



Detector Support Group

Weekly Report, 2018-04-18

Summary

Hall B Magnets

- FastDAQ data for Solenoid accessed to record voltage tap readings at time of fast dumps.
 - ★ Files from Solenoid's commissioning had to be requested from tape storage.
 - ★ After analysis, all files were moved to *hblin4* storage array to make future access to files easier.
 - All FastDAQ files are eventually written to tape for long-term storage.
 - Moving files to storage array will expedite access since requesting a file from tape takes several hours.
- Loss of Solenoid LV cRIO communication investigated.
 - ★ No obvious faults on cRIO and communication was restored with reboot
 - ★ Second time error has happened (previous time was March 19, 2018).
 - ★ Communication loss does not immediately trigger any ramp down
 - Issue was resolved before a controlled ramp down or fast dump occurred.

HDice

- Hardware upgrade of RF Box #1 complete.
 - ★ Upgrade allows read-back of the cable and terminator keys and the capability for direct read-back of the NMR and AFP attenuators by the NMR program.
- RF Box #1 Attenuator B read-back for AFP mode debugged.
 - ★ Attenuator read-back was incorrectly fixed at -63 dB, regardless of the actual attenuator settings because input module floats to ~4V when relay module's contacts were open.
 - ★ RF Box #1 tested with new DIO modules from a working RF Box.
 - Did not correct the problem; new module still floated too high.
 - ★ Found that Attenuator B's input resistance is higher than the other attenuators, causing module to float to a higher voltage when relay module contacts are open.
 - ★ Floating input corrected with addition of 2.2-k Ω pull-down resistors to RF Box #1's input module.
 - 22.2-k Ω pull-down resistors will be added to RF Box #2 and RF Box #3 on their DIO 7053D module to prevent future issues.
 - ★ Attenuator B will be replaced and the cooling fan (fan is going bad) in RF Box #1.
- Investigated alternative methods of calibration for the CT-box current shunt head.
 - ★ The typical method of zeroing the CT-box head at 0 Amps will not be possible in the NMR system as current must always be on to maintain polarization on the HDice target.
- RF Box drawing updated to show resistor values for power supply status LED wiring.



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SVT

- Patch Panel Type #1 boards for humidity sensors received, populated, and tested.
 - ★ Five boards populated.
 - ★ Power distribution tested; LED and fuse functionality works as intended.
- Redesign of HTSB completed and submitted to manufacturer for design inspection.

Gas System

- New MFC power chassis design modified to reduce chassis size from a double-DIN to a single-DIN size.
- Gas configuration for DC Mix 1 changed back to use of mix gas after TCU study.
- HTCC had low pressure alarm due to changes in atmospheric pressure.
- MVT flow multipliers changed to decrease flow to mix tank in attempt to decrease pressure in mix tank.
 - ★ Pressure in tank was not decreasing due to high temperature caused by warm weather and heat tape.

Hall D PXI

- Communication tested between PXI controller and Krohn-Hite Voltage Source via GPIB to develop an automated ADC calibration program.

cRIO Test Station

- Missing code test for manual mode revised to measure slope for each 1-V interval and to implement corrected pass/fail conditions.
 - ★ To determine if a channel passed test, bits for the ideal output are compared to the bits measured and if the ideal is greater than the measured, the channel fails.
- National Instruments single-board cRIO (sbcRIO) researched for future projects.
 - ★ PR submitted for a sbcRIO and interfaces.
- DSG control room rearranged to have Peter and Amanda swap workspace locations.
 - ★ Drawers, power strips, and desk risers moved to create workspace that meets Peter and Amanda's requirements.

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Left: Amanda's old workspace before/during rearranging of DSG control room. Right: Amanda's new workspace after rearranging.



Left: Peter's workspace before/during rearranging of DSG control room. Right: Peter's new workspace after rearranging.



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Antonioli, Mary Ann

- Updated HDice RF box drawing with resistor values for LED wiring.

cRIO test stand

- Began revising missing code test for manual mode to measure slope for each 1 V interval.

Bonneau, Peter

HDice

- Debugged hardware for upgrade of RF Box #1.
 - * Upgrade allows:
 - Read-back of the cable and terminator keys.
 - The capability for direct read-back of the NMR and AFP attenuators by the NMR program.
- Debugged Attenuator B read-back for AFP mode.
 - * The read-back was incorrect and fixed at and -63 dB, regardless of the actual attenuator settings.
 - The signals to the DIO 7053D module found to be floating too high (~4V) when the attenuator DIO relay module (7060D) outputs were open.
 - * The DIO modules were swapped with a working RF Box.
 - Did not correct the problem; module still floated too high.
 - * Found that Attenuator B's input resistance is higher than the other attenuators, causing it to float to a higher voltage when the relay module output is open.
 - * 2.2-k Ω pull-down resistors added to RF Box, on the 7053D input module, correcting floating input problem.
 - Original design of RF Box hardware did not include pull-down resistors.
 - * Attenuator B will be replaced along with the cooling fan in RF Box #1.
 - * 22.2-k Ω pull-down resistors will be added to RF Box #2 and RF Box #3 on their DIO 7053D module.
- Investigated alternative methods of calibration for the CT-box current shunt head.
 - * The typical method of zeroing the CT-box head at 0 Amps will not be possible in the NMR system as current must always be on to maintain polarization on the HDice target.
- Wrote and posted DSG HDice work status summary detailing progress on NMR programming and hardware.

DSG

- Researched use of National Instruments single-board cRIO (sbcRIO) for future projects.
 - * PR submitted for a sbcRIO and interfaces.

Campero, Pablo

Magnets

- Solenoid alarm due to Solenoid-LV cRIO error communication on 4/17/2018.
 - * cRIO stopped sending data to the Solenoid PLC, raising an alarm in EPICS alarm handler and Interlocks screen.



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- * Temperature and load cells values went to 555.55 and hall sensor stopped updating as programmed.
- * Rebooted cRIO controller remotely via serial port; communication recovered without problem
- * Same error occurred on March 19, 2018.
- Generated table with 21 voltage taps values in the solenoid for each of the 14 fast dump events from September 2017 to April 2018.
 - * Imported voltage taps data from data archiver and root files.
- Created spreadsheet with the Solenoid Voltage taps location and normal operational values for comparison with Hall D's Solenoid.

DC

- Changed gas system configuration from standard gas (90% CO₂/10% Ar) to mixture.
- Collaborated to move Amanda and Peter's work station in EEL 121C control room.
 - * Locations were swapped between Peter and Amanda with the aim of get more space available for HDice and cRIO test stands used by Peter.
- Corrected "Missing Code" test for the NI9207 ADC input module as part of the cRIO Test Station project.
 - * Determined that slope has to be found for each interval point measured.
 - * The slope measured is used to calculate the output bits for each point.
 - * Ideal output bits is compared with the measured and if the ideal is greater by at least 1 bit than the measured then the channel is considered as failure with missing code.
 - * Discussed LabVIEW code with MaryAnn to implement corrections.

Eng. Brian

SVT

- Upgraded Linux PC to Red Hat 7.4 from 7.5.
 - * Required rebuild and update of GEMC from version 2.1 to 2.2.
- Tested power distribution of first assembled humidity patch panel board
 - * LED and fuse functionality works as intended.

MVT

- Changed mixing multipliers because the pressure wasn't decreasing due to high ambient temperature from warm weather.
 - * <https://logbooks.jlab.org/entry/3560801>

Hall B Magnets

- Moved FastDAQ files that got moved to tape back to cache directory and copied them to *hblin4* storage array.
 - * Files stored in directory /storage/magnets for easy access as moving data from tape takes all day and files moved from tape will eventually get removed again.
- Investigated loss of Solenoid LV cRIO communication with Pablo.

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- ★ Communication loss does not immediately trigger any ramp down; issue was resolved before a controlled ramp down or fast dump occurred.
- ★ No obvious faults; solved with reboot
- ★ <https://logbooks.jlab.org/entry/3562376>

Hall D PXI

- Tested communicating with Krohn-hite Voltage Source via GPIB on PXI controller.
 - ★ Installed 488.2 drivers
 - ★ End goal is to better automate running the ADC calibration program.

Hoebel, Amanda

DC

- Switched gas back to mixture after monitoring TCU voltage for 1 week with standard gas, with Marc, Tyler, and Pablo.
- Debugged problems with TCU program.
 - ★ Program would not run with new voltage values.
 - ★ Value saved from MYA read as “<< Archiving of channel turned off >>” was causing error.
- Recorded Solenoid voltage values for VTT fastDAQ recorded during quenches, using MYA archiver.
- Started SVT detector health report.
- **Rearranged control room.**



Peter and Amrit arranging Peter's new workspace.

Jacobs, George

- Monitored daily LTCC S5 detector pressure and gas usage in its single sector test.

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- For HTCC, discussed cause of low pressure alarm and how to limit number of future alarms
- Discussed RTPC gas system components with Carlos A.
- Discussed C₄F₁₀ recovery system with Brad S, Doug H, Zhiwen Z, and Jack S.

Leffel, Mindy

- Five SVT Patch Panel Type #1 boards populated.
- Continued reviewing for overhead crane training.

Lemon, Tyler

Hall B Magnets

- Retrieved fastDAQ data for Solenoid fast dumps for logging of voltage tap readings at time of fast dump.
 - ★ Data read from ROOT files and recorded into Excel.
 - ★ Used *jcache get* command to move files that had been written to tape to *clon* cache directory for analysis.
 - ★ Copies of all fast dump fastDAQ data written to DSG's RAID (*hblin4*) to keep data on hand for analysis.
 - Files would eventually move back to tape if left in *clon* cache directory.

DSG

- Rearranged DSG control room with Peter, Pablo, Amanda, Marc, and Amrit.
 - ★ Control room rearranged to have Peter and Amanda swap workspace locations.
 - ★ Moved drawers and power strips to create workspace that meets Peter and Amanda's requirements.
- Installed keyboard tray on personal workspace.



Left: Amanda's workspace before/during rearranging of DSG control room. Right: Amanda's new workspace after rearranging.

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Left: Peter's workspace before/during rearranging of DSG control room. Right: Peter's new workspace after rearranging.

McMullen, Marc

SVT

- Completed redesign of HTSB.
 - ★ Revised PCB submitted to manufacturer for design inspection.
- Received Patch Panel Board #1.

Gas System

- Modified new MFC power chassis design per B. Eng.
 - ★ Chassis will be reduced from a double DIN to a single DIN size.
- Mix 1 TCU is back in standard configuration.
- HTCC had low pressure alarm due to changes in atmospheric pressure.