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# Recent developments on the Multi-axis Motion Controller in MicroTCA.4

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DESY has developed 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 the MicroTCA crate and across the DESY campus. This allows for performing position-synchronous data acquisition. Using the MicroTCA features, this device can interact with virtually any other MicroTCA card and trigger user-programmable actions.

The bring-up of the first hardware prototypes has finished successfully. The focus is now shifting toward applications. The needed firmware development was done in parallel with the hardware design. While it initially used the ZCU102 development kit for testing and demonstration, it can now be ported to the actual target hardware. The complete firmware is based on the open-source FPGA framework FWK. It takes full advantage of the heterogeneous system design: It uses the ARM-based Processing System (MPSoC) to interface the board to high-level instrument control software (e.g. Certified Scientific Software - spec) while a real-time FPGA handles multiple synchronous motor-control sequences in parallel.

In this talk, the hardware and firmware design, their current states and the latest developments will be presented.

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