AMC and RTM Boards Intended for Performance Evaluation of MTCA.4 Based Modules

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Introduction

➢ Two MTCA.4 modules will be presented:
   - DAMC-AMCTEST
   - DRTM-RTMTEST

➢ Boards will be used for:
   - Performance evaluation of analog modules compliant with DESY Analog Class Recommendation A1.1
   - Automated teststand for MTCA.4 modules
ZONE3 Analog Class Recommendation

> Analog signal transmission zone:
  - 10 channel AC-coupled differential input signals
  - 10 channel DC-coupled differential input signals
  - 5 channel DC-coupled differential output signals

> Digital clock signal transmission zone:
  - 6 AC-coupled differential inputs for low-jitter clock signals

> User signal transmission zone:
  - 6-12 LVDS inputs / outputs for user-configuration
  - Optional 3 LVDS outputs with fixed output direction
  - Optional high-speed link

> Full specification available on website: mtca.desy.de
This board is an AMC module that can be used to test RTM modules working with frequencies up to 3 GHz.

Features:

> Fully compliant with DESY Analog Class A1.1 recommendation
> 10 analog channels with SMA outputs.
  - AC(10-3000 MHz)
  - DC(DC-1000 MHz)
> 6 x DAC
  - 16 bit, 250 MSPS
  - 5 outputs to ZONE3
  - 1 output to SMA
DAMC-AMCTEST

➢ Clock distribution
  ▪ 6 SMA clock outputs (ZONE 3)
  ▪ DACs and FPGA can be clocked either from ZONE3 or external source (SMA input).

➢ Optional FPGA module:
  ▪ Mercury KX-1 module from Enclustra
  ▪ Kintex 7 FPGA (XC7K160T-1FBG676C)
  ▪ 1 GB DDR3 Memory
  ▪ PCI-e
  ▪ GbE

➢ Standard MTCA MMC
➢ Rx and Tx for trigger interlock signals
➢ MGT over ZONE3
➢ Possible operation outside of MTCA crate
DAMC-AMCTEST - S11 Measurement

![Graph showing S11 measurement data with two curves for CH1 and CH10 across different frequencies.](image-url)
The board is a RTM module that can be used to test AMC modules working with frequencies up to 3 GHz.

Features:

> Fully compliant with DESY Analog Class A1.1 recommendation
> 10 analog channels with SMA inputs.
  - AC(10-3000 MHz)
  - DC(DC-3000 MHz)
> Universal clock distribution with integrated PLL
  - 6 clock outputs to ZONE3
  - Clock signal generation from external reference with low noise PLL
  - External clock distribution
DRTM-RTMTEST

- Onboard configuration
- Standard MTCA.4 MMC
- ZONE 3 transceiver inputs and outputs (SMA)
- Possible operation outside of MTCA crate
DRTM-RTMTEST – Block Diagram

10 SMA INPUTS

10 ANALOG CHANNELS

5 DAC OUTPUTS

CLOCK GENERATION AND DISTRIBUTION

uC

USB to Serial

MMC

POWER SUPPLY

MICRO USB INPUT

ZONE 3
Summary

- DAMC-AMCTEST and DRTM-RTMTEST are boards designed for performance evaluation of MTCA.4 modules compliant with DESY Analog Class A1.1 recommendation.
- DAMC-AMCTEST was manufactured and it is in the characterization stage.
- DRTM-RTMTEST is in final design stage and soon will be send to production.
Thank you for attention!