Detector Support Group
Weekly Report, 2018-03-07

Summary

Hall B Magnets
- Fast-Daq-Torus-cRIO controller failure debugged.
  - Controller could not run start-up program and connect to the network.
  - Rebooted controller and changed to safe mode.
    - Ethernet connection came back in safe mode, but communication problem persists when switched back to normal mode.

RICH
- Monochromator-integrated reflectivity test program tested with monochromator.
  - Program works *on laptop* with both monochromator and Keithley electrometer.
  - Program does not work *on PC in cleanroom*; program generates an error for monochromator subVIs.
- LabVIEW subVIs for Ximea CCD investigated for potential development into LabVIEW program for d0 measurements.
  - If CCD commands can be replicated in LabVIEW on Windows PC, test can be run from one PC with simplified user interface.
- N_2 gas panel components labeled.
- For third cRIO chassis:
  - DIN rails and cable tray cut.
  - Holes drilled.

SVT
- Hardware Interlocks cRIO replaced with loaner processor.
  - The cRio processor would not boot into real-time mode after Hall B power outage.
  - PR was submitted for a new processor since there were no spares.
- *SVT Hardware interlocks* program modified.
  - Control logic added to average AI signals in the cRIO that are received from the Panasonic-SQ4-C11 controller.
  - *SVT Hardware interlocks* upgraded program tested with cRIO controller.
    - Averaging worked as expected.
- Wire-bond strength vs N2 flow tested.
  - Held at ~60 SLM at 40 psi.
- Three additional MFCs installed for better flow control in the new N_2 cooling setup.

HDice
- Temperature and liquid level alarms disabled for IBC operation.
- Insulators installed in NMR rack #1.

Gas System
- PR placed for continued funding of Hall B liquid argon contract.

MVT
- C4H10 mixing system tested to see if modifications caused gas to no longer condense.
  - Small amount of condensed gas found after the ambient temperature was ~26 °F.

Hall D Magnets

- PXI-e 1078 inability to power on controller investigated.
  - Power-on inability was due to faulty power supply in chassis (swapped by a spare chassis on 2/27/2018).
  - PC-power supply connected to PXI-e 1078 chassis and PXIe-8840 controller started up without any problem.
  - New power supply ordered and installed.
  - Two fans ordered to replace old fans in the PXI-e 1078 chassis.

PLC Test Station

- PLC chassis and modules received for test station.

Antonioli, Mary Ann

- Attached plastic strips to **HDice** rack, with Mindy.

- Set up Excel template for **cRIO test stand code** and wrote code to send data to Excel for 9207 samples.
  - ★ Tested and debugged. Works.
  - ★ In setting up Excel template and code for comprehensive 9207 test, code failed.
    After extensive debugging, discovered replicated code causing problem.
- Made more changes to Amanda's TCU **note**.

Bonneau, Peter

HDice

- Programming, testing, and debugging NMR Development test program.
  - ★ Testing on current shunt data acquisition rates with the full instrumentation set is underway.
  - ★ Developed binary decoder logic for current shunt raw data.
  - ★ Testing and debugging post-acquisition subroutines to process instrumentation data arrays.
- Worked with Amanda on NRM program issues while using the IBC.
  - ★ He level/temperature controls need to be disabled for IBC operation.
  - ★ A pop-up requesting the operator to choose a magnet type has been requested.

SVT

- Worked with Tyler and Pablo on the debug of the SVT Hardware Interlock System cRio processor.
  - ★ After the Hall B power outage, the cRio processor will not boot into real-time mode.
  - ★ Since there are no spares for the SVT, a PR for a new processor was submitted.
  - ★ DSG will attempt to get a loaner processor operational to temporary get this system working until the delivery of the replacement, but there are no guarantees this will be possible.
- Worked with Pablo on the SVT Hardware Interlock System upgrades.
  - ★ Debug and test of interlock control program for leak sensor controls were reviewed.
  - ★ Use and debug of the Panasonic leak sensor and control module was discussed.

Hall D

- Held meetings on Hall D status and EPICS controls monitoring.
- Screen for monitoring Hall D detectors was investigated.

Campero, Pablo

Magnets

- Debugged Fast-Daq-Torus-cRIO, controller with Brian.
  - ★ Controller was unable to run start-up program and connect to the network.
  - ★ Rebooted controller and changed to safe mode.
    - ▪ Noticed that in safe mode cRIO Ethernet connection came back, but communication problem persists at soon as it switched to normal mode.

- ✶ Attempt local communication via serial port but it did not work, process stacked after rebooting the system.
- ✶ For all mentioned conditions present in the cRIO controller, determined that failure is the same as on 06/27/2017 and 09/14/2017.
  - ▪ cRIO controller at that occasions recovered for unknown reasons after it was power off and disconnected for long period of time.
  - ▪ Power off Torus Fast-DAQ cRIO to see if it recovers again.

SVT

- Debugged *SVT Hardware Interlocks* cRIO systems with Peter and Tyler.
  - ✶ NI-9067 controller lost connection with the network and was unable to run interlocks program.
  - ✶ Rebooted NI-9067 controller to attempt to recover Ethernet connection did not work.
  - ✶ Changed controller from normal to safe mode and set up connection with NI Max.
    - ▪ Noticed that controller was unable to connect in normal mode.
  - ✶ Swapped faulty NI-9067 controller by a NI-9035 controller which was being used for the new upgraded version of the *SVT Hardware Interlock* system.
    - ▪ Moved all NI-I/O modules to the NI-9035 controller.
    - ▪ Left controller sit on the chassis base due to it was 1.5" longer than the faulty cRIO controller and did not fit. Interlocks hardware must be arrange into the control box to set the controller properly in the rail chassis box.
  - ✶ Assigned new IP address for NI-9067 controller to be set in the Hall B subnet.
  - ✶ Configure LabVIEW project with new controller and I/O modules.
  - ✶ Deployed and run *SVT Hardware Interlocks* program.
  - ✶ Set thresholds and conditions to run the system properly.
- Modified *SVT Hardware interlocks* upgraded program.
  - ✶ Added control logic to average AI signals in the cRIO that are received from the Panasonic-SQ4-C11 controller.
  - ✶ Run *SVT Hardware interlocks* upgraded program in the cRIO controller to test modifications.
    - ▪ Averaging implemented worked as expected, monitored and found that it did not cause any trip when the sensor detects no liquid.

Solenoid

- Investigated PXI-e 1078 with Brian and Tyler.
  - ✶ Found inability to power on controller was due to faulty power supply in chassis (swapped by a spare chassis on 2/27/2018).
  - ✶ Connected a regular PC-power supply to the PXI-e 1078 chassis and PXIe-8840 controller started up without any problem.
  - ✶ New power supply ordered and installed.
  - ✶ Fan ordered to replace the old noisy fan in the PXI-e 1078 chassis.

- Edited **DSG weekly report** for the week of 2/28//2018.

Eng, Brian

SVT

- Tested wire-bond strength vs N2 flow with Yuri, they held at ~60 SLM @ 40psi.

- Upgraded hblin4 (mainly used as the storage array) from RHEL6 to RHEL7.
  - ✶ Yuri wanted to run gemc on this computer and the requisite software wasn't available on 6.
- Installed 3 additional MFCs (these are only for the RGA run):
  - ✶ https://logbooks.jlab.org/entry/3543198

Magnets
- Torus FastDAQ cRIO died again:
  - ✶ https://logbooks.jlab.org/entry/3543526

Hall D Magnets
- Continued debugging bad PXI chassis with Tyler and Pablo, found that connecting a spare computer power supply to the PXI chassis allowed the new controller to boot just fine.
- Ordered replacement power supply and fans for PXI chassis.
- Installed new power supply in PXI chassis (new controller powers up fine, will need to do more testing once fans are installed and crate is fully loaded).

Hoebel, Amanda
FT
- Connected two temperature sensors and two humidity sensors to hardware interlocks cRIO.
HDIce
- Corrected program to ignore temperature and liquid level alarms when NMR program is connected to IBC.
- Program found to have 10 G offset when in manual mode.
SVT
- Switched interlocks cRIO with different module after the first module stopped working, with Tyler and Pablo.
- Investigated noise from water sensor, with Tyler and Pablo.
  - ✶ 10 V noise was causing interlocks to trip.
  - ✶ Signal on scope showed multiple 10 V spikes.

- Received PLC for test station.

Jacobs, George
- Placed PR for continued funding of the Hall B liquid argon contract.
- Had discussions with M Ungaro about C4F10 quote from US lab.
  - ✶ Wrong price quoted, quote is invalid.

Gas Systems
- Had discussions concerning differential Pressure Transducers for RICH to atmosphere and RICH air to RICH N2 pressure system requirements – NONE REQUIRED.
- Updated RICH-N2-GAScontrols diagram.
- Updated LTCC Single Sector Test Status 06 March 2018 pptx.

Leffel, Mindy
RICH
- Labeled N2 gas panel components.
- Worked on third cRIO chassis.
  - Cut DIN rails, drilled holes, and attached them.
  - Cut cable tray.
  - Started cutout for switch.

HDICE
- Worked with Mary Ann to attach insulators for NMR rack #1.

- Completed Safe Lifting MED05.

Lemon, Tyler
RICH
- Tested monochromator-integrated reflectivity test program with monochromator in DSG small cleanroom.
  - Program works *on laptop* with both monochromator and Keithley electrometer.
  - Program does not work *on PC in cleanroom*; program generates an error for monochromator subVIs.
  - Installation of monochromator drivers in progress to be able to debug monochromator subVIs.
- Investigated LabVIEW subVIs for Ximea CCD for potential development of LabVIEW program for d0 measurements.
  - Current test procedure for d0 measurements uses two PCs: Debian Linux for CCD's command line scripts and Windows for stepper motors' GUI interface.
  - If CCD commands can be replicated in LabVIEW on Windows PC, test can be run from one PC with simplified user interface.
  - Made small darkbox to be able to test CCD without over-exposure.
  - Researched existing subVIs from Ximea to interface with CCD.

SVT
- Replaced failed SVTCRIO used in hardware interlock system with DSGCRIODEV2.
  - SVTCRIO (model:cRIO-9067) failed at time of power outage in Hall B.
    - Would not respond over network unless cRIO was in safe-mode; interlock program cannot run in safe-mode.
    - Problem seen twice before with Hall B Magnets' FastDAQ cRIOs; all cRIOs similar models.
  - Installed DSGCRIODEV2 (model: cRIO-9035) in Hall B as temporary measure to be able to use interlock system until replacement is ordered.
- Tested updated version of hardware interlock program with Pablo, Peter, and Amanda.
  - Debugged issues with dewpoint calculation resulting as NaN, coolant leak detector reset, and averaging of signal for coolant lead status.
- Tested coolant leak interlock after implementation of averaging for signal.
  - Signal now always averaged over 100 samples.

- ✶ Signal from leak detector's controller in current configuration is 24 V pulse at ~400 Hz when off and a constant 24 V when on.
- ✶ With averaging, off signal was ~200 mV, but signal still spiked above interlock threshold every few minutes.
- ✶ Coolant leak interlock remains disabled.

McMullen, Marc

MVT

- Mixing system tested to see if the C4H10 condensing issue has been resolved with modifications to the system. There was a small amount of condensed gas after the ambient temperature was ~26 degrees F.

SVT

- Installed 3 mass flow controllers to supply N2 to different areas of the SVT.
  - ✶ These will only be installed temporarily to give Hall B the ability to control flow amounts to areas of the detector. Once the correct flows are determined the MFCs can be replaced with rotameters.
- Continued with corrections to the HFCB Temperature and Humidity patch panel boards.

RICH

- Submitted drawing changes by G. Jacobs to the system owner and design authority. Waiting on feedback from the DA, the system owner has approved installation of the pressure transducers pending feedback from the DA.

LTCC

- The C4F10 supply tank has 57kg remaining. Continue study of LTCC S5 gas usage.