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Design and Implementation of the DAQ System for the HEPS-BPIX 6M Detector

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The High Energy Photon Source (HEPS) is a 4th generation synchrotron radiation light source of ultrahigh brightness that is currently under construction in China. HEPS-BPIX 6M is a dedicated silicon pixel detector under development that will be used in HEPS. The detector hosts about 6 million pixels which will be assembled with 40 modules, covering a large effective detection area of about 28.8×40.5 cm². The readout chip supports dual threshold readout and achieves maximum frame rate up to 1 kHz. The characteristics of the detector leads to high readout data bandwidth, which brings challenges for the data acquisition. Based on the detector's specifications, a distributed DAQ system has been designed to achieve high-throughput data readout, high-performance data processing and real-time data storage. Meanwhile, friendly user interface has been provided for configuration, run control, real-time monitoring and so on. The detailed design, implementation and performance tests will be presented in this talk.

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