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An sTGC Prototype Readout System for ATLAS New-Small-Wheel Upgrade

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ATLAS will replace the muon end-cap detectors, the so-called Small Wheel(SW), with the New Small Wheel (NSW) in the Phase-I upgrade to enhance its high rate performance. Small-Strip Thin Gap Chambers (sTGCs), developing from the Thin Gap Chamber(TGC) technology but with much smaller strip pitch, have been selected as one of the main detector technologies to be used for the NSW. An sTGC quadruplet consists of four pad-wire-strip planes. To readout sTGC signals, two kinds of Front End Board (FEB)will be designed, pad Front End Board(pFEB) and strip Front End Board (sFEB). The pFEB with the maximum 192 channels is responsible for reading out pad and wire signals of each plane, while the sFEB with the maximum 512 channels is responsible for reading out strip signals of one gas-gap. This paper presents a readout system capable of testing one full-size sTGC quadruplet. It consists of 4 pFEBs and 4 sFEBs along with one specifically designed DAQ board. The FEBs use VMM3 ASIC for analog signal amplification and digitization. The DAQ board is able to configure and readout up to 8 FEBs through Gigabit Ethernet. This readout system can be used to evaluate the functionality and performance of sTGC prototype, and help optimize the design of the final pFEB and sFEB.

Minioral

Yes

Description

VMM3 ASIC DAQ board

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