Cosmic ray muon detector data acquisition electronics (DAQ)

## QCC-CUNY Physics dept. (Armendariz and Stalerman) - 2024

Design:

The DAQ front-end PCB includes amplifiers, discriminators, event counters, and signal amplitude detector circuitry to make two channel coincidence measurements from 2 PMTs. The events are time stamped using GPS.

Arduino microcontroller is used to receive data from the DAQ front-end and reset it

Raspberry Pi computer is used to operate Arduino board and upload cosmic ray data to internet

Perforated electronics bread-board contains a GPS receiver used to time-stamp coincidence events; two LM317 variable voltage regulators to power DC-DC converters for PMT high voltage power; and ambient temperature and pressure sensors to record atmospheric data
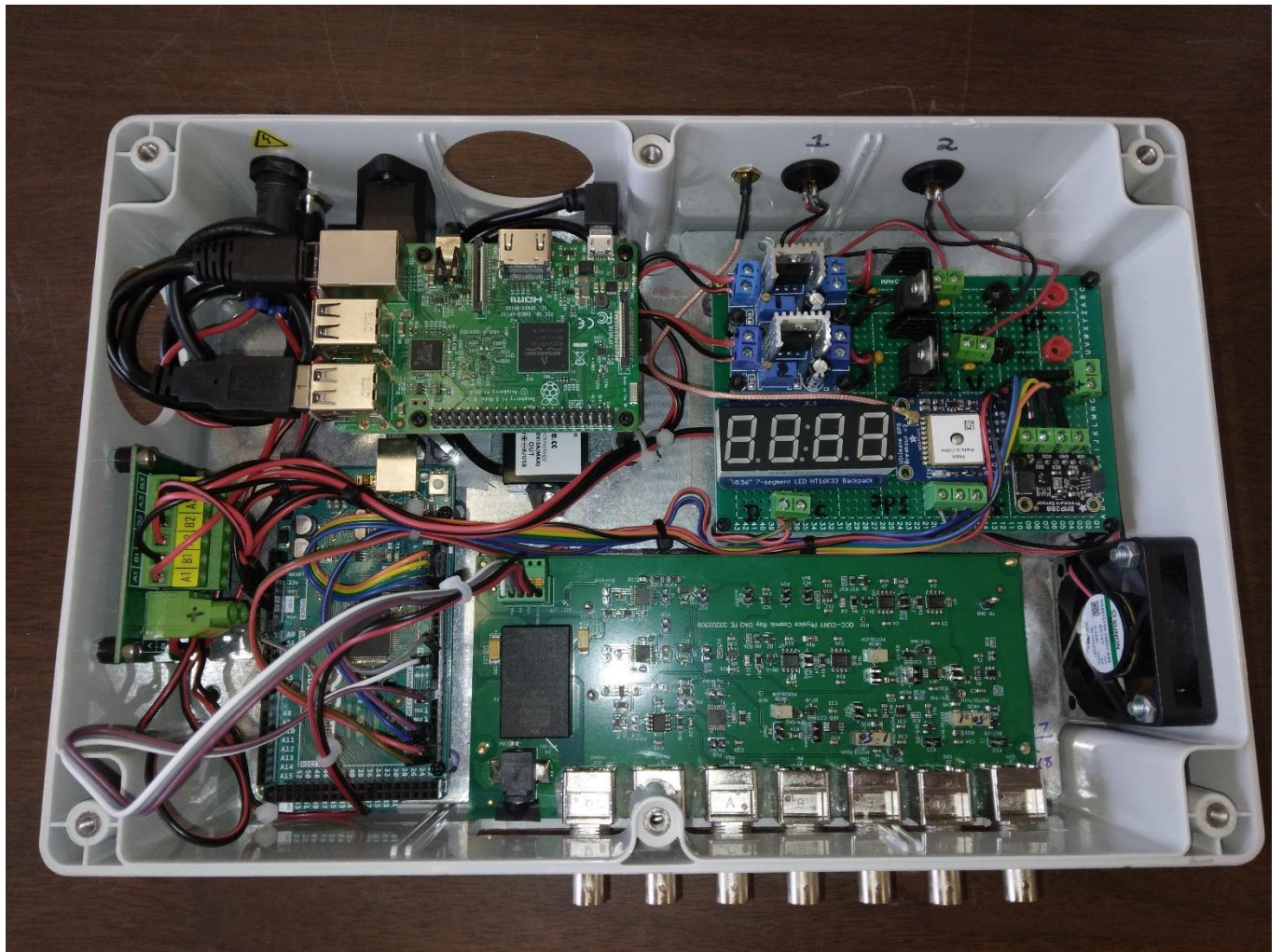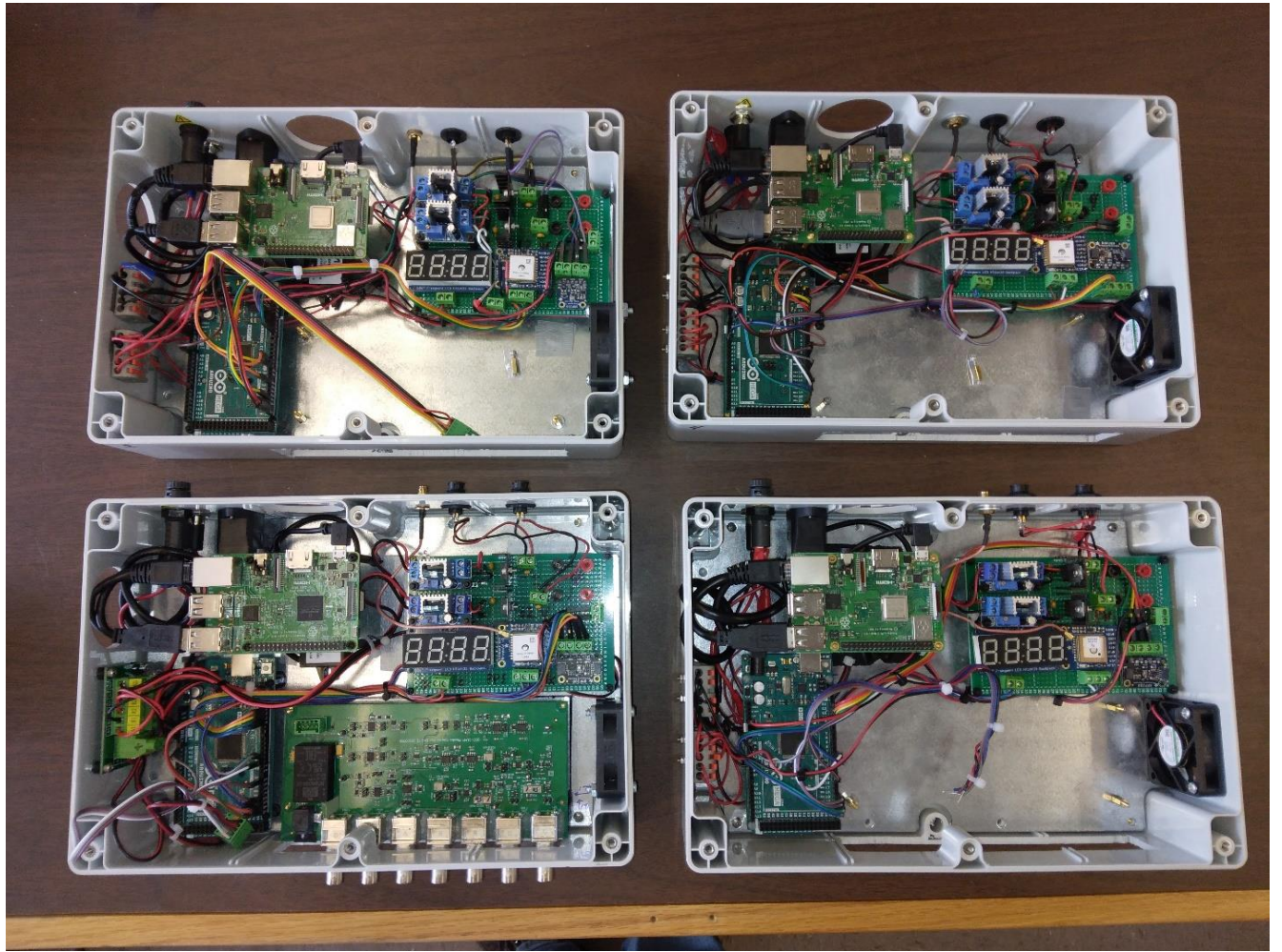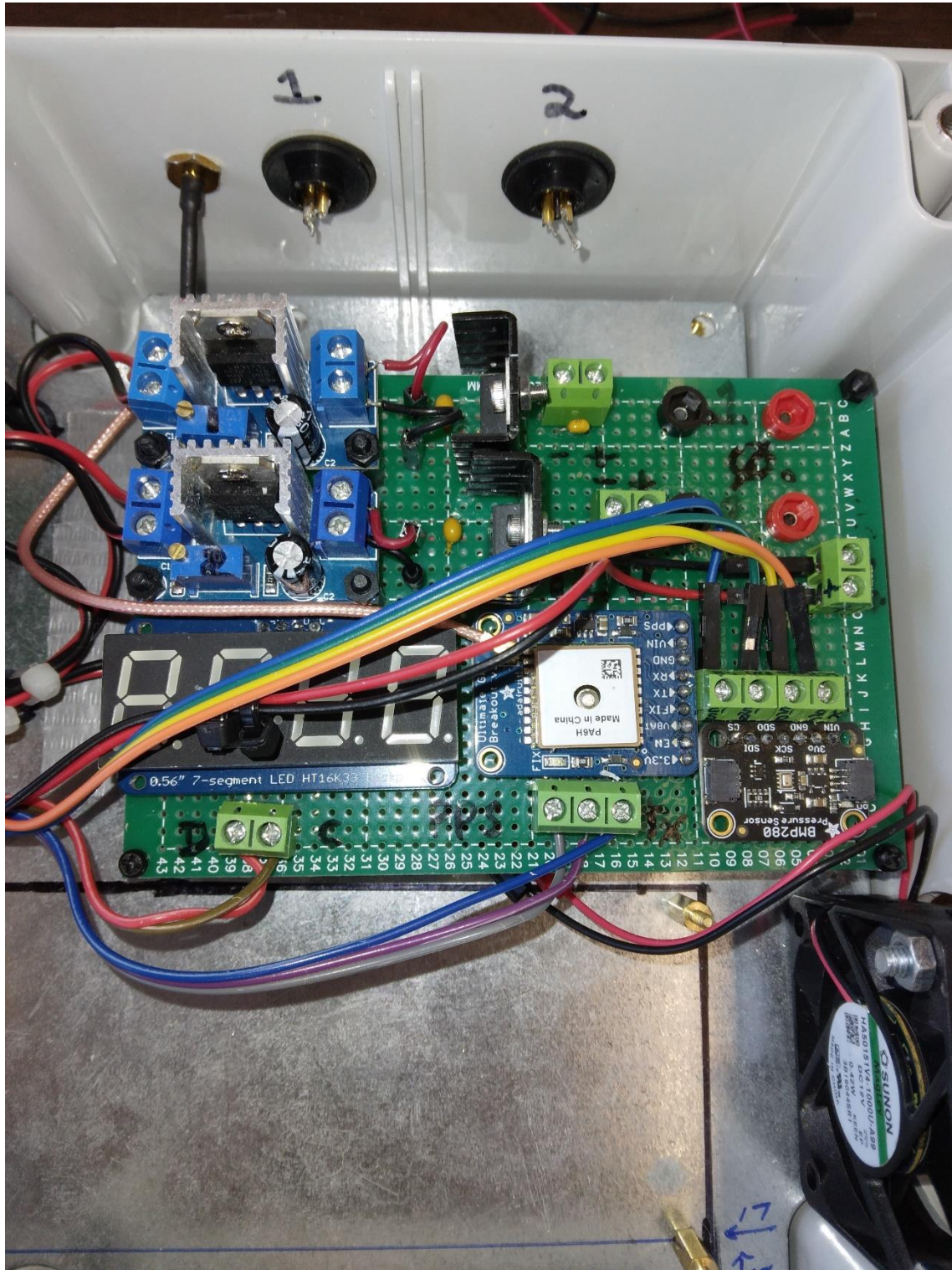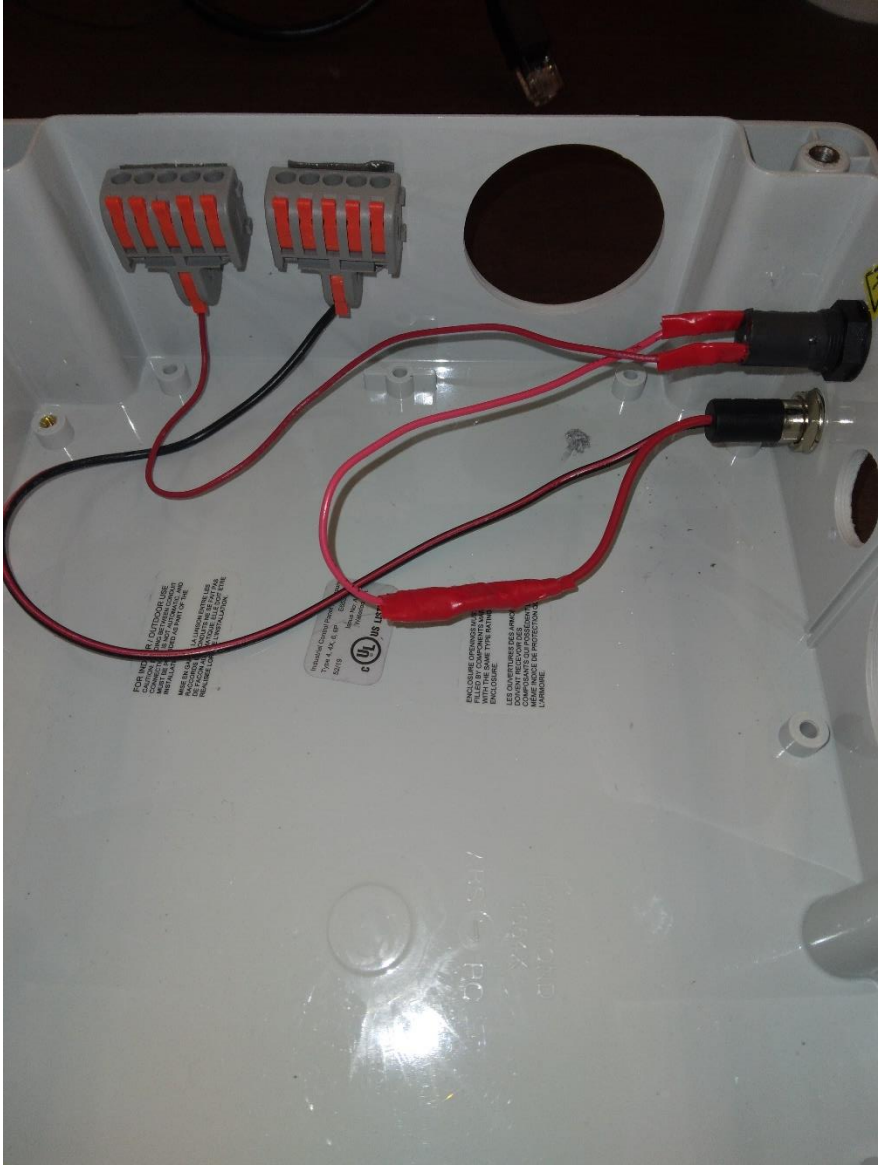
4 DAQ boxes shown without their DAQ front-ends
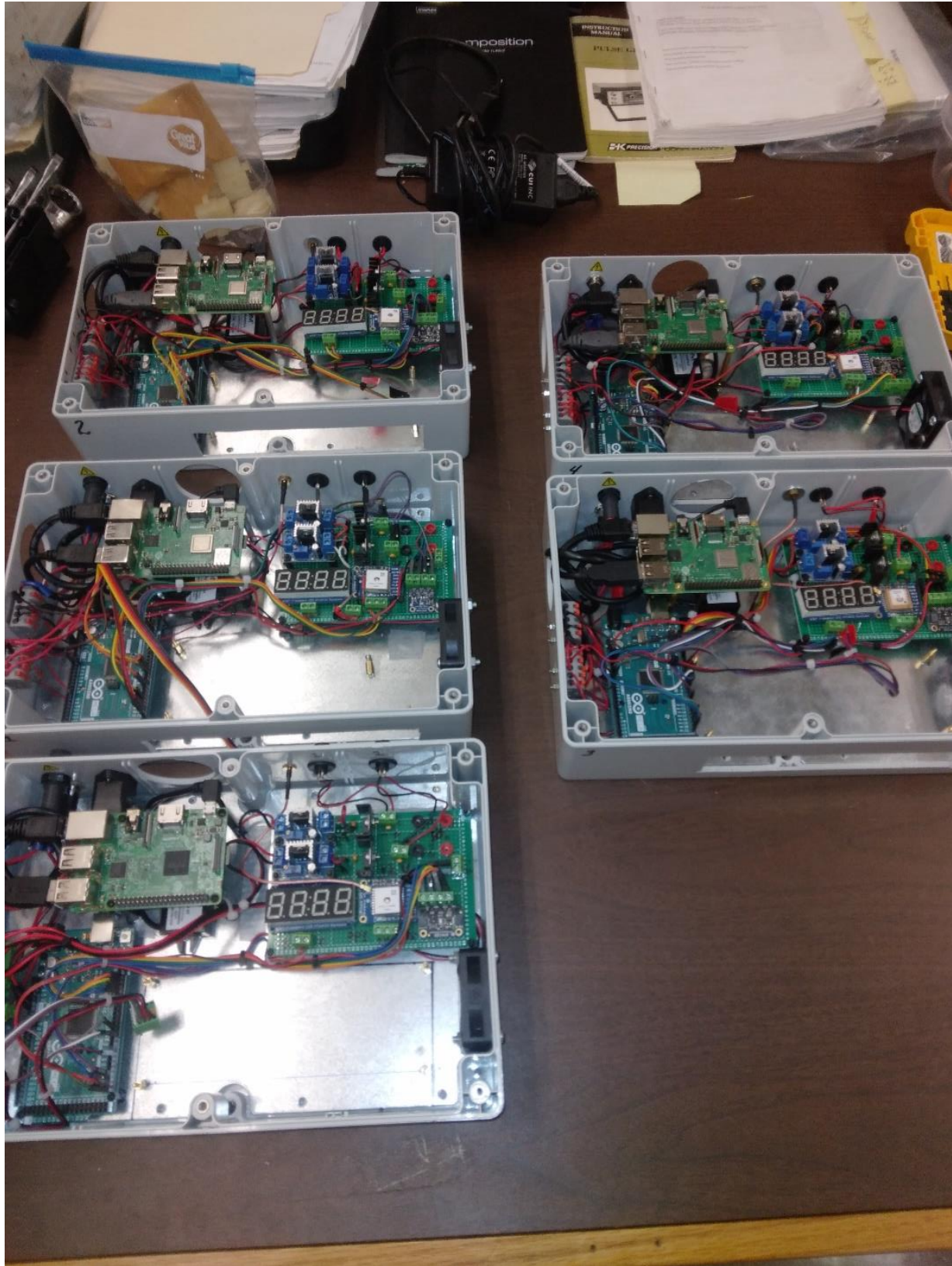
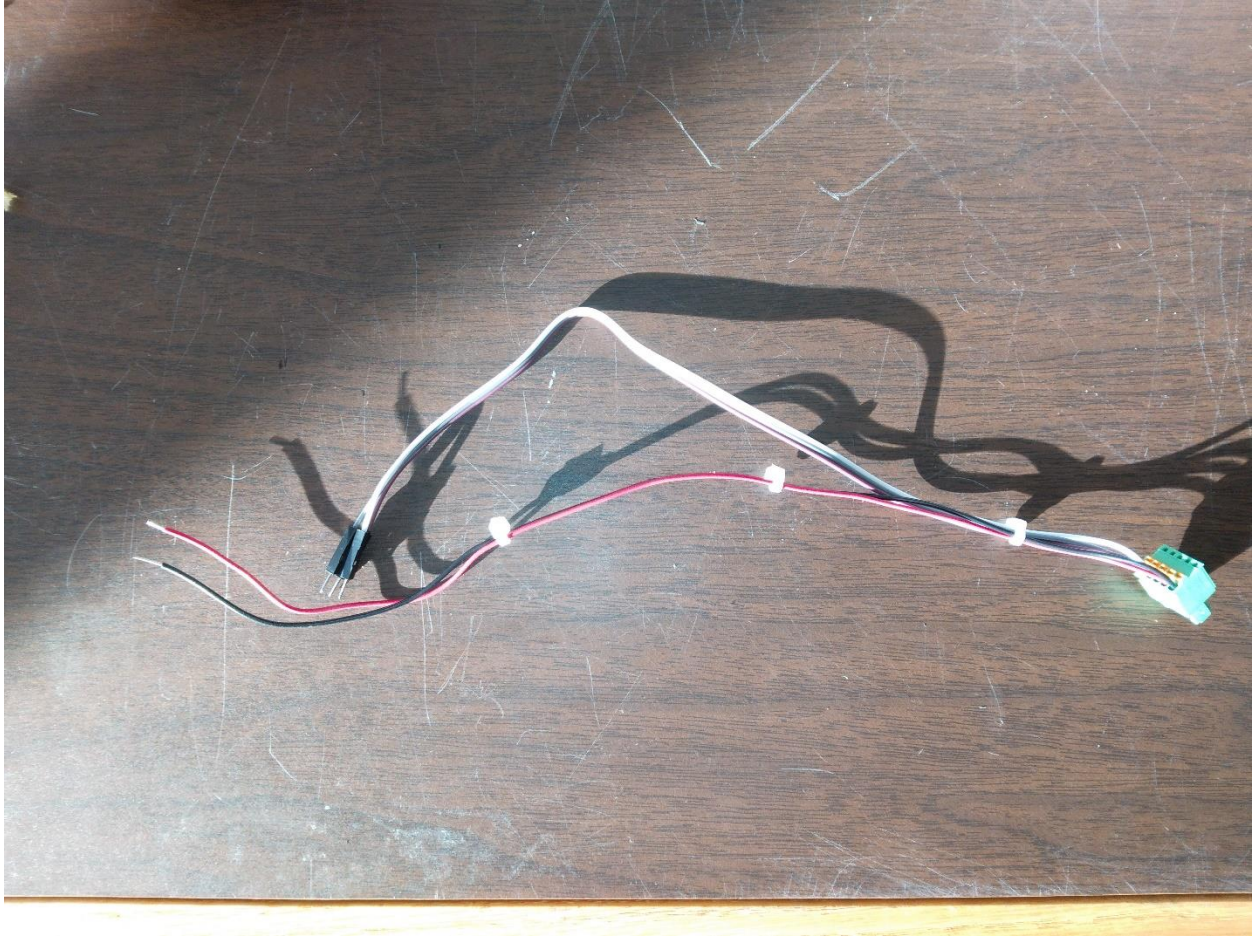6 DAQ boxes shown without their DAQ front-ends

Perforated bread-board for electronics - GPS, LM317 voltage regulators to power PMTs, ambient temperature and pressure sensors
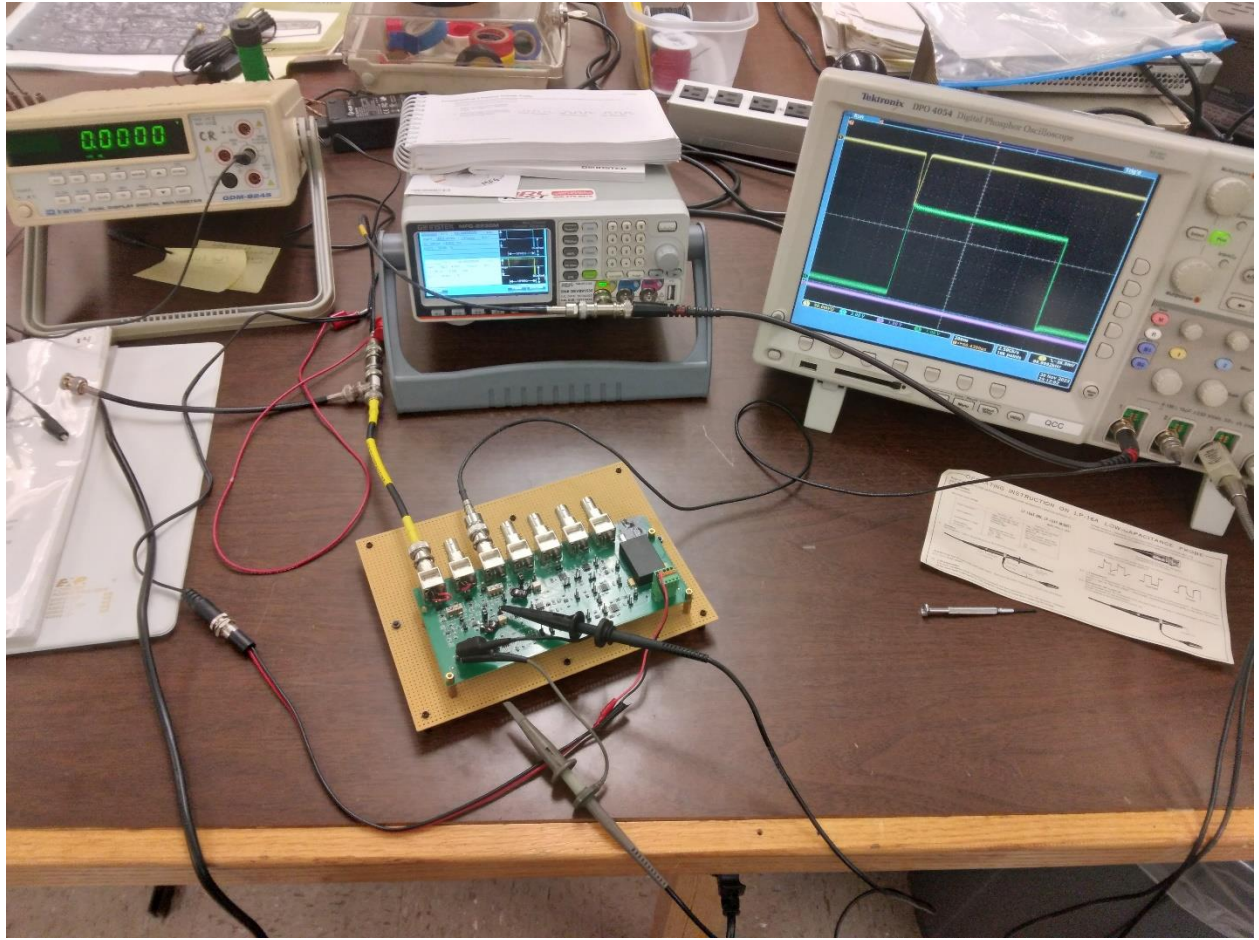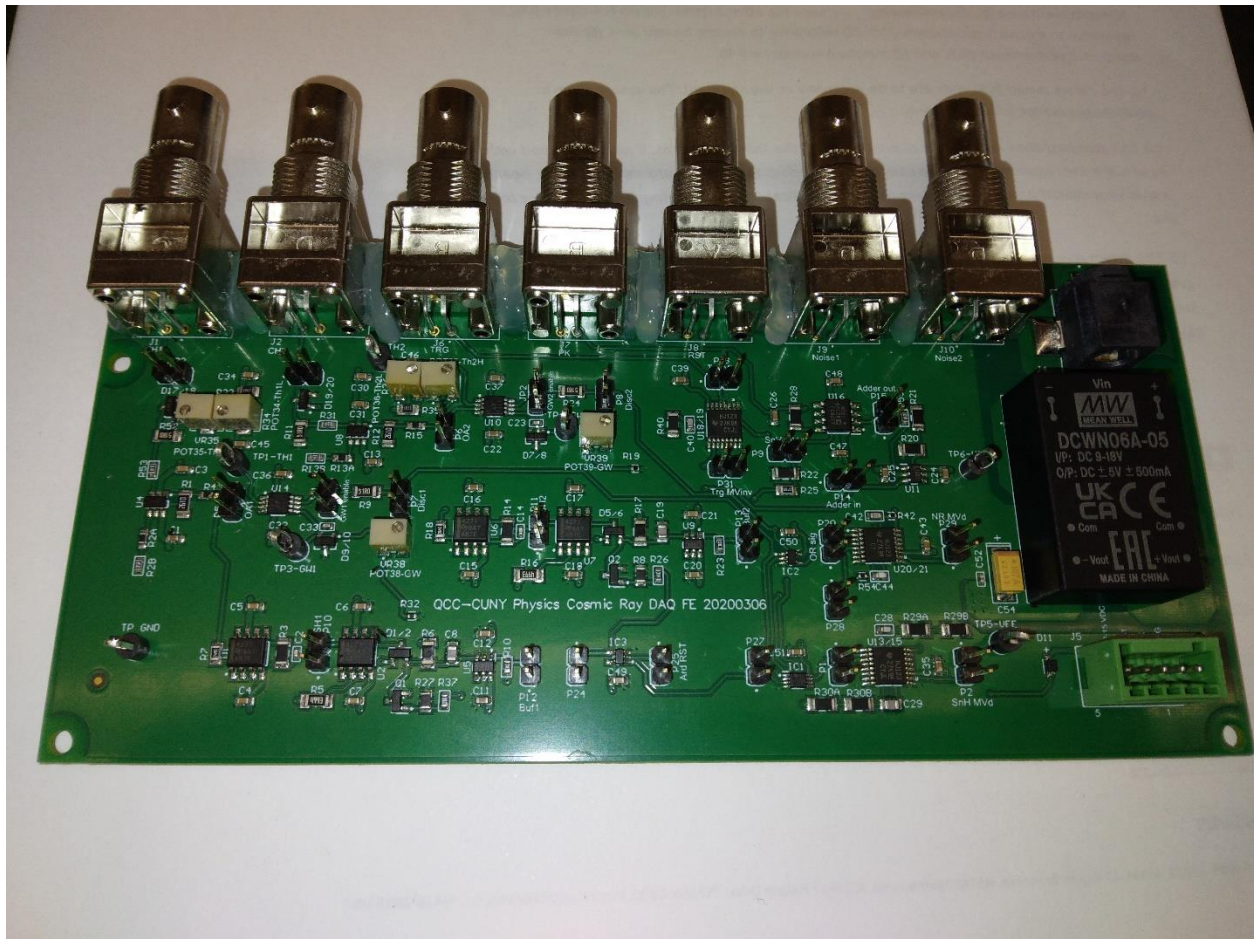
Power input and fuse

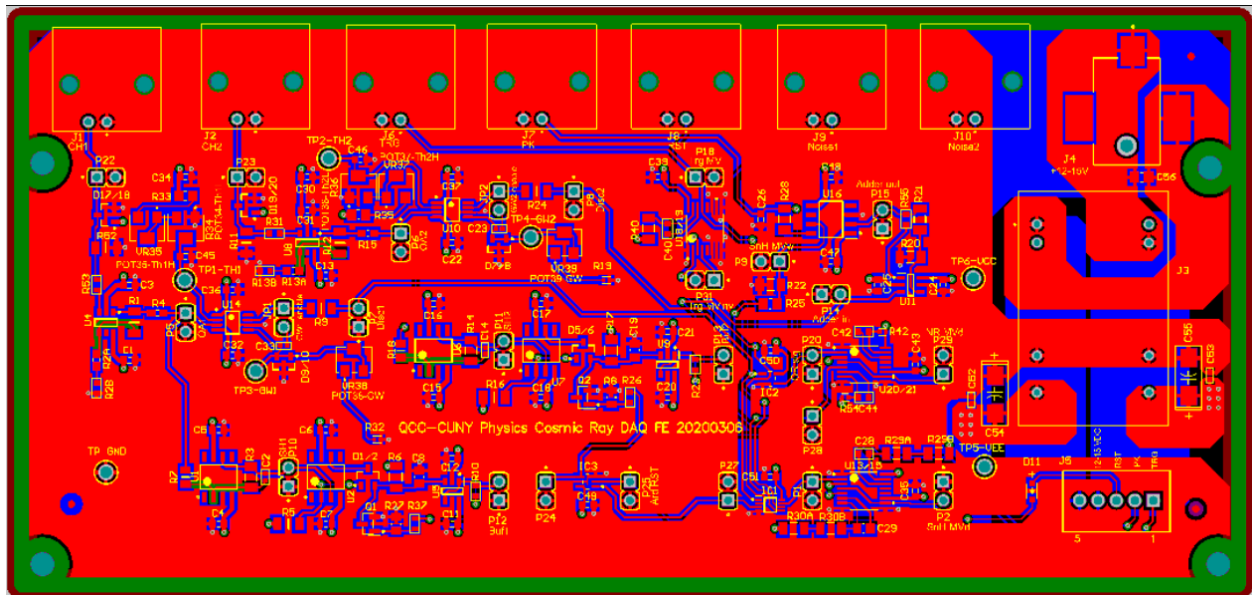Perforated bread-board for electronics, Raspberry Pi, and Arduino

This connector plugs into the DAQ front-end PCB, and the wires bring 15V power, and signals to and from the Arduino Mega board
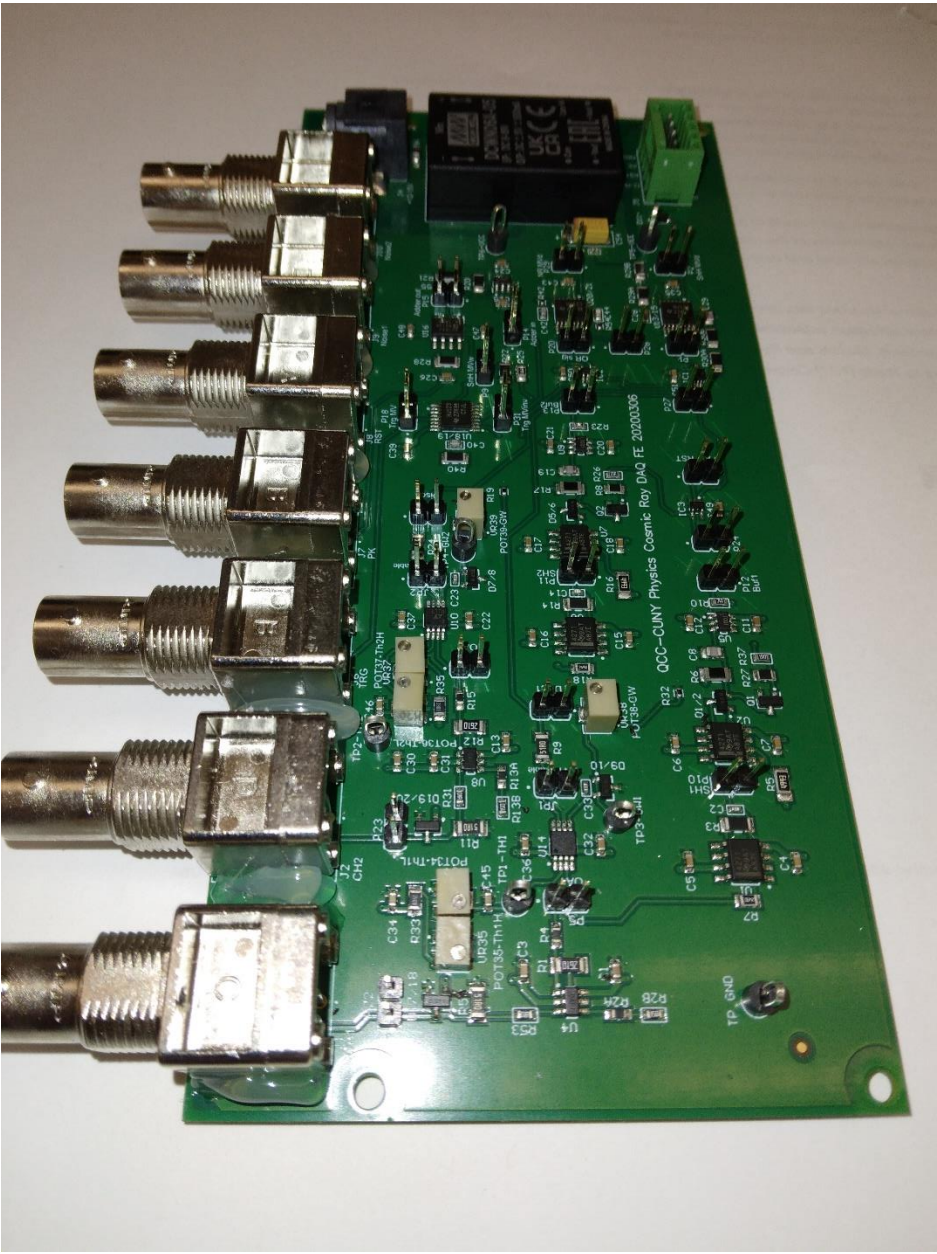
DAQ front-end PCB being tested

DAQ front-end PCB

DAQ front-end PCB

DAQ front-end PCB