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Real-time Data Flow Control for CBM-TOF Super Module Quality Evaluation

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Super module assembled with MRPC detectors is the component unit of TOF spectrometer for the Compressed Baryonic Matter (CBM) experiment. Quality of super modules needs to be evaluated before it is applied in CBM-TOF. The maximum data rate is up to 6 Gbps at each sandwich TDC station (STS), which is used to digitize time signal exported from super module. In this paper, a real-time data flow control method is presented for quality evaluation. In this control method, data flow is divided into three types: scientific data flow with digitized time information, status data flow and control data flow. In scientific data flow, data of each STS is divided into 4 sub-flows, and is read out by a distributed network, which consists of multiple readout mother boards (DMBs) and readout daughter boards (DRMs) groups. Each DRM is expected to support Gigabit Ethernet transmission to DAQ at the rate of 400 Mbps. In status data flow, status data is aggregated into a specialized DMB and DRM group via crate backplane, and then is uploaded to DAQ. In control data flow, control data is downloaded to all DMB and DRM groups and STS in the opposite direction of status data flow. Preliminary test result indicates that average transmission capability of single DRM reaches 540 Mbps over the expectation of 400 Mbps. This data flow control method can meet the requirement of CBM-TOF super module quality evaluation.

Minioral

No

Description

RT data flow

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