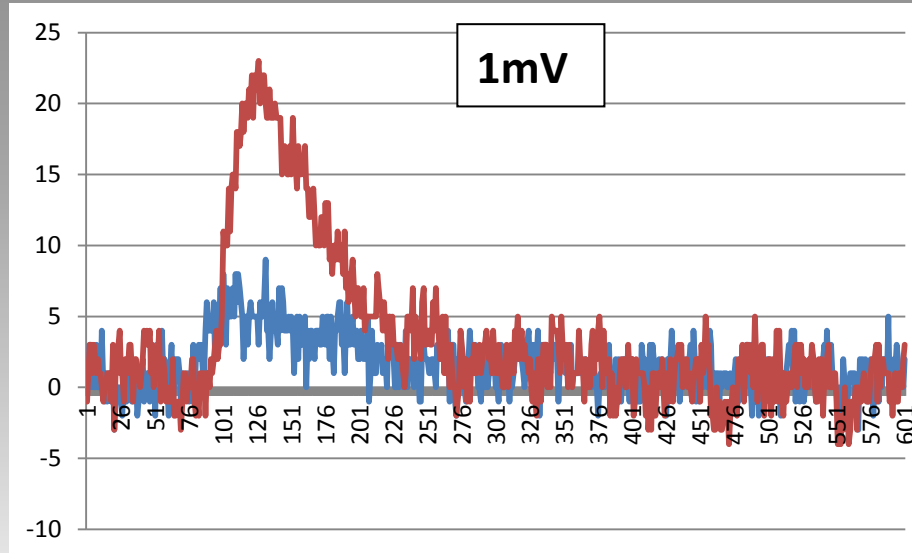
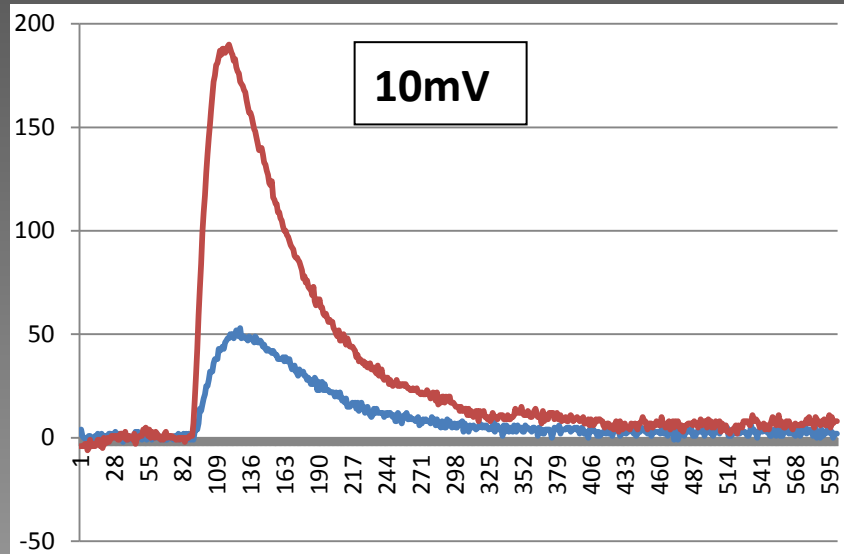
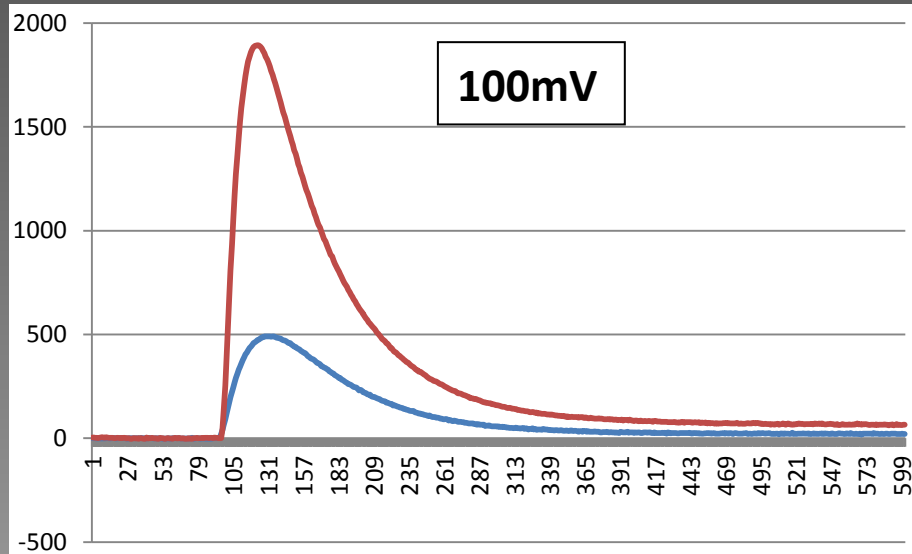


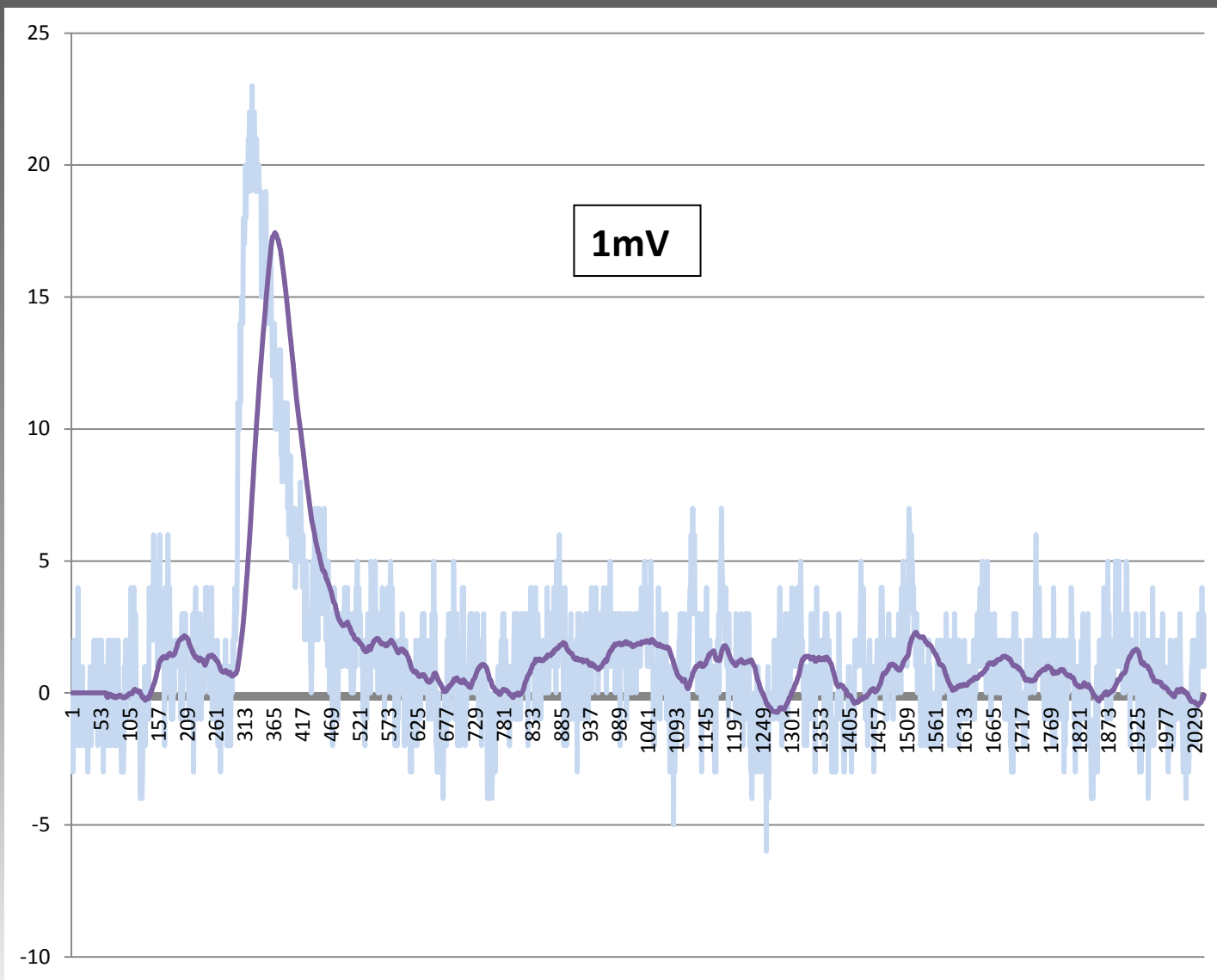
ADC-64K2 – open input



LTM9009-14: Shorted Input Histogram



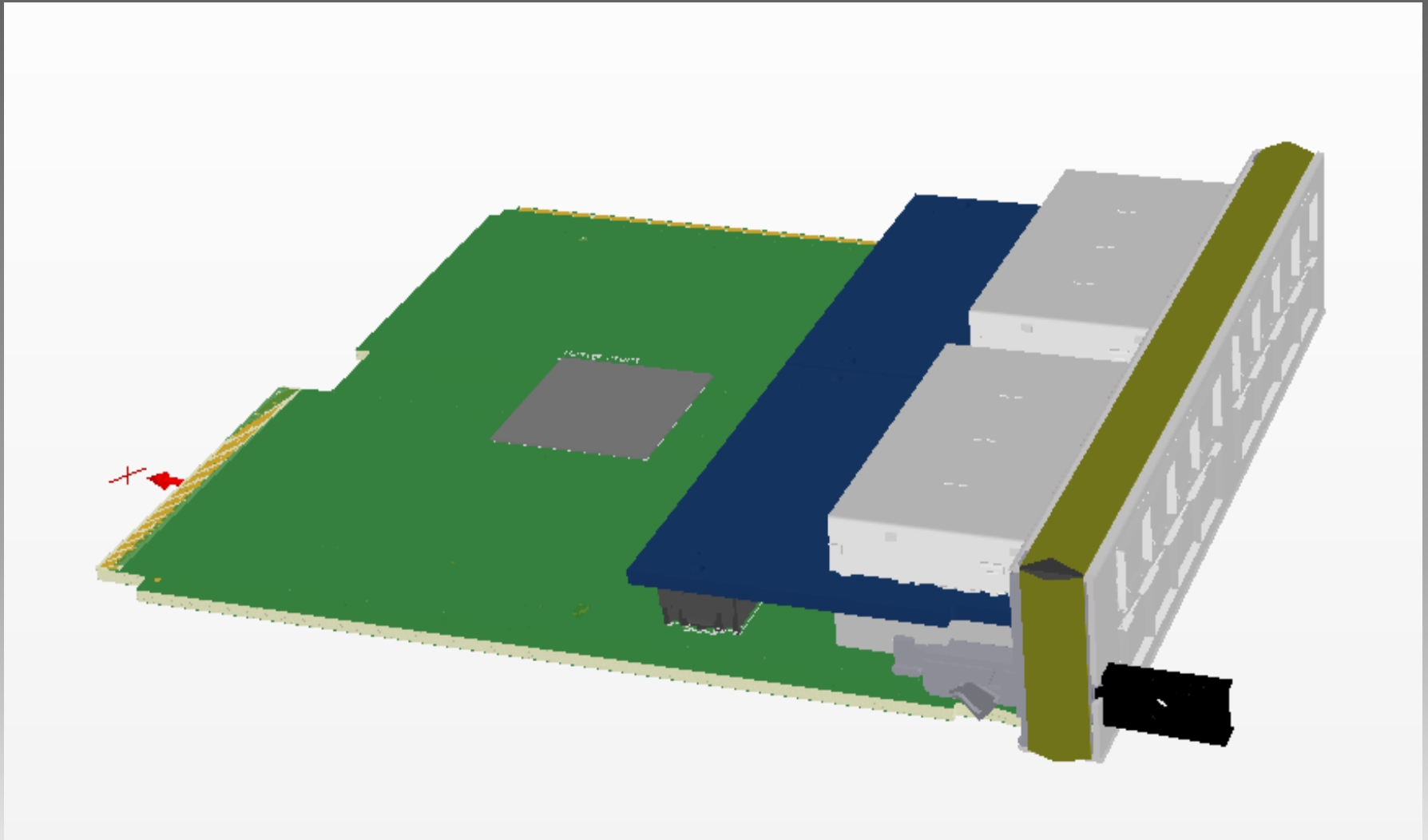






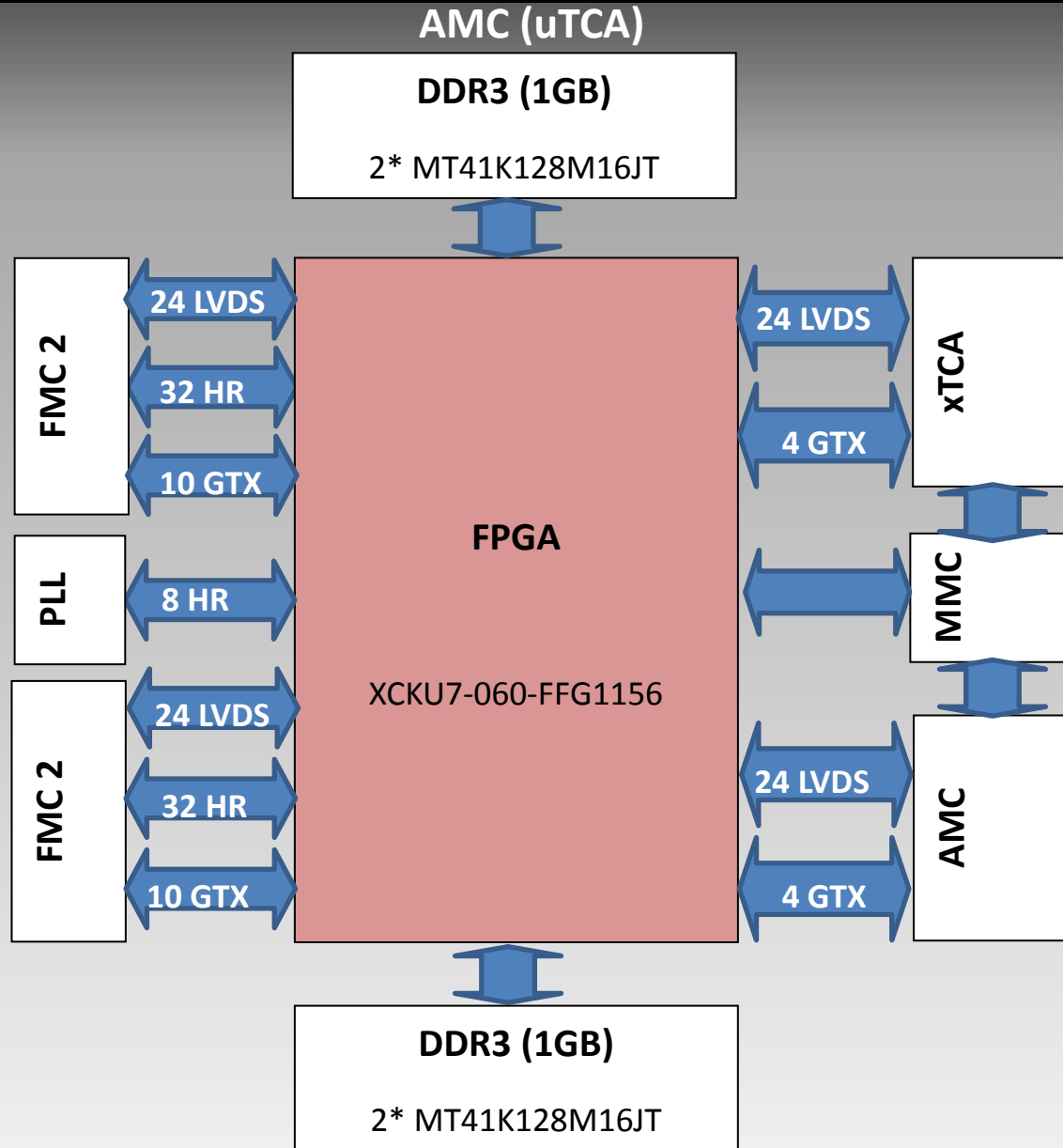
- Data Concentrator Board

AMC (uTCA)





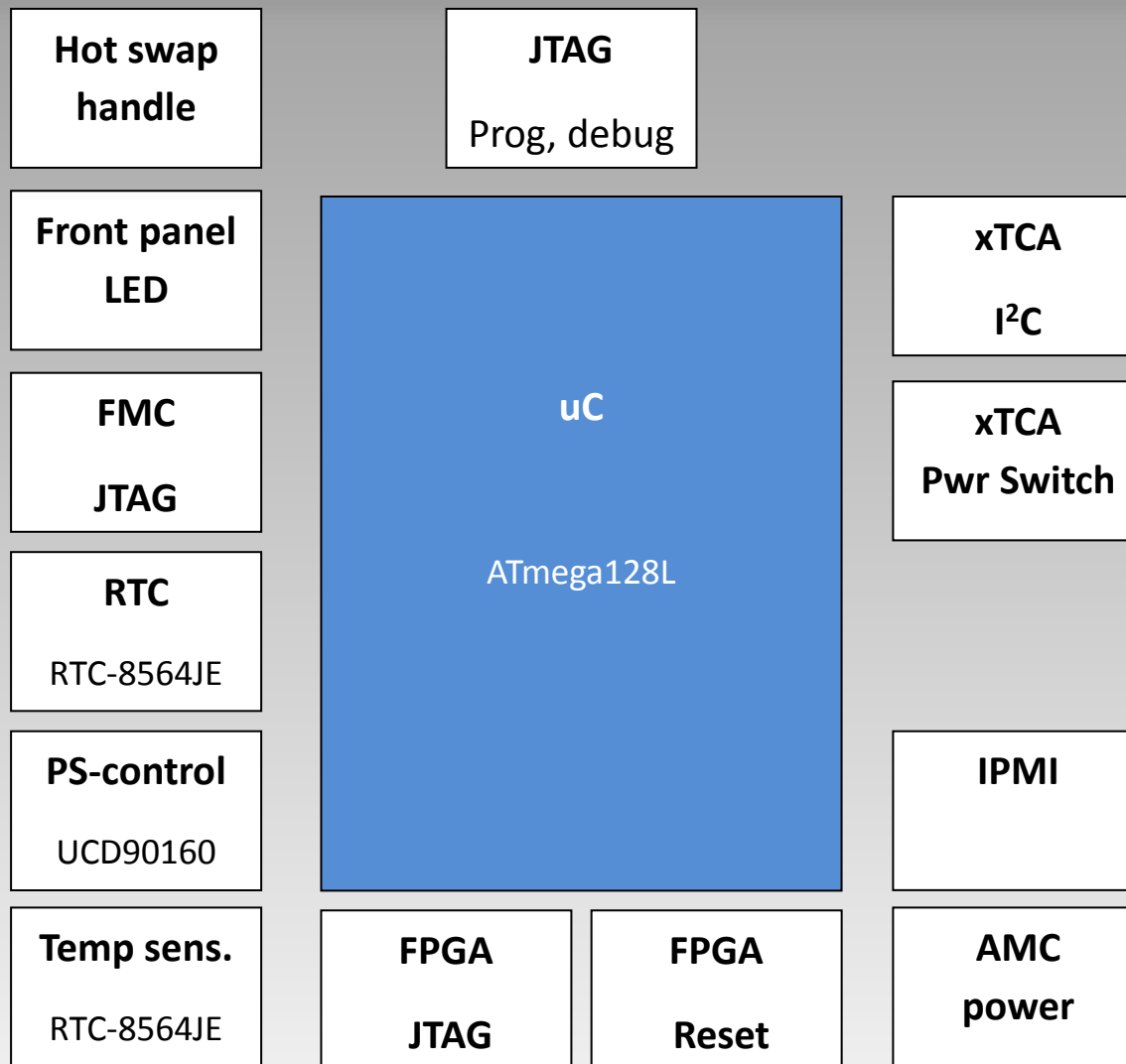
- Data Concentrator Board





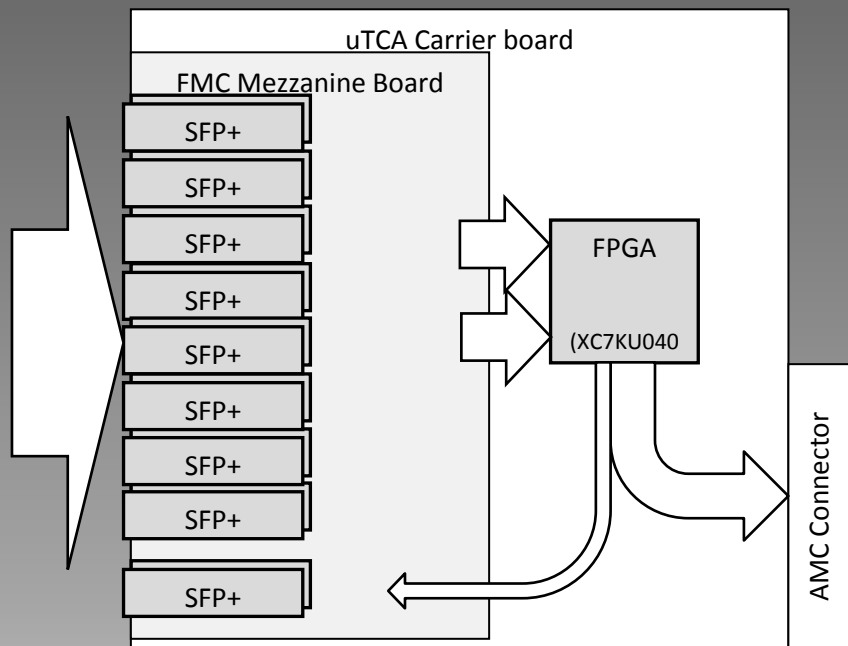
- Data Concentrator Board

MMC

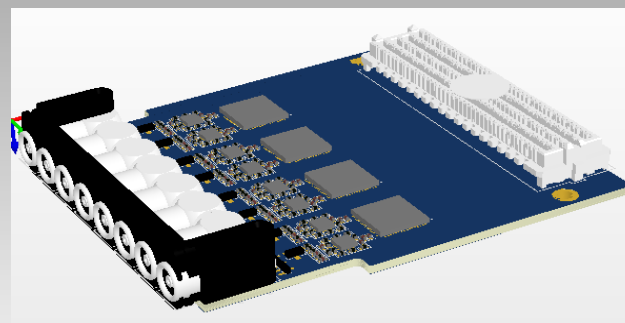
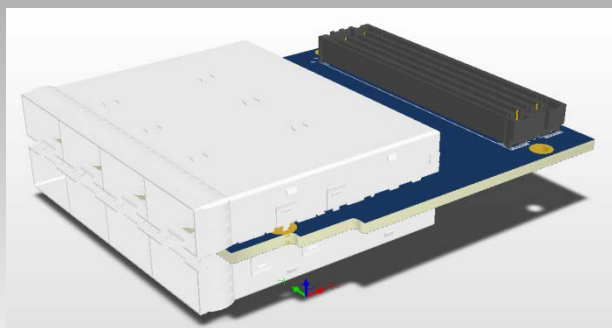
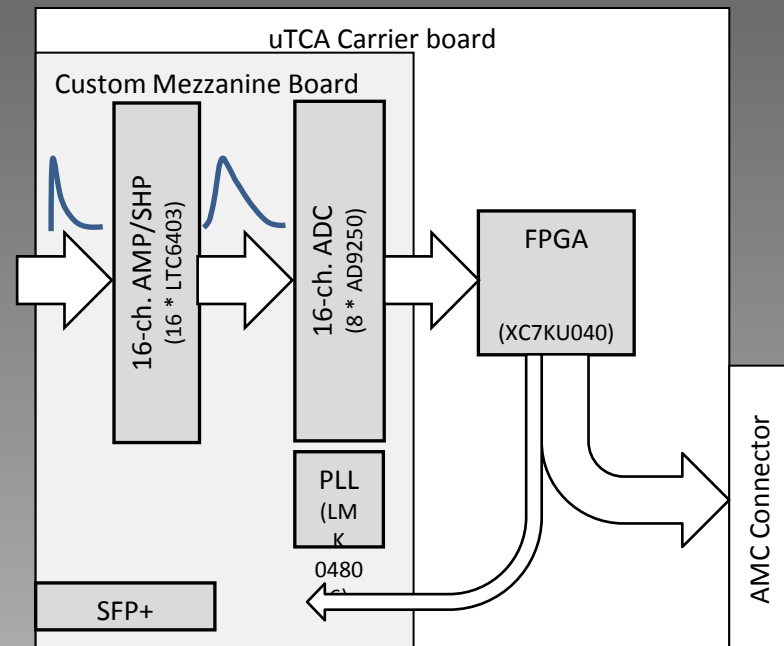




Optical Data Concentrator



Shashlyk 250 MSPS 14-bit ADC





We may consider the following options for the SADC chips with JESD204B interface:

1. **LTC2123** - 2-ch, 14-bit, 250 MSPS, 860 mW - a'132\$ @100pc
2. **ADS42JB49** - 2-ch, 14-bit, 250 MSPS, 1700 mW - a'125\$ @100pc
3. **ADS42JB69** - 2-ch, 16-bit, 250 MSPS, 1700 mW - a'185\$ @100pc
4. **ADS42JB69** - 2-ch, 16-bit, 370 MSPS, 1600 mW - a'265\$ @100pc

Option 1 is technically the easiest solution due to the lowest power and size.

Option 2 is a little cheaper, but dissipates double as much power as option 1 and the chip size makes it the layout more difficult.

Options 3 and 4 have much better performance, but are more expensive.

Of the options 2,3,4 the last one is relatively the easiest to design.

1. AMC (xTCA) carrier with FMC mezzanines:

The costs of the AMC carrier (ca. 2500 \$) and the FMC (ca. 500 \$) per 16 channels.
The cost of the system would then be ca:

260\$/ch - (14-bit/240 MSPS version)

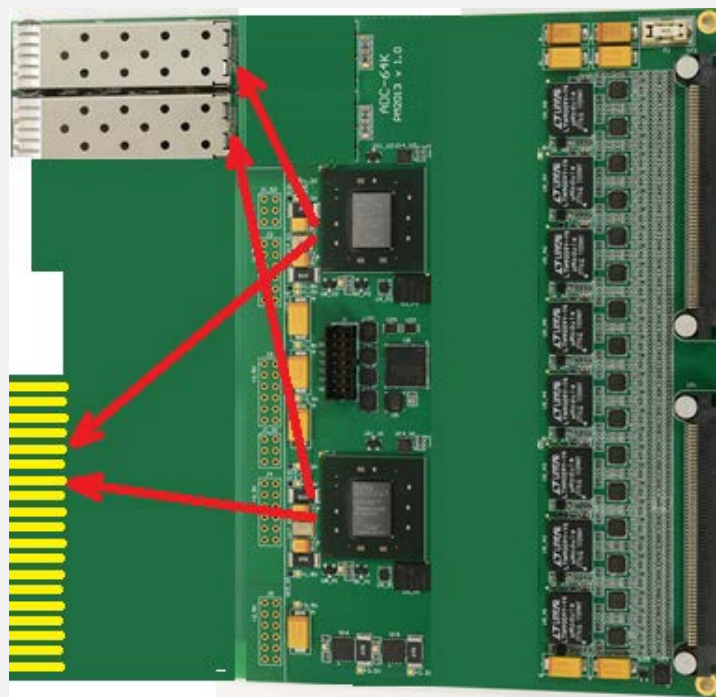
320\$/ch - (16-bit 370 MSPS version)

To this one should add the costs of crates.

2. Current 64-ch EMC ADC design adapted to AMC (xTCA):

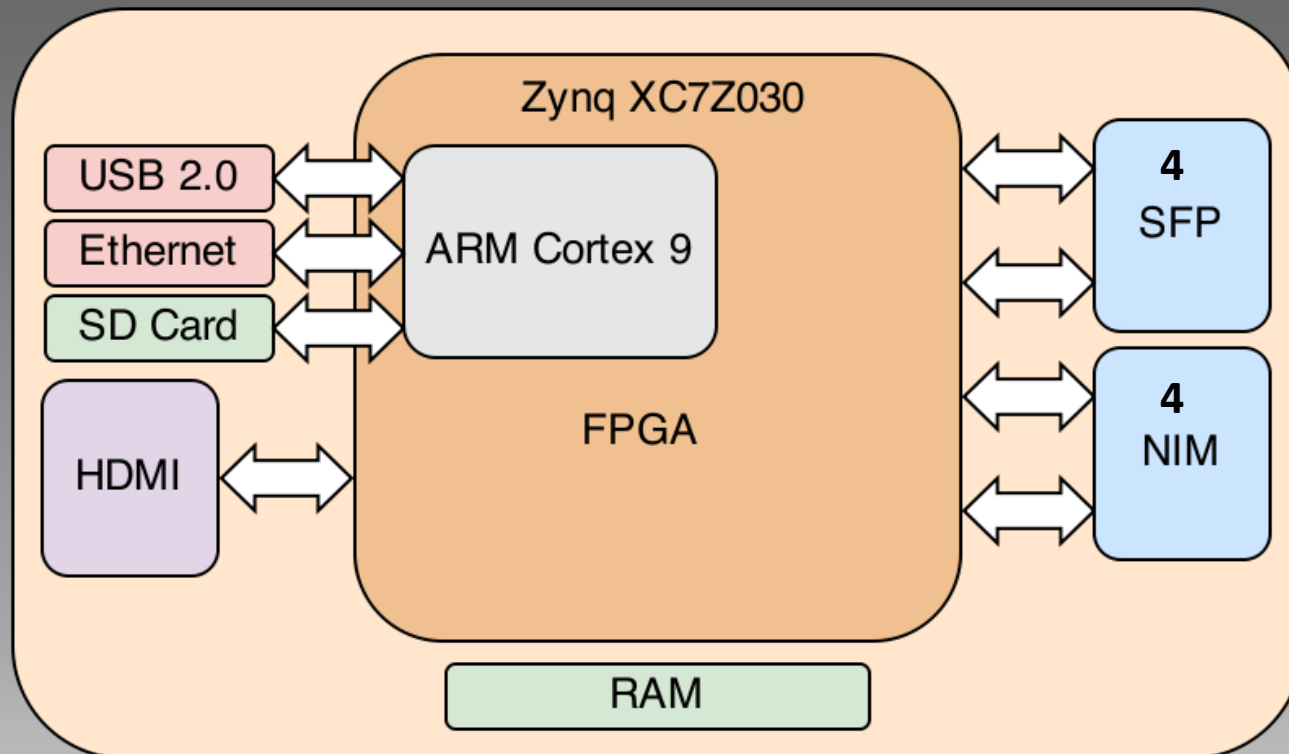
50..60\$/ch (14-bit/125 MSPS version)

+ 1/4 crates.



- Data Concentrators

Stand Alone Optical Concentrator Board



Based on ZED-board from Avnet

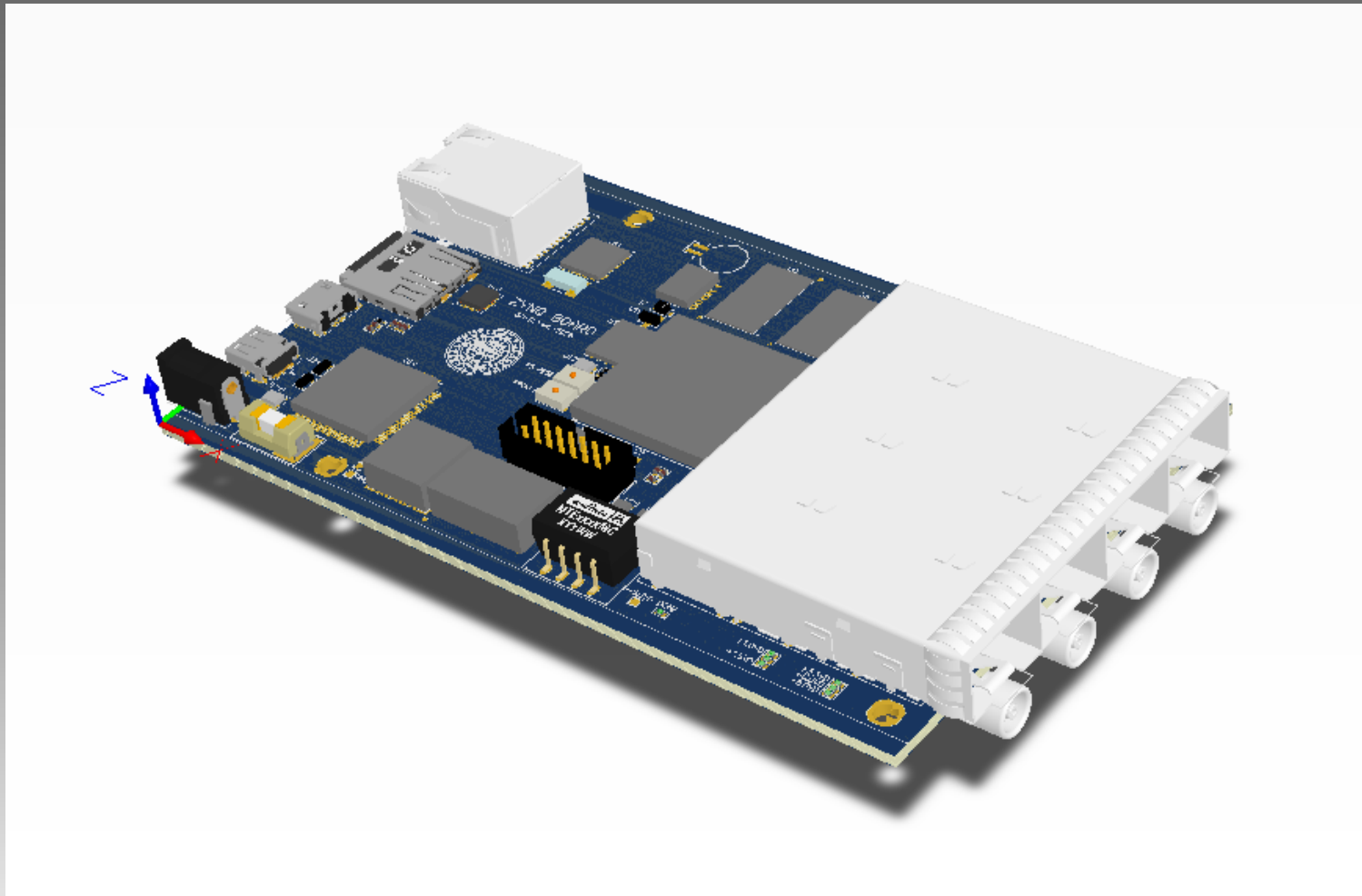
Diploma work of:

- Panagiotis Stamatakopoulos
- George Ntounas



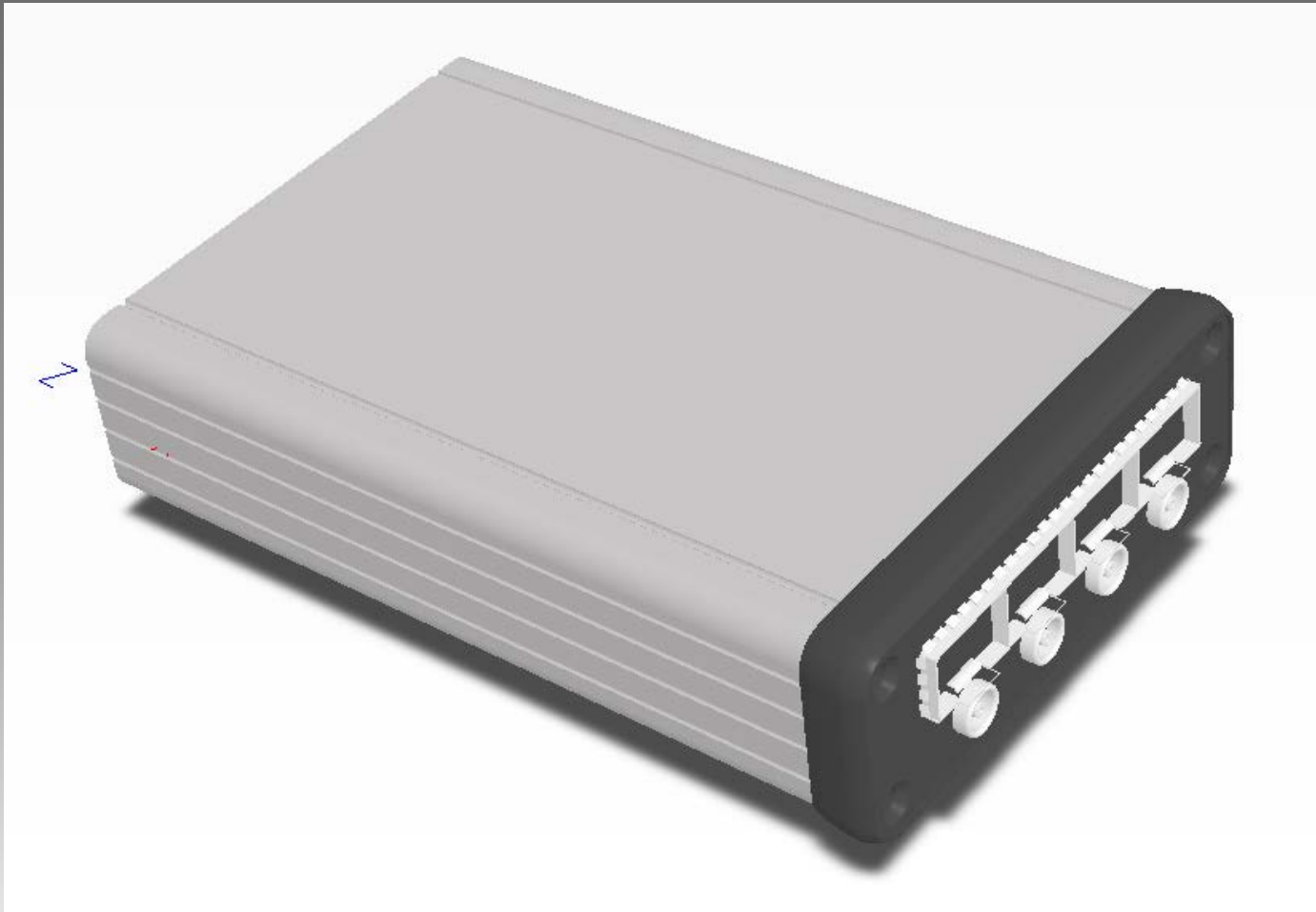
- Data Concentrators

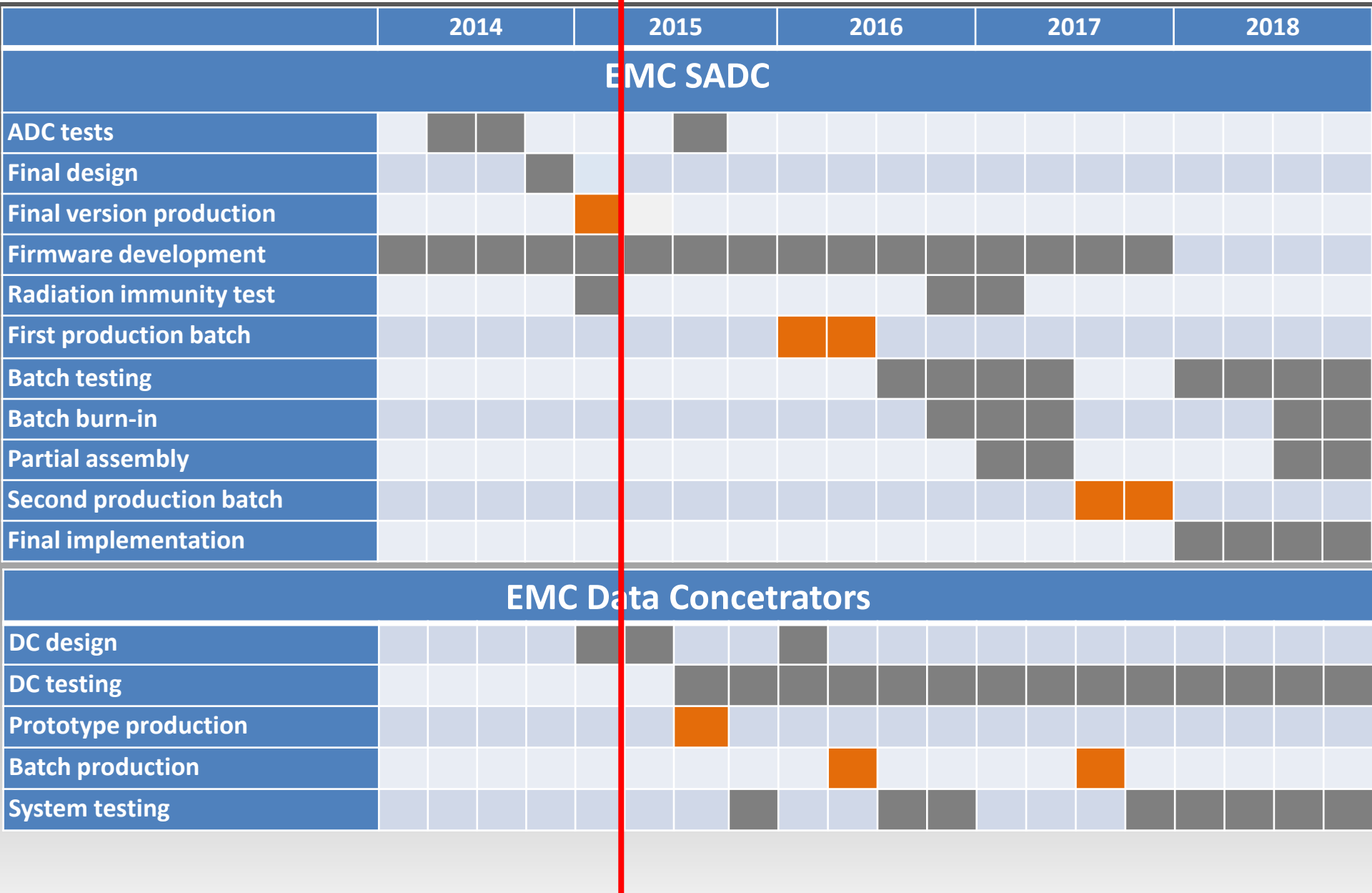
Stand Alone Optical Concentrator board





Stand Alone Optical Concentrator board







Manpower

Hardware design	Uppsala
System integration	- Pawel Marciniewski
	- Postdoc
	Stockholm
Firmware	- PhD Marcus Preston
	KVI Groningen
Firmware	- Peter Schakel
	Uni Bonn
Firmware/Integration	- PhD (Johannes Muellers)



Thank You !