

A person wearing a white lab coat is working on a server rack. The rack contains several MicroTCA (MicroTCA) boards. The person is holding a green MicroTCA board, which is densely packed with electronic components, including a large central processor, various memory modules, and connectors. The server rack is metallic and has various ports and labels, including "DAMC2" and "L2S80". The background is dark, and the lighting is focused on the server and the person's hands.

MicroTCA Technology Lab at DESY.

Jan Marjanovic (DESY)

9.6.2018

IEEE RT2018, MTCA pre-workshop

microTCA
TECHNOLOGY LAB
www.mtca-lab.desy.de





TRANSFER MTCA TO RESEARCH AND INDUSTRY

- ▶ Custom developments
- ▶ High-end test & measurement services
- ▶ System configuration & integration
- ▶ LLRF design

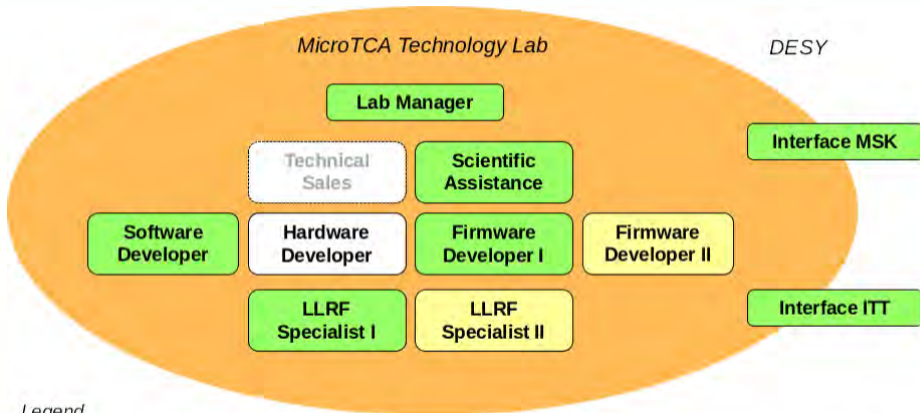
Marketing.
Services & Support.
Tech-Shop.

Status

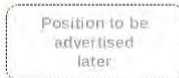
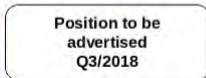




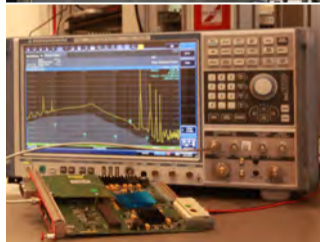


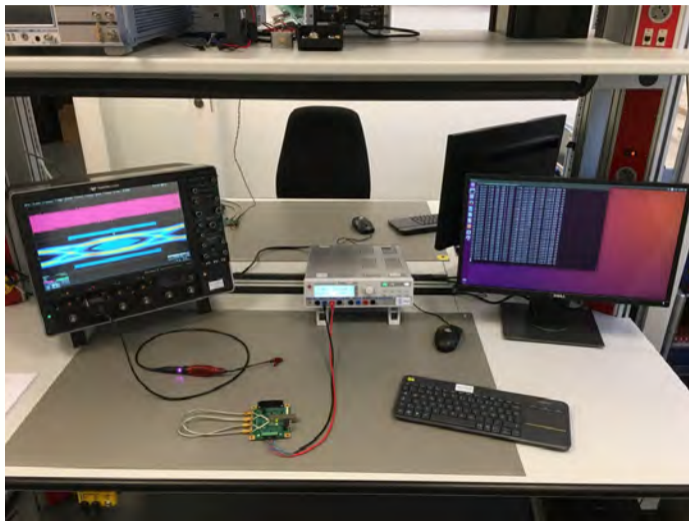


Legend

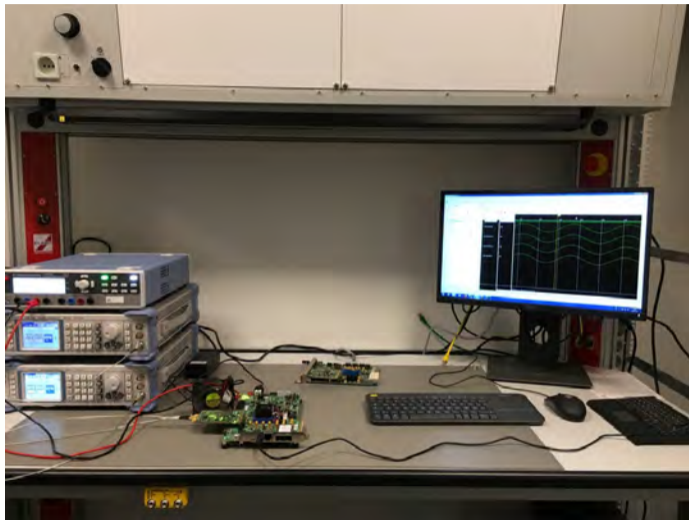


MSK - Maschine Strahlkontrolle
ITT - Innovations- und Technologietransfer



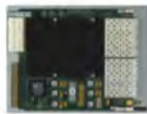


Projects





DAMC-2



DAMC-TCK7



DAMC-FMC20



DRTM-DWC10



DAMC-X2timer



DAMC-FMC25



DRTM-PZT4



DRTM-VM2LF



DRTM-AD84



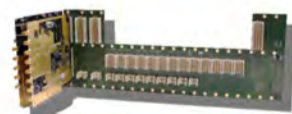
DRTM-DWC8VM1



DRTM-LOG1300



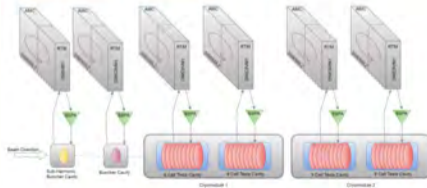
DFMC-MD22



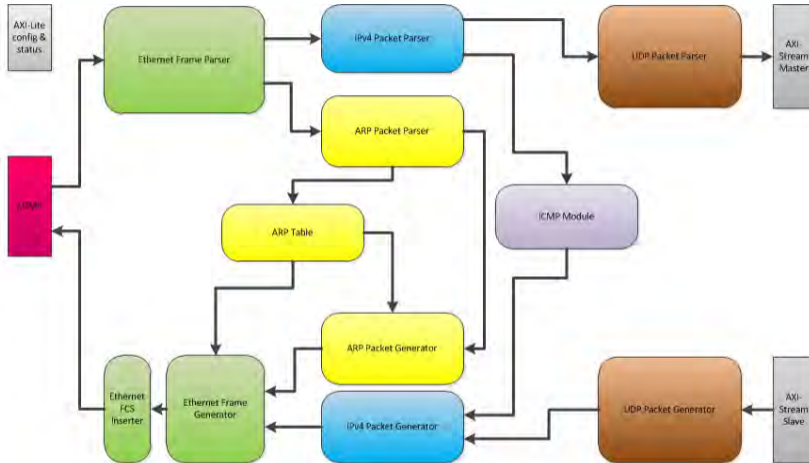
RF Backplane



Turkish Accelerator and Radiation Laboratory Ankara



System integration test at DESY & preparation for final rack assembly



10G Ethernet UDP/IPv4 engine, MicroTCA Tech Lab (DESY)

BRTM-AD84 Test Report

1 Test Info

Customer name:	DESY Microtron
Date:	25.05.2018 10:27:47 (UTC+02:00)
Tester:	

2 Board Info

Board Manufacturer:	DESY
Product Name:	DESY-AD84
Serial Number:	000000000000
Part Number:	000001
Version:	000000000000
Manufacturer:	DESY

3 FPGA Info

	CS0	CS1	CS2	CS3	CS4	CS5	CS6	CS7	PASS/FAIL
Board version:	1.07	1.07	1.07	1.07	1.07	1.07	1.07	1.07	PASS
Board part No.:	00	00	00	00	00	00	00	00	PASS

4 ADC Measurement

4.1 Filter Off

	CS0	CS1	CS2	CS3	CS4	CS5	CS6	CS7	PASS/FAIL
Offset [mV]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	PASS
Gain [mV]	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	PASS
Linearity [mV]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	PASS
Offset [mV]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	PASS
Gain [mV]	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	PASS
Linearity [mV]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	PASS
Offset [mV]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	PASS
Gain [mV]	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	PASS
Linearity [mV]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	PASS

Test end

	CS0	CS1	CS2	CS3	CS4	CS5	CS6	CS7	PASS/FAIL
Offset [mV]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	PASS
Gain [mV]	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	PASS
Linearity [mV]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	PASS
Offset [mV]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	PASS
Gain [mV]	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	PASS
Linearity [mV]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	PASS

Test end (part 2) PASS

4.2 Filter On

	CS0	CS1	CS2	CS3	CS4	CS5	CS6	CS7	PASS/FAIL
Offset [mV]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	PASS
Gain [mV]	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	PASS
Linearity [mV]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	PASS
Offset [mV]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	PASS
Gain [mV]	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	PASS
Linearity [mV]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	PASS

Test end

	CS0	CS1	CS2	CS3	CS4	CS5	CS6	CS7	PASS/FAIL
Offset [mV]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	PASS
Gain [mV]	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	PASS
Linearity [mV]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	PASS
Offset [mV]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	PASS
Gain [mV]	1.43	1.43	1.43	1.43	1.43	1.43	1.43	1.43	PASS
Linearity [mV]	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	PASS

Test end (part 3) PASS

5 DAC Measurement

Test end

Reaching the community



<https://techlab.desy.de>

The screenshot shows the homepage of the MicroTCA Technology Lab. At the top, there is a navigation menu with links for 'PRESENTS', 'SERVICES', 'PARTNERS', 'EVENTS', and 'SUPPORT'. Below the navigation is a hero image featuring a computer monitor displaying a blue waveform on a black background, with the text 'High-end Test and Measurement Services' overlaid. The main content area is divided into several sections:

- OUR COMPONENTS:** A text block describing the development of universal and multi-use products for MicroTCA systems, mentioning through programming, these products are available for external customers and have been used in many other industrial and research facilities. It lists product ranges such as AMC, ATM, and ATC units.
- OUR SERVICES:** A text block stating that the MicroTCA Technology Lab offers a wide range of services including hardware and firmware development, test services, design services, consulting and requirement analysis. It notes that an open lab space is available for customers and anyone who is interested in the technology.
- OUR PARTNERS:** A text block mentioning collaboration with strong partners to provide high-level and development services. It includes a call to action: 'Find out more about the facilities and official partners of the MicroTCA Technology Lab.'
- ABOUT MICROTCA:** A text block explaining that MicroTCA (Micro Telecommunications Computing Architecture) is an electrical and mechanical open standard for storage, transport, modular and high-reliability electronic boards. It describes MicroTCA as an enhancement of this open standard and was developed by DESY and several other research institutes and industrial partners. The aim was to allow the realization of high-performance analog function modules along with powerful digital electronics. It lists advantages such as high modularity and compactness, along with state-of-the-art digital technologies supporting PCIe, 10 Gigabit Ethernet and other high-speed communications. It also mentions that MicroTCA has specific modules to become a viable standard for demanding applications in large-scale research facilities (e.g. particle accelerators, high-energy physics, plasma fusion sources) and many more. Industries with a keen interest in fully managed, compact, modular and reliable computing performance (e.g. medical technology and industrial process control) are currently evaluating MicroTCA as an alternative.
- CONTACT US!:** A section with the MicroTCA logo and contact information: 'Feedback: 01 230077 marjanovic@desy.de web: tca@desy.de'.
- ABOUT THE LAB:** A text block stating that the MicroTCA Technology Lab is one of seven Innovation Labs funded by the Helmholtz Association. DESY together with partners has created this Innovation Lab. In a show-room we are able to demonstrate major boards and systems for potential users of this technology. For existing users of the technology we offer lab space with high-end measurement equipment where we can test, verify and develop products under development together with the customer. Along with hardware development, the lab has a strong focus on FPGA Firmware development. This effort can be offered through design services as well as complete system integration projects.

The screenshot displays the MicroTCA system configurator web interface. At the top, there is a navigation menu with links for PRODUCTS, SERVICES, PARTNERS, EVENTS, and SUPPORT. Below the menu, there are two images of hardware components. The main section is titled "ADVANCED MEZZANINE CARDS" and contains five product cards:

- DAMC-TCK7**: 7 FPGA, 16 GB DDR3 SDRAM, 16 GPIO on front panel (30 Pins)
- AM 902K11-y2**: 4 Core 2.1 GHz Intel Core i7, 3612QE CPU, Up to 34 GB ECC DDR3-1333 SDRAM, Configurable 256x1600 pixel resolution, 4 core 2.1 GHz Intel Core (7-3612QE), 8 GB RAM
- DAMC-FMC20**: FMC Carrier Board, Supports 2 FMCs One FMC module and one LPC module, Dual FPGA processing, IC32SLX107 for serial communication including PCIe
- DAMC-FMC25**: FMC Carrier Board, Double width, mid box, AMC, RTM Clock Div 2 support, 2x FMC, AD9515A 57.2 (GPIO) interface, Inboard Spartan-6 FPGA
- NAMC-piTimer**: Timing System, Can be used as a transmitter or receiver module, delivers precision clocks on TCLKA and TCLKB, provides triggers, gates, clocks, 2x 8.240 outputs at front panel with 2 triggers

Below this section is the "REAR-TRANSITION-MODULES" section, which includes:

- DRTM-AD14**: 8 channel ADC, 10-bit, 4 channel DAC, 20-bit, Resistor matchable (10k on input), Resistor matchable (swapping bits)
- DRTM-OS1VM1**: RTM 8-Channel Direct Sampling 1-Channel Vector Module, 8 analog input channels (5 to 400MHz), 2 analog input channels (DC to 400MHz), 1 high frequency vector modulator channel (5 to 6.5GHz) from DC
- DRTM-LC1130R**: 100W Low Loss Power Processor, 100W maximum power @ 100MHz, supports from 400MHz to 6GHz, Conversion: 20 W input (calibrated) level regulated up to 100 W output
- DRTM-OWC18**: 18 channel high frequency down-conversion from 12GHz - 4GHz, Short-term AM, PM stability $\pm 0.005\%$, Supports various intermediate frequencies between 5MHz and 40MHz
- DRTM-OWC3VM1**: 3VM 20 Channel Down-Converter, 20 channel high frequency down-conversion from 12GHz - 4GHz, Short-term AM, PM stability $\pm 0.005\%$

On the right side of the interface, there is a "REQUEST QUOTATION" button, a section for "Popular MicroTCA Applications" with links to "Landing_CentreStation_127", "Desktop_CentreStation_127", and "One_South_Controller_127", and a summary of resources: "Free power module slots: 0", "Free MCH slots: 0", "Free AMC slots: 4", "Free RTM slots: 4", "Free FMC slots: 2". Below this, it shows "Power supply: 600 W" and "Power consumption approx: 148.2 W". At the bottom right, there is a "Items in shopping cart" section with a list of items and their quantities.

§ 1 Subject of the Agreement

- (1) The Subject of this Agreement is the cooperation between the Parties within the “Helmholtz Innovation Labs” with the title “MicroTCA Technology Lab - A Helmholtz Innovation Lab” (HIL-02) funded by the Helmholtz Association]
- (2) The Parties shall cooperate in one or more of the following areas of activities:
 - Advance research and development for next generation MicroTCA systems, including the investigation of new materials, design concepts, interfaces and communication protocols.
 - Joint marketing activities to promote MicroTCA as a standard and foster its widespread adoption in research and industry through collaboration in market research, appearances in showroom, industry exhibitions on conferences and trade fairs.
 - Implementation of a cutting edge lab for analog and digital developments.
 - MicroTCA component design.
 - Tutorials, trainings and workshops with a focus on MicroTCA, electronics design, test and measurement.
 - Resolution of interoperability issues between MicroTCA components of different manufacturers through joint tests and design reviews.
 - Pooling hardware to enable potential users a short term evaluation of MicroTCA systems on a loan basis.

7th MicroTCA Workshop for Industry & Research

5 – 6 Dec 2018

CFEL, DESY, Hamburg

