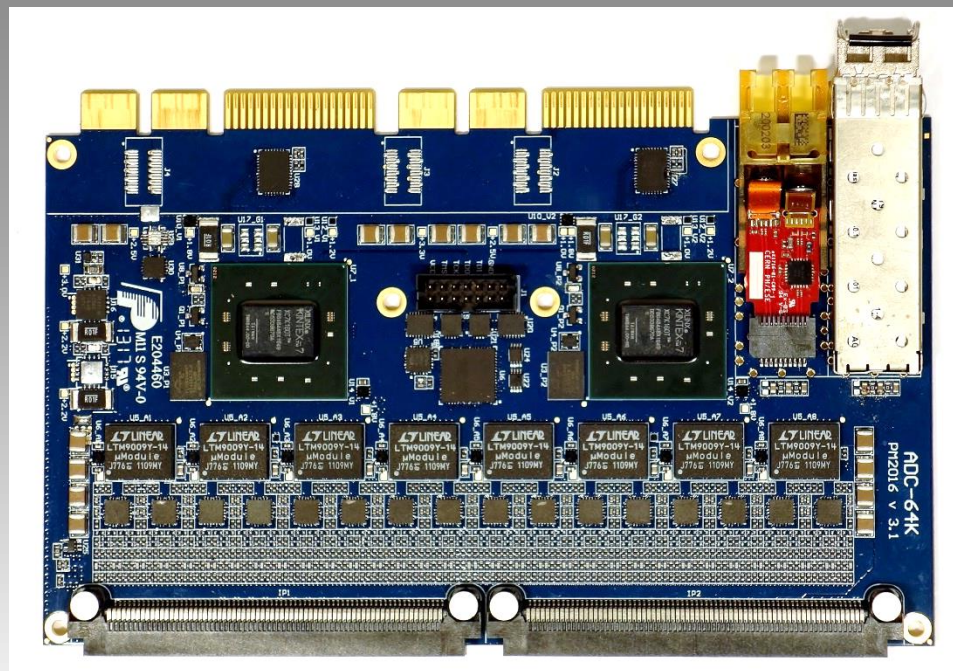


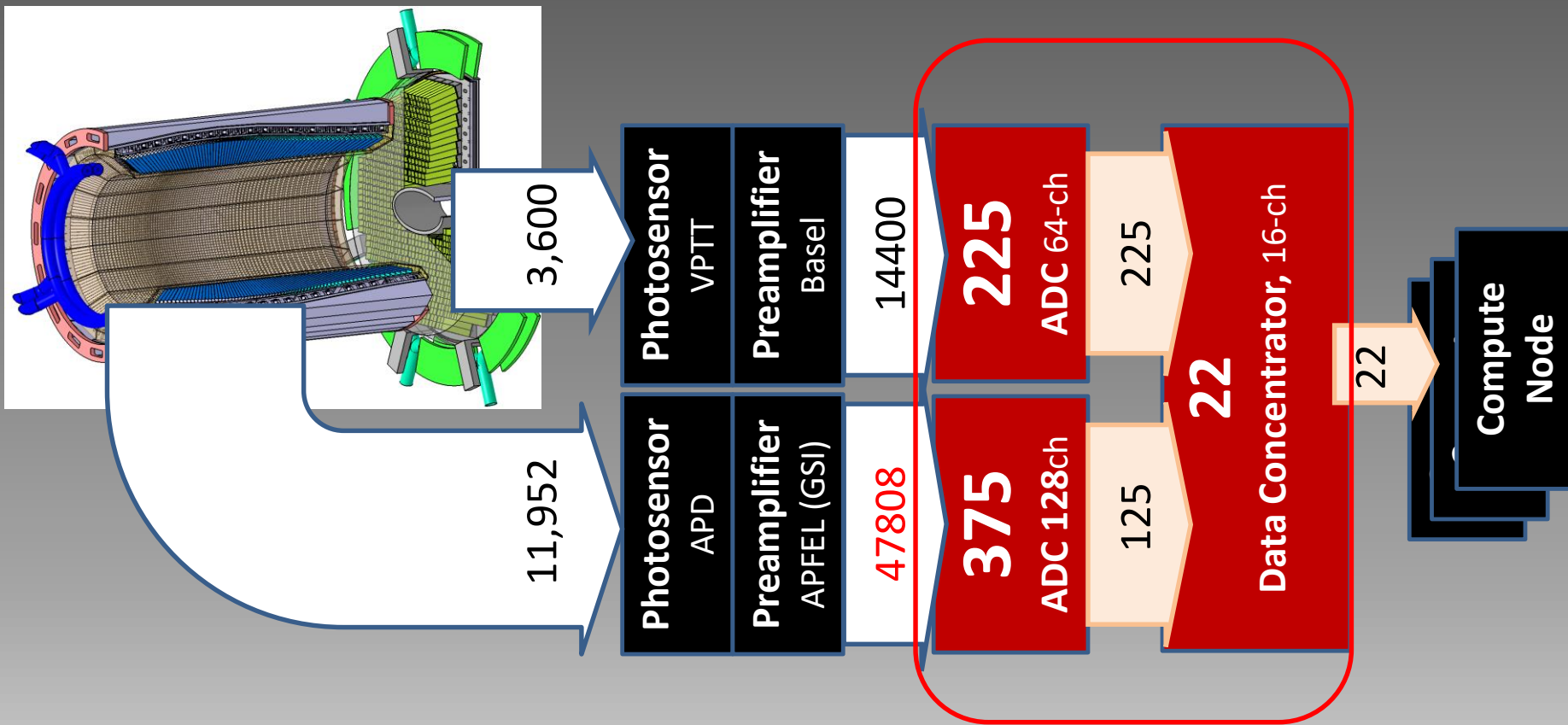
- PANDA EMC Readout System

A compact size,
64-channel, 80-125 MSPS, 14-bit dynamic range ADC module
for the PANDA Electromagnetic Calorimeter

P. Marciniewski, Tord Johansson, Uppsala University, Sweden,
M. F. Preston, K. Makonyi, Per-Erik Tegner, Stockholm University, Sweden
P. Schakel, M. Kavatsyuk, KVI Groningen, The Netherlands
J. Müllers, University Bonn, Germany
M. Albrecht, Ruhr University Bochum, Germany



- PANDA EMC Readout System



- 15000 crystals
- Dual photosensor readout
- Dual range



- High channel density



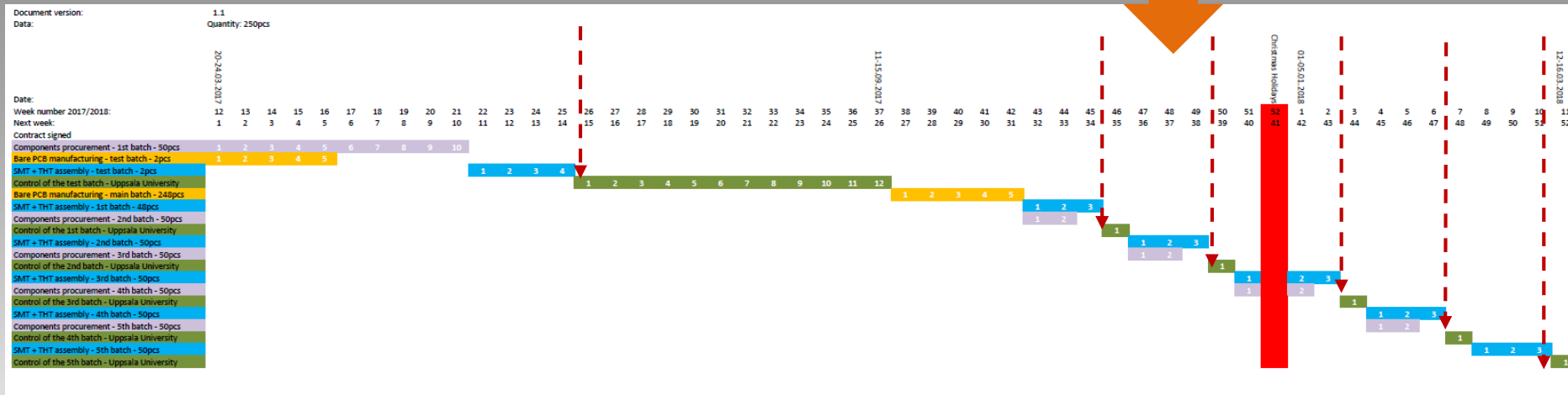
- Production of 250 pcs for EMC Forward Endcap

ADC Production

Batches of 50 pieces every 5 weeks

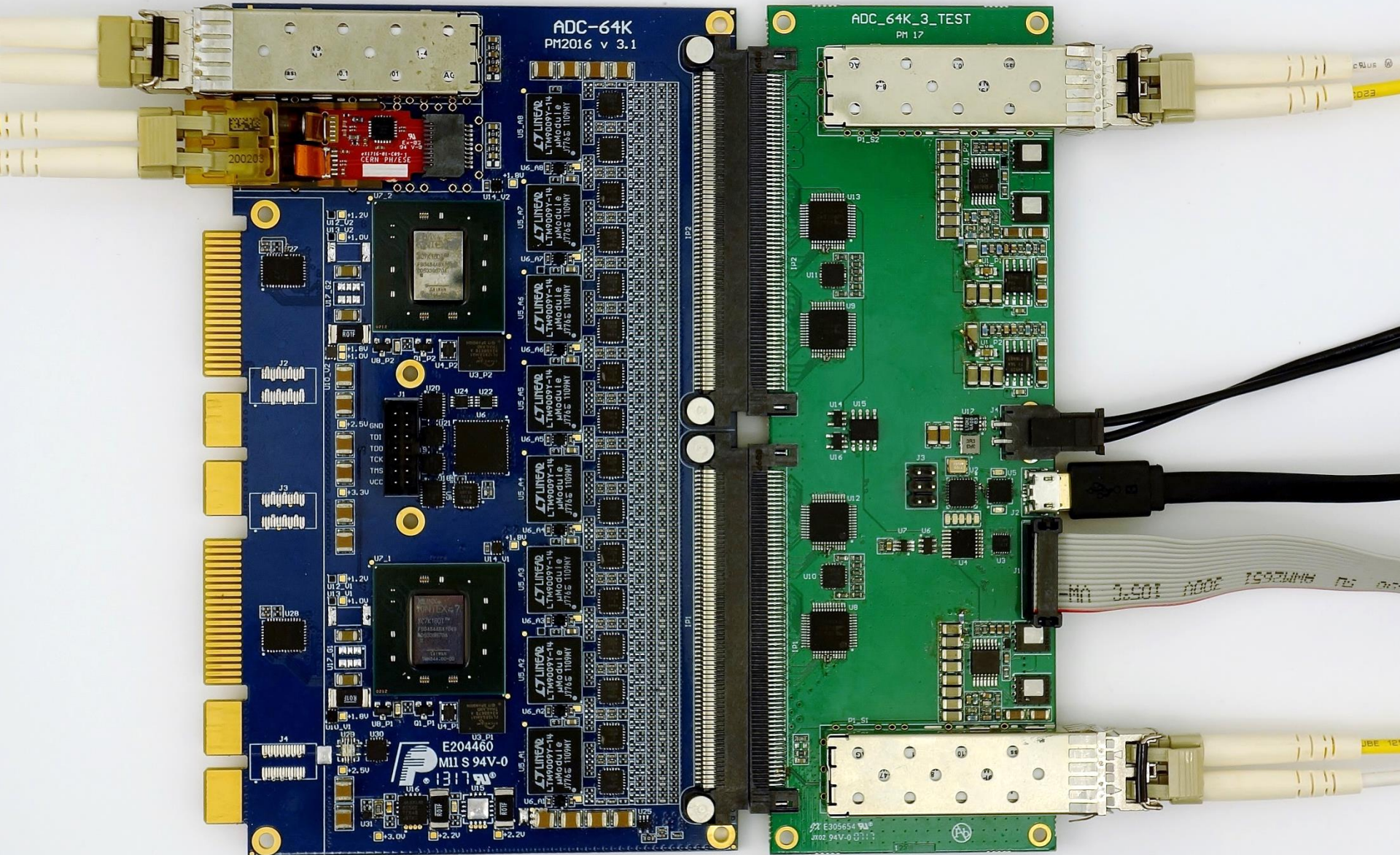
Payment for each batch is made after the successful test

The money are used for financing components for the next batch





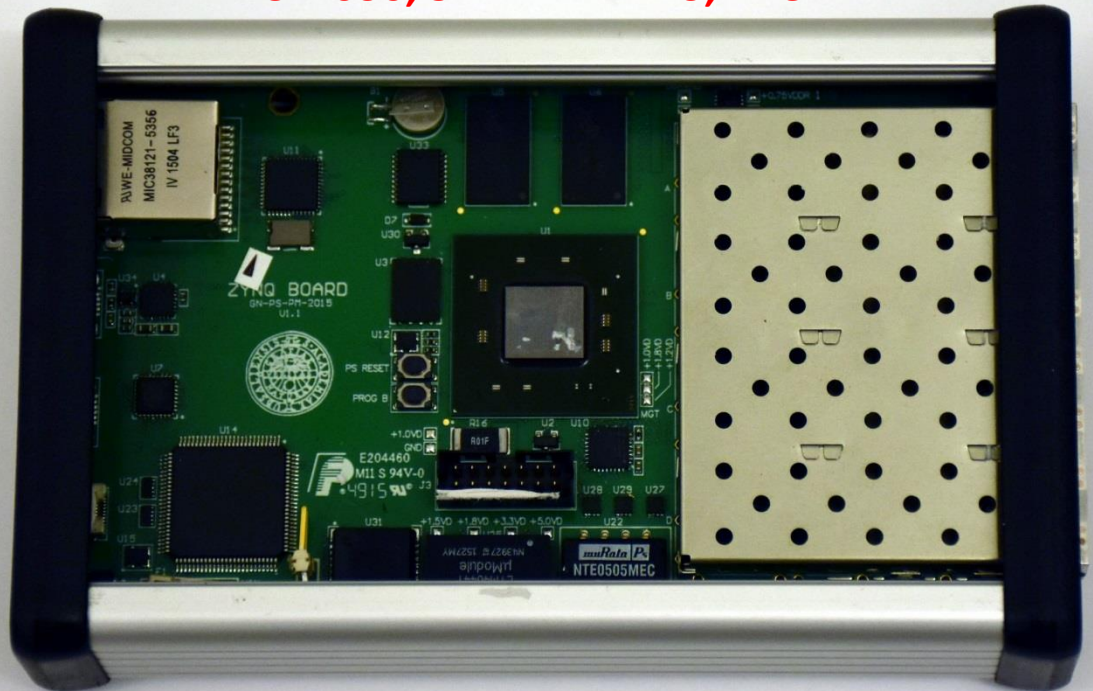
ADC for EMC-Endcap - Post-production functional tests



XC7Z030, 512 MB DDR3, RTC

ZYNQ-Board – Data Readout Module

- Tested
- Running Linux/PetaLinux
- Communicating over Ethernet
- Prepared for data taking with any data format



4xSFP+ (6.6 Gb/s)



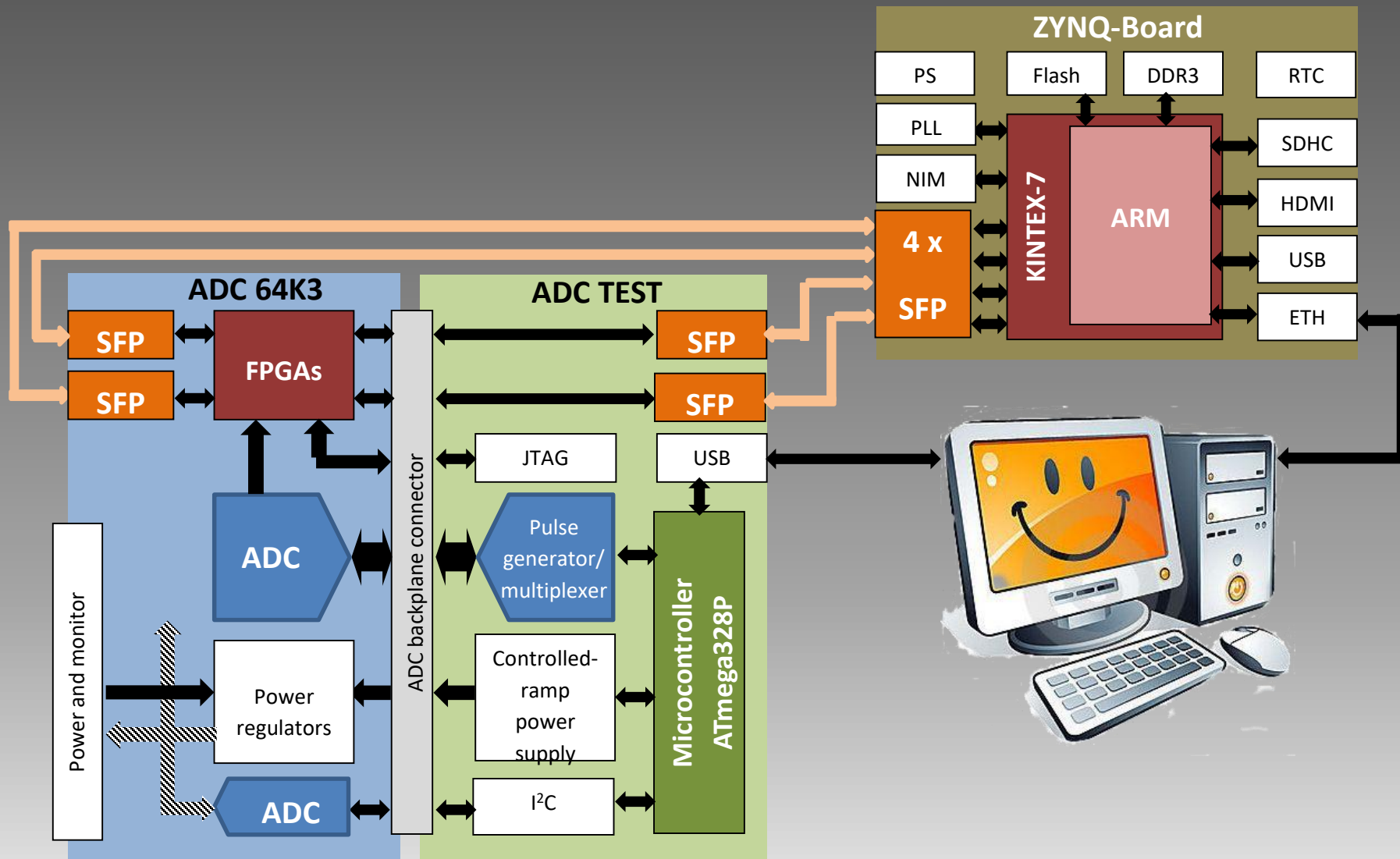
4xNIM(I/O)

GbE, USART, USB, HDMI



SDHC

- Post-production functional tests





- Production of 250 pcs for EMC Forward Endcap

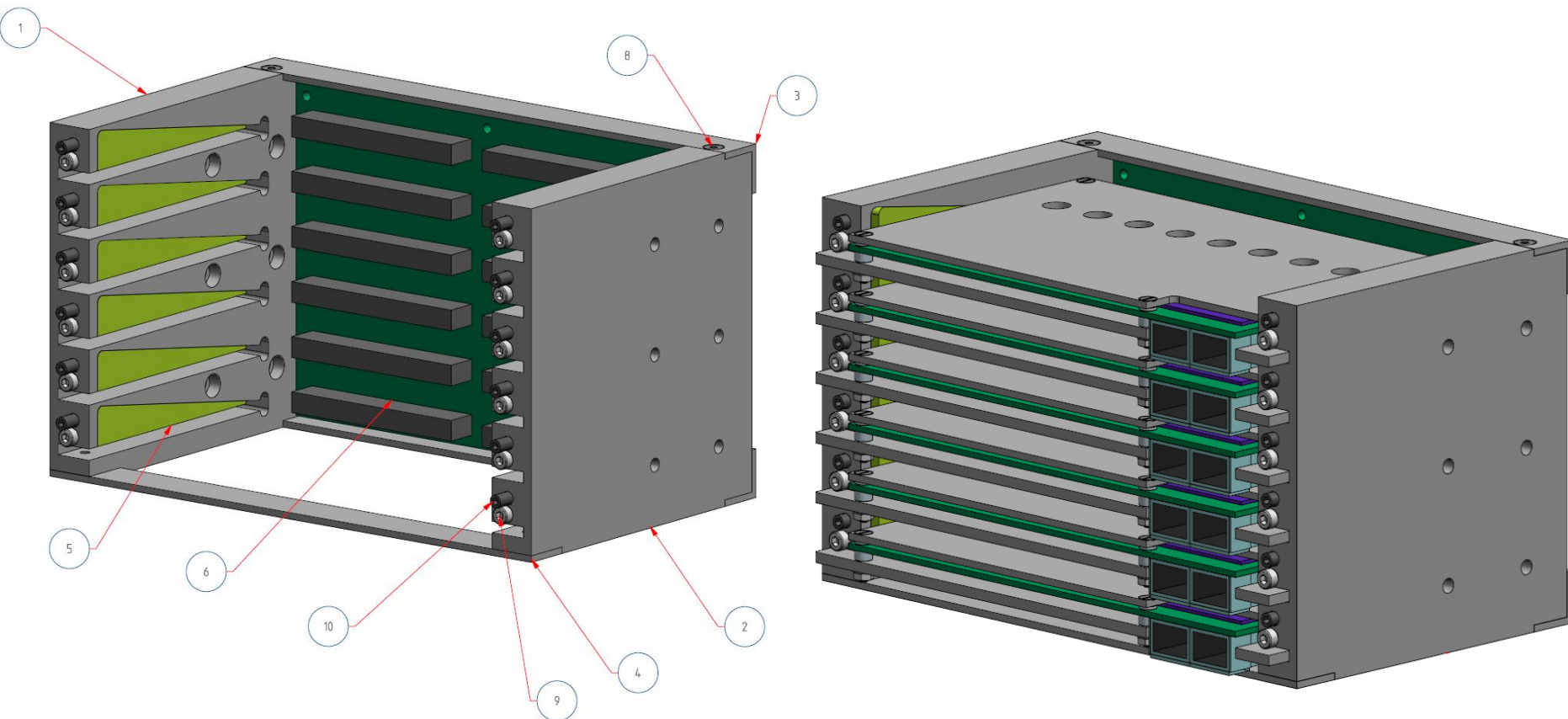
Current pool

- 1 pc v.221 (64ch, 125 MSPS - Shashlyk)
- 2 pcs v.217 (64-ch, 80 MSPS – Giessen)
- 48 pcs v.222 (32-ch. DR, 80 MSPS – Forward Endcap)

Tests:

- Start-up voltages and currents
 - JTAG configuration and Flash boot
 - PLL and clocks
 - ADC calibration and functionality
 - GTX, SFP and Versatile Link
-
- 33 tested OK
 - 13 tested OK, returned for correcting one voltage regulator
 - 2 problems with 1 ADC each – to be investigated

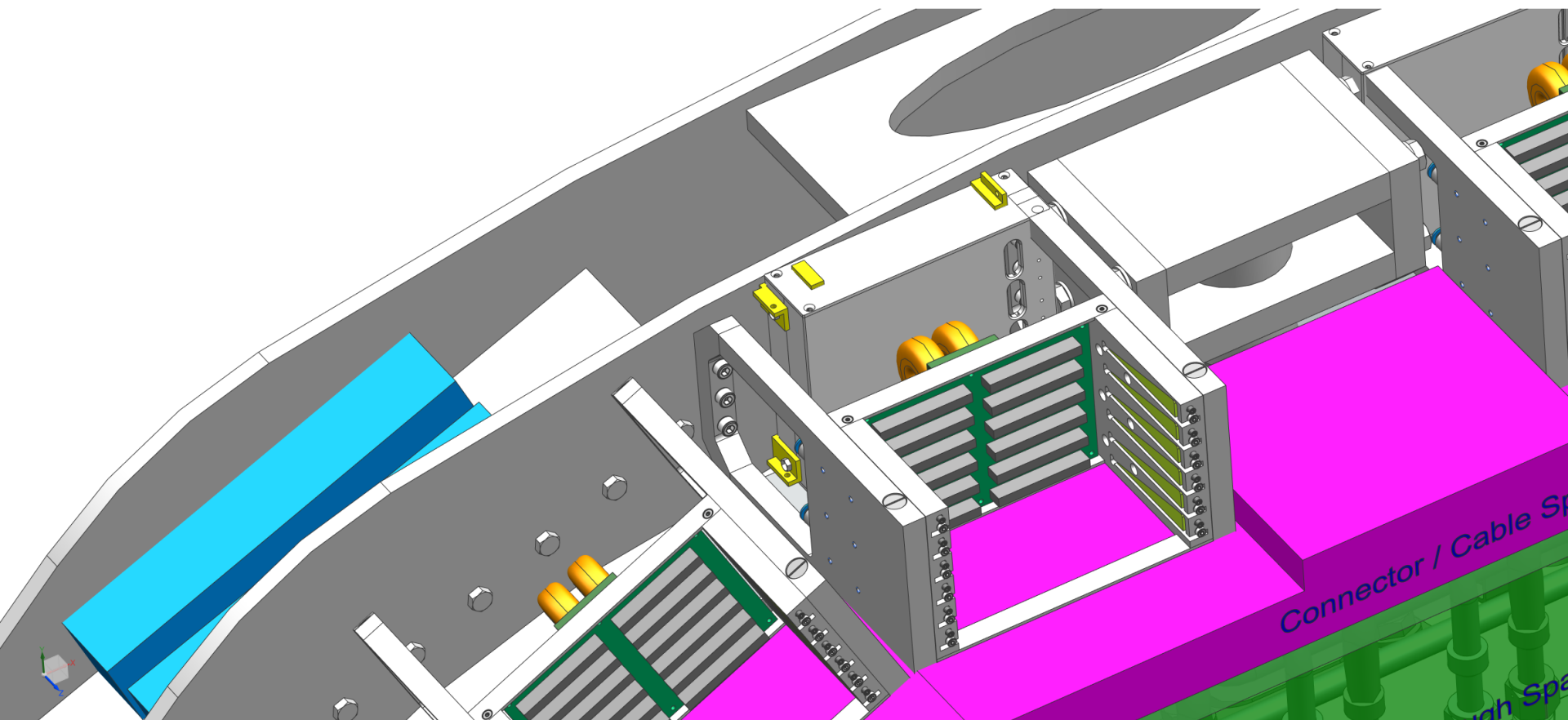
- 6 pcs Stand-alone power supply (v.222)
- 6 pcs Mezzanine power supply (v.222)
- 7 pcs Input patch panel u-FL (positive signal polarity)
- 2 pcs Automatic tester



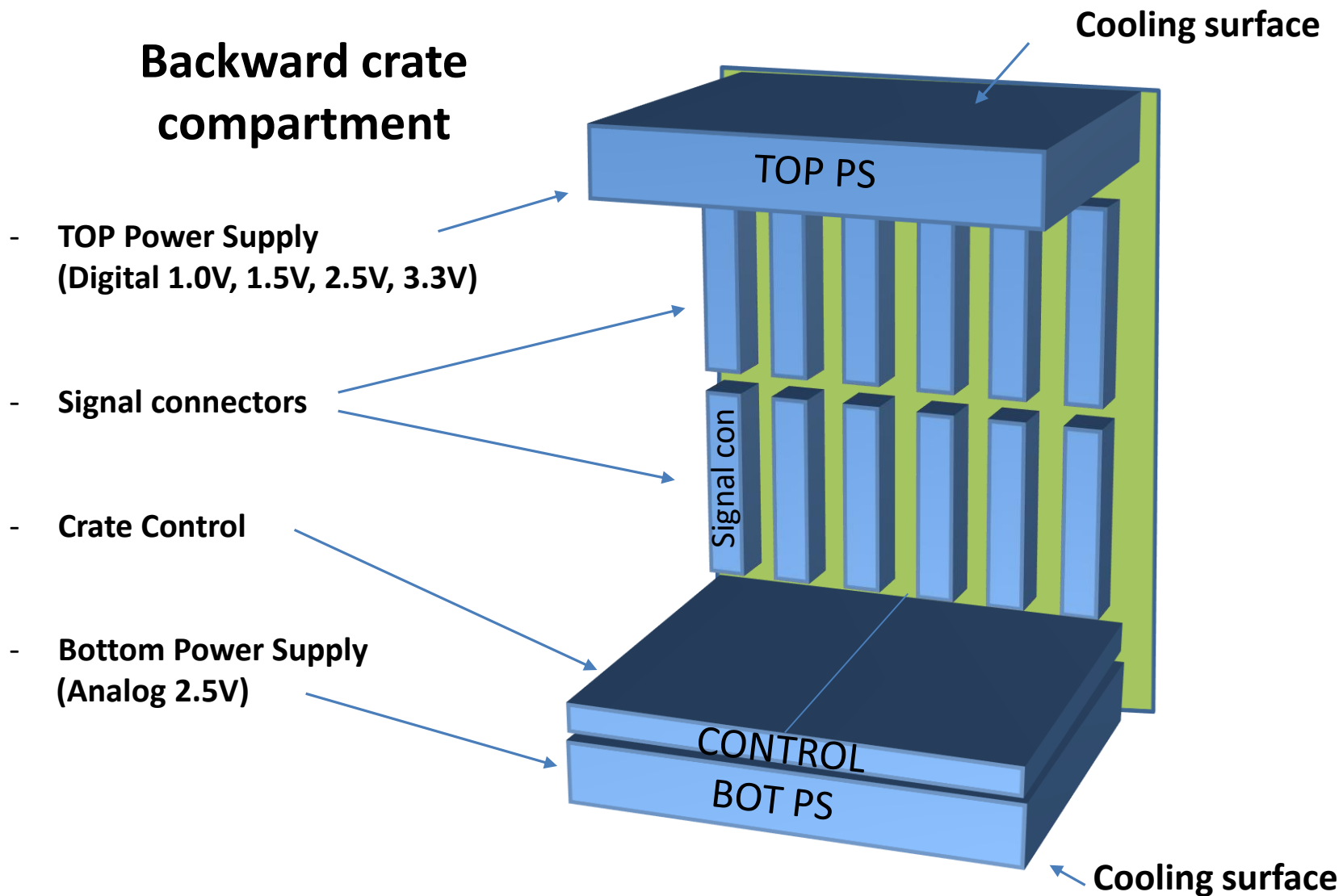
Courtesy KVI

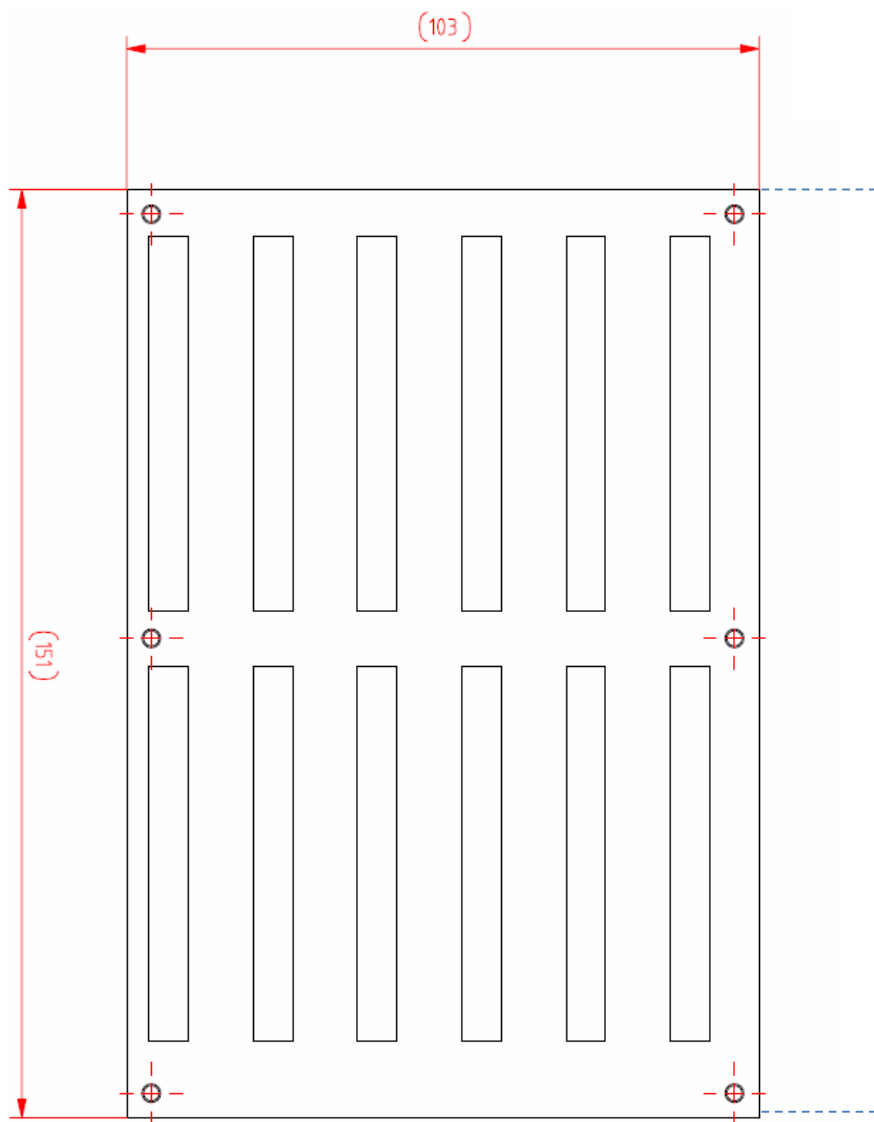


ADC for EMC-Endcap - Encapsulation and Cooling

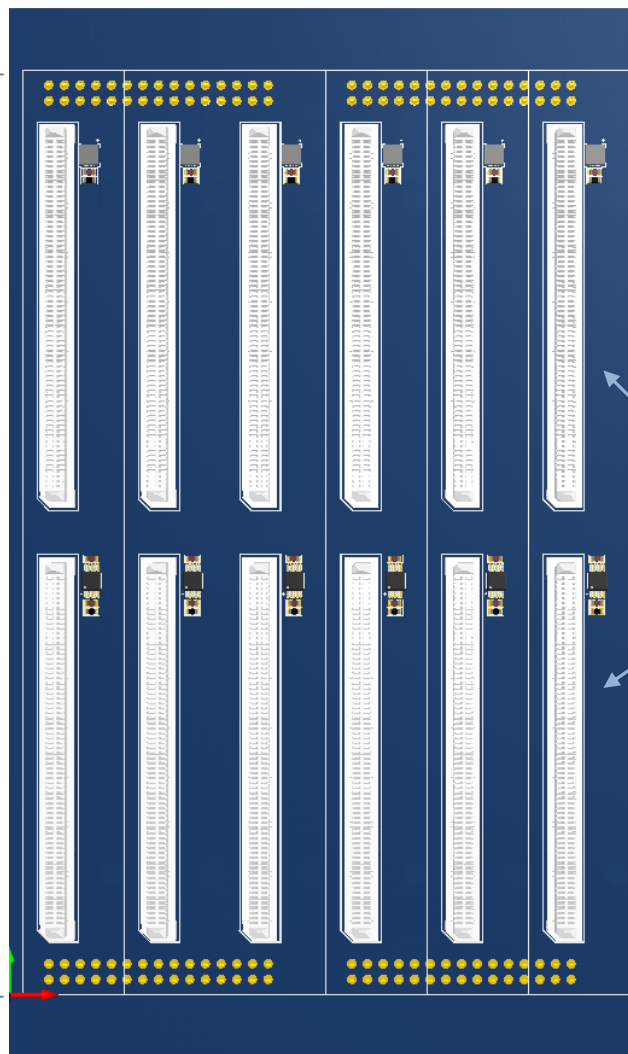


Courtesy KVI





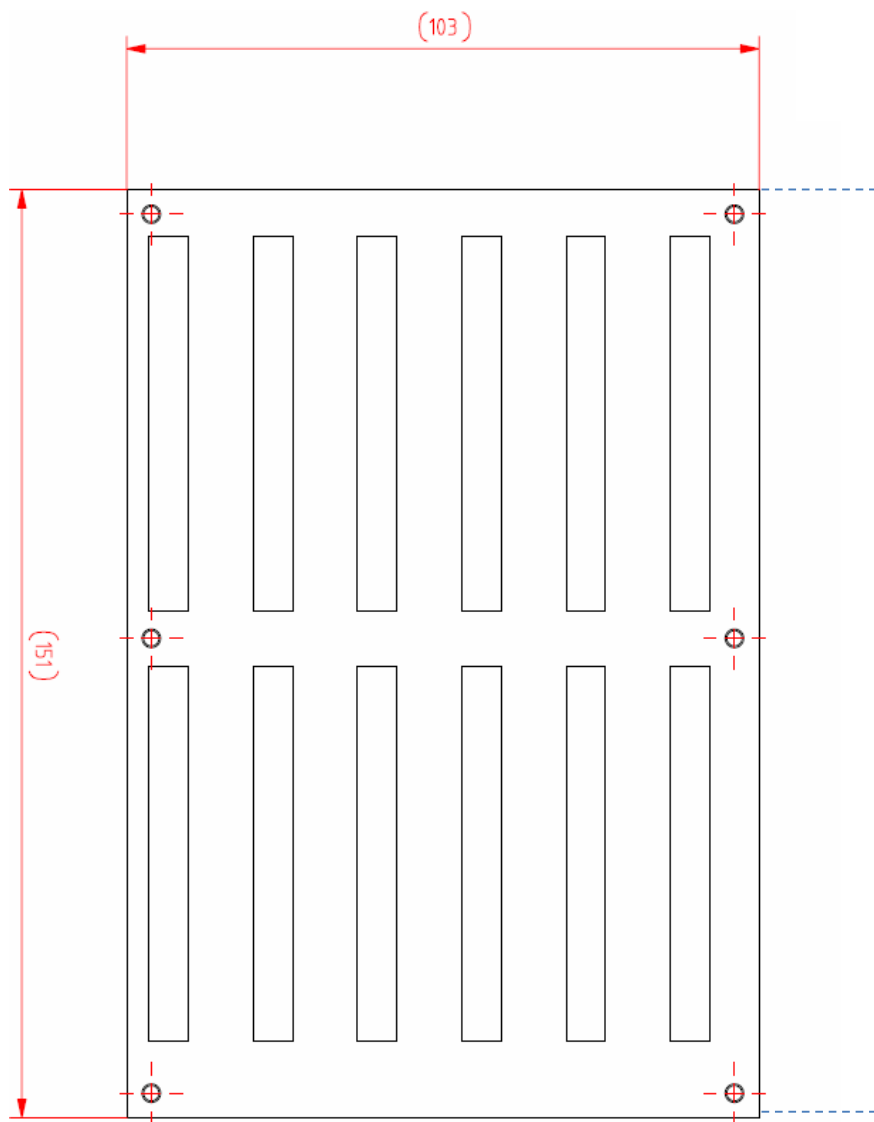
Front side (ADC compartment)



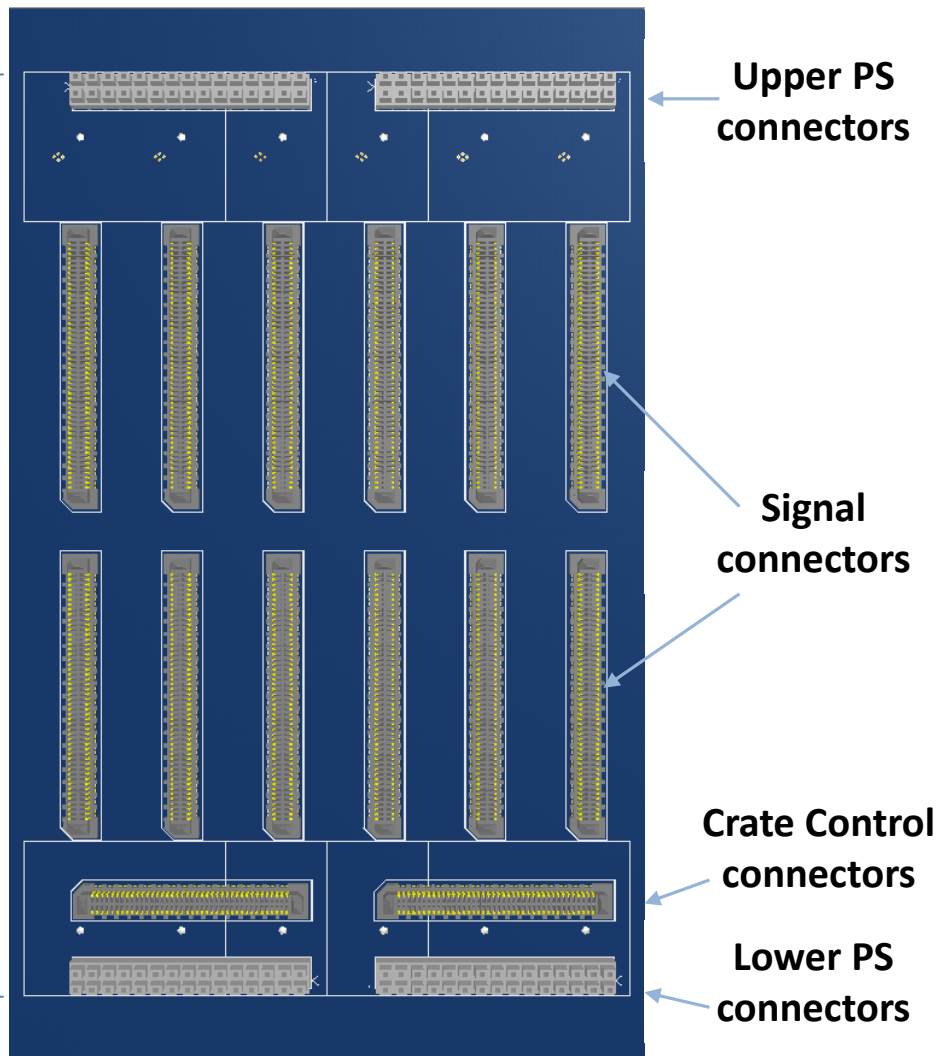
ADC
connectors



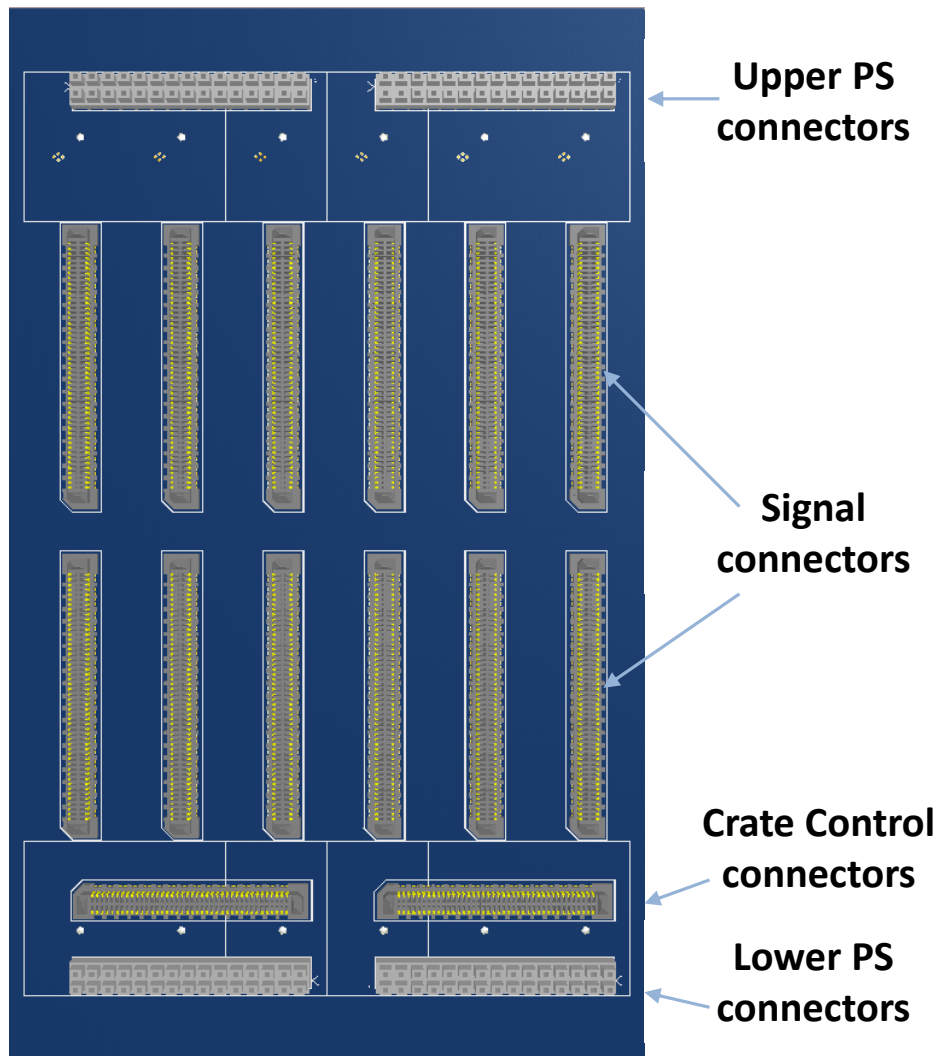
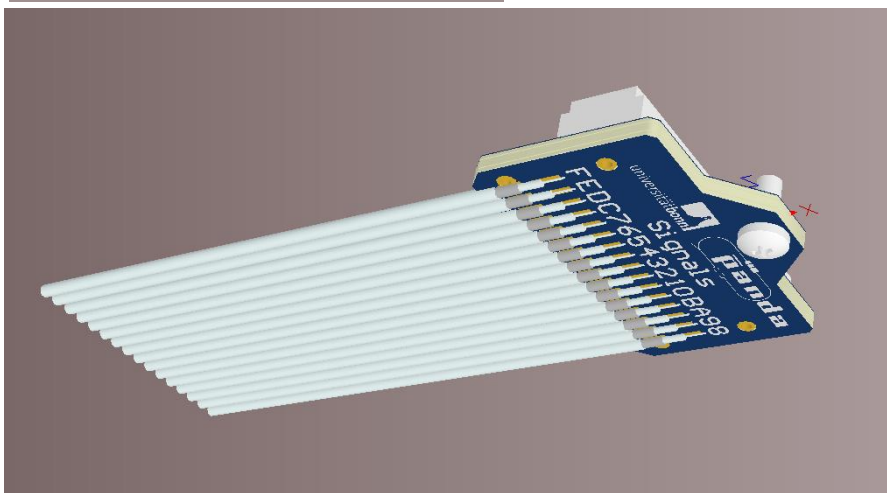
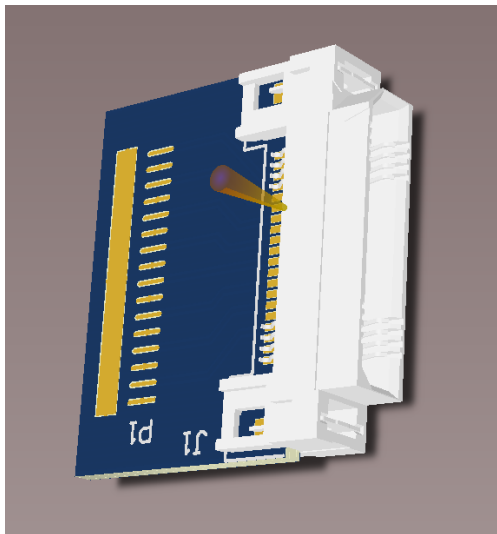
- Crate backplane preparation



Back side (Signal and PS compartment)



Back side (Signal and PS compartment)



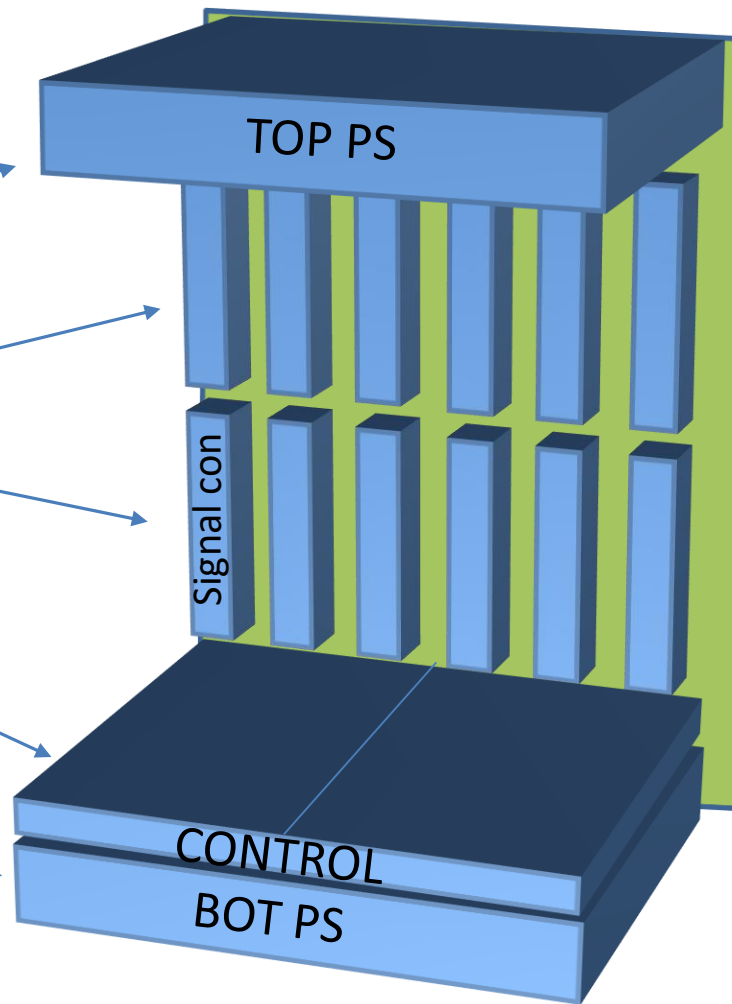
Backward crate compartment

- TOP Power Supply
(Digital 1.0V, 1.5V, 2.5V, 3.3V)

- Signal connectors

- Crate Control

- Bottom Power Supply
(Analog 2.5V)

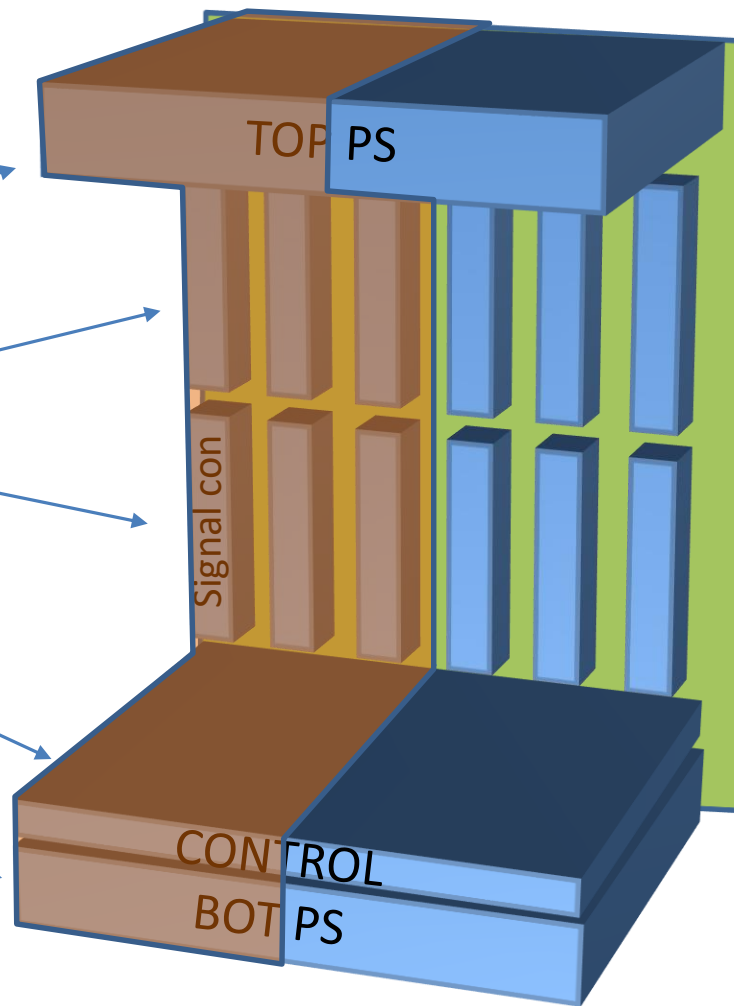


- Crate backplane preparation

Tripple slot module division

Backward crate compartment

- TOP Power Supply (Digital 1.0V, 1.5V, 2.5V, 3.3V)
- Signal connectors
- Crate Control
- Bottom Power Supply (Analog 2.5V)





ADC for EMC-Endcap - Crate backplane preparation

TRIPLE SLOT MODULE

TX/RX - GTX Triple module loop (HF buffered)

Can be used for re-routing of faulty main transceivers or for multiplexing of the readout

I²C AUX – provides differential I2C control for the detector ASICs (requested by Barrel).

Can be used for indicating FPGA configuration status (DONE) to the control system

I²C PWR – For monitoring of the ADC voltages and currents

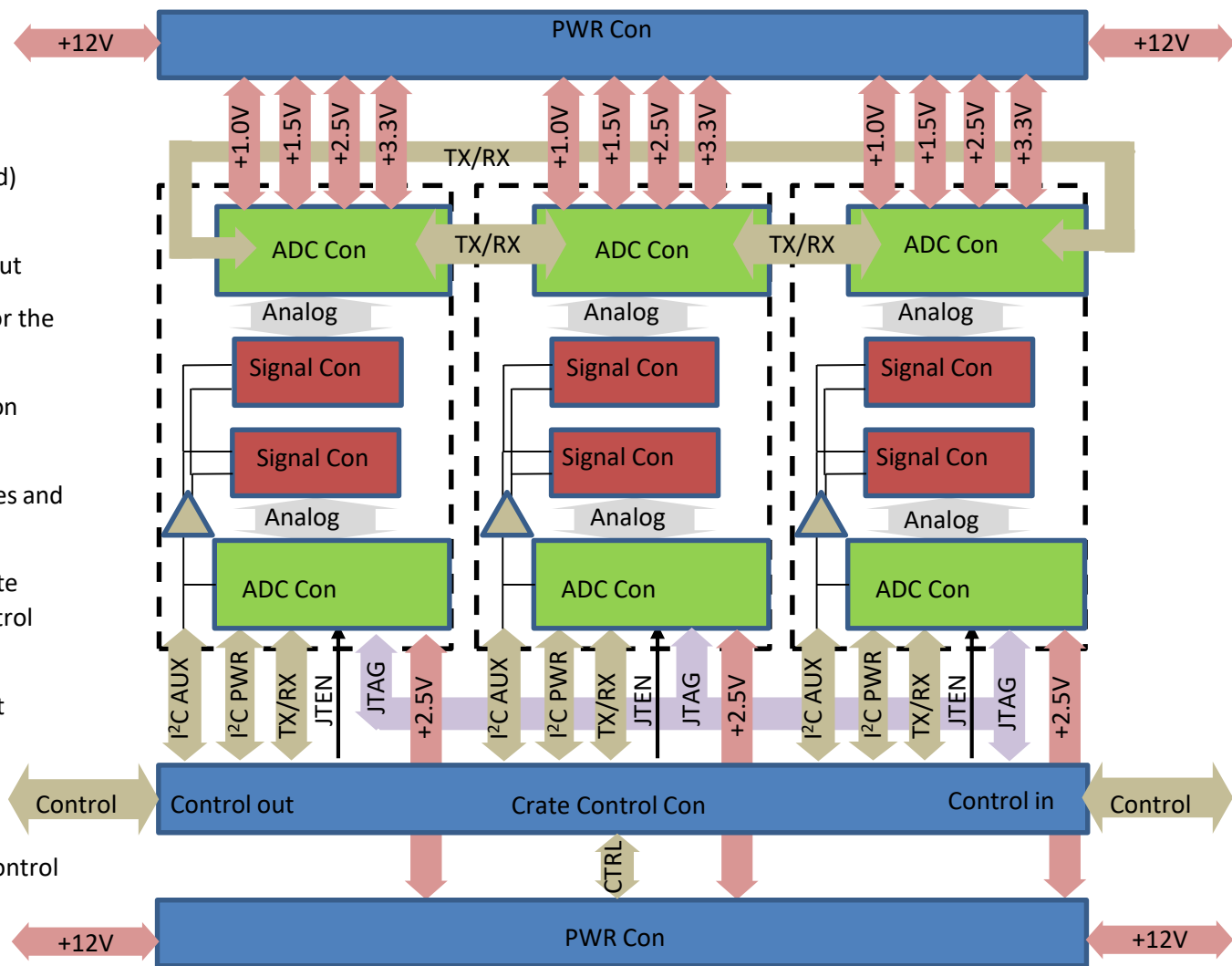
TX/RX – can be freely used inside of the Crate Control board. Either looped or fed to a control FPGA

JTEN – JTAG enable for operation on the slot

JTAG – Common lines (buffered)

CTRL – PS control

Control – A daisy-chain interface for crate control (optical interface out?)





Thank You !