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The readout of the sPHENIX MAPS vertex detector

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The MVTX detector will serve as the inner tracker of the sPHENIX experiment at RHIC. It is an extremely precise silicon pixel vertex detector, with excellent displaced secondary vertex detecting capabilities. The MVTX will enable key measurements of heavy-flavor-tagged jets and B-mesons in heavy ion collisions. The detector is based on the latest generation of Monolithic Active Pixel Sensors (MAPS) technology, developed for the ALICE collaboration at CERN. The readout chain is composed of three parts: a sensor stave assembly, a RU (Readout Unit) board, and a FELIX (Front End Link eXchange) board. The stave assembly consists of nine ALPIDE (ALice Pixel DETector) sensor chips, which will send its data on nine gigabit links over a FireFly cable to an RU board. The RU board consists of two FPGAs, one for reading the stave data and sending data using CERN's rad-hard GBT links over fiber to the FELIX board and a second FPGA which is used for scrubbing (SEU detection). The FELIX board consists of an FPGA that reads out the data over the fiber link and sends its data to a 16 lane PCIe interface, placing the data to disk. We will present the latest R&D efforts and performance achievements of the three parts of the Readout system mentioned above.

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