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Real-time data acquisition with CompactPCI serial platform at PSI

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Data acquisition (DAQ) is an ubiquitous feature in modern particle accelerator measurement and control systems. At the Paul Scherrer Institut (PSI), a next generation of electronic devices is being designed to meet the demands of upcoming renewal of facilities. The new developments utilize the CompactPCI Serial (CPCI-S.0) platform, and will cover a diverse set of applications, including Low Level Radio Frequency (LLRF), Longitudinal Beam Loss Monitoring (LBLM), and Filling Pattern Monitoring (FPM) systems. Careful design considerations and selection of an optimal architecture are crucial to fulfill a variety of DAQ requirements such as maximum frequency of acquisition, size of the data and different modes of triggering. In this contribution, we focus on the real-time DAQ implementations utilizing a multiprocessor system on chip (MPSoC) technology. We review the IP components developed in-house at the PSI that provide the DAQ functionality. We demonstrate, that by reusing the IP components development, prototyping and testing of applications requiring the DAQ are accelerated.

Footnotes

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