

Trigger Primitive Generation using FELIX FPGA system: A Case Study for DUNE

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DUNE will be a long baseline neutrino experiment with a broad physics program, including neutrino oscillation, proton decay, and supernova studies. The detector, located 1,500 m (4,850 ft) underground at SURF, South Dakota, will be 1,300 km (810 mi) away from the ultimate 2.4 MW proton beam source at Fermilab. Four far detector modules, of 17 kt total mass of liquid argon each, will produce ionization data at a rate of $\sim 1\text{-}2$ TB/s per module, while in total $\sim 30\text{-}60$ PB/year can be permanently stored. This contribution presents the design and operational performance of a trigger primitive generation (TPG) algorithm implemented on FPGAs using the ATLAS FELIX readout interface in the DUNE Trigger and DAQ system. Although in parallel a software-based TPG was developed and delivered as the baseline solution, we demonstrate that the FPGA-based system was successfully integrated and put into operation.

Alternate track

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