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The Fast Readout Unit for general control and data acquisition in heavy-ion experiments

To reduce the development time, production cost, and maintenance difficulties of the readout electronics, a Fast Readout Unit (FRU) has been designed for generic control and data acquisition in heavy-ion nuclear experiments at the Heavy Ion Research Facility in Lanzhou (HIRFL). FRU is an FPGA-based data acquisition advanced mezzanine card (AMC) module, suitable for micro telecommunications computing architecture (MicroTCA) and MicroTCA systems. The FRU can connect four front-end readout boards (FEBs) through optical fiber links for data collection, packaging, and transmission. The system backplane bus uses the high-speed serial PCI Express (PCIe) bus, which is several times faster than the traditional parallel bus. This paper checks the single-board loopback test, dual-board loopback test, and application test on the data transmission system. As a result, it is proved that the system can receive data via fiber optic link, transmit data via PCIe link, and accomplish data restoration. In addition, the AMC standard requires that the module management controller (MMC) be implemented onboard to monitor available and system of hardware needed management parameters. Thus, the system can meet the needs of heavy-ion nuclear experiments. This paper will discuss the design and performance of the FRU.

Minioral

No

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No

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