Detector Support Group
Weekly Report, 2018-05-02

<u>Summary</u>

<u>HDice</u>
- Debugging of error in NRM program regarding the end-of-scan field setting completed.
  - ✱ For some scans, the program would not completely finish the field ramp-up at the end of a cycle.
  - ✱ It was found that the program was issuing a ramp-hold command too early during the field ramp-up when the buffer limit was reached.
- Communication debugged for Mercury IPS power supply.
  - ✱ Power supply unable to read SCPI commands sent via USB connection.
    - ▪ Updated Gadget Serial drivers.
    - ▪ TeraTerm downloaded and installed to test serial/USB port connections.
  - ✱ After debugging, the connection could not be still established.

<u>RICH</u>
- EP cRIO's hardware interlocks program updated to give ability to enable trip delays with user-set time over threshold requirements for individual sensors.
  - ✱ Previous version used global trip delay control settings for all sensors.
  - ✱ Update successfully tested on development cRIO; will be deployed to EP cRIO over summer shutdown.
- Wiring schematic and code developed to allow remote software override for both cRIOs in the hardware interlock cRIO.
  - ✱ Each cRIO will serve a remote relay override for the other cRIO in RICH's dual-cRIO interlock system.
  - ✱ Successfully tested preliminary version for remote override on development cRIO.

<u>SVT</u>
- New humidity and temperature sensor boards arrived.

<u>Gas System</u>
- New design for MFC power distribution chassis completed.
  - ✱ Chassis adds additional fusing and ability to take signal box offline without effecting MFCs.
  - ✱ Request for quote to Par-metal enclosure sent.

<u>Hall B Magnets</u>
- Quartus 17.1 software installed on Linux, software used to program FPGA board.
- Development code for the LV chassis' FPGA board in progress.
  - ✱ GitHub repository for FPGA created.
  - ✱ FPGA-only mode builds fine on new development board.
  - ✱ Having some issues getting "System on a Chip" (SoC) part deployed/running properly.
    - ▪ SoC will allow direct communication with the PLCs.

LERF
- Both Harp power distribution boards populated.
- Populating one of six VME FSD fiber card boards for Machine Protection System started.

Harp power distribution board

cRIO Test Station
- Wiring between NI-9207 and NI-9265 modules completed.
  - ⋆ D-sub connector soldered and wired according NI technical specification.
  - ⋆ Problems found with current "bleeding" into other channels.
  - ⋆ LabVIEW code written to test set current and readout current (0-20mA) for NI-9265 and NI-9207 modules respectively.
- LabVIEW sub-VIs written to take current samples from channel 8 to 11 and calculate mean, accuracy, and standard deviation.
  - ⋆ Sub-VIs added to manual and automatic mode tests.
  - ⋆ Sub-VI programs tested and debugged.

VME Test Station
- Instrumentation for test station configured and tested.
  - ⋆ Serial communication problems between Keithley voltage source and PC solved.
    - ▪ Bad RS-232 cable changed; adaptor added to convert serial to USB connection.
  - ⋆ LabVIEW program written to set voltage output in the Keithley power source.

Hall C
- Meeting held with Steve Lassiter, Jack Segal, and Mike Fowler regarding Hall C magnets control systems.
  - ⋆ Hall C is requesting assistance with the magnet control systems for their High Momentum Spectrometer (HMS) and Super High Momentum Spectrometer (SHMS).
  - ⋆ Hall C will make a list of control system hardware and programming tasks with timeline completion dates where DSG can contribute.

Antonioli, Mary Ann

cRIO test stand

- Completed wiring of 9207 D-sub connector for connection to 9265 module (current supply) for testing 9207 channels 8-11. Tested by Pablo.
  - ✶ Problems found with current "bleeding" into other channels.
  - ✶ Wired a second connector; tested; works.
- Wrote subVI to take current samples from one channel of 8-11and calculate mean, accuracy, and standard deviation.
  - ✶ Tested and debugged. Works.
  - ✶ Added subVI to manual mode of User Interface and Main Real Time.
- Wrote subVI to take samples and calculate mean, accuracy, and standard deviation for all channels, 8-11.
  - ✶ Added subVI to auto mode of User Interface and Main Real Time.
  - ✶ Tested OK.

- Edited Pablo's **Hall B Magnets** presentation.
- Took Standards of Conduct training.

Bonneau, Peter

HDice

- Completed debugging the error in NRM program regarding the end-of-scan field setting.
  - ✶ For some scans, the program would not completely finish the field ramp-up at the end of a cycle.
  - ✶ It was found that the program was issuing a ramp-hold command too early during the field ramp-up when the buffer limit was reached.
  - ✶ Removing the ramp hold command at buffer limit allowed the first cycle in a run to always successfully complete the field ramp-up.
  - ✶ However, removing the hold command during a run with multiple cycles, the program would start ramping too soon after the first cycle completion.
  - ✶ A while loop was added at the field ramp-up sequence that waits and confirms that the power supply has fully completed the ramp up (by reading back the field) before issuing the ramp-hold command.
  - ✶ Power supply now successfully completes the field ramp-up on single and multiple cycle runs.
  - ✶ The error found was in the original NMR code written by Brookhaven.

Hall C

- Held meeting with Steve Lassiter, Jack Segal, and Mike Fowler regarding Hall C magnets control systems.
  - ✶ Hall C is requesting assistance with the magnet control systems for their High Momentum Spectrometer (HMS) and Super High Momentum Spectrometer (SHMS).
  - ✶ Hall C will make a list of control system hardware and programming tasks with timeline completion dates where DSG can contribute.

> ✶ DSG will evaluate the list and given our other commitments, see where and if we can accommodate their task requests.

- Held meetings on Hall B and D detector and magnet status.

Campero, Pablo
HDice

- With Amanda debugging IPS power supply communication issues.
  - ✶ Re-installed latest version of the USB drivers.
  - ✶ Swapped USB type B cable. Probe that cable was not the problem in the connection.
  - ✶ Downloaded and installed TeraTem program to send and receive commands by opening serial connection.
    - TeraTerm unable to open the serial port and send any commands.
    - Error to open serial terminal.
  - ✶ Run LabVIEW drivers used to set and read basic function, but immediately time out errors were showed due to communication problems.
  - ✶ Power supply unable to read SCPI commands sent via USB connection, still debugging.

cRIO Test Station

- Installed and tested hardware for "ADC -Current Test" to be performed in the NI-9207 ADC module.
  - ✶ Connected external power supply (+12 V) to the NI9265 AO module.
  - ✶ Installed and wired NI9265 AO module and NI9207 AI module based on NI specification, used current loop diagram.
- Wrote LabVIEW code to test set current vs readout current on NI9207 and NI9265 modules respectively.

VME Test Station

- Configure and tested instrumentation to be used as part of the VME Test Station.
  - ✶ Solved RS-232 communication problems with the Keithley voltage source and PC
    - Changed serial cable
    - Added an adaptor to convert serial to USB connection.
  - ✶ Wrote LabView program to set voltage output in the Keithley power source.
    - Wrote basic drivers read and set voltage output, set power source to local and remote control, and set up serial configurations.
    - Measured output voltage by using Fluke DMV connected at the Keithley voltage output to verify accuracy and precision
    - Run program for different negative and positive voltage values.

- Attended **Hall C** magnet meeting magnets control systems task in which DSG can help.

Eng, Brian
Hall B Magnets
- Installed Quartus 17.1 software on Linux.

- Tested development code for the LV chassis' board.
  - Created GitHub repository for FPGA.
    - https://github.com/JeffersonLab/clas12-fpga-lv.
  - FPGA-only mode builds fine on new development board.
  - Having some issues getting SoC part deployed/running properly.

- For the **Hall B gas systems** reviewed and approved new chassis for MFC power distribution that Marc designed.
  - Chassis adds additional fusing and ability to take signal box offline without effecting MFCs.

- Upgraded one computer to Windows 10 to check compatibility with various software

Hoebel, Amanda
HDICE

- Attempted to establish communication with Mercury iPS.
  - Could not get VISA drivers to work.
  - Error on VISA read but not on VISA write.
  - Updated Gadget Serial drivers.
  - Troubleshooting:
    - Toggled between Legacy and SCPI commands in iPS.
    - Toggled between Remote and Local.
    - Tried Read and Write drivers.
    - Downloaded TeraTerm to test port connection.
  - After debugging connection was not established.

- Made corrections to **SVT** health status report.

- Met with **Hall C** spectrometer support engineers to discuss work for Hall C.

- Took ODH 1 training.

Jacobs, George
LTCC

- Monitored daily LTCC S5 single sector test detector pressure and gas usage.
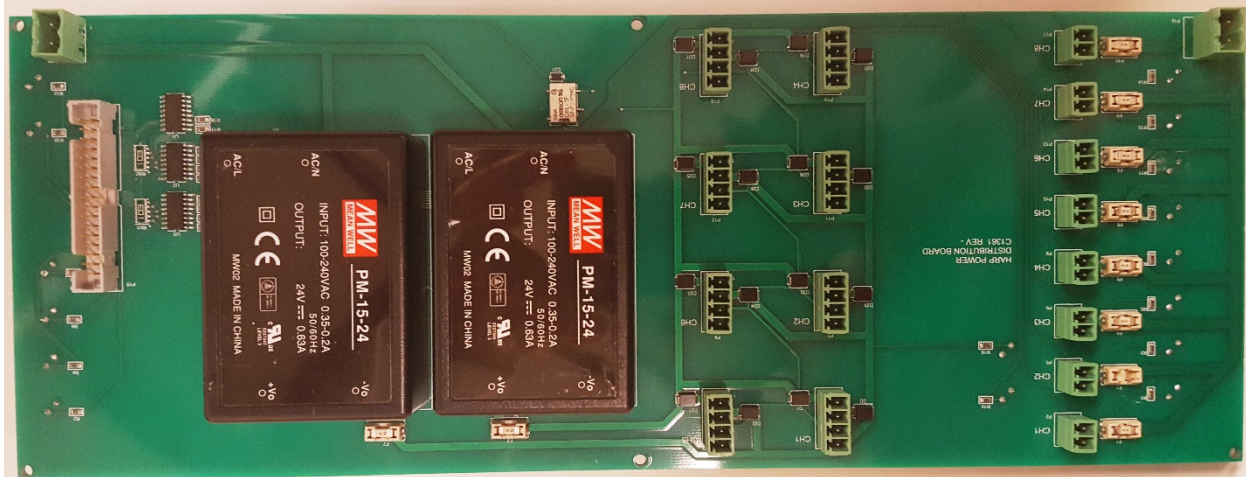- Created LTCC Gas System Status 01 May 2018 power point presentation.

Leffel, Mindy
LERF

- Finished populating both Harp power distribution boards.
- Started populating one of six VME FSD fiber card boards for Machine Protection System.

Harp power distribution board

Lemon, Tyler
RICH

- Updated EP cRIO's hardware interlocks program to give ability to enable trip delays with user-set time over threshold requirements for individual sensors.
  - Previous version used global trip delay control settings for all sensors.
  - Update successfully tested on development cRIO; will be deployed to EP cRIO over summer shutdown.
- Developed wiring schematic code to allow remote software override for both cRIOs in the hardware interlock cRIO.
  - Each cRIO will serve a remote relay override for the other cRIO in RICH's dual-cRIO interlock system.
  - Successfully tested preliminary version of code for remote override on development cRIO.
- Discussed potential causes of drops in measurements for N2 Volume Humidity 6 and 14 with Peter, Amanda, and Pablo.
  - Signals for H6 and H14 suddenly dropped to below normal reading and then suddenly recovered.
  - Potential causes include bad sensor, bad connection in wiring of sensors to cRIO, bad connection at d-sub connector at feedthrough from N2 Volume to atmosphere.
  - During next open access period for Hall B, wiring of sensors to cRIO will be checked.
- Attended **Hall C** magnet meeting. In meeting, discussed:
  - Overview of Hall C magnets system.
  - Tasks Hall C is requesting DSG's help for.

McMullen, Marc
Hall B Gas System

- Completed gas system status presentation.
- Completed design for MFC power chassis and sent request for quote to Par-metal incorporated.
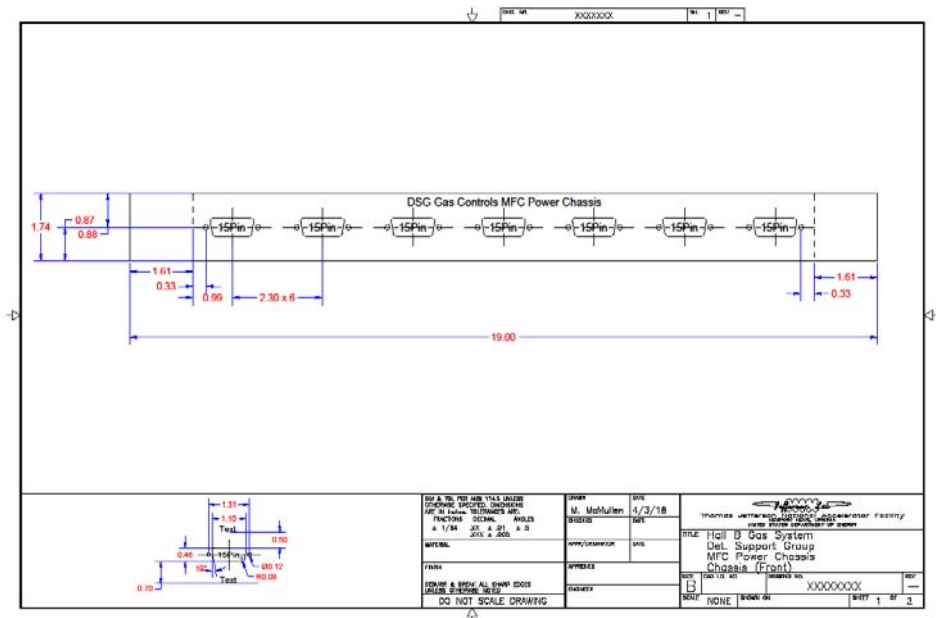 - Design work on the status LED board will begin this week.

Diagram shows front view of the Gas Controls chassis used to power up MFCs in Hall B gas systems.

SVT

- New humidity and temperature sensor boards have arrived.
    - ✶ Functionality tests will be performed after a few of them are populated.