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Modular Machine Timing System for the ELBE accelerator based on MRF MicroTCA.4 series 300 hardware.

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At the ELBE accelerator center a new timing system is being developed based on the MRF hardware platform. It uses two mTCA-EVM-300 configured as masters and a scalable number of connected receivers (mTCA-EVR-300U, PCIe-EVR-300) to generate flexible pulse patterns for operating the machine. It allows for independent operation of two electron injectors and offers the opportunity for a combined injection into ELBE.
The control software is tailored to ELBE's requirements based on mrfioc2. All machine operations modes as well as plausibility checks have been implemented. The communication interface to the ELBE control system is provided by a Siemens PLC that is at the same time integral part of the machine safety system. It sets the allowed parameter space for the timing system according to the current machine state and interlock signals.
The system will provide timing signals on few picosecond level to machine subsystems as LLRF and diagnostics as well as to user labs allowing for individual trigger generation based on the machine event signals. Universal IO modules offer a variety of logic levels on the receiver front panel while the MicroTCA backplane can be used to trigger hardware installed.

Summary

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