

# Acquisition and Control Module for the DAMIC-M Experiment

Friday, 31 May 2024 08:50 (1 minute)

We introduce a new Acquisition and Control Module (ACM), designed for the DAMIC-M (Dark Matter In CCDs at Modane) experiment. This novel technique to search for dark matter uses thick CCDs, almost one mm, which can detect signals as low as a few electrons. One Acquisition and Control Module incorporates all power, bias and clock generators required to control four CCDs, as well as four 18-Bit, 15Msps ADC channels. In this experiment, high resolution detection of a single electron is made possible by taking repetitive measurements of the pixel charge. The ACM functionality is managed by a powerful Intel Arria 5 FPGA, allowing for remote configuration of all parameters. This 6U VME form factor module was designed to work independently, or inside a traditional VME crate. The board can interface via two 6Gbps SFP optical links and one Gigabit Ethernet port on the front panel, as well as via the VME64 back plane. Multiple module synchronization with simultaneous sampling is made possible with four LVDS signals via an auxiliary front panel RJ45 connector. The DAMIC-M experiment will run 50 Acquisition and Control Modules, installed at the Laboratoire Souterrain de Modane in France. The full design and test results are presented.

## Collaboration

## Role of Submitter

I am the presenter

**Primary authors:** BOGDAN, Mircea (The University of Chicago); Mr MUNAGAVALASA, Sravan (The University of Chicago); PRIVITERA, Paolo (University of Chicago); DHELLOT, Marc (LPNHE); FLORIN, Daniel (University of Zurich); GAIOR, Romain (LPNHE (CNRS)); KILMINSTER, Ben (Universität Zürich); IDDIR, Lounes (LPNHE); ANTOINE, Letessier-Selvon - (LPNHE); VOLLHARDT, Achim (University of Zurich)

**Presenter:** BOGDAN, Mircea (The University of Chicago)

**Session Classification:** Electronics and On-Detector Processing - Poster session

**Track Classification:** T7 - Electronics and On-Detector Processing