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Characterization of Zynq-Based Data Aquisition Architecture for the 129,024-Channel UHR PET Scanner Dedicated to Human Brain Imaging

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The Ultra-High-Resolution (UHR) positron emission tomography (PET) scanner is the latest LabPET II-based device being designed at Université de Sherbrooke for imaging the human brain. This new scanner uses the already established LabPET II technology capable of sub-millimetric spatial resolution in preclinical imaging. The UHR architecture implements 129,024 detection channels. The purpose of this paper is to assess the maximum data acquisition rate achievable by the second version of the Embedded Signal Processing Unit (ESPUV2) of the UHR architecture, handling 2304 of the 129,024 channels. To achieve this goal, we built and characterized a test PCB implementing the features of the UHR DAQ. This prototype ESPUV2 reads the data generated from 768 channels and transfers them to an acquisition computer by an Ethernet link. During the preliminary testing, the data throughput reached 49.61 MB/s for continuously generated data and a mean value of 44.94 MB/s for randomly generated data.

Minioral

Yes

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Yes

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