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Paolo Scarbolo - MTCA.4 Applications for Accelerators: Machine Protection System and Beam Stabilization Exploiting DAMC-FMC25

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This contribution aims to show how MTCA.4 is used for the development of accelerator systems for diagnostics and beam stabilization exploiting the DAMC-FMC25 AMC carrier board features.

We present the system architecture and the final application of a Machine Protection System (MPS) and a Beam Stabilization System (BSS) in research facilities.

The MPS is composed by a control board that communicates with multiple AMC-PICO-8 8-channel picoammeters developed by CAEN ELS. The AMC-PICO-8 stores acquired data buffer up to 1 Msps and sends MPS signals back to the control board upon specific over-threshold conditions.

The BSS elaborates the information received from a position detector via the FMC-PICO-1M4 picoammeter front-end, performs the feedback controller computations and sends the correction signals directly to the FAST-PS power supplies equipped with fast low-latency SFP interfaces.

The communications with backplane (PCIe) and FMC modules (SPI) and all the high demanding computations are handled by the FPGA available on the DAMC-FMC25.

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