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Design of the WaveDAQ system

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The WaveDAQ data acquisition system has been developed at PSI, Switzerland in collaboration with INFN Pisa in the past nine years. It features integrated data acquisition up to 5 GSPS/12 bits of resolution using the DRS4 chip, combined with sophisticated triggering capabilities. The DAQ boards of this system have integrated bias voltage generation for SiPMs, shaping, pre-amplification and scalars. Each board with 16 channels can be either read out directly with onboard Gigabit Ethernet, or in a custom crate using Gigabit serial links. A 3 HE crate houses up to 256 channels with central clock distribution, triggering and data readout, allowing timing measurements down to 10 ps resolution.

The paper will describe the design principles and their implementations and show our experience to deploy almost 9000 channels of this system in the MEG experiment and other applications such as beam profile monitors and the FOOT experiment. Emphasis will be given on the lessons learned and best practices in designing such large custom systems.

Collaboration

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