

Design of a Data Acquisition Module Based on PXI for Waveform Digitization

Thursday, May 25, 2017 2:18 PM (18 minutes)

The waveform digitization is more and more popular for readout electronics in the particle and nuclear physics experiment. A data acquisition module for waveform digitization is investigated in this paper. The module is designed on a 3U PXI (PCI eXtensions for Instrumentation) shelf, which can manage the measurement of two channels of waveform digitization for detector signals. It is equipped with a two channels ADC (Analog to Digital Converter) of 12 bits resolution and up to 1.8G samples per second sampling rate, and an FPGA (Filed Programming Gate Array) for controlling and data buffering. Meanwhile, a CPLD is employed to implement the PXI interface communication via PXI Bus. The electronics performance of this system was tested. The bandwidth of the system is more than 450MHz. The ENOB (Effective Number Of Bits) is up to 9.31 bits for an input signal from 5 MHz to 150 MHz and the ENOB is still above 8.17 bits for an input up to 400 MHz. The results show that the module can be successfully used in the particle and nuclear physics experiment.

Primary author: Dr CAO, Zhe (State Key Laboratory of Particle Detection and Electronics, University of Science and Technology of China)

Co-authors: Mr LI, Cheng (State Key Laboratory of Particle Detection and Electronics, University of Science and Technology of China); Mr HU, Jiadong (State Key Laboratory of Particle Detection and Electronics, University of Science and Technology of China); Prof. AN, Qi (University of Science & Technology of China); Prof. LIU, Shubin (University of Science & Technology of China); Mr MA, Siyuan (State Key Laboratory of Particle Detection and Electronics, University of Science and Technology of China)

Presenter: Dr CAO, Zhe (State Key Laboratory of Particle Detection and Electronics, University of Science and Technology of China)

Session Classification: R3-Front-end electronics and fast data transmission(3)

Track Classification: Front-end electronics and fast data transmission