

Latest Hardware Developments in MicroTCA.4

Thursday 9 December 2021 12:35 (15 minutes)

Powerful hardware boards are key components for future installations at DESY and other facilities. To complete the portfolio, three new AMC were projected. All new cards base on the XILINX MPSoC FPGAs which provide an exceptionally convenient way for user application development, integration and maintenance - allowing the use of high-level programming languages such as Python or SystemC.

The most advanced new board is the DAMC-DS812ZUP. It is the first product of the new coaxial analog Zone 3 RF Class. Using the new interface, 8 analog channels can be transferred from front or rear input and captured by low-latency 12-bit digitizers with 500 or 800 Msps sample rate. The ADCs feature 2.7 GHz analog input bandwidth; the amplifiers have a bandwidth of 4.8 GHz, so that the card can also operate in an interleaving mode with 1600 Gsps data rate.

In addition, DESY has been developing a MicroTCA.4-based multi-axis motion controller: DAMC-MOTCTRL. This board is a contribution to the ecosystem, since it enables controlling motion in big experiments from within the MicroTCA crate. It is designed to move up to 48 stepper motors per card in parallel - which means each card replaces up to 6 VME cards. One major benefit is the possibility to aggregate multiple cards inside crate and across DESY campus. This allows to perform position-synchronous data acquisition. Using the MicroTCA features, this device can interact with virtually any other MicroTCA card and trigger user-programmable actions.

To open the door towards new serial JESD204 digitizers, a new AMC card is also under development. It will come with RTM Class D1.2 and Class D1.3 assembly options and with high-bandwidth LVDS and MGT Zone3 interfaces so that especially new serial converters with many parallel MGT lanes can be integrated on the RTM.

A powerful MPSoC Chip is used on the AMC, so that the application can benefit from high-bandwidth parallel memory interfaces and a large number of optical transceivers on the front panel.

Summary

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Session Classification: Session 7