

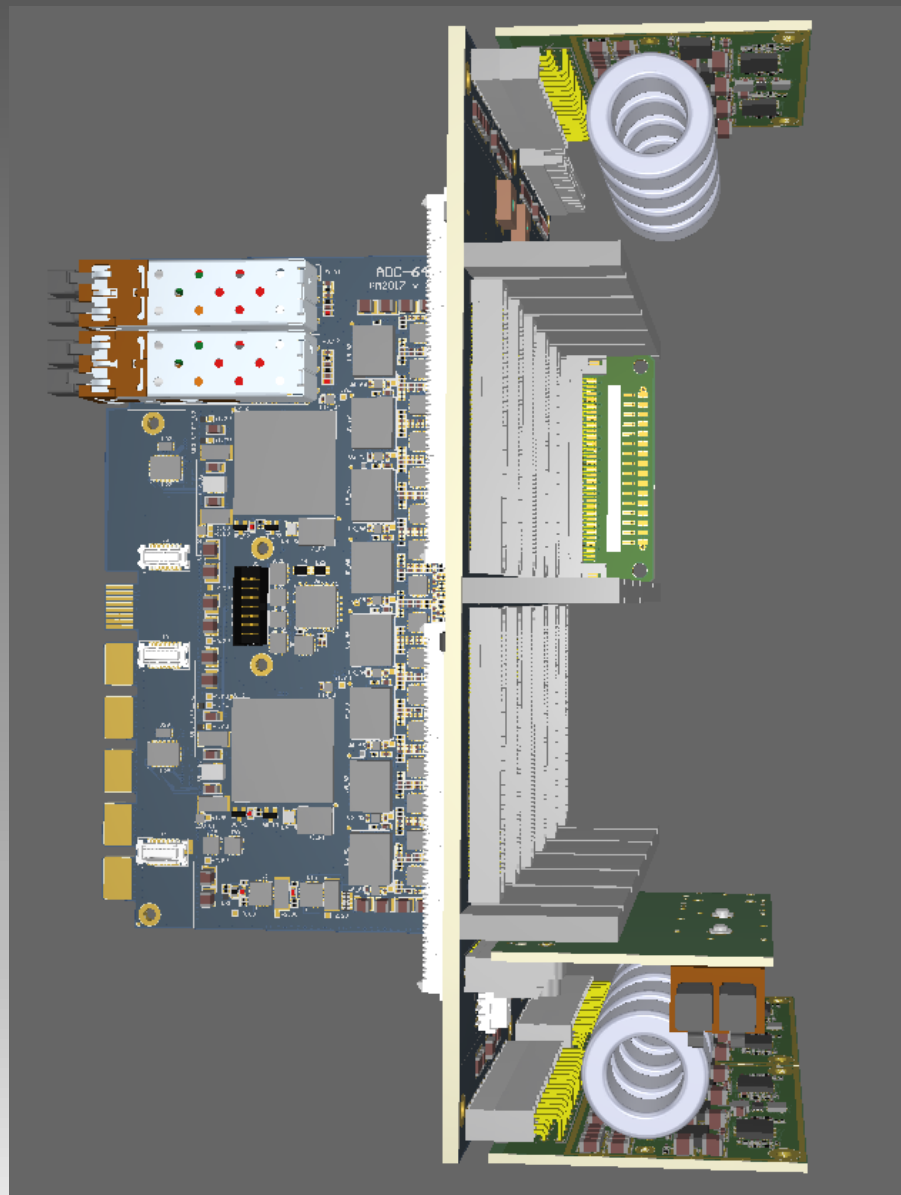


Status of the ADC Crate electronics for the PANDA-EMC

- **Backplane**
- Crate Controller
- Power Supplies

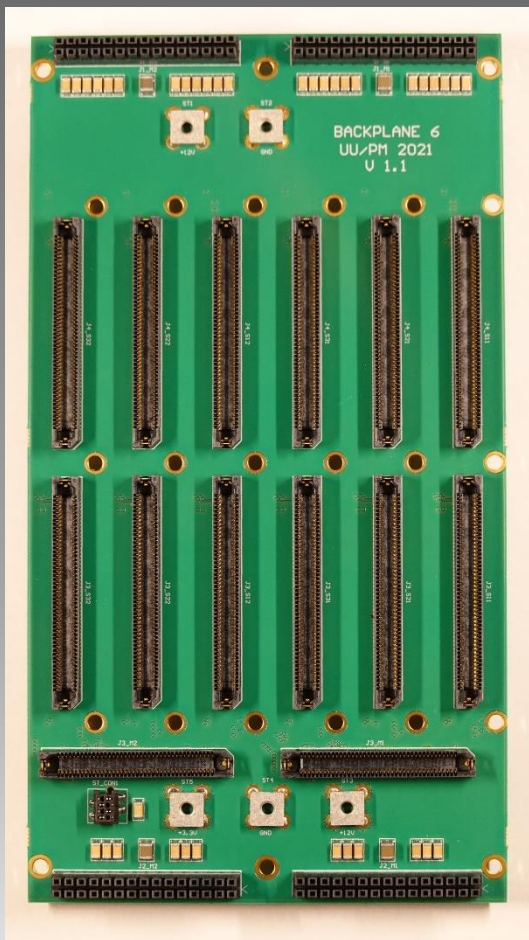


Crate Back compartment

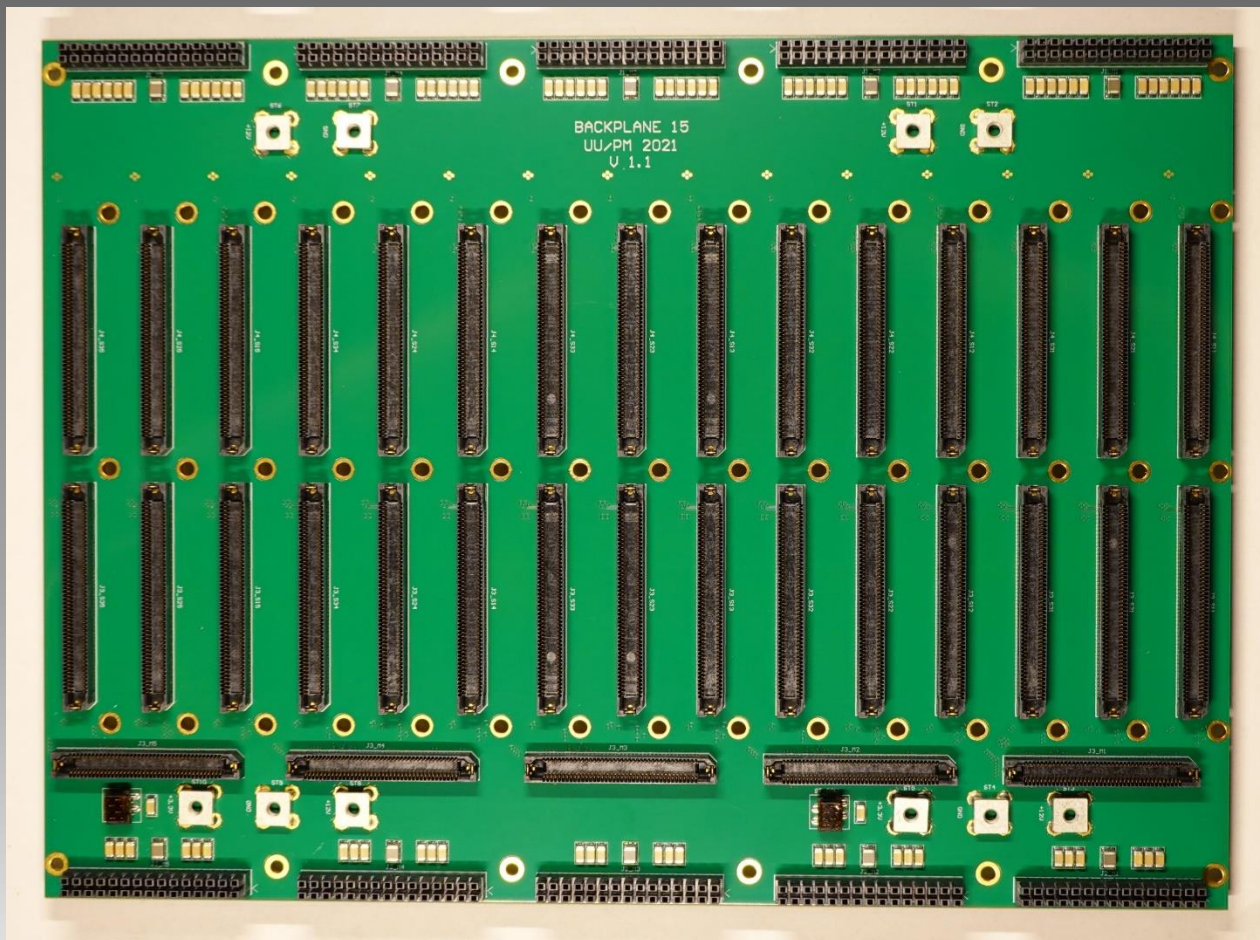




6-slot



15-slot





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

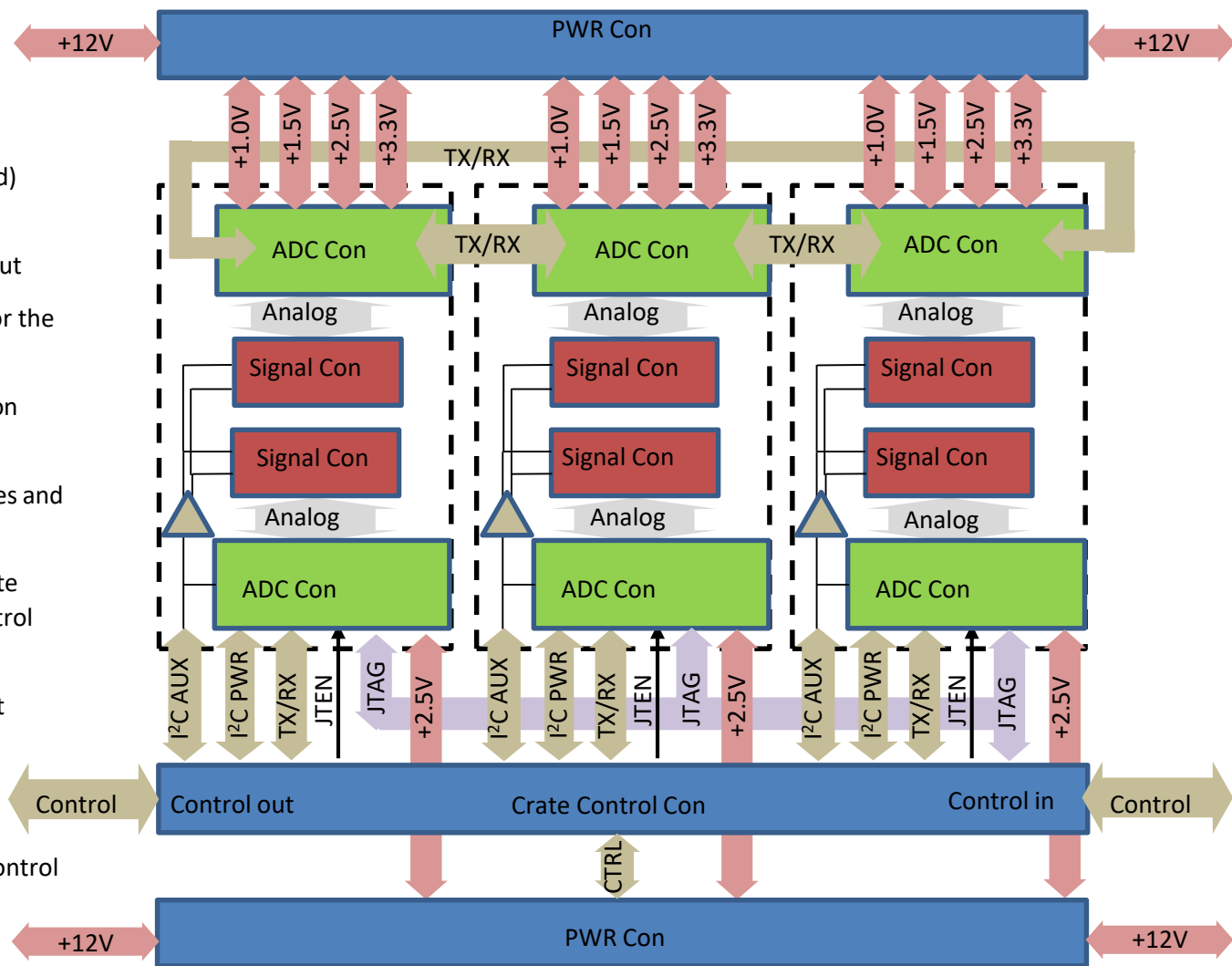
TX/RX – can be freely used inside of the Crate Control board. Either looped or fed to a control FPGA

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?)



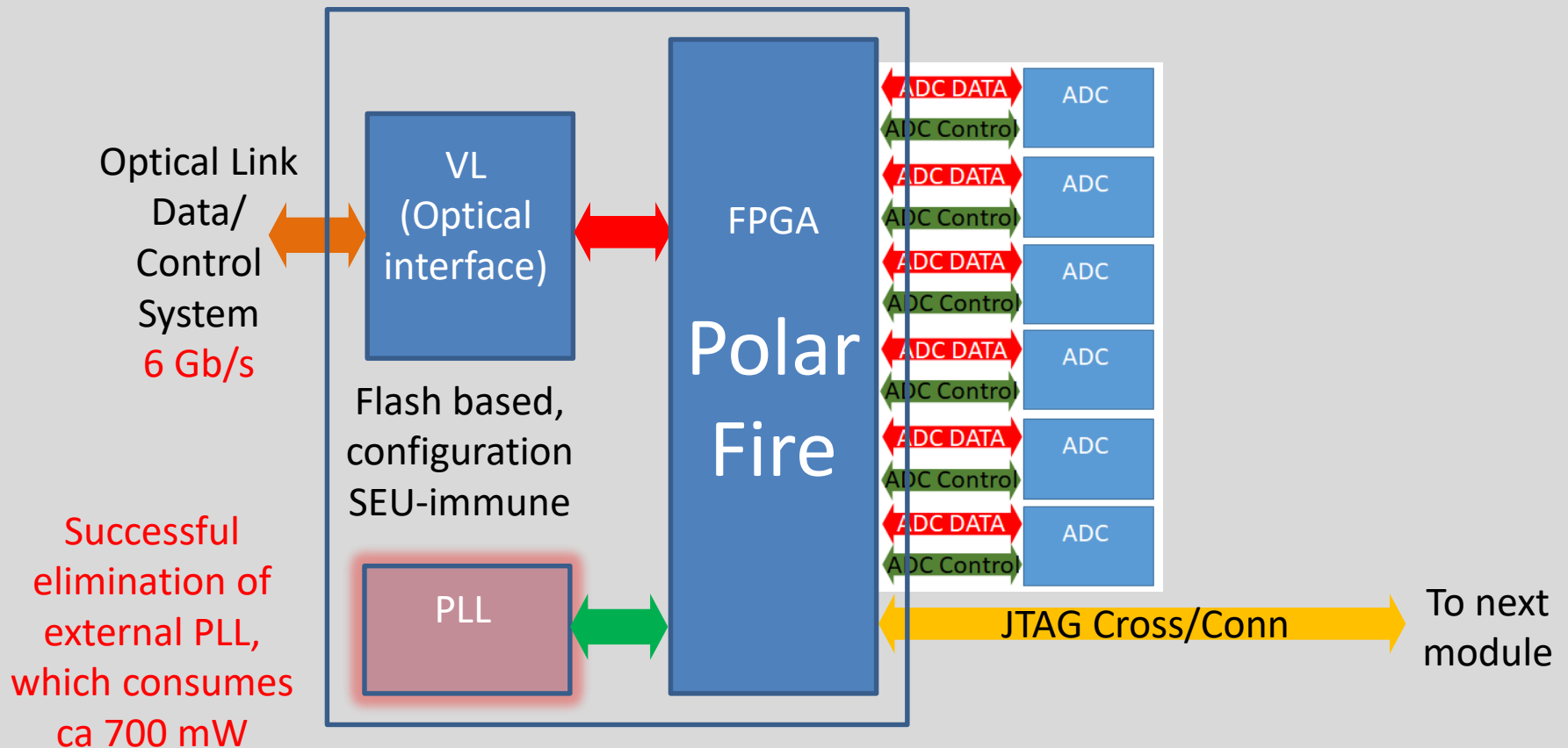


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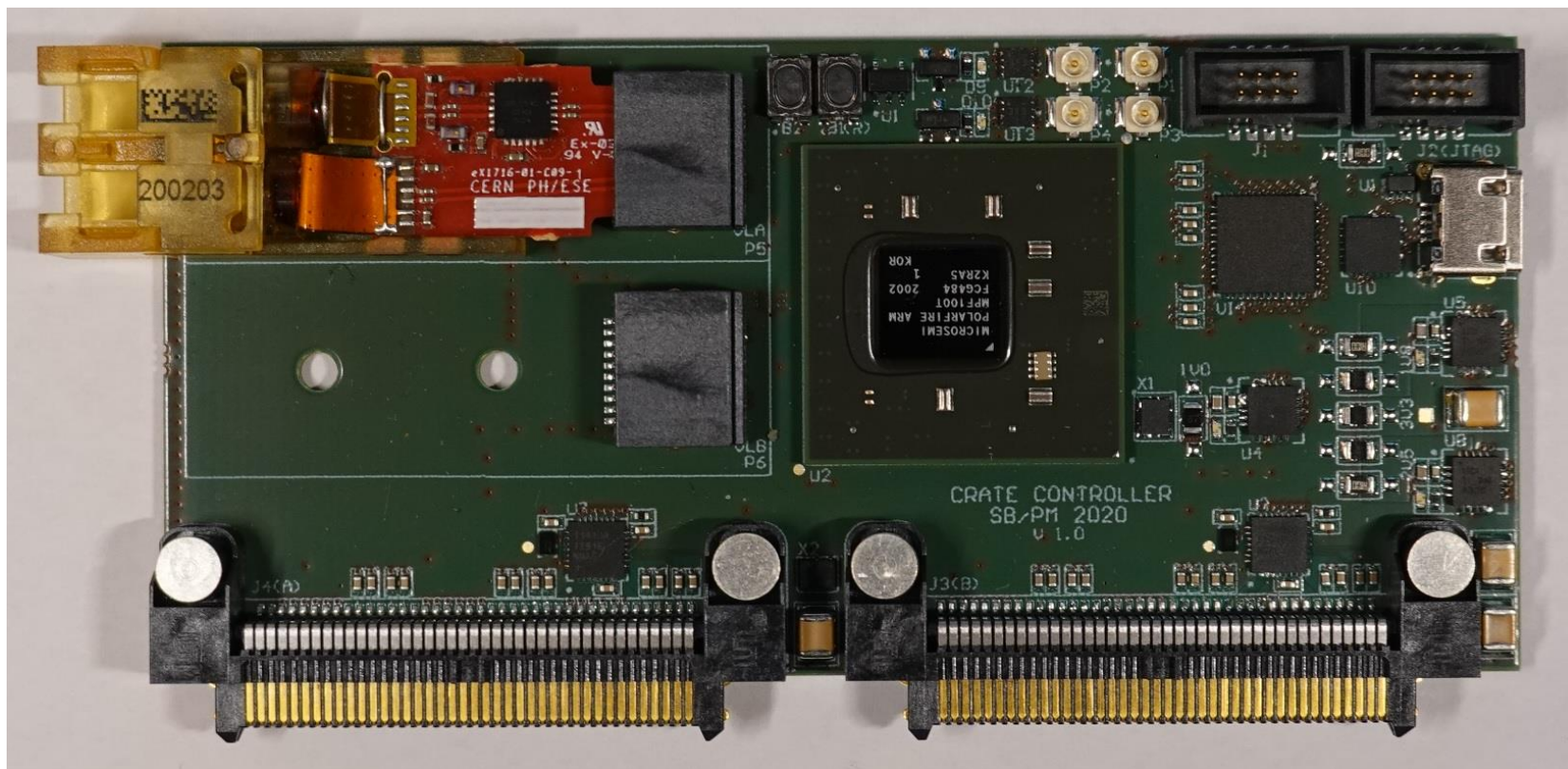
Polar Fire – based Crate Controller

1. Direct JTAG configuration of individual ADCs
2. Reaction to SEU
3. Health control of ADCs (voltages, currents, temperatures)
4. Crate PS control



CRATE CONTROLLER

Dual channel VTRx
Test version, 2 x 4,8 Gb/s



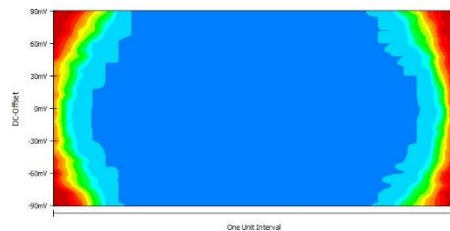
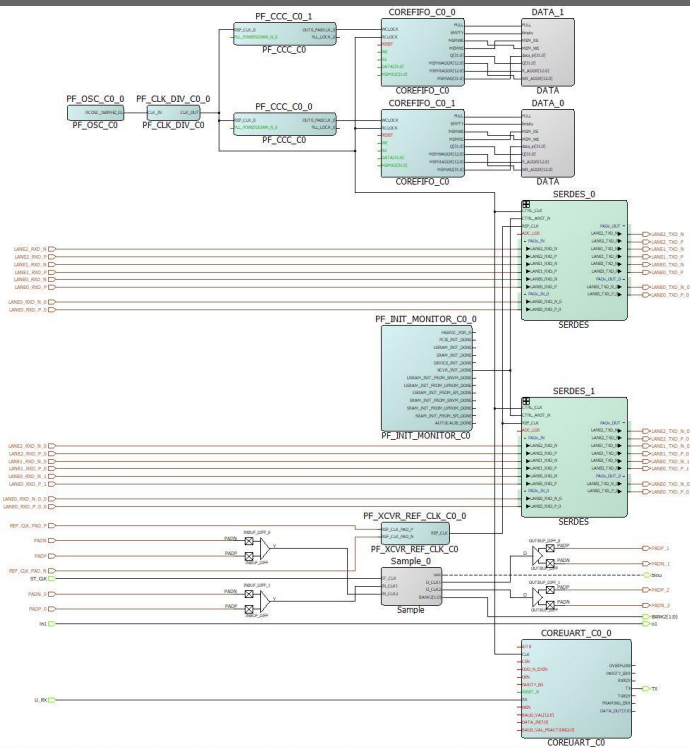
The first prototype with VTRx

A project containing 6 channels 2Gb/s and 2 channels 6.25 Gb/s (**time deterministic**)

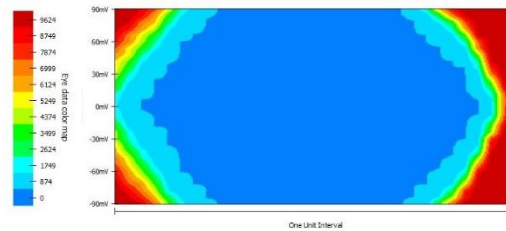
Status

Firmware:

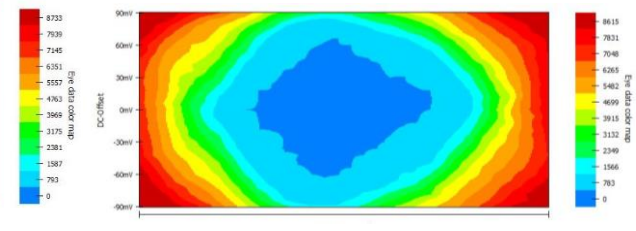
- Canvas project in Libero is ready (mux 3 x 2 Gbit/s → 6 Gbit/s)
- Successful elimination of external PLL, which consumes ca 700 mW
- Successful **time deterministic** tests of bilateral communication to ADC



2 Gb/s

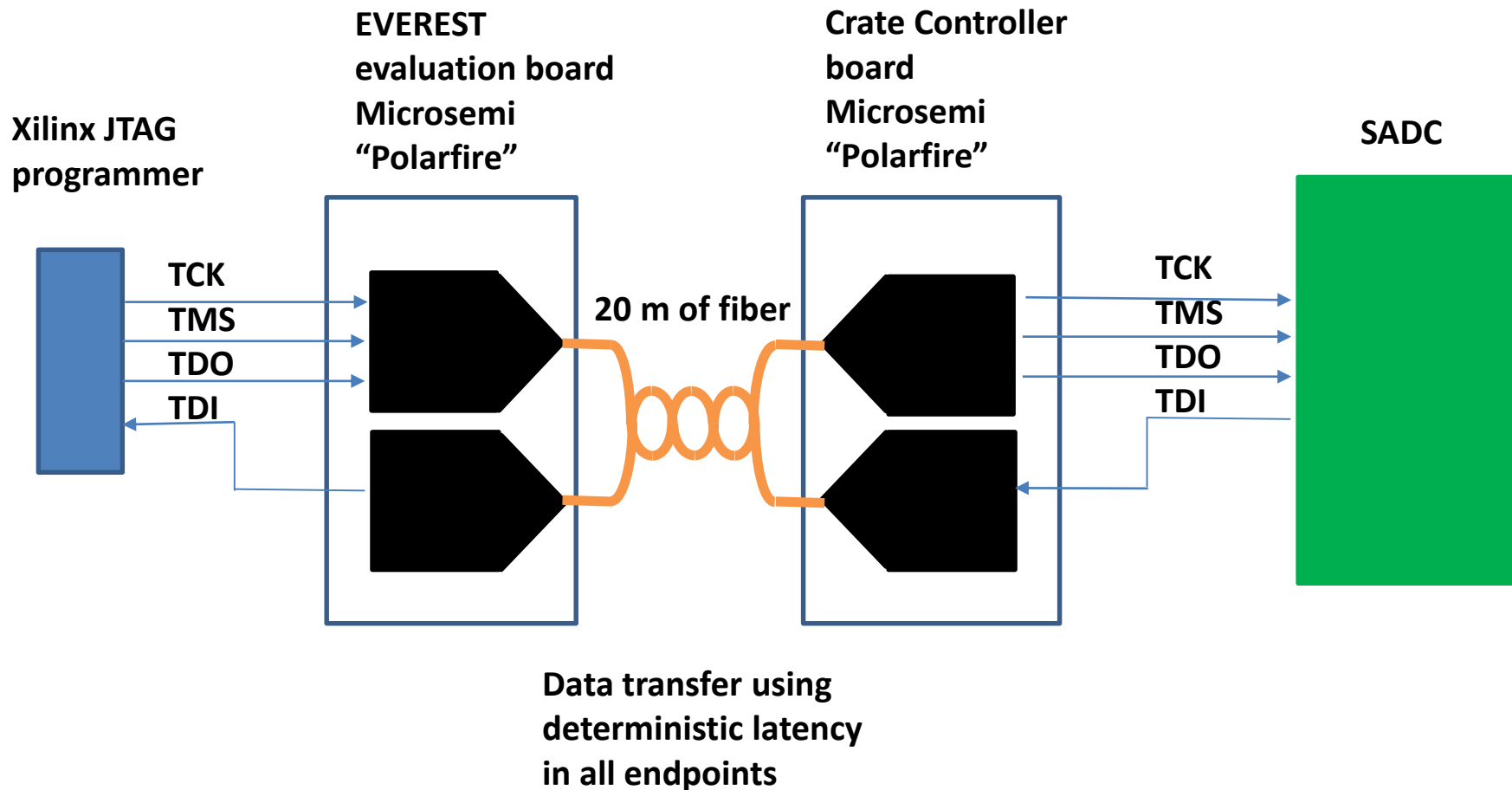


6.25 Gb/s



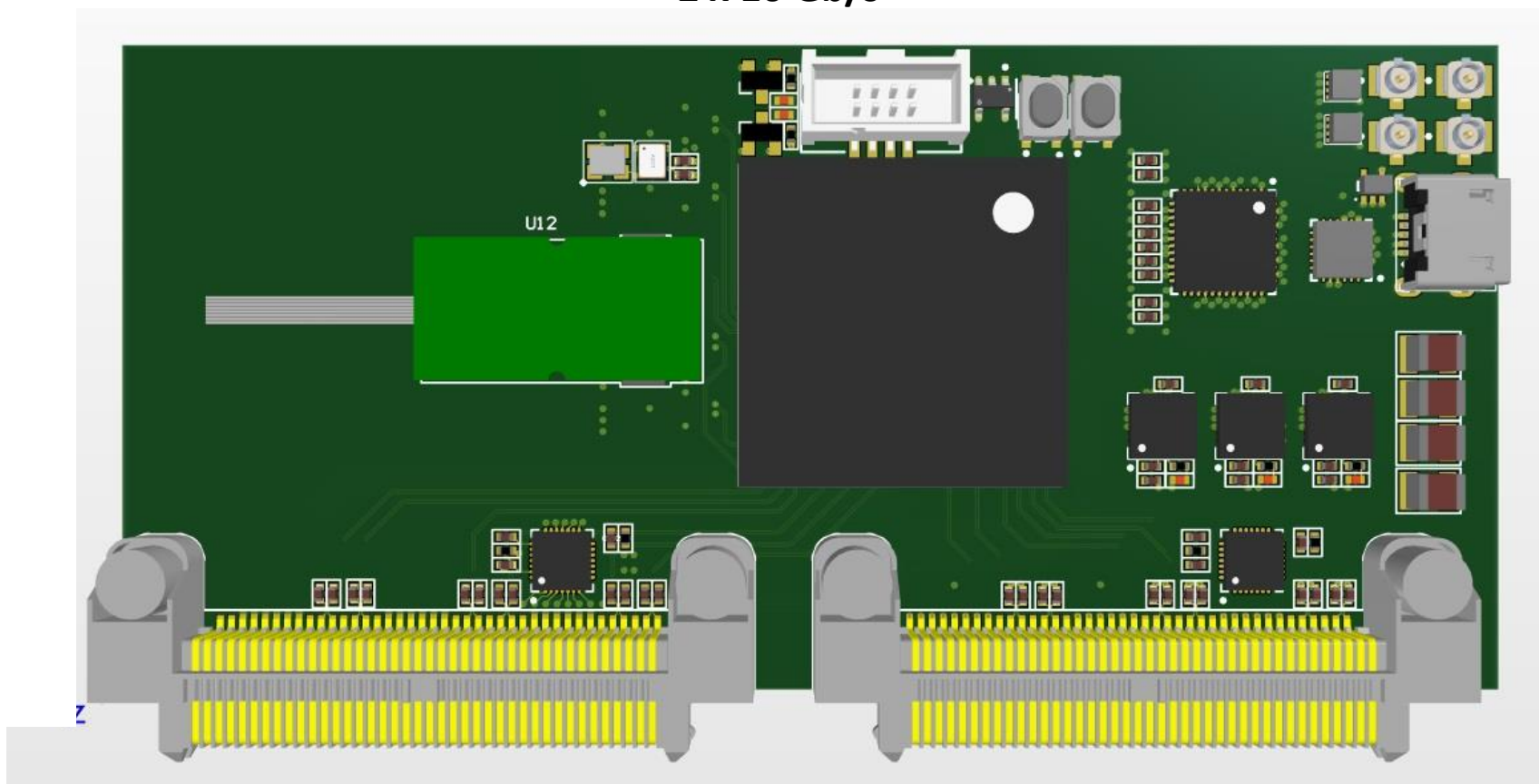
10 Gb/s

JTAG control over fiber



CRATE CONTROLLER

Future plans:
Dual channel VTRx+
2 x 10 Gb/s



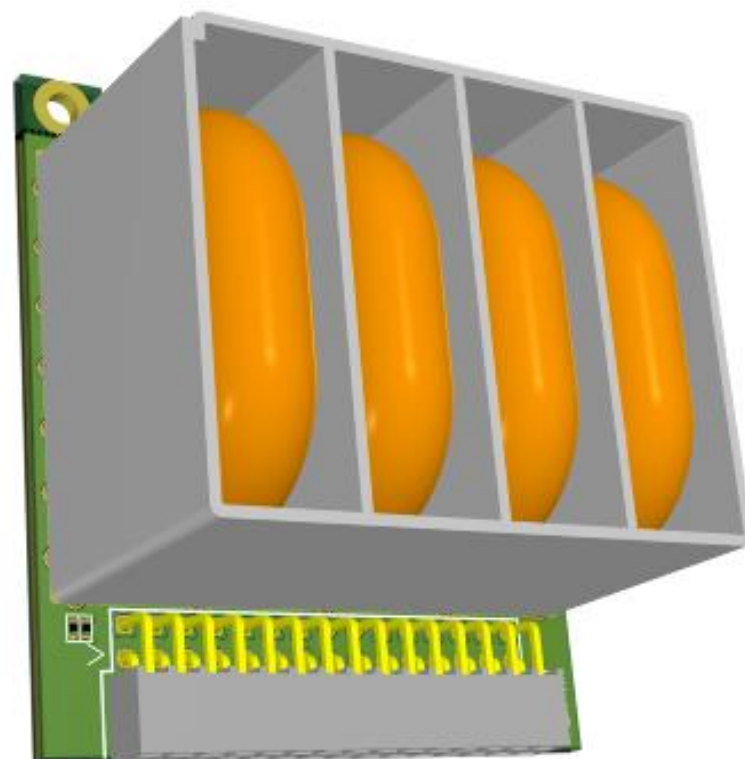
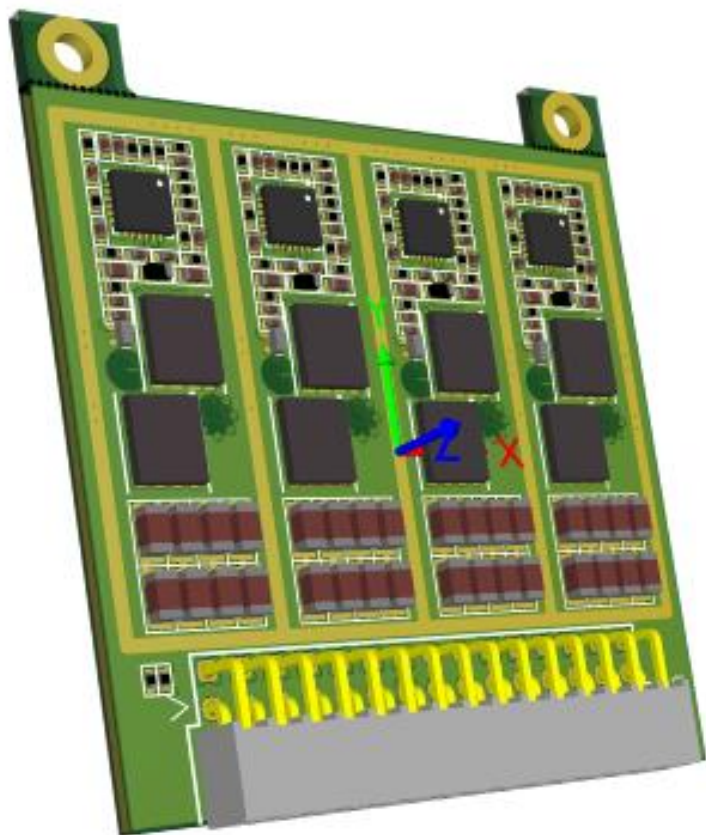
Artwork of the future Crate Controller
VTRx+ will be produced 2021



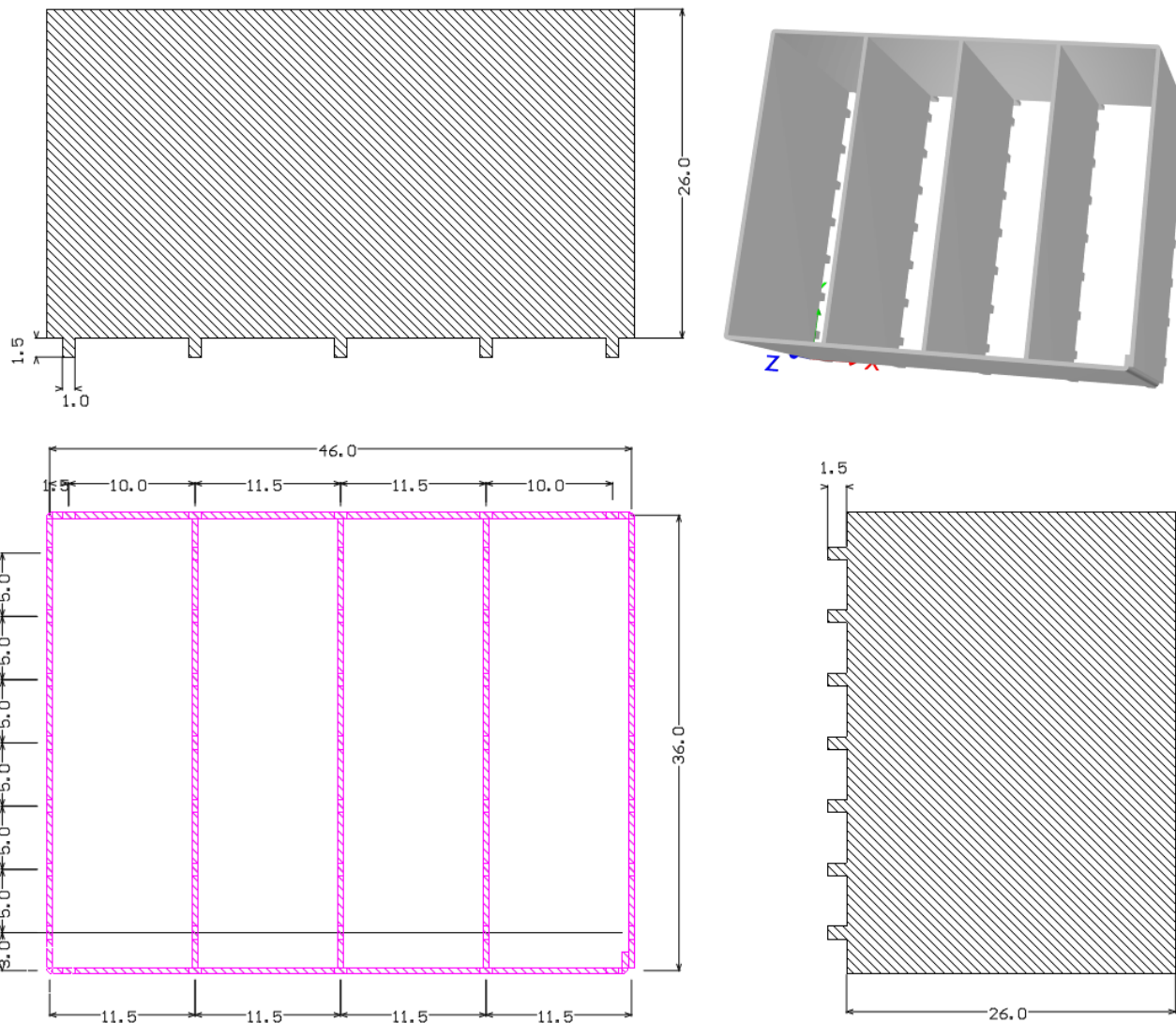
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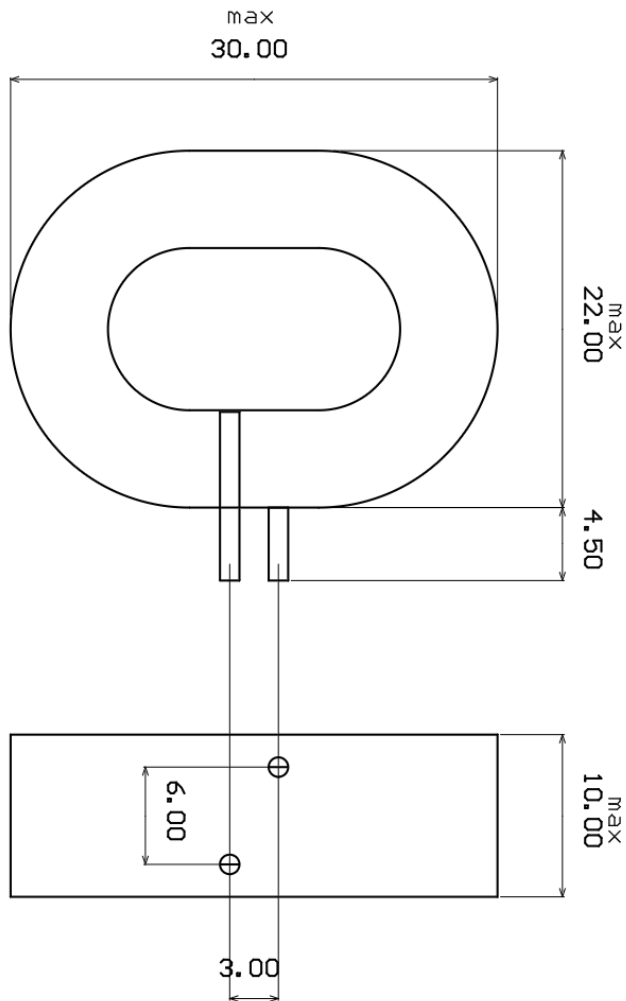
4-channel Power Supply module



4-channel Power Supply module



4-channel Power Supply module



$$L = \frac{\mu N^2 A}{l}$$

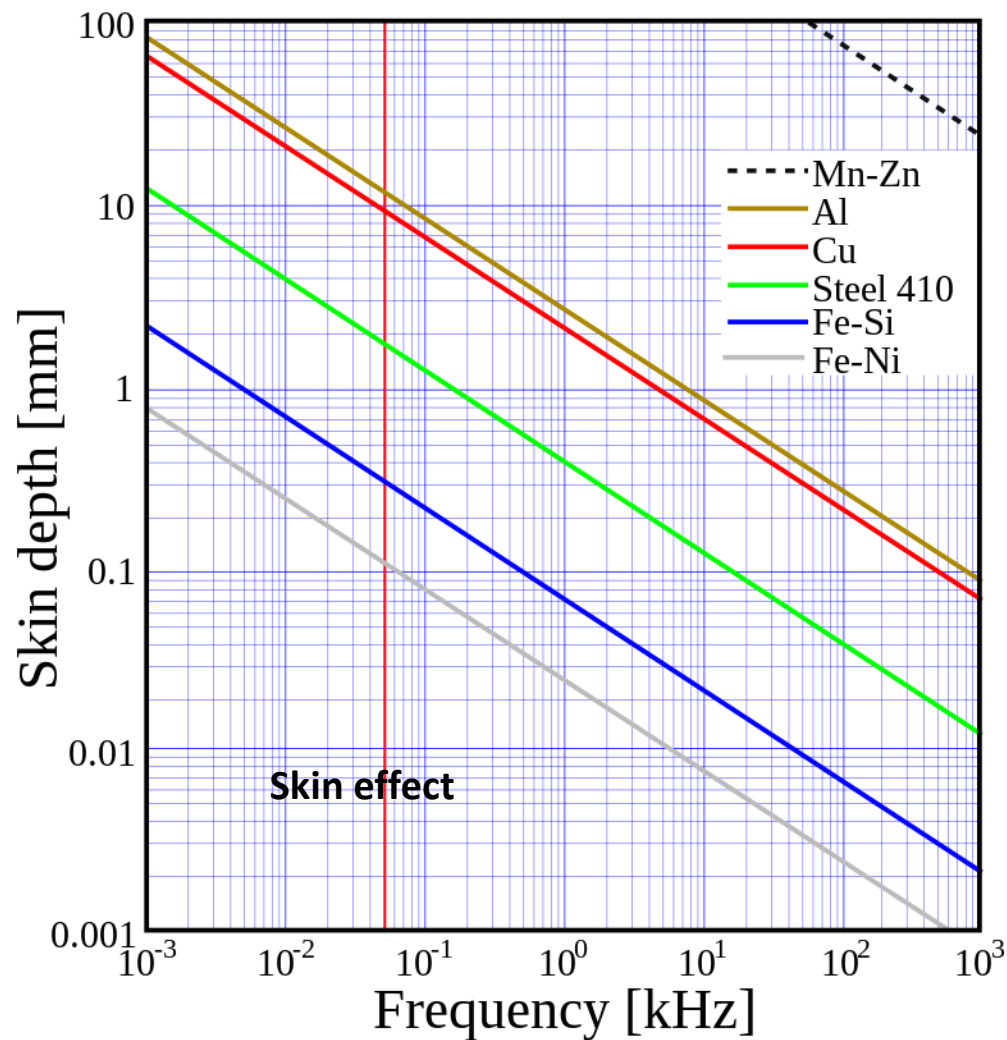
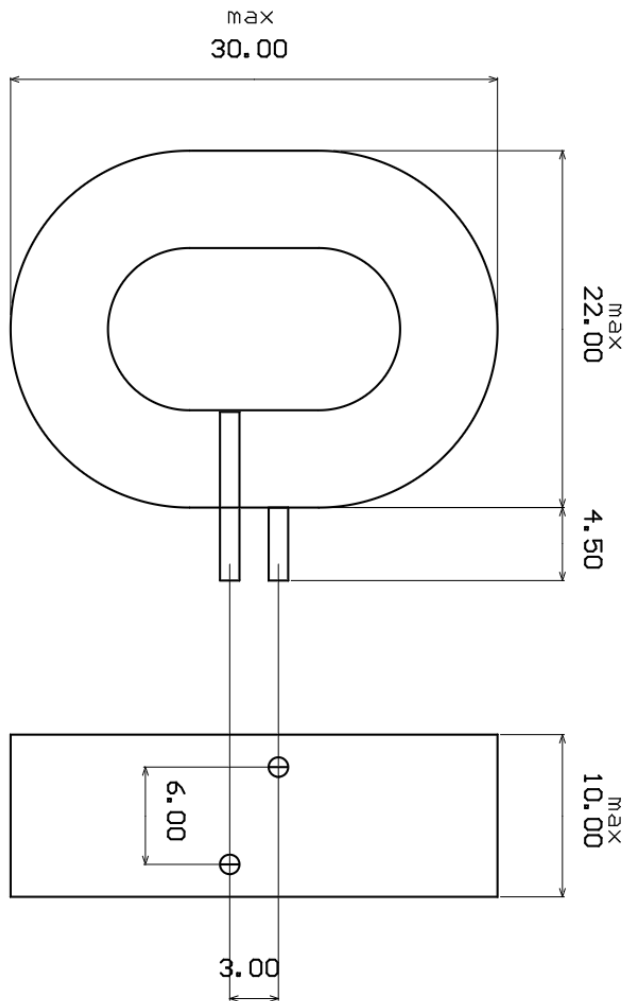
Winding cross-section area A
 length – (circumference) l

$$L = \frac{\mu \pi N}{d} (W^2 - 2Wd)$$

Width W
 Wire diameter d

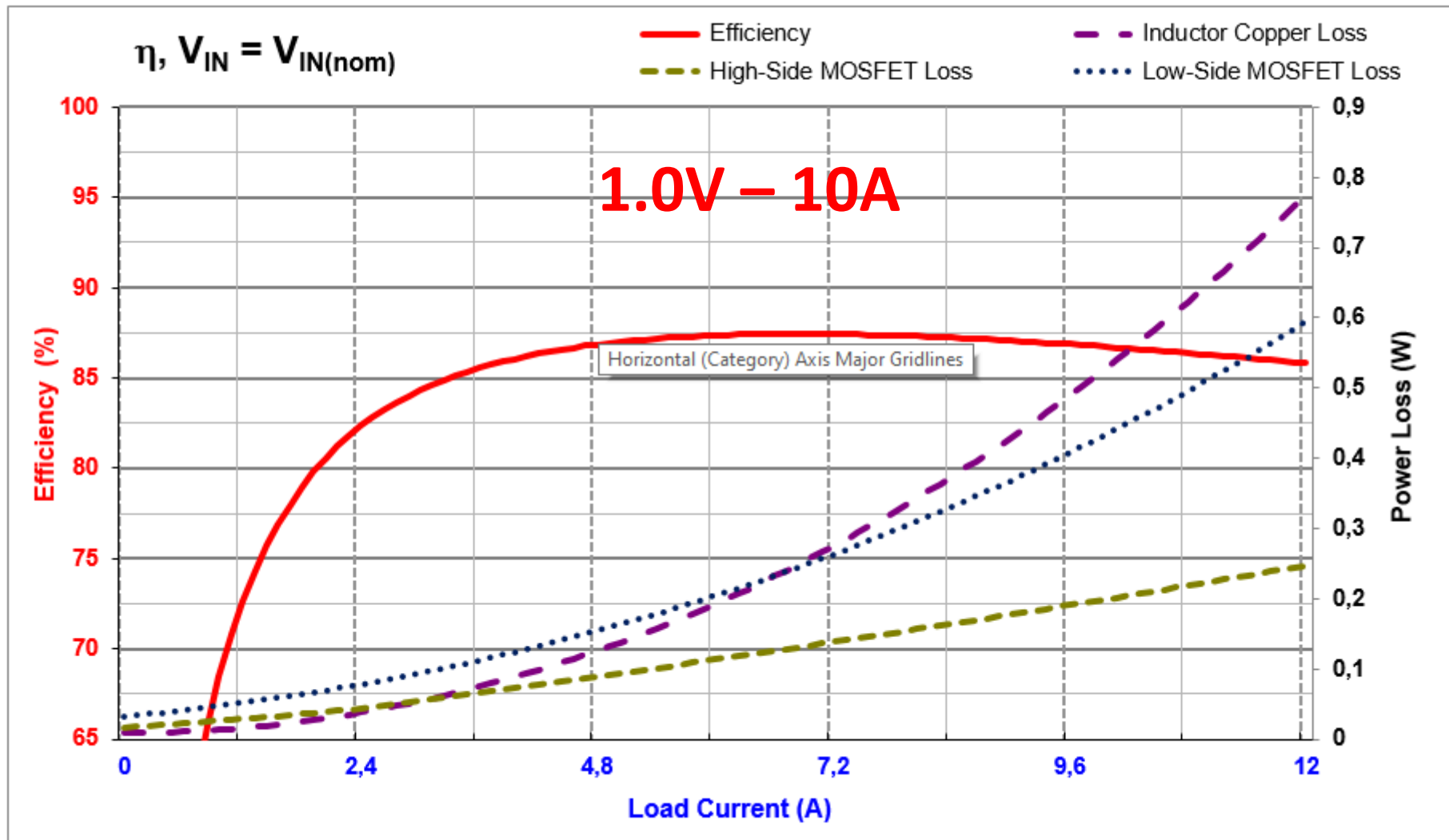


4-channel Power Supply module





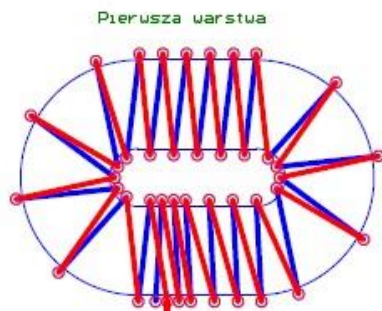
4-channel Power Supply module



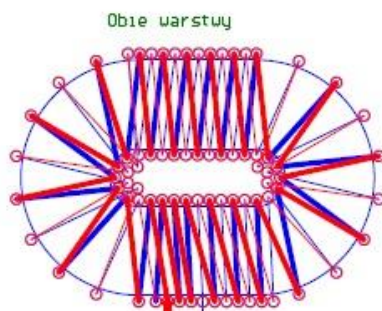


4-channel Power Supply module

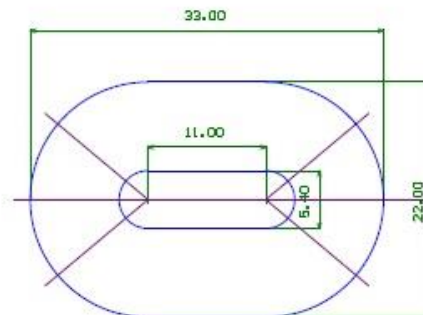
CEWKA 2.0 uH



Drut
nawojowy
1 mm

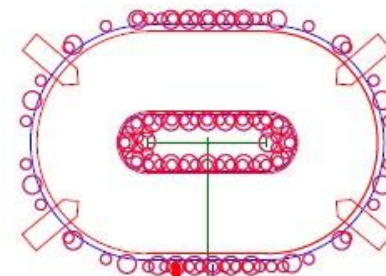


Konec
uzwojenia
(spod)



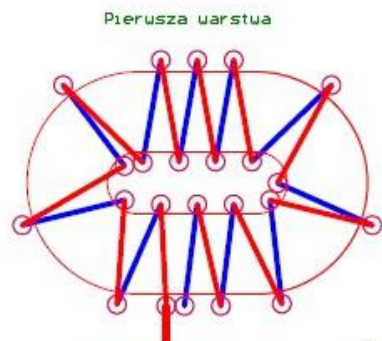
Szerokość
rdzenia
7.2 mm

Otwory pozycjonujące

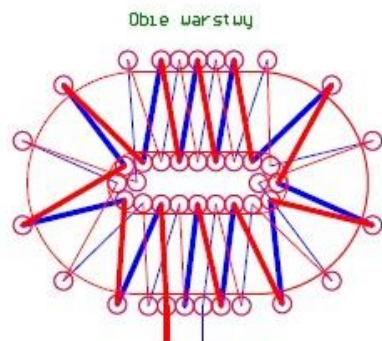


2.80 0.50
Początek
uzwojenia
(wierzch) Konec
uzwojenia
(spod)

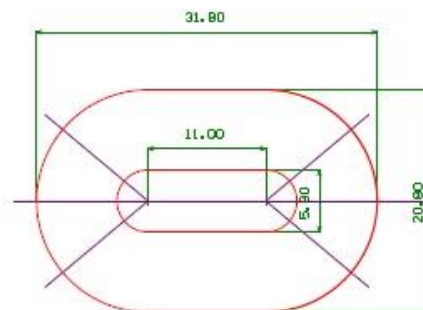
CEWKA 0.5 uH



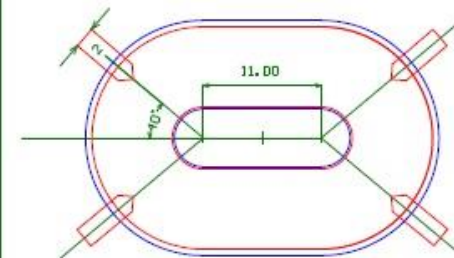
Drut
nawojowy
1.6 mm



Konec
uzwojenia
(spod)



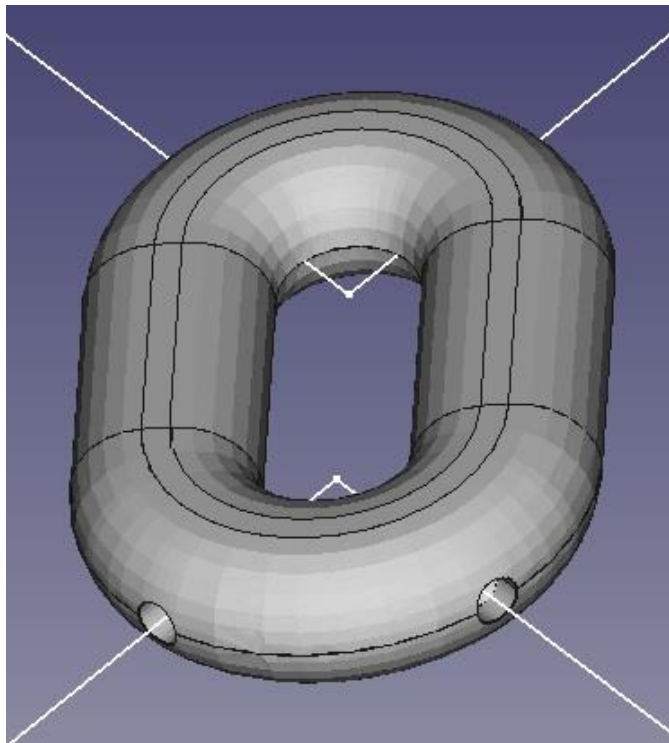
Szerokość
rdzenia
6.4 mm



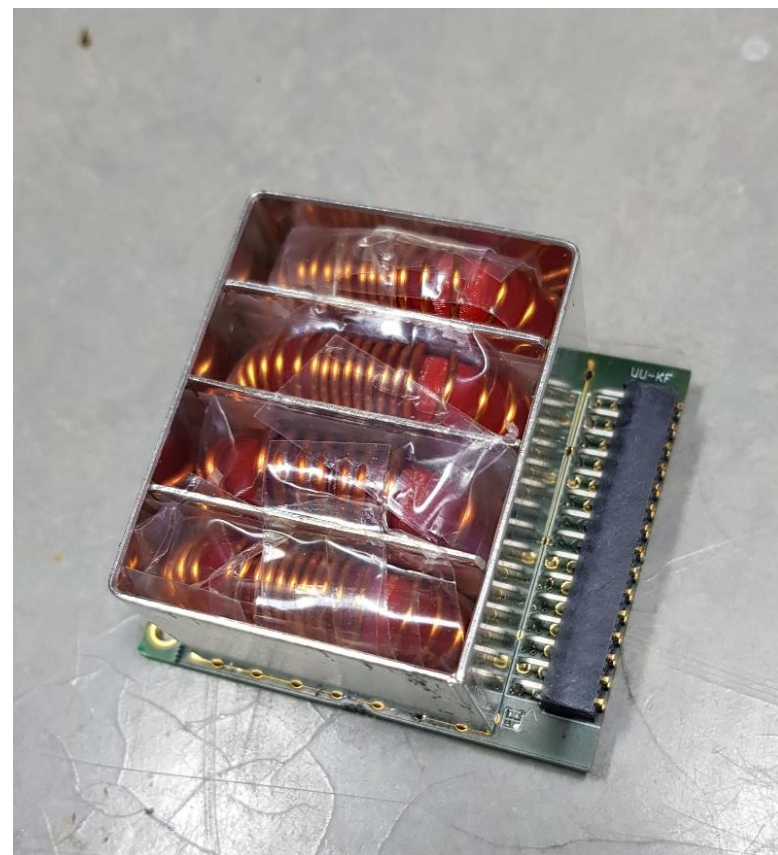
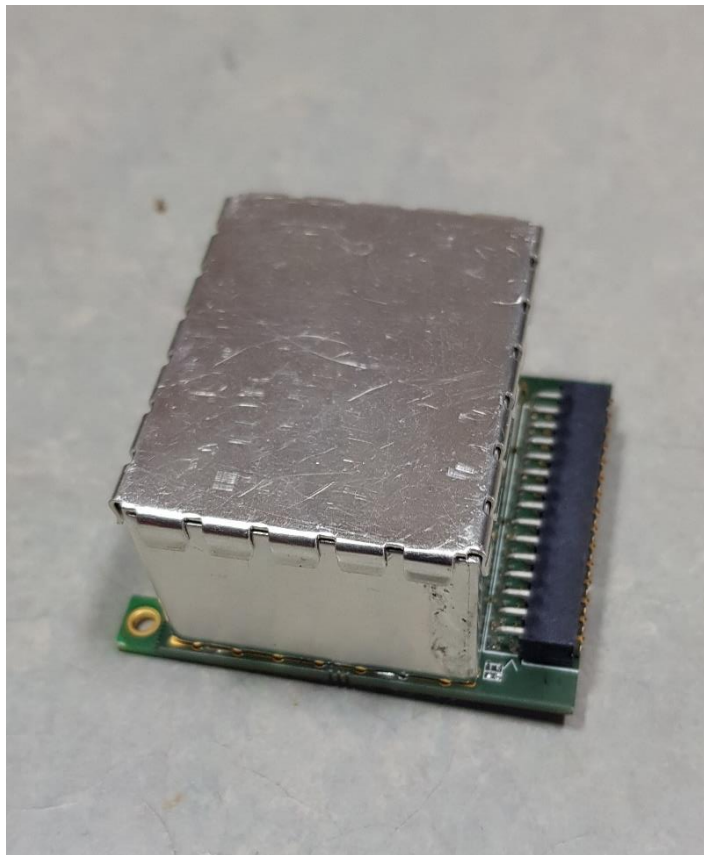
2.80 0.50
Początek
uzwojenia
(wierzch) Konec
uzwojenia
(spod)



4-channel Power Supply module

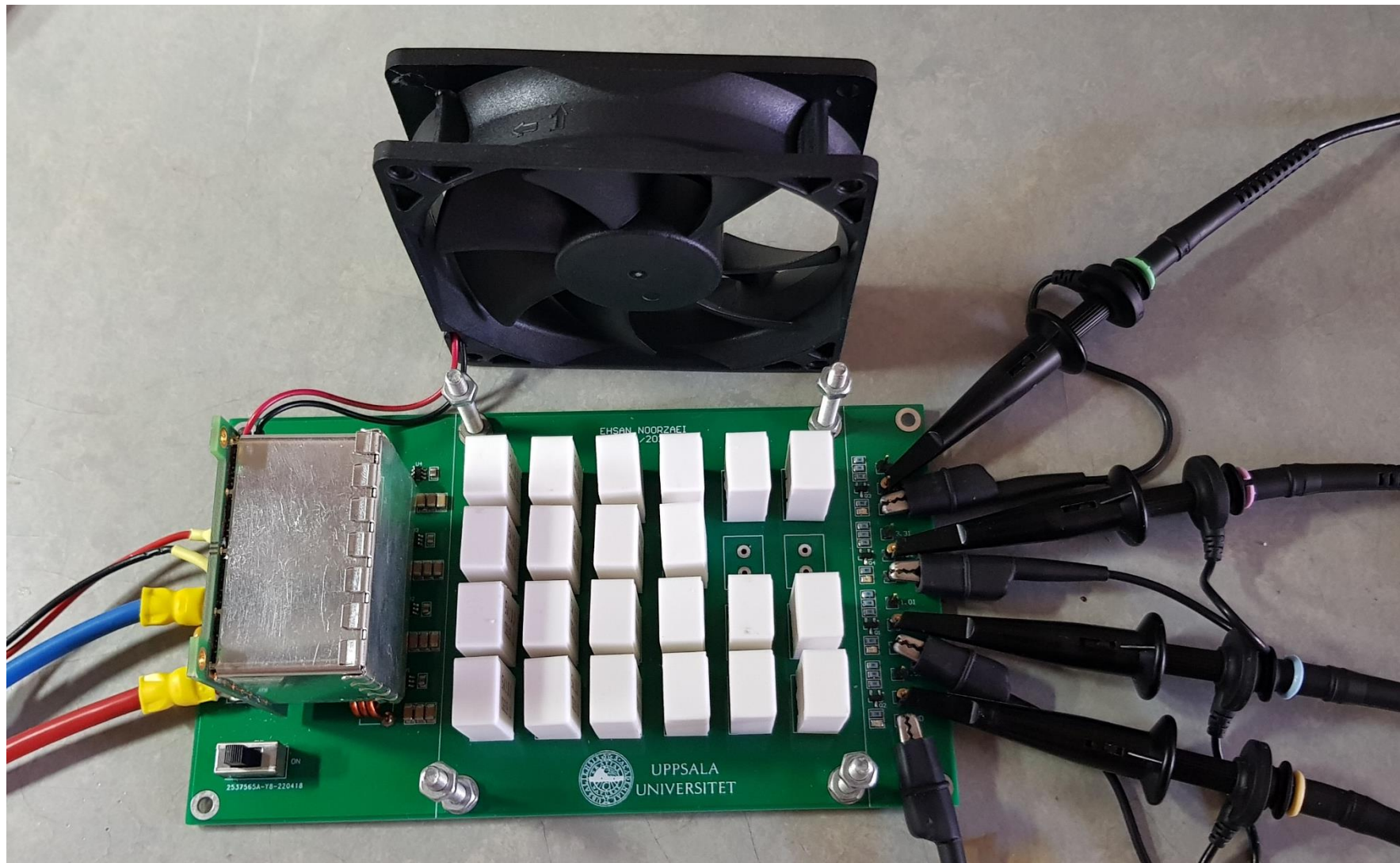


4-channel Power Supply module

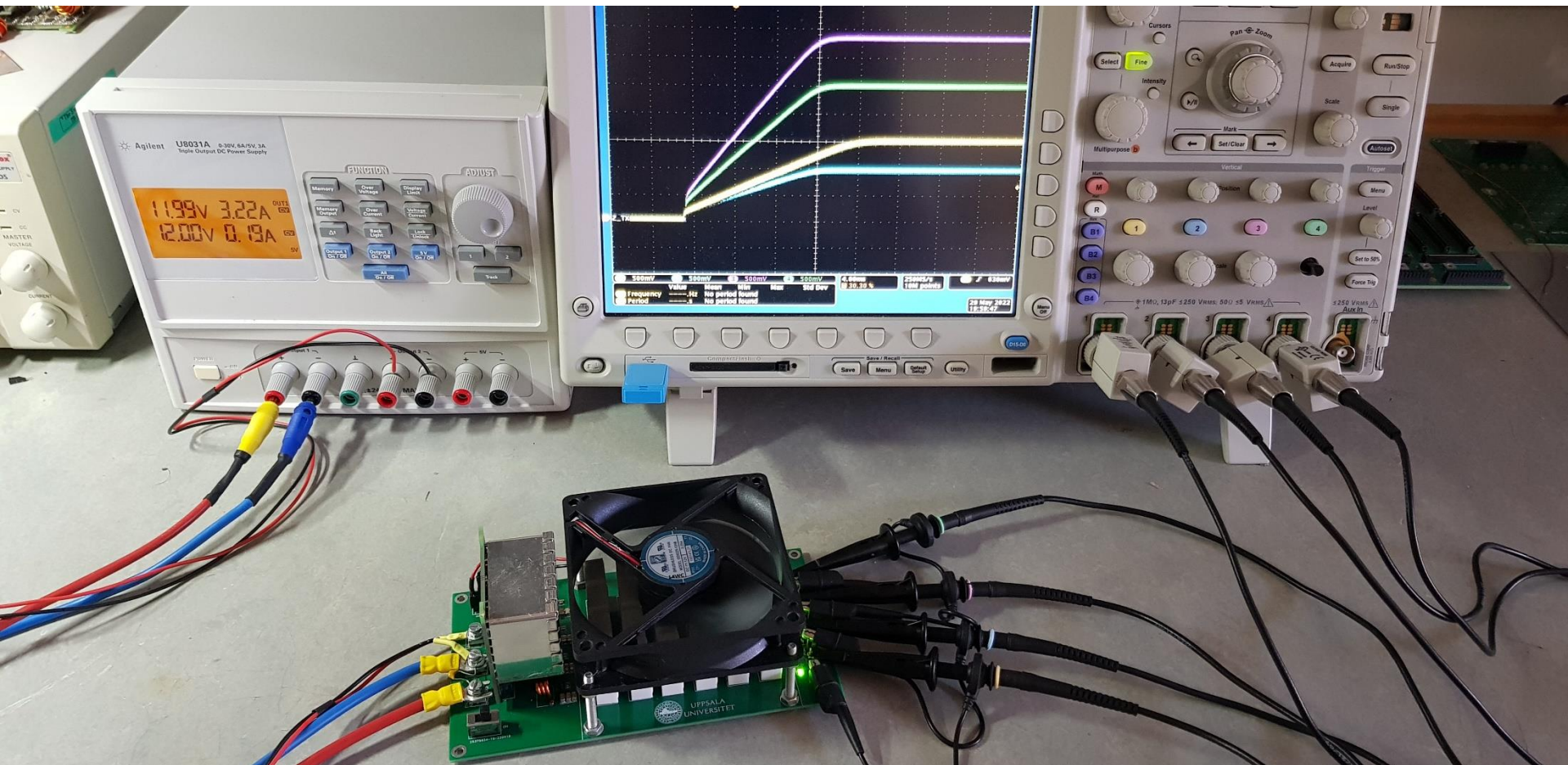




4-channel Power Supply module tester



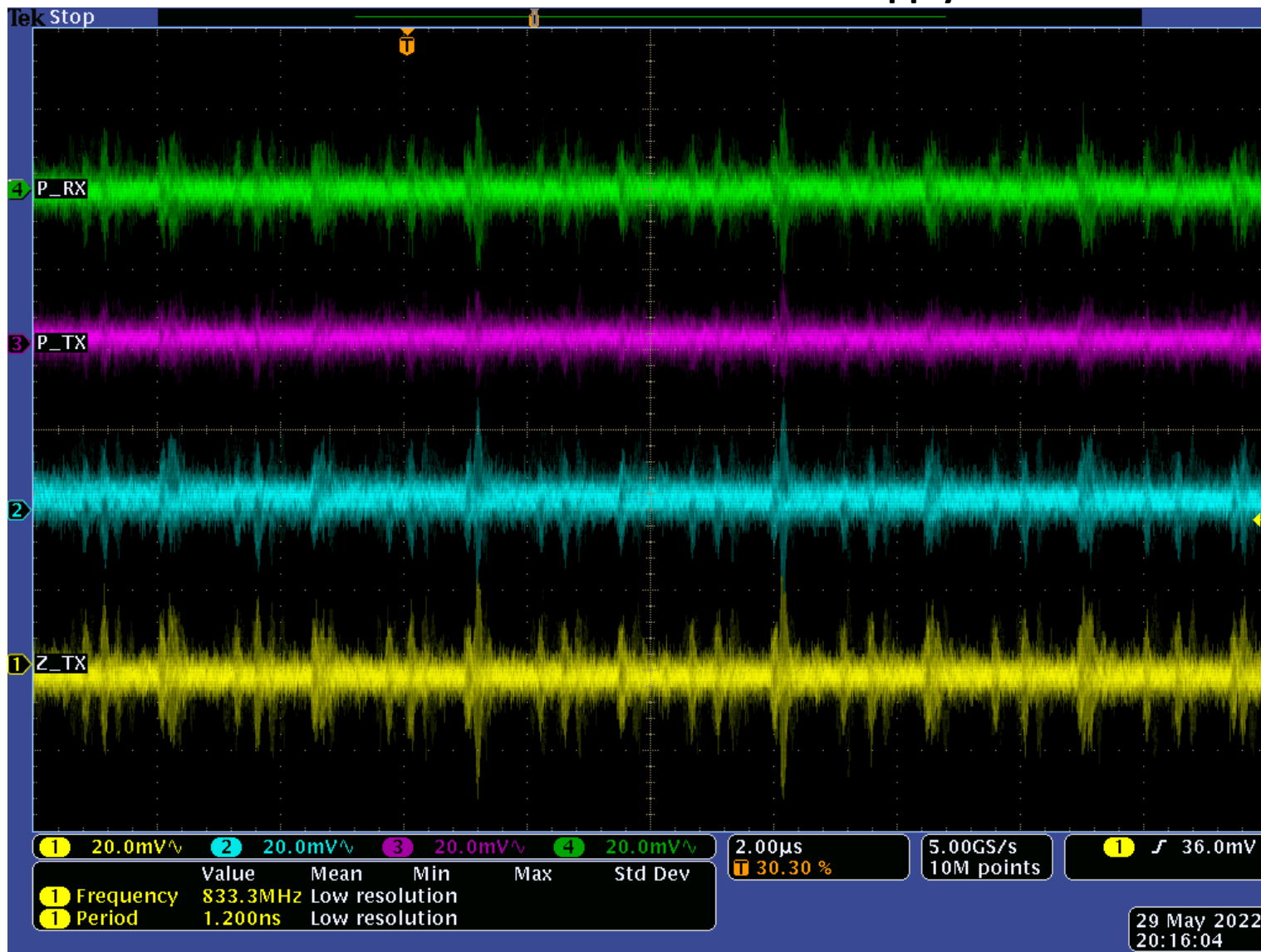
4-channel Power Supply





Power supply

4-channel Power Supply





Thank You !