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A VXS [VITA41] Trigger Processor for the 12GEV Experimental Programs at Jefferson Lab

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The VXS_Trigger_Processor [VTP] was developed and commissioned for CLAS12 in the fall of 2016. This board is a VITA41 switch card and it collects data from a variety of front-end TDC and Flash ADC modules. The VTP has since been used in several experiments at Jefferson Lab serving as the L1 trigger module for a variety of detector types, such as stacked calorimeters, strip calorimeters, time-of-flight, Cerenkov, hodoscopes, drift chambers, and silicon strips. Trigger algorithms implemented include cluster finding (1D, 2D), drift chamber segment and road finding, geometry matching between various detectors, particle counting, and general global trigger bit processing. The VTP is also capable of reading out each front-end crate with up to 40Gbps Ethernet which is an enormous increase compared to the currently used 200MB/s VME bus. Recent progress has been made to show that a firmware and software upgrade can enable existing Jefferson Lab front-end crates to operate in a streaming DAQ mode. In February 2020, tests will be performed on a full calorimeter and matched hodoscope which are components of the CLAS12 Forward Tagger detector system with beam in Hall B. This paper details the hardware performance, triggered, and streaming applications that have been implemented using the VTP for several experiments at Jefferson Lab.

Minioral

Yes

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Yes

Are you a student?

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