New SoC-based MicroTCA Hardware Developments

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HELMHOLTZ SPITZENFORSCHUNG FÜR GROSSE HERAUSFORDERUNGEN

DESY.

Topics

- **Present two recent developments (based on Xilinx Ultrascale+ MPSoC)**

- **MicroTCA Templates and Tools provided to the Community**

Why MPSoC?

DESY DAMC-FMC2ZUP Board

- Recent boards: MPSoC-based
- Processor-centric approach ("Raspberry PI inside FPGA")
- Methodology changed
- "on-the-fly", "re-use" and "blocks"
- Modules, Linux, Python
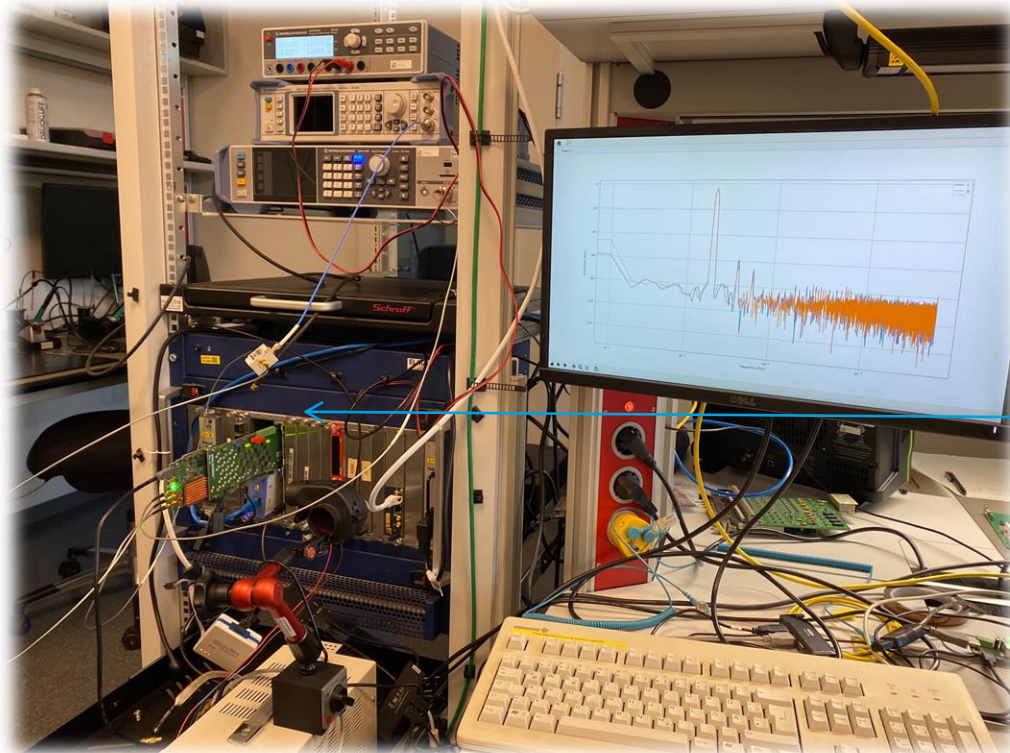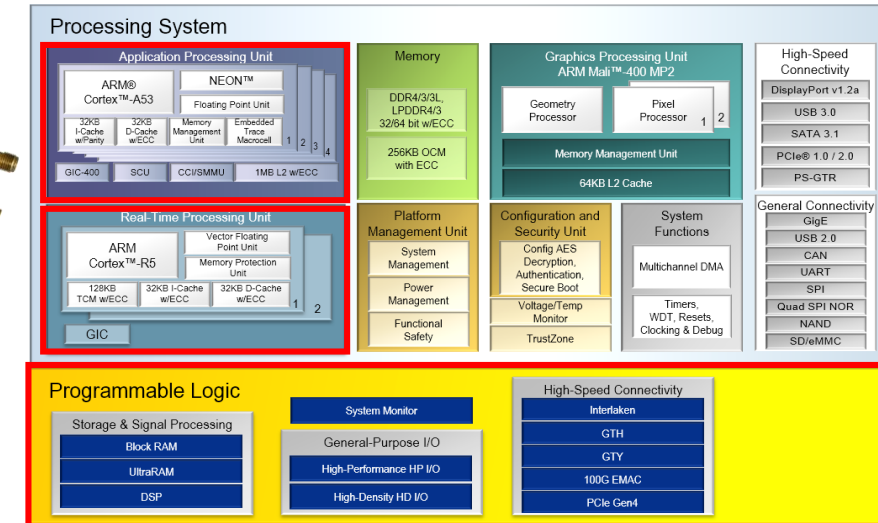
- DAMC-FMC2ZUP operating on bench with **graphical Linux OS** and display output

- DAMC-FMC2ZUP collecting data from FMC-DS500 and plotting on Display using **Python Matplotlib**

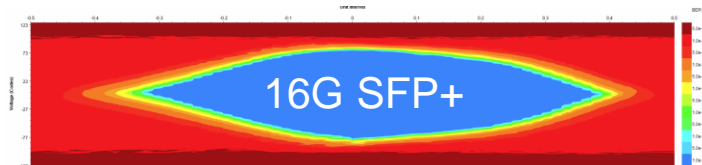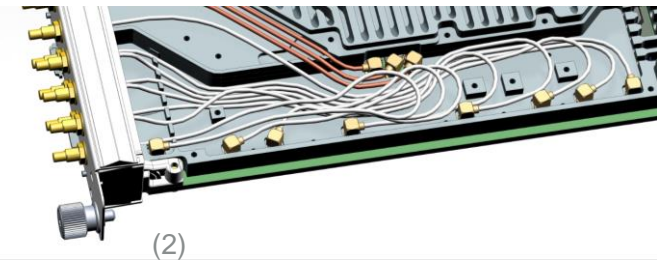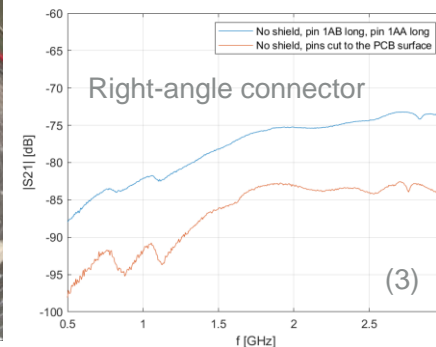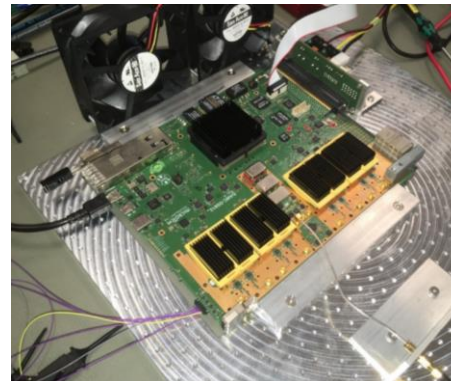Courtesy of J. Marjanovic and S. Farina

DAMC-DS812 – 8-Channel RF Low-Latency Digitizer
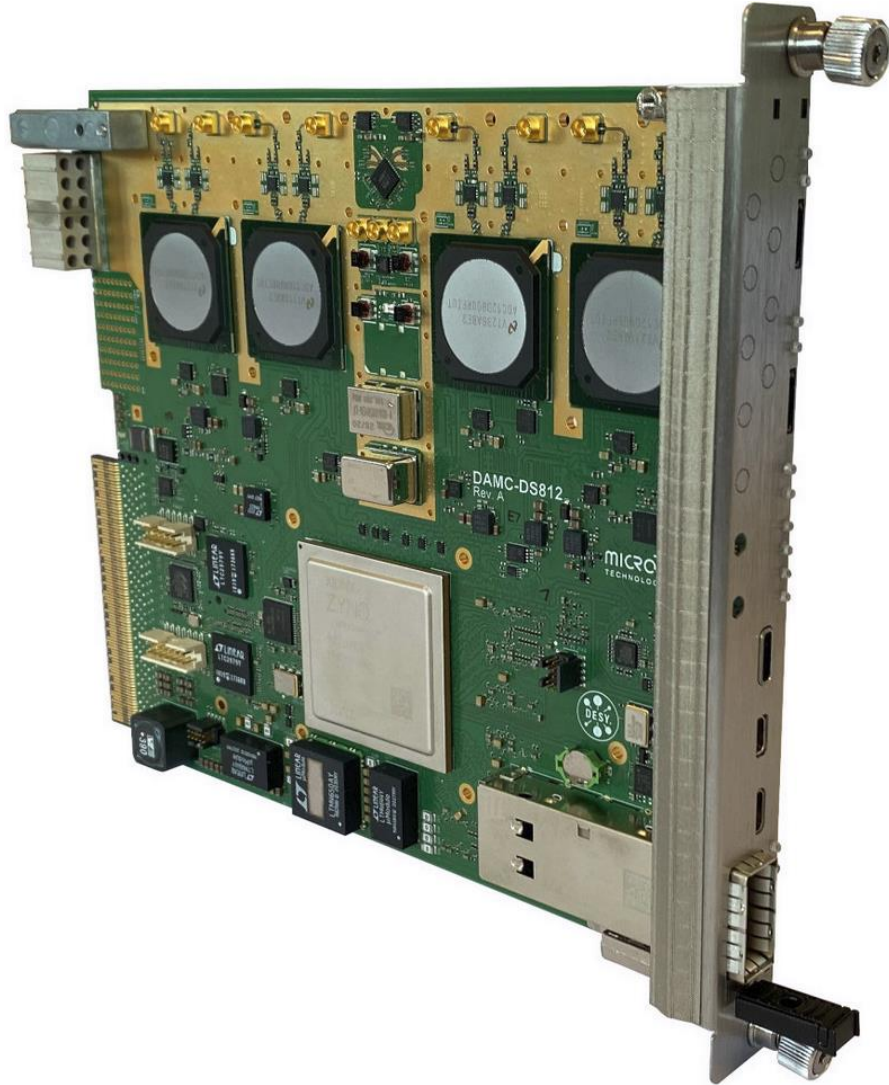
- Low-latency 8-channel 12 bit ADC board
- Based on **new coaxial analog Zone 3 RF Class**
- Developed for the community (PHD Johannes Zink)
- 2.7 GHz input bandwidth (amplifiers: 4.8 GHz)
- 800 MSPS / 1600 MSPS
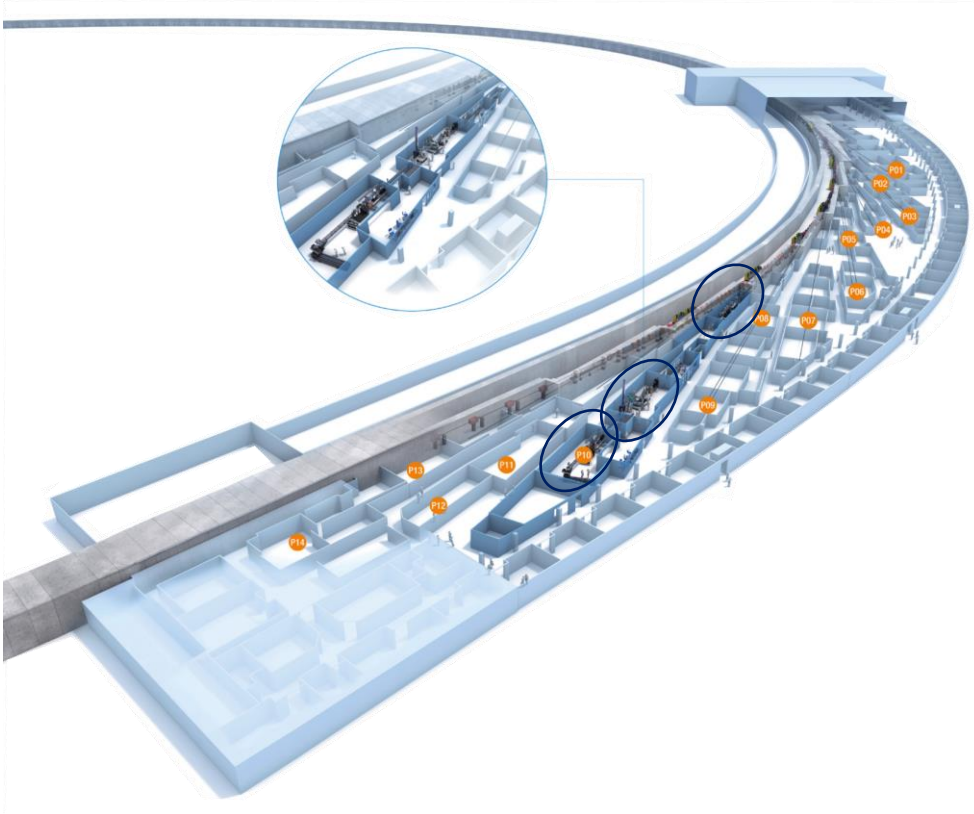- Excellent performance (14fs on-board PLL Jitter)

(1)

(2)

(2)

- Test Platform

16G SFP+

Right-angle connector

(3)

(2)
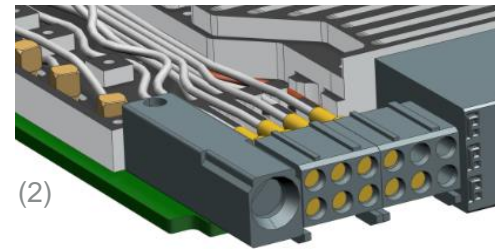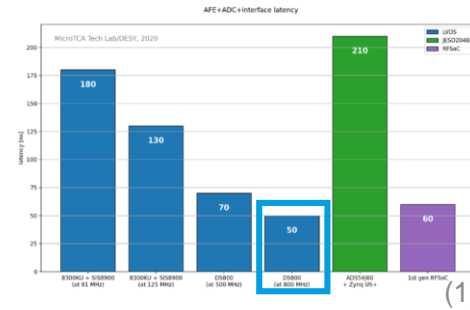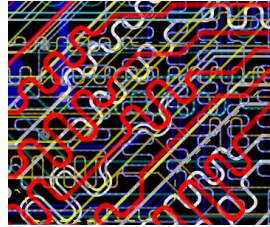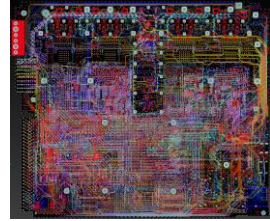
(1) courtesy of J.Marjanovic
(2) courtesy of J.Zink
(3) courtesy of S.Jablonski

MicroTCA Motion Controller

- We need to move motors in experiments
- Existing solution not suited for new installations
- We decided to develop a motion controller card

Motors

MTCA.4 Motion Controller Card

- Designed as a replacement for existing VME solution
- Based on MPSoC (communication) and Kintex-7 (Motion)
- Moves up to 48 Stepper motors per card
- One MTCA card replaces 2 to 6 VME cards
- Aggregation of multiple cards inside crate and across DESY campus
- Allows position-synchronous data acquisition
- Fully backwards compatibility to legacy motor drivers installed at DESY
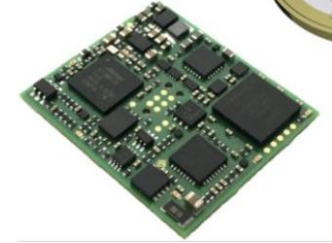- Certif SPEC Support

- **Beta-Testers welcome!**
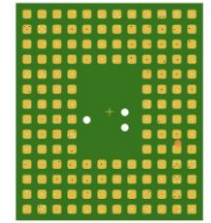- **Please contact us.**
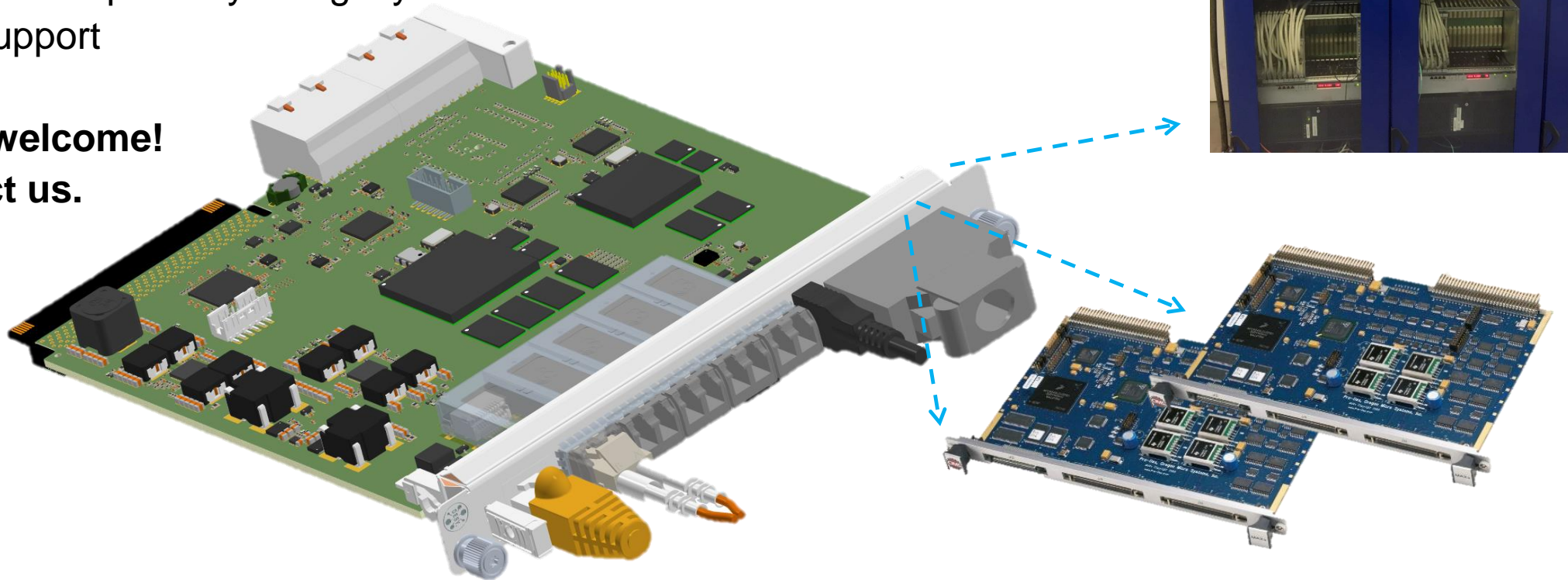
MicroTCA Design Support

- Reference designs for AMC and RTM
- Free templates in Altium Designer ®
- MMC Stamp SoM and Software Development Kit (SDK)
  (commercial product)
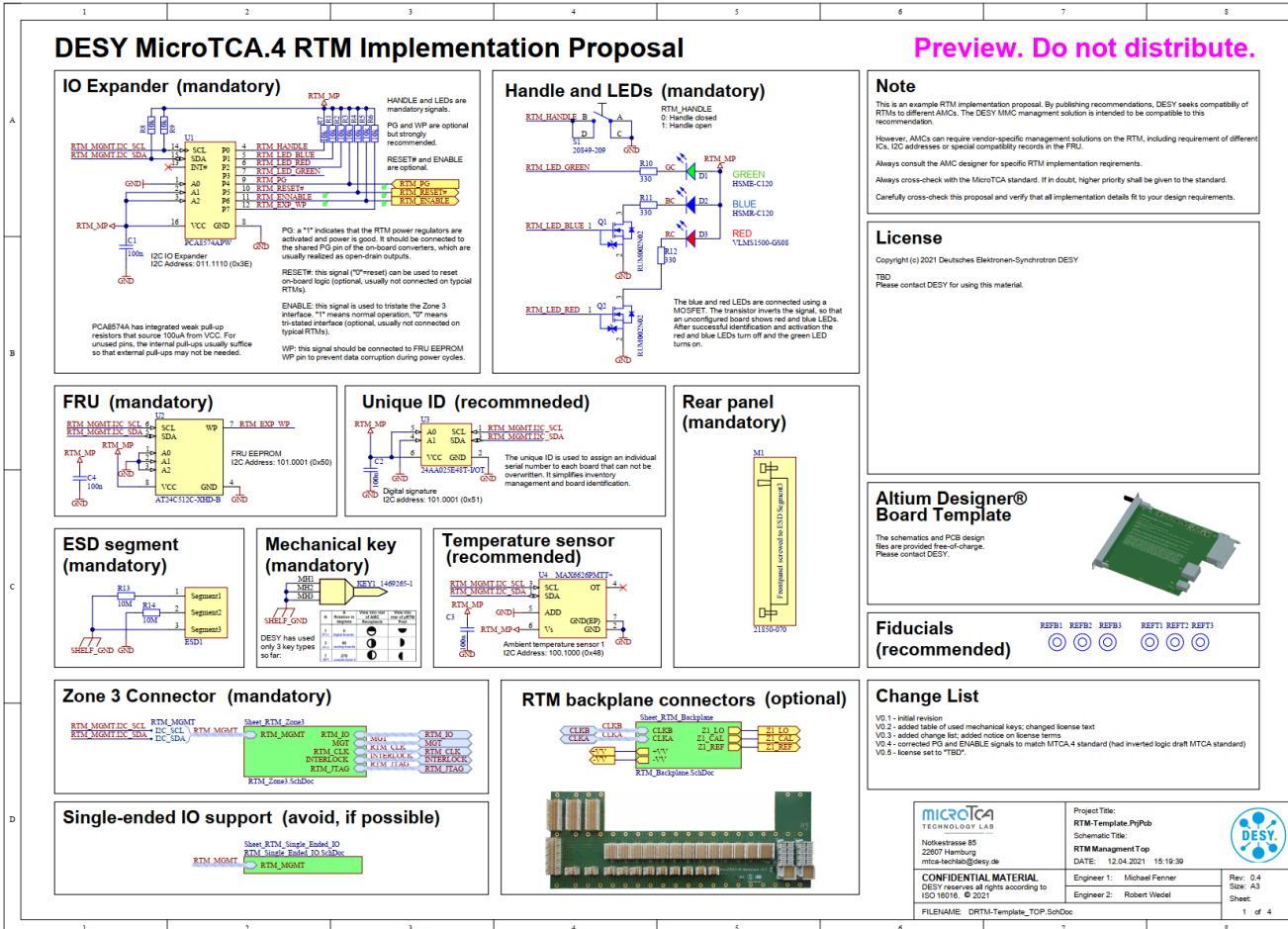- MTCA Bring-up Board (Gerber Files)

DMMC-STAMP size comparison

LGA bottom view (2mm pitch)

DESY MicroTCA.4 RTM Implementation Proposal — **Preview. Do not distribute.**

Thank you!

Acknowledgments: Nikola Radakovic, Jan Marjanovic, Johannes Zink, Stanislav Chystiakov

Kontakt

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