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A Real-Time multi-channel ADC based Digitizer for radiation detector applications

Recently, multi-channel waveform digitizer is increasingly used for new detector research. We will describe a novel real-time digitizer based on the latest multi-channel Analog-to-Digital Converter (ADC) for radiation detector applications. The digitizer can be configured as 16, 32, 64, 128 channels for different kinds of pixelized detectors. ADS52J90 chip, which is a high-speed, high-performance ADC from TI, is chosen as the digitized core in the system. All function modules, such as data buffering and transferring, are implemented in the Field Programmable Gate Array (FPGA). Mass post-digitizing data are stored in a DDR3 SDRAM memory using Avalon bus protocol. For different configurations, data buffering method in the FPGA are not identical. The buffered data finally are transferred into a PC via a PCI Express (PCIe) interface, which is developed based on the Altera Avalon Memory Mapped Hard IP. To validate the digitizer, some detector experiments, such as cosmic ray muon scattering imaging experiment based on scintillating fiber and semiconductor detector readout based on new material for Single Photon Emission Computerized Tomography (SPECT) imaging, will be carried out. The following experiment results will be presented in the meeting.

Minioral

Yes

IEEE Member

No

Are you a student?

Yes

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