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High performance generic beam diagnostic signal processor for SHINE

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A generic signal processor has been developed for beam diagnostic system in SHINE. The stand-alone processor is used for the signal processing of stripline BPM, cavity BPM, cold button BPM, beam arrival measurement, bunch length measurement and other diagnostic systems. The main core is an SoC FPGA, which contains both quad-core ARM and FPGA on a chip. The ARM runs LINUX OS and EPICS IOC, and FPGA performs peripheral interfaces and high-speed real-time signal processing. An FMC carrier ADC board is mounted, which can sample 4 channels input signal with a maximum sampling rate of 1GSPS. The processor is equipped with a White Rabbit timing card, which can realize 1MHz high repetition rate synchronous measurement. Lab test results and on-line beam tests prove that the processor has high performance. This paper will introduce the processor development and applications on SHINE.

Footnotes

Funding Agency

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Yes

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