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Data acquisition system of the TPC/MPD detector for the NICA project

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The data acquisition system (DAQ) is consisting of 95232 registration channels in total containing 1488 Front-End Cards (FEC) grouped into 24 groups of 62 pcs. in each. Each FEC has an individual full-duplex few-gigabit communication channel with Readout and Control Unit (RCU). Each RCU manages each FEC within the group of size of 1/24 of full TPC, collects data with subsequent transmission via a high-speed optical channel into the Local Data Concentrator (LDC) computer. Every 4 optical channels are connected to a LDC computer via a Data Concentrator Unit (DCU) card installed. Each of the 6 DCU controls four RCUs, receives data from them and stores it into the LDC's memory via the PCIe interface. LDC computers are docking point of the TPC DAQ with the MPD DAQ.

The DAQ was designed for operating with raw TPC event of size of 37 MB containing information up to 2000 tracks from central heavy ion collision and trigger rate of up to 7 kHz in zero suppression mode.

The report presents the overall structure of the system, realized functionality of its main parts and result of the DAQ prototype testing.

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