



Detector Support Group

Weekly Report, 2018-04-25

Summary

HDice

- Development completed of subVIs for DAq synchronization.
 - * Calculations for buffer depth and data acquisition rate rewritten to use CT-box synchronous triggering.
 - * Data buffer timestamp adapted for synchronous operation.
 - * VI developed to process raw CT-box data in temporary storage queue while simultaneously reading lock-in amplifier buffer data.
- Gauss offset problem in NRM program solved.
 - * For some cycles, the NMR program would not complete a ramp-up during a scan.
 - * Program found to be redundantly issuing ramp hold command when the buffer limit was reached.
 - * Removing redundant ramp hold command resolved gauss offset problem.
- Setup and debug completed of Rack #1 test station after relocation in DSG control room.
 - * CT-box trigger interface hardware debugged and tested.
 - * RS-485 cable replaced; bad cable was causing communication to RF box to fail.
 - * Oxford power supply, RF generator, lock-in amplifier, and CT-box reconnected and successfully tested with NMR synchronization program.
- Communication debugged for Mercury IPS power supply.
 - * Power supply unable to read SCPI commands sent via USB connection.
 - * Cause of errors in LabVIEW code not yet found; further debugging required.
- PR submitted for RF Box parts:
 - * DIO module resistors, cooling fan, attenuator, and power supply status LEDs.

RICH

- DSG's spare cRIO-9082 configured as development station for improvements to hardware interlock program.
- EP cRIO'S hardware interlock program updated to give ability to enable averaging and set number of samples averaged over for individual sensors.
 - * Previous version used global averaging control settings for all sensors.
 - * Update successfully tested on development cRIO; will be deployed to EP cRIO over summer shutdown.

LTCC

- All sectors will be moved from Hall B to ESB for resealing over summer shutdown.
 - * Hall B Engineering will start sealing Sector 1 during the week of April 23, 2018.
 - * Magnehelic differential pressure transmitter and solenoid valve ordered for tests.
 - * DSG will monitor the leak rate after gas and instrumentation is connected.
- System diagram created for portable C₄F₁₀ distillation and recovery system.

SVT

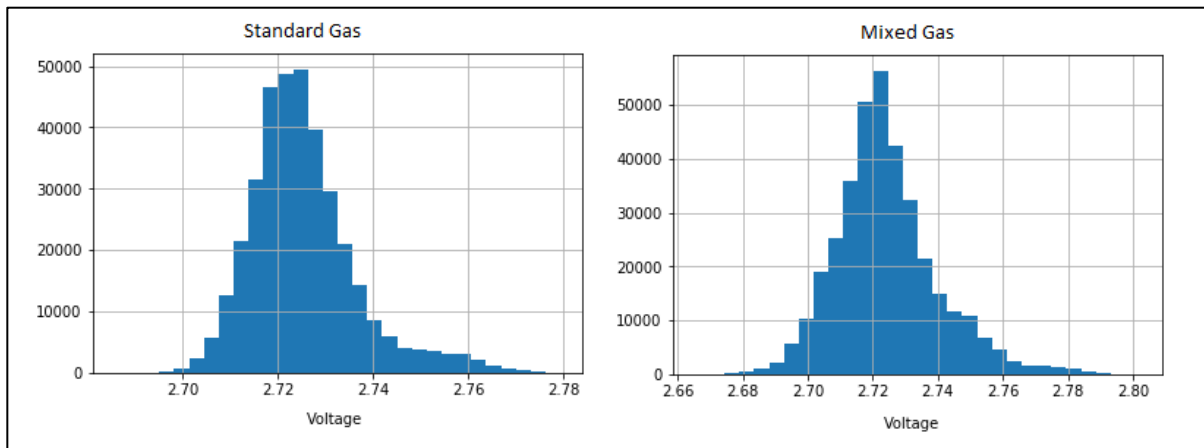
- New, redesigned HTSB boards and parts ordered.
- Population of all 10 Patch Panel Type #1 boards completed.
- Assembly of Patch Panel Type #2 board completed.
 - ★ Preliminary tests of board's power circuit underway.



Assembled SVT Patch Panel Type #2 board.

Gas System

- Script written to publish data from Facilities' weather station on top of Hall B to EPICS.
- Histograms generated in Python for DC TCU 1 voltage data.



Histograms showing TCU 1 voltages for standard and mixed gas measurements.



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Hall B Magnets

- 25-turn trim pots (one 2k Ω , one 100 k Ω) ordered to test their fit in QD board assembly.
 - ★ Ten-turn trim pots currently on boards drift, potentially causing QD unit trip levels to change, and in turn causing false fast dumps.
 - ★ If ordered 25-turn trim pots fit in QD board assembly, enough will be ordered to replace all old 10-turn trim pots
- Because of latency in system due to wiring, data acquired for Solenoid voltage taps at recorded time of fast dumps may not be voltages that caused trip.
 - ★ Noted VT18 and VT2 voltages were lower at time of trip because their spikes happened ~ 200 ms before the recorded trip times.
 - ★ Spreadsheet generated containing data will be checked to confirm voltage recorded are signals that caused trip.

Hall D PXI

- NI PXIe-4300 ADC module calibration code put on GitHub.
 - ★ <https://github.com/JeffersonLab/halld-pxi-4300-calibration>

LERF

- Overview received of upcoming tasks in the Low Energy Recirculator Facility (LERF).
 - ★ Tasks include terminating cables for cryomodule testing.
- Population of two HARP power distribution boards in progress.

cRIO Test Station

- “Missing Code” test for NI-9207 ADC module removed from test program.
 - ★ NI-9263 analog output module used as voltage source for tests has a 16-bit resolution, where NI-9207 has a 24-bit resolution.
 - ★ Differences in resolutions does not allow full range of NI-9207 to be tested.
- Hardware determined for NI-9207 ADC current input tests.
 - ★ NI-9265 analog output module will be used as 4 – 20 mA current source.

VME Test Station

- Hardware for test station gathered and set up:
 - ★ VME crate, VME-USB card, V450 ADC card, and Keithley 6487 power source.
- Keithley 6487 configured to communicate to PC’s com port via RS-232.
- LabVIEW program written and debugged to test communication to Keithley 6487.
 - ★ Program is unable to send/receive SCPI commands to the power source due to timeout errors; debugging still in progress.

MPOD Test Station

- Test station MPOD’s faulty power supply sent to Weiner for repair.
- Quote received for new MPOD crate to replace crate with bad power supply (\$6,805).



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Antonioli, Mary Ann

cRIO test stand

- Revised, tested, and debugged missing code test for manual mode.
 - ★ Code revised to measure slope for each 1 V interval.
- Updated and tested Main Real Time and User Interface with revised missing code test.
- Due to inability to get accurate results, missing code test scrapped.
 - ★ Revised overall module test to remove missing code test.
 - ★ Retested all manual tests and automatic test; all test successful.
- Wired 9265 current supply module for tests of 9207 ADC module with current input.

Bonneau, Peter

HDice

- Completed rewrite, debug, and testing of subVIs for DAq synchronization.
 - ★ Run-table calculations for buffer depth and data acquisition rate rewritten for CT-box sync triggering.
 - ★ Timing for data buffer timestamp adapted for synchronous operation.
 - ★ Developed VI to process CT-box raw data in temporary storage queue while simultaneously reading lock-in amplifier buffer data while.
- Debugged gauss offset problem in NRM program.
 - ★ For some cycles, the NMR program would not complete a ramp-up during a scan.
 - ★ Confirmed calculations for ramp and commands to power supply were correct.
 - ★ Found that program was issuing a ramp-hold command too early when the buffer limit was reached.
 - Redundant hold command removed since the power supply holds at the set-point at the end of a ramp,
 - ★ Power supply now completes all ramp-ups.
- Completed setup and debug of Rack #1 test station after relocation.
 - ★ CT-box hardware trigger interface hardware debugged and tested
 - ★ RS-485 communication with the RF box was intermittently failing due to bad cable; cable replaced.
 - ★ The Oxford power supply, RF generator, lock-in amplifier, and CT-box re-connected and tested with NMR synchronization development program.

DSG

- Received quote for Weiner MPOD crate for DSG test station (\$6805).
- Held meetings on Hall B and D detector and magnet status and



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Campero, Pablo

Magnets

- Discussed data acquired for the “Solenoid Voltage Tap Values During Fast Dumps” spreadsheet with Tyler and Amanda.
 - * Determined that all values for the table were taken right at the trip time.
 - * Noted VT18 and VT2 values showed lower values because their spikes happened ~ 200 ms before the trip times.
- Corrected “Hall B Magnets Status Report” talk.

HDice

- Debugged communication for Mercury IPS power supply with Amanda.
 - * Installed USB drivers.
 - * Power supply unable to read SCPI commands sent via USB connection.
 - * Verified LabVIEW code and did not find any obvious problem, further debugging needed.

cRIO Test Station

- Discussed “Missing Code” test for the NI-9207 ADC input module with Amrit.
 - * NI-9263 analog output module used as voltage source for tests has a 16-bit resolution, where NI-9207 has a 24-bit resolution.
 - Discrepancy in resolutions does not allow full range of NI-9207 ADC module to be tested.
 - * Decided to remove “Missing Code” test from overall test program because:
 - Test requires several hours to run.
 - Full range of NI-9207 cannot be tested with how test station is set up.
- Determined hardware required for the test of NI-9207 ADC module with a current input.
 - * NI-9265 analog output module will be used as a 4 – 20 mA current source.
 - * Wiring schematic developed to provide current to the NI-9207 ADC module from the NI-9265 analog output module.
 - * Investigated procurement of an additional NI-9265 module to be able to test all eight channels of NI-9207 ADC.
 - One NI-9265 module has only four channels.

VME Test Station

- Set up hardware for test station:
 - * VME crate, VME-USB card, V450 ADC card, and Keithley 6487 power source.
- Configured Keithley 6487 to communicate to PC via RS-232.
- Wrote and debugged LabVIEW program to test communication to Keithley 6487.
 - * Unable to send/receive SCPI commands to the power source.
 - * Found errors due to timeout; debugging still in progress.



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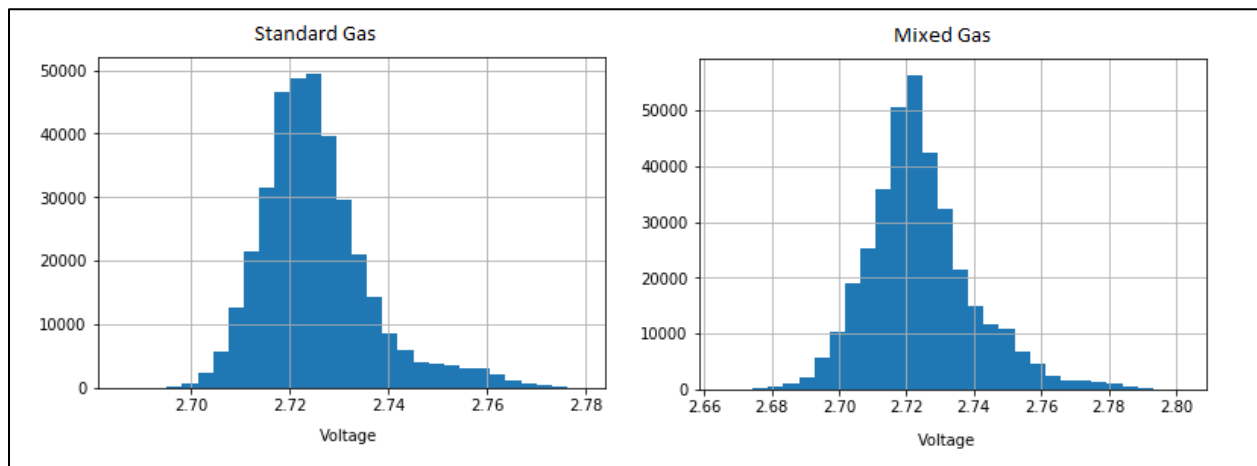
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Eng, Brian

- Wrote script to pull data from weather station on top of Hall B and write it to EPICS.
 - ★ Script pulls data once every minute.
 - ★ Converted script to run via crontab to run via procServ, allowing it to run in an infinite loop instead of single-shot (<https://logbooks.jlab.org/entry/3566279>).
- For LTCC tests in ESB, ordered new solenoid coil and magnehelic.
- For Hall B Magnets QD boards, ordered replacement trim pots for QD board.
 - ★ Existing ones are 1/4" tall, but trim pots with additional turns are 3/8".
 - ★ Ordered a few to check their fit on the QD Board.
- Put the Hall D PXI 4300 calibration code on GitHub.
 - ★ <https://github.com/JeffersonLab/halld-pxi-4300-calibration>

Hoebel, Amanda

- Submitted PR for HDice RF Attenuator Box parts:
 - ★ Resistors for DIO module pull-down resistors, cooling fan, attenuator, and LEDs.
- Wrote SVT health status report.
- Analyzed DC TCU voltage data with Python.
 - ★ Made histograms for standard and mixed gas.
 - ★ Calculated statistics for standard and mixed gas.
 - ★ Completed TCU note.



Histograms showing TCU voltages for standard and mixed gas measurements.



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Jacobs, George

Gas System

- Monitored daily LTCC S5 single sector test detector pressure and gas usage.
- Discussed why gas flow changes as supply pressure varies over time for systems that have their pressure regulators improperly set.
 - ★ Examples: RICH air and nitrogen systems, FR nitrogen purge.
- Discussed with Brad S., Doug H., Zhiwen Z., and Jack S. about C₄F₁₀ recovery system and the increase in cost and lead times for gas procurement.
- Created system diagram for portable C₄F₁₀ distillation and recovery system.

Leffel, Mindy

SVT

- Finished populating all 10 Patch Panel Type #1 boards.
 - ★ Soldered 10 D-sub connectors, 20 four-position headers, and 80 three-position headers.
- Received overview of upcoming work in the Low Energy Recirculator Facility (LERF).
 - ★ Tasks include terminating cables for cryomodule testing.
- Started populating one of two HARP power distribution boards.

Lemon, Tyler

RICH

- Configured DSG's spare cRIO-9082 to use as a development station for hardware interlock program improvements.
 - ★ Reconfigured cRIO to use local IP address with host name DSGCRIO-DEV3.
 - ★ Installed modules to mimic RICH's EP cRIO.
 - ★ Modified hardware interlock subVIs to write configuration file to development cRIO's internal memory rather than SD card.
 - Actual RICH cRIOs run NI Linux RT OS and store files on SD card.
 - Development cRIO runs Pharlap OS and does not have SD card slot.
- Modified EP cRIO program to remove unneeded logic for gas system's interlocks.
 - ★ Original version of EP cRIO program was a copy of N2 cRIO program with gas system interlocks removed from only the interlock control loop.
 - EP cRIO program set up this way because of time constraints in setting up RICH's dual-cRIO hardware interlock system.
 - ★ New version will make it easier to add RICH #2's EP sensors in the future.
- Added individual averaging controls for all sensors in EP cRIO.
 - ★ Previous version used one global control to set averaging enable/disable and number of samples averaged over for all sensors.
 - ★ New version allows averaging to be enabled for individual sensors and to change number of samples averaged over for individual sensors.
 - ★ New version successfully tested on development cRIO.



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- Wrote Python program to search fastDAQ files for user-input time and return voltage tap readings at that time.
 - ★ Goal of program was to expedite retrieval of voltage tap data at the time of fast dumps.
 - Previous method to obtain voltage tap data was to open the file in to Excel and manually search for times close to that of the fast dump.
 - ★ Debugging of program in process.

McMullen, Marc

SVT

- Ordered the new, redesigned HTSB boards and parts.
- Patch Panel Type #2 board assembly completed by M. Leffel.
 - ★ Brian performed a preliminary test of the power circuit.



Assembled SVT Patch Panel Type #2 board.

LTCC

- Met with Hall B Mechanical & Engineering group to discuss resealing and testing of the LTCC sectors.
 - ★ DSG presented the current disposition of Regions 2, 3, 5, and 6.
 - ★ Hall B will start sealing Sector 1 this week.
 - ★ DSG will monitor the leak rate after gas and instrumentation is connected.
 - Instrumentation is on order.