Detector Support Group
Weekly Report, 2018-01-24

Summary

Hall B Magnets

- Torus and Solenoid monitored on a daily basis via EPICS and logbooks.
  - ✶ Noise on VCL B VT21 caused controlled ramp interlock trips while the magnet power supply was turned on and the current set at 0 A.
    - Condition added to Solenoid PLC program requiring absolute current to be greater than 10 [A] before interlock becomes active.
  - ✶ Torus axial and vertical strain gauges analyzed.
    - Eight strain gauges monitor strain in the vertical upstream and downstream supports.
    - Six strain gauges monitor strain on the axial supports in coils B, D and F.
  - ✶ Table generated to monitor Torus strain gauge interactions with Torus and Solenoid magnetic fields.
  - ✶ Solenoid fast-dump on January 24, 2018 possibly caused by coil shifts.

SVT

- Trip delay timers and signal averaging added into SVT Hardware Interlock System control logic.
- New A40 chiller tested.
  - ✶ When pump speed is set to "auto", A40 chiller reduces flow in bath when temperature is under 0 °C.
  - ✶ Pump speed set to "high" to prevent decreases in flow at low temperatures.
- RTD ordered to measure temperature of chilled nitrogen gas
- Module currents dropped by ~400μA after implementation of new chilled nitrogen system.

RICH

- Diagram of second cRIO chassis layout generated to note part numbers and screw sizes.
- Power wiring diagram for second cRIO generated in Visio.
- Hole to mount the AC connector in second cRIO chassis machined.
- Second cRIO chassis wiring started.
- RICH-N2-valve-panel-REV P&I diagram and components list updated
- Additional components ordered for RICH N_2 valve panel upgrade.

RTPC

- Cost estimate for controls equipment and hardware prepared.
- Meeting held with RTPC representatives to discuss detector's gas system:
  - ✶ Gas system cost estimate will be forwarded to RTPC detector management.
  - ✶ Advance notice requested on procurement of components.
  - ✶ RTPC group considering using a mixing system to mix helium and CO_2 instead of premix bottles.

HDice

- Test station for Rack #1 hardware and software development debugged.
  - ✶ NMR program would not reliably connect with instrumentation, causing the program to freeze.
    - Cause of problem was intermittent GPIB communication faults between the NMR computer and instrumentation; replacement of the GPIB controller resolved issue.
  - ✶ NMR program would halt during scan initialization and continuously loop on a liquid helium level sensor fault.
    - NMR program revised to bypass liquid helium level sensor check and helium temperature check during scan initialization when the respective sensors are disabled.
- Redesigned Rack #1 RF distribution and attenuation control.
  - ✶ Redesign will allow display of RF Box settings on its front panel display and computer read-back of the actual settings in the control computer.
- All power and control wiring of RF Box #1 completed.
- Isolation brackets cut for the second rack.

LTCC

- C_4F_{10} gas flow started in LTCC S5
- Overpressure bubbler installed for LTCC S5.
- LTCC-SingleSector-piping.pdf diagram modified to show both bubblers.

MVT

- As of January 22, 2018, there are six bottles of premix left,
  - ✶ Delivery of 20 more premix bottles expected in early February.

cRIO Test Station

- Options to run test program from the local PC on a user interface by utilizing LabVIEW's messaging features investigated.
  - ✶ Running test program on local PC would allow for easier access to results.

MPOD Test Station

- Drivers developed in LabVIEW for Keithley 2002 multimeter to set multimeter's measurement settings for MPOD tests.
- Programs developed to acquire data from Keithley multimeter in two ways:
  - ✶ Scan all channels at once: allows tests to verify output of MPOD is only enabled for the set channel.
  - ✶ Measure single channel: allows for fast acquisition (100 samples in ~10 seconds) of measurements for a single channel.
- Developed version of all drivers and programs to work with either Prologix GPIB-USB controller or NI GPIB interface.

Antonioli, Mary Ann

- Completed all power and control wiring of **HDice** RF box 1.
  - ✶ RF wiring remains, to be completed by Mindy.

- Drew **RICH** cRIO power wiring diagram in Visio.

Bonneau, Peter

HDice

- Debugged test station for Rack #1 hardware and software development.
  - ✶ NMR program would not reliably connect with instrumentation, causing the program to freeze.
    - Cause of problem was intermittent GPIB communication faults between the NMR computer and the RF signal generator, lock-in amplifier, and Oxford power supply.
    - Replacement of the GPIB controller resolved the issue.
  - ✶ NMR program would halt during scan initialization and continuously loop on a LHe level sensor fault.
    - NMR program revised to bypass liquid helium level sensor check and helium temperature check during scan initialization when the respective sensors are disabled.
- Worked with Mary Ann on the upgrade of Rack #1 RF distribution and attenuation control.
  - ✶ Redesign will allow the display of the RF box instrumentation settings on the front panel display and computer read-back of the actual settings in the control computer.

SVT

- Worked with Pablo on the SVT Hardware Interlock System upgrades.
  - ✶ Discussed implementation of interlock trip sub-routines and the addition of the delay trip timers and signal averaging option into the interlock control logic.
  - ✶ Added temperature and humidity sensors to the DSG cRIO Development System for the test and debug of the SVT interlock system upgrade.

Magnets

- Met with Amanda, Pablo, and Tyler regarding issues encountered with the Torus and Solenoid magnets during the engineering run.
  - ✶ While the magnet power supply was turned on and the current set at 0 A, noise on VCL B VT21 was causing controlled ramp interlock trips.
    - A condition was added in the PLC program requiring the current to be > 10A before this interlock becomes active.

- Worked with Mindy on the design and layout of power distribution system for the new DSG cRIO Development System chassis.

Campero, Pablo

Magnets

- Analyzed Torus axial and vertical strain gauges locations with Amrit, Peter, Tyler and Amanda.
  - Eight strain gauges are distributed in the vertical upstream and downstream supports.
  - Six strain gauges are set on the axial supports in coils B, D and F.
- Generated table to monitor how the Torus strain gauges values are affected by Torus and Solenoid magnetic field.
- Monitored Solenoid and Torus on a daily basis through EPICS screens and logbooks.

- Completed modifications to upgrade **SVT** Hardware Interlocks Real-Time LabVIEW program.
  - Added averaging and trip delay timers for dew point, coolant flow, coolant temperature, and coolant leak detection interlocks.
  - Configured upgraded SVT LabVIEW program to run on developmental cRIO system (DSGCRIODEV2).
    - Tested averaging upgrade for temperature signals.

- Investigated options to run **cRIO Test Station** from the local PC on a user interface.
  - Consulted National Instrument documentation to learn about Queued Message Handler for potential implementation in the current cRIO Test Station LabVIEW program.

Eng, Brian

SVT

- Testing new A40 chiller: https://logbooks.jlab.org/entry/3519131
- Researched and ordered RTD to measure temperature of chilled N2 gas

- Met with **RTPC** collaborators to discuss gas system components

- Ordered spare/replacement **PXI** controller

- Upgraded Mac minis in EEL/231 to OS 10.12

Hoebel, Amanda

Magnet

- Monitored Torus and Solenoid via EPICS and logbooks.
- Discussed solenoid fast-dump.
  - ✶ Fast dump possibly caused by coil shifts.

- Compared currents in **SVT** modules before and after new cooling.
  - ✶ Currents dropped by ~400μA after cooling.

- Reviewed **FT** LabVIEW interlocks program.

- Wrote note on **DC** TCUs.

Jacobs, George

RICH

- Ordered additional components for RICH N_2 valve panel replacement
- Created updated RICH-N2-valve-panel-REV P&I diagram and spreadsheet components list

LTCC

- Started C_4F_{10} gas flow in LTCC S5
- Installed overpressure bubbler for LTCC S5 at original location
- Modified LTCC-SingleSector-piping.pdf diagram showing both bubblers

Gas Systems

- Contacted vendor AirGas about bulk liquid argon delivery due to low tank level
- Ordered CO_2 for DC and HTCC, 4 dewars

- Met to discuss **RTPC** gas system with collaborators.

- Completed MGT105 Training – Ethics for Supervisors

Leffel, Mindy

RICH

- For second cRIO chassis:
  - ✶ Discussed wiring diagram with Peter.
  - ✶ Started wiring.
- Created diagram of second cRIO chassis layout
  - ✶ Diagram includes part numbers and screw sizes.

HDICE

- Cut isolation brackets for the second rack.

Lemon, Tyler

- Monitored **Hall B Magnets** via EPICS and logbooks and discussed status on a daily basis with Peter, Pablo, and Amanda.

MPOD Test Station

- Developed drivers in LabVIEW for Keithley 2002 multimeter.
  - Drivers developed to:
    - Verify scan card is installed in multimeter
    - Set which channels to scan.
    - Set all channels to read DC voltage.
    - Configure and initiate scan of selected channels.
    - Repeat scan.
    - Take single measurement from multimeter.
    - Parse string output of multimeter extract voltage measurement.
    - Calculate mean and standard deviation from measurement arrays.
- Used drivers to develop programs acquire data from Keithley multimeter in two methods:
  - Scan all channels at once.
    - Will allow tests to verify output of MPOD is only enabled for the set channel.
  - Measure single channel.
    - Allows for fast acquisition (100 samples in ~10 seconds) of measurements for a single channel.
- Developed version of all drivers and programs to work with either Prologix GPIB-USB controller or NI GPIB interface.

McMullen, Marc

MVT

- Six bottles of premix left, As of January 22, 2018.
  - Delivery of 20 more premix bottles expected in early February.

LTCC

- LTCC filling with C_4F_{10}
  - Pressure at 0.77 [inH_2O] as of January 23, 2018.

RICH

- Machined a hole to mount the AC connector in second cRIO chassis.

RTPC

- Prepared cost estimate for controls equipment.
- Met with RTPC representatives.
  - Hardware and controls cost estimate will be forwarded to the detector management.
  - Requested advance notice on procurement of components.
  - RTPC group is considering using a mixing system to mix helium and CO_2 instead of premix.