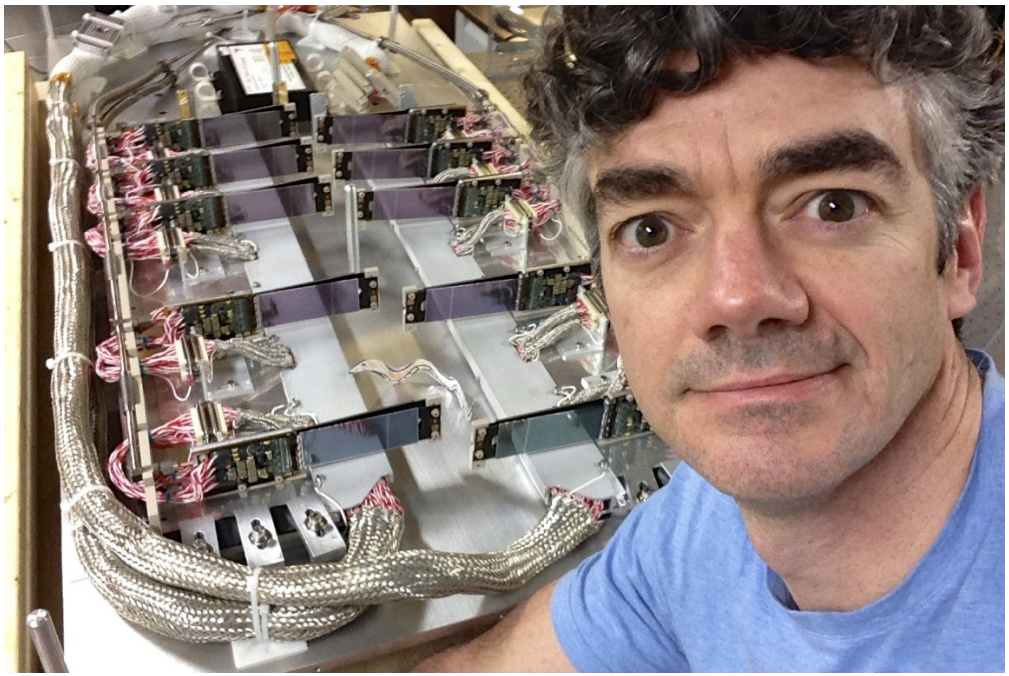
Test SVT operation at SLAC

Sho Uemura

SLAC



SVT test goals

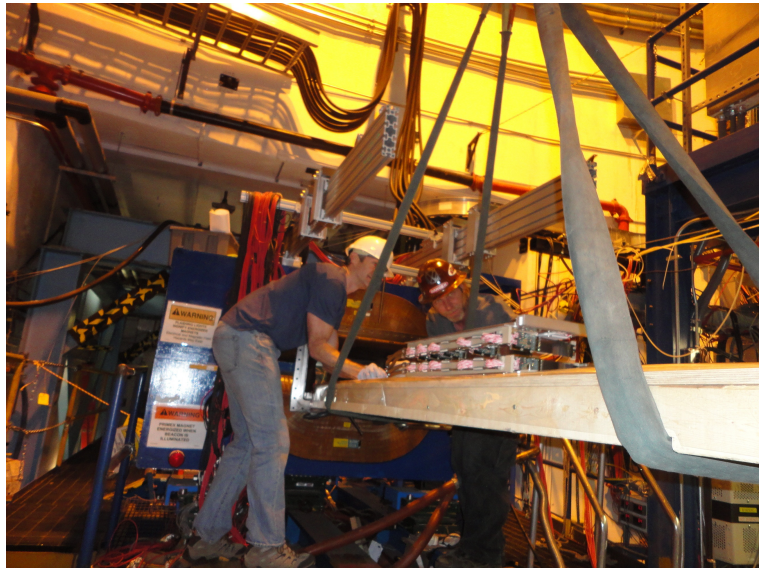
- Reproduce and debug issues seen in test run/pre-test run QA
  - Noisy readout chips, loss of sync
- Further needed studies
  - Reduce shaping time (50$\rightarrow$35 ns)
  - Cold running
- Test bed for SVT
  - Controls: interlocks, motion controls, EPICS
  - JLab DAQ integration testing
  - New DAQ
  - New module designs
- Test rig for full SVT DAQ

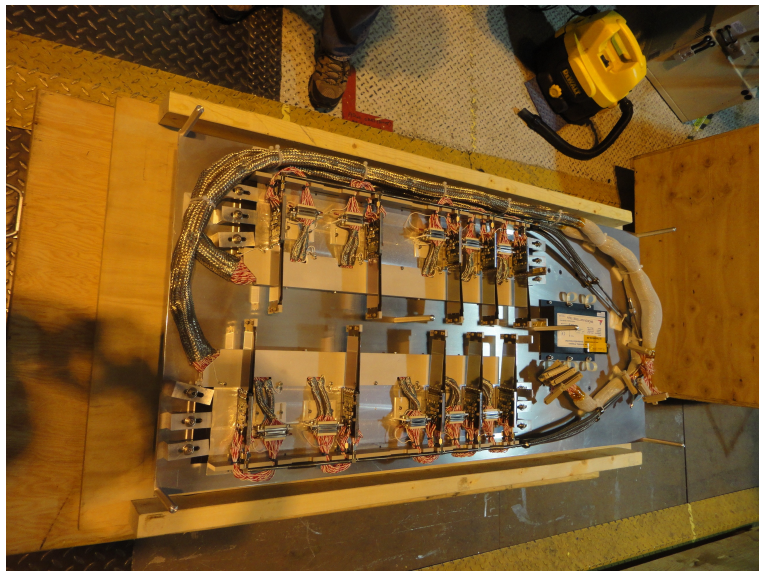
Test setup requirements

- Duplicate running conditions for half of the test run SVT
  - Same DAQ, same cables, same power supplies
- Protect the detector
  - Layer 1–3 half-modules will be reused; don't damage or contaminate them
- Single-sensor setup for testing and QA
  - Update the QA setup with current firmware and cooling

Getting the SVT back

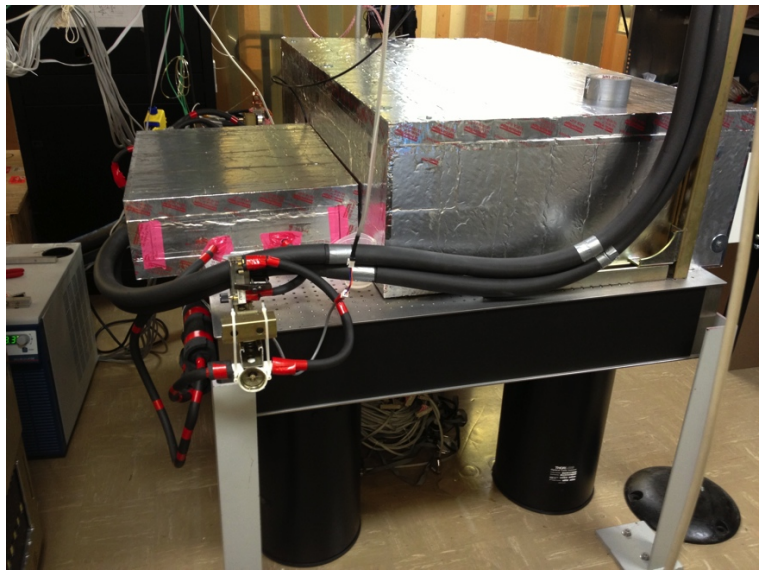
- January: test run SVT extracted from vacuum chamber and shipped back to SLAC
  - Shipping box tested by unplanned cross-country truck ride
- CAEN power supplies also shipped to SLAC





Setup at SLAC

- Keep SVT in Lexan shipping enclosure
  - Add penetrations for cooling, data, dry air
  - Add outer thermal box to isolate from heat and light
- CAEN power supplies also shipped to SLAC
- Chiller (water-glycol to -10°C), valve manifold
- Air dryer to lower dew point in SVT enclosure; air kept clean by oil separators and point-of-use filters

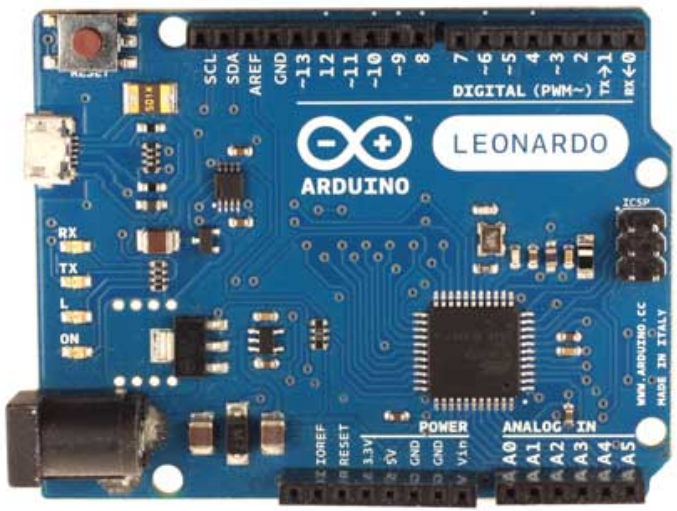


Power and DAQ

- CAEN crate controlled using serial console (no EPICS)
- DAQ crate set up as at JLab
- Installing JLab DAQ (CODA) at SLAC

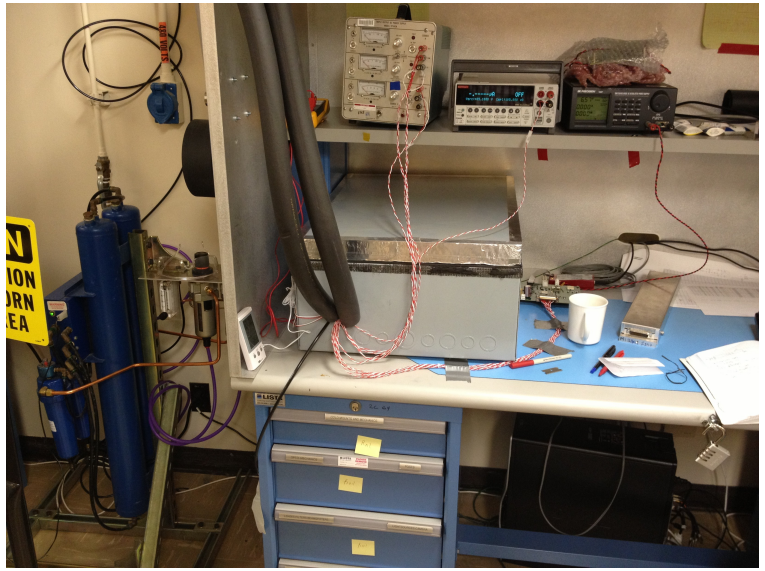
Interlocks

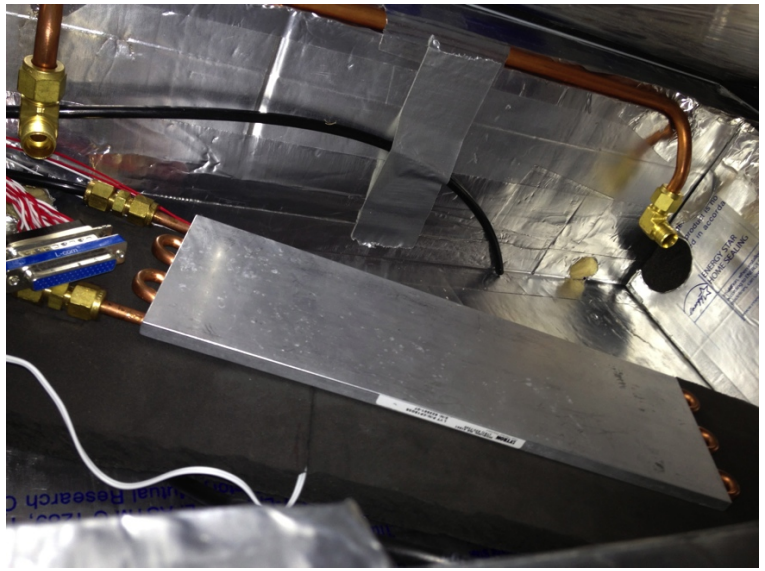
- Interlock:
  - SVT power is only enabled when SVT cooling flow is adequate and dew point is low
  - Chiller trips if cooling flow drops below nominal
- Interlock is built using Arduino microcontroller, which controls SVT power (CAEN crate-level interlock input) and chiller (RS-232 control) and sees the following inputs:
  - Humidity/air temperature sensor inside SVT enclosure
  - Flow switch in return line to chiller
- Highly configurable; could be used in other HPS applications



Test station

- DAQ development board in place of full DAQ
  - Shipping box tested by unplanned cross-country truck ride
- Cooling and dry air supplied from the same chiller and air dryer
- Same dew point monitoring scheme (sensor+Arduino)





First results

- Some early results from test station: cold running (18°C vs. 7°C)