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Evaluation of a streaming readout solution for Jefferson Lab experiments

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Jefferson Lab (JLab) operates the CEBAF accelerator that provides a high energy (up to 12 GeV) and high current (up to 150 μA) polarized electron beam for fixed target experiments. JLab's mission is to provide substantial progress in understanding the Quantum Chromo Dynamics (QCD), the current theory of the spectrum and the dynamics of hadronic matter. Given the broad scientific program a general-purpose detector, CLAS12, has been designed and constructed. Such a detector requires a sophisticated trigger and current experiments use an on-line FPGA-based system that relies upon custom firmware and electronics both of which are difficult reconfigure from one experiment to the next. To overcome these challenges transitioning to a streaming readout has been proposed since it would allow a more flexible, easier to debug, software trigger to be developed. To facilitate this JLab is gaining experience with streaming readout systems and is actively working to design and test a streaming data acquisition architecture. Significant work has already been done to make existing front-end electronics compatible with operation in streaming mode. Software-wise, much work remains to be done but an existing framework, TriDAS, which was developed for underwater neutrino telescopes can, in principle, be used with the existing JLab hardware. A test stand is already in place in the INDRA DAQ development lab at JLab. This paper will present the development of this TriDAS based test system and it's operation in-beam using parts of the CLAS12 detector to evaluate streaming readout for a large general purpose detector.

Minioral

No

IEEE Member

No

Are you a student?

No

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