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Implementation of embedded EPICS for MELSEC iQ-R in the SRILAC LLRF System

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At the Superconducting RIKEN Linear Accelerator (SRILAC), auxiliary control and monitoring tasks for the RF system, such as RF voltage and power readout, feeder control, and tuner adjustments, are managed using a Mitsubishi MELSEC iQ-R series programmable logic controller (PLC). This PLC is directly connected to the FPGA-based LLRF controller, forming an integrated system for low-level RF operations. In the conventional configuration, the PLC communicated with EPICS via an external Linux computer using the MC protocol over TCP/IP, which often suffered from limited reliability compared with fieldbus-based solutions. To overcome this limitation, we implemented EPICS support directly on the C-language intelligent function module of the iQ-R series. By embedding the IOC in the PLC module itself, the need for an external Linux interface was eliminated, and communication stability was significantly improved. The new system has been deployed and tested in the SRILAC LLRF environment. This paper describes the system architecture, details of the embedded implementation, and operational results obtained during beam operation.

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Yes

Footnotes

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