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A low power DAQ system with high-speed storage for submersible buoy

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Submersible Buoy (SB) is an important apparatus capable of long-term, fixed-point, continuous and multi-directional measurement of acoustic signals and hydrological environment monitoring in the harsh marine environment, providing important information for hydrological environment research, marine organism research and protection.

The SB has long runtimes and recovery cycles, and the entire system is powered by batteries. So, the DAQ system should be as low-power as possible due to the requirement of long-term, stable underwater operation. Meanwhile, the DAQ system also demands large capacity storage because of long runtime and relatively high sampling rate. Owing to the wide distribution of the SB, the DAQ system must ensure high-speed data storage as well as high-speed upload path to the host when retrieving data in order to reduce data collection time and improve the extraction efficiency.

Given all above, this paper proposes a DAQ system, which consists of multi-channel ADCs for hydrophones signal digitization; one Spartan-6 FPGA for data package, capture and compression; SD card for short-term data storage; SSD for long-term data storage along with dual Gigabit Ethernet for data upload. Preliminary test shows that the DAQ system can achieve high-speed data conversion, storage and readout at comparatively low-power.

Description

hardware

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Yes

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