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DAQ Design and Implementation for the HEPS-BPIX 1M Detector

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HEPS-BPIX 1M is a silicon detector with 1 million pixels, which is designed for the High Energy Photon Sources (HEPS) in Beijing, China. It is a high-frame-rate pixel detector working in the single-photon-counting mode. The frame rate is designed to 1 kHz, which leads to ~ 2GB/s high data bandwidth. The data acquisition (DAQ) system need to read out data efficiently. Meanwhile it should provide the functionalities including run control, data transmission, event building, lossless compression, data storage, real-time image display and so on. The DAQ system is deployed in a high performance server, using open source QT framework to develop the user interface. The test results show that the DAQ system is stable and reliable, and the required data bandwidth has been achieved. The detailed design and implementation will be presented, and the results of the performance test will be shown.

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