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PandABox: Real-time Processing Platform for Scanning and Feedback applications

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Synchrotron scanning techniques, particularly in experimental continuous scans, require a high level of synchronization between data acquisition- and motion systems - (optics or sample). The purpose of the PandABox system [1] is to address multi–technique scanning- and feedback- applications. The initial objective driving the project was to provide a real-time, multi-channel, encoder processing system to deliver synchronous triggers. The first resulting system, based on a multi-purpose platform, was constructed to address FLYSCAN technique, but the modularity of the platform has also been demonstrated as a real-time beam-intensity-attenuation controller for synchrotron experiments, Current-Injection-Efficiency-and-Lifetime measurement systems (CIEL) and a derivative product for readout electronics. This flexible electronic system embeds an industrial board with a powerful Xilinx Zynq 7030 SoC (System on Chip)[2], associated with peripheral modules: FMC slot, SFP modules, TTL and LDVS I/Os and removable encoder. The framework, called PandABlocks [3], comprises firmware and software with the FPGA logic, TCP server, webserver, boot sources and root filesystem. All embedded functionalities are run-time configurable and rewireable over the use of multiplexed data and control buses. The project was developed in collaboration between Synchrotron SOLEIL and Diamond Light Source to provide an open solution from the hardware-level up to control systems integration (TANGO or EPICS). This paper details the capabilities of the platform for hardware performance, framework adaptability and applications status.

References

[1] Zhang, S., et al. "PandABox: A Multipurpose Platform for Multi-technique Scanning and Feedback" ,ICALEPCS. 2017.

[2] http://zedboard.org/

[3] Christian, G. et al. "PandaBlocks-a flexible framework for zynq7000-based soc configuration".ICALEPCS 2019.

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Yes

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