



# Detector Support Group

## Weekly Report, 2018-08-29

### Summary

#### Hall C

- Dipole field regulation PLC program in progress
  - ★ Implemented digital filter in the code to read magnetic field from NMR PT2026 at desired rates, sample numbers.
  - ★ Filter added is making a sliding average for 60 samples every 1 second.
  - ★ Added sampling options to HMI test screen.
- Continued development of Python Danfysik power supply simulation.
  - ★ Successfully tested capability of program to ramp to higher currents at varying ramp rates.
  - ★ Improved program's structure to remove duplicated logic.

#### Hall B Magnets

- Analyzed and tested Solenoid FastDAQ data after it fast dumped at 2416 A on 08/27/2018.
  - ★ Got SOE PLC timestamps, which showed QD#2-ch2 (only VT1 connected at this channel) as the first trip.
  - ★ Analyzed FastDAQ data for 21 voltage taps
    - Found significant voltage spikes on VT2, VT1, VT15, VT18, and VT19.
    - VT15 presented the first spikes of ~ 1V, 198 ms before the others.
    - VT15 is part of a VTs group that is connected in QD#1-ch3 and QD#2-ch4.
    - Nether QD#1-ch3 or QD#2-ch4 tripped.
  - ★ After looking at all the voltage taps only VT15 has a spike at a reasonable time before the dump (Fast Dump switch opened).
  - ★ At the time of VT15 spike, all other taps were quiet.
  - ★ Tested QDs functionality by injecting voltage in Solenoids Resistor Box.
    - Injected 1, 2 V to simulate Voltage spike in VT15, VT1.
    - QD#1-ch3 and QD#2-ch4 tripped as expected.
  - ★ Checked wiring connection and compared it to the latest version of the drawings.
    - Wiring between Resistor Box, Voltage Tap Panel, and QDs is correct and matches the drawings.
  - ★ Checked wiring connections on cRIO ADC input modules, all connections matched drawings and also LabVIEW code channel assignment.
  - ★ Injected pulse signal with signal generator on VT15 at the Resistor Box connector to test cRIO Notch filters.
    - Voltage signal injected:  $V_{pp} = 10$  V, at 0.5, 2, 3, 5 and 10 KHz.
    - Filter reacted as expected, showing decrement in the  $V_{pp}$  at higher frequencies.
  - ★ VT15 probably is not the cause of the dump as the analysis indicates duplicate and missed samples on the FastDAQ data used for voltage tap analysis.
- Fixed PTP time on cRIOs that used the PLCs as master on the Hall B subnet

#### HDice

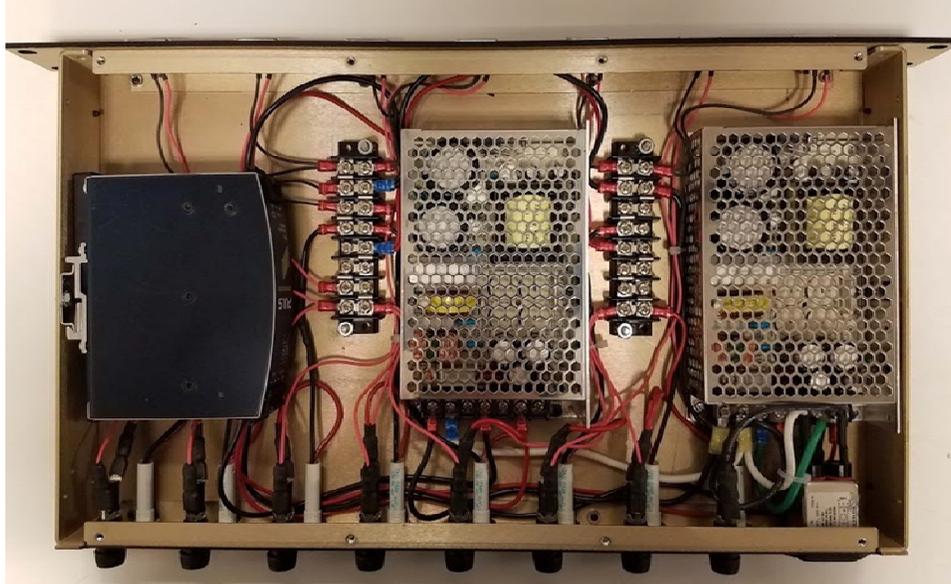
- Updated HDice NMR code flowchart.
- Asked for re-location of the instrumentation spares for NMR rack #1.

#### RICH

- Created documentation for wiring of RICH hardware interlock cRIO chassis.
  - ★ Work in progress includes power distribution and sensor wiring for both N2 cRIO and EP cRIO.

**Hall B Gas System Controls**

- MFC power chassis fabrication completed.
  - ★ Installed fuses in fuse holders on two back panels.
  - ★ Wired LEDs, fuse holders, and power module.
  - ★ Cut DIN rail for decoupling module.



Top view of the Mass Flow Controllers power chassis completed

**LTCC**

- Moved the C4F10 scale from forward carriage to gas shed.
  - ★ Readout code was moved from the forward carriage back to the gas shed cRIO.
  - ★ The scale wasn't zeroed prior to having the tank placed on it so the reading isn't correct, but relative changes should be.
- Fixed a bug with the gas selection in the LabVIEW code used for gas systems.
  - ★ Found that LTCC gas selection did not change from N2 to C4F10.
  - ★ Found that to talk with the MFC it is required to use the Fully Qualified Domain Name
    - Example: hb-mfc-ltcc-s5@jlab.org
- Worked on troubleshooting Gas Shed cRIO issues.
  - ★ Issue 1: DC mixing mode controls and mix tank pressure controls got stuck in manual mode.
    - Issue solved by disabling signal on a development cRIO, which was causing the Boolean signals to revert to false.
  - ★ Issue 2: Gas shed cRIO stopped at 7:53 on 8/27.
    - Solved issue by rebooting cRIO controller.
- Analyzed details for the process of filling and venting LTTC sector 3.

**DC**

- Added H2O & O2 sensor readout on exhaust manifolds.
  - ★ R1-2 is reading quite a bit higher compared to R3.
    - R-2: O2 sensor ~ 600 ppm, R1-2 H2O ~ 500 ppm
    - R3: O2 sensor ~100 ppm, R3: H2O sensor < 100 ppm



# Detector Support Group

## Weekly Report, 2018-08-29

### DSG

- Writing python code to simulate **Krohn-Hite** voltage source.
- Completed **cRIO Test Station** code for manual test of module 9205 in  $\pm 1$  V and  $\pm 0.2$  V ranges, using Krohn-Hite voltage source calibrator.
  - \* Made Visio drawing of cable for testing with Krohn-Hite power supply.
  - \* Modified cRIO Test Station LabVIEW code to implement Krohn Hite voltage calibrator drivers
    - Code implemented in User Interface area.
    - Ran test to verify proper setting of voltage in Krohn Hite and readouts in NI-9205 ADC module.
  - \* Debugged DSGCOMP2 computer used for the cRIO test station.
    - Computer did not “wake up properly” after it goes to sleep mode.
    - Computer center support is taking care of the computer, problem not solved.



# Detector Support Group

## Weekly Report, 2018-08-29

### Antonioli, Mary Ann

#### cRIO test station.

- Completed code for manual test of module 9205 in  $\pm 1$  V and  $\pm 0.2$  V ranges, using Krohn-Hite power supply.
- Made Visio drawing of cable for testing with Krohn-Hite power supply.
- Re-made Excel templates for 9207 test that was “lost”.
- Continued editing DSG Note on Hall B Gas System.
- Updated HDice NMR code flowchart.

### Bonneau, Peter

Absent

### Campero, Pablo

#### Hall C

- Dipole field regulation PLC program in progress
  - \* Implemented digital filter in the code to read magnetic field from NMR PT2026 at desired rates, sample numbers.
  - \* Filter added is making a sliding average for 60 samples every 1 second.
  - \* Added sampling options to HMI test screen.
- Updated DSG- Hall C PLC task list.
- Generated DSG Hall C PLC weekly report.

#### Hall B Magents

- Followed Solenoid magnet after fast dump occurred on 8/27/2018.
  - \* Solenoid fast dump at full current 2416 [A]
  - \* Got SOE PLC timestamps, which showed QD#2-ch2 (only VT1 connected at this channel) as the first trip.
  - \* Analyzed FastDAQ data for 21 voltage taps
    - Found significant voltage spikes on VT2, VT1, VT15, VT18, and VT19.
    - VT15 presented the first spikes at  $\sim 1$  V just 198 ms before the others and the Fast Dump switch would opened.
    - VT15 is part of a VTs group that is connected in QD#1-ch3 and QD#2-ch4.
    - Nether QD#1-ch3 or QD#2-ch4 tripped.
  - \* Tested QDs functionality by injecting voltage in Solenoid Resistor Box.
    - Injected 1, 2 V to simulate Voltage spike in VT15, VT1.
    - QD#1-ch3 and QD#2-ch4 tripped as expected.
  - \* Checked wiring connection and compared with latest version of the drawings.
    - Wiring between Resistor Box, Voltage Tap Panel, and QDs is correct and matched with current drawings.
  - \* Checked wiring connections on cRIO ADC input modules, all connections matched drawings and also LabVIEW code channel assignment.



# Detector Support Group

## Weekly Report, 2018-08-29

- \* Injected pulse signal with signal generator on VT15 at the Resistor Box connector to test ADC cRIO filters.
  - Voltage signal injected:  $V_{pp} = 10$  V, at 500 Hz, 2,3,5 and 10 KHz.
  - Filter reacted as expected, showing decrement in the  $V_{pp}$  at grater frequencies.
- Edited and compile DSG weekly report.
- Modified **cRIO Test Station** LabVIEW code to implement Krohn Hite voltage calibrator drivers
  - \* Code implemented in User Interface area.
  - \* Ran test to verify proper setting of voltage in Krohn Hite and readouts in NI-9205 ADC module.
- Debugged computer used for the **cRIO test station**
  - \* Computer did not “wake up properly” after it goes to sleep mode.
  - \* Computer center support is taking care of the computer, problem not solved.
  - \* Generated backup files of the LabVIEW project, since computer will be rebuilt.

### **Eng. Brian**

#### **LTCC**

- Moved the C4F10 scale from the FC to the GS: <https://logbooks.jlab.org/entry/3590509>
- Fixed a bug with the gas selection on the FC cRIO:  
<https://logbooks.jlab.org/entry/3591937>

#### **DC**

- Added H2O & O2 sensor readout on exhaust manifolds:  
<https://logbooks.jlab.org/entry/3590110>

#### **Hall B - Magnets**

- Analysis and troubleshooting of fast dump on 8/27:  
<https://logbooks.jlab.org/entry/3591860>
- Fixed PTP time on cRIOs (that used the PLCs as master on the 96 subnet):  
<https://logbooks.jlab.org/entry/3592351>

### **Hoebel, Amanda**

#### **HDice**

- Took Mary Ann to the lab to look at Rack #1.
  - \* Asked Xiangdong where to put spares from Rack #1.

#### **Magnets**

- Attended meeting to discuss solenoid quench.
  - \* PLC SOE showed QD #2 sum signal tripped first, causing quench.
  - \* FastDAQ showed VT15 as having first voltage spike ~1V.
  - \* Voltage injection tests were conducted to check voltage tap behavior.



# Detector Support Group

## Weekly Report, 2018-08-29

### DSG

- Monitored EPICS and logbooks for Halls B, C, and D.
- Worked on Keithley and Krohn-Hite simulator programs in Python.

### Jacobs, George

#### GAS Systems

- Discussions with Marc about MFC operation and what happens when the wrong gas correction factor is used
- Discussions with Marc detailing the process of filling and venting LTCC S3
- Discussions with M Jones about the GEM gas supply in EEL 124-125

### Leffel, Mindy

#### Hall B Gas Systems

- MFC power chassis fabrication.
  - \* Installed fuses in fuse holders on two back panels.
  - \* Wired LEDs, fuse holders, and power entry module.
  - \* Cut DIN rail for YR2 decoupling module.

### Lemon, Tyler

- Investigated Hall B Solenoid fast dump on August 27, 2018 with Pablo and Amanda.
  - \* SOE module indicated that QD2 tripped first and EPICS QD bits showed QD 2 Ch 7 that monitors only VT1-DAQ tripped had.
    - Could not find any voltage spike on VT1-DAQ before fast dump.
- Created documentation for wiring of RICH hardware interlock cRIO chassis.
  - \* Work in progress includes power distribution and sensor wiring for both N2 cRIO and EP cRIO.
- Continued development of Python Danfysik power supply simulation.
  - \* Successfully tested capability of program to ramp to higher currents at varying ramp rates.
  - \* Improved program's structure to remove duplicated logic.

### McMullen, Marc

#### DC

- Terminated O2 and moisture sensor cables which were relocated to the DC exhaust.
- Performed some troubleshooting of the R1-2 exhaust moisture channel; this unit may need replacement.

#### LTCC

- Reinstalled supply tank scale to the Gas Shed cRIO.
- Worked on troubleshooting Gas Shed cRIO issues from the weekend.



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## Weekly Report, 2018-08-29

- ★ Issue 1: DC mixing mode controls and mix tank pressure controls got stuck in manual mode. The issue was solved by disabling a development cRIO which was causing the Boolean signals to revert to false.
- ★ Issue 2: Gas shed cRIO stopped at 7:53 on 8/27. After rebooting the cRIO, all systems were operational. With the exception of Issue 1. Issue not solved after Issue 2.
- LTCC gas selection did not change from N2 to C4F10.
  - ★ This did not allow for the 0.1 gas correction factor.
  - ★ At some point, the MFC software requirement changed from needing the abbreviated host name to the Fully Qualified Domain Name (example hb-mfc-ltcc-s5@jlab.org).
  - ★ After an update, this worked.
- Sector 5 has been supplied 36Kg of C4F10 from the supply tank as of ~8:30 on 8/29/18
- Wrote **DSG document** on the Hall B Gas Controls.
  - ★ The document gives details on how the system ran during RGA (spring run), as well as configuration changes made for RGB (fall run.)