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Designing Data Read Out Electronics for the CHANDLER Neutrino Detector[1] JAH'SHAWN ROSS, North Carolina Central University , THE CHANDLER DETECTOR PROJECT COLLABORATION — CHANDLER is a reactor neutrino detector technology with applications in nuclear security, nuclear instrumentation, and basic science. In 2017, a prototype named MiniCHANDLER was deployed at North Anna Nuclear Generating Station where it demonstrated the detection of reactor antineutrinos. The CHANDLER collaboration has been working on improvements including the readout electronics. The old electronics were not able to effectively measure higher energy neutron-proton recoils, as there was cross-talk between neighboring channels, and high-energy pulses would lead to a large oscillation of the baseline. The new electronics consist of a custom all-in-one base that will digitize and process the PMT signals with improved dynamic range, no cross-talk, and provide the high voltage. This all-in-one base is based on a field programmable gate array (FPGA), which allows coding capabilities that were not present in the previous electronics. To improve the trigger algorithm, a new running baseline code was designed that takes an average of previous ADC counts and accounts for baseline fluctuations. Having this new baseline potentially allows for a more precise online separation of neutrons and gammas in the FPGA. Once these electronics are fully assembled testing will take place.

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