

NA62: The LKr Electronics

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Installation & Setup (1/5)

Crate Setup

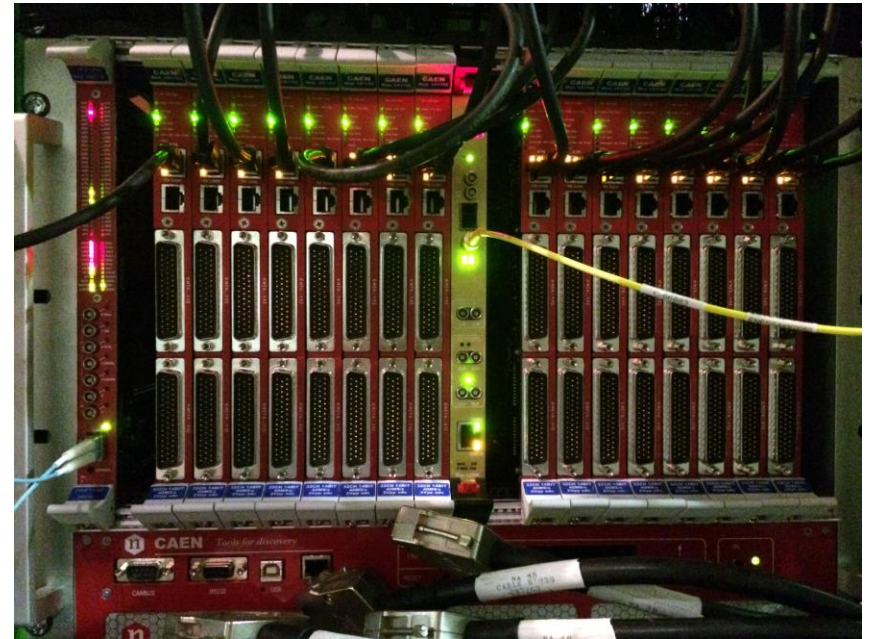
- 8 vertical columns of 4 crates
- Almost all installed



Installation & Setup (2/5)

Calorimeter Readout Module Setup

- CREAMS: each crate contains 16 readout modules, one bridge and one motherboard (about half installed)
- Bridge: allows communication with the PC farm
- Motherboard: receives the L1 trigger from the PC farm and administers it to the CREAMs
- Ethernet connection: the creams send data via Ethernet ports to the switch, which then sends that data to the PC farm



Installation & Setup (3/5)

The Switch

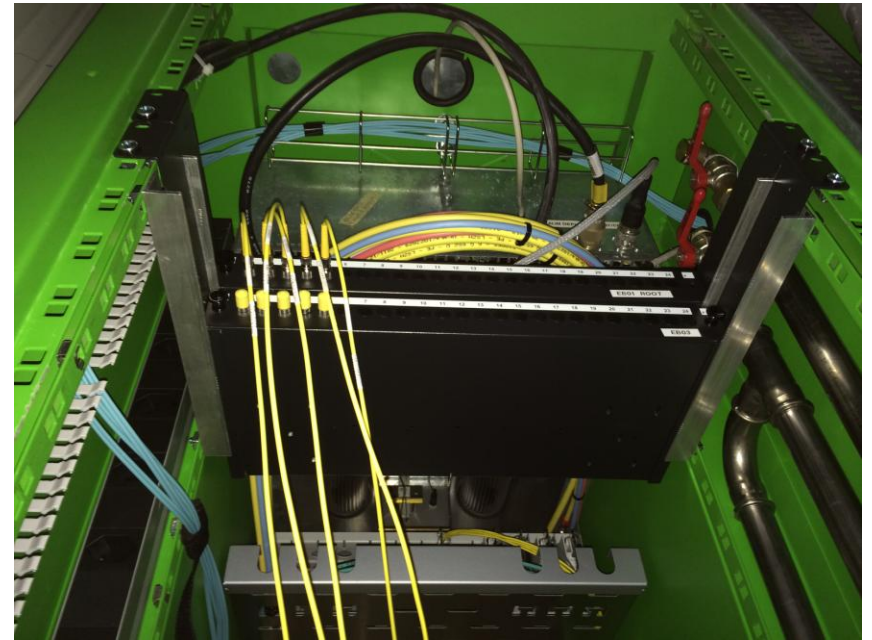
- Collects data from the CREAMs via Ethernet cables
- Combines data from all 16 CREAMS into a single 10Gb/s Ethernet connection, which is then sent up to the PC farm
- We have all of these installed but only 4 are currently configured
- There is also a problem with fitting the backplane behind the switches



Installation & Setup (4/5)

The Trigger

- Administers the L1 trigger from the PC farm to each motherboard, which in turn administers the trigger to each individual CREAM



Installation & Setup (5/5)

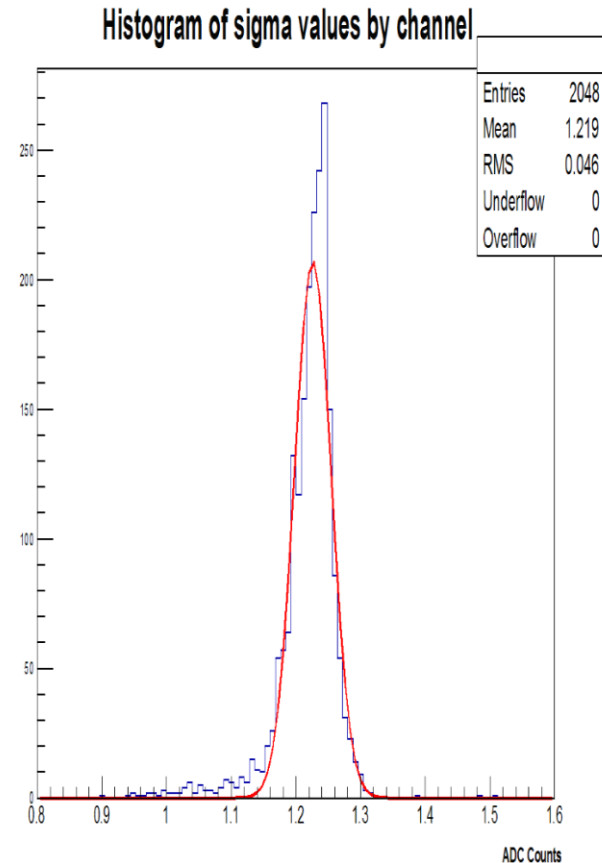
LKr Channels

- These channels send an analog signal from the LKr tank to each CREAM
- These are all in place, but few are actually connected
- I have not had any role in connecting these



Real Data / Equipment Testing (1/2)

- First real data!
- Data was acquired from 4 crates (64 CREAMS; 2048 channels) during a short period of time
- We can only take data for a short time currently because the cooling system is not yet installed
- I wrote and implemented a code which plotted a histogram of each channel and extracted the mean and sigma values
- I then plotted two histograms of all mean and all sigma values and fit them with a Gaussian
- I included the underflow and overflow to make sure no data was outside the range of each histogram
- Good result!



Real Data / Equipment Testing (2/2)

- This code is time-sensitive because it extracts the fit parameters of 2048 histograms currently and will eventually need to do so for 16,384 histograms
- I implemented two different methods for the same desired output
- Method 1:
 - creates a temporary array of 32 histograms (corresponding to all channels of a single CREAM)
 - The two final histograms (mean and sigma) are filled with the Gaussian fits of all 32 histograms
 - The array of histograms is emptied and refilled when the data from a different CREAM is being analyzed.
- Method 2:
 - creates an array of all 2048 histograms and iterates through to fill them with data
 - fits all 2048 histograms iteratively and extracts the mean and sigma values, which are then passed to the final histograms
- Method 1: ~3 minutes
- Method 2: >1hour

