



Detector Support Group

Weekly Report, 2016-06-15

Ongoing Projects

1. Hall B Gas System

1.1 Drift Chambers

Status quo ante.

1.2 HTCC

Status quo ante.

1.3 LTCC

Status: Software completed. Hardware: no change since last week.

1.4 SVT

Hardware

- Removed MVT from SVT.
- Plan to move SVT to Hall B during summer to check for noise.

Software

- Update of hardware interlock to LabVIEW 2015 started.

1.5 RICH

Hardware

- Marco Mirazita and Marco Contalbrigo transported aerogel blocks to D.C. for testing.
- Saptarshi has finished with the calculation for pressure system and selected relief valves.
 - ★ Calculations and choice of relief valves need approval by subject matter expert.

1.6 MicroMegas

Hardware

- OSP needed.
- Gas system review is planned.

1.7 Forward Tagger

Hardware

- OSP submitted three times over!

2. Hall B Magnet Slow Controls

Work Request for Hall B Magnet Slow Controls: November 6, 2015

2.1 **Task 1:** Test power supply PLC code with actual Danfysik Power supply.

Background: Josh has written a new PLC driver and did some limited testing (simulation) for communicating with the 4000 A Danfysik power supplies. Prospective PLC programmer will need knowledge of Danfysik power supply communication protocols, serial communications through RTA 435-NBX module, and will need to coordinate testing with the DC Power group. The code is intended to be reusable, so it will be relevant for both Torus and Solenoid. Actual testing will likely occur with the Solenoid power supply.

Time Estimated: 2 man-weeks: 1 each for testing and debugging.

- **Completed.**



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- 2.2 Task 1a:** Work with Wesley Moore to define/develop EPICS screen(s) for power supply status/control.
Background: Hall B is using CSS/BOY (VERY similar to Hall D). Programmer would need to understand the underlying data structure for the MPS control, be familiar (or be made familiar) with Hall D's PSU EPICS screens and work with Wesley to get the screens defined and functioning. Test the power supply control through the EPICS interface. Assuming this is the same person as 1, above.
Time Estimated: Anticipate this would be 2 weeks of effort.
- **Completed.**
- 2.3 Task 2:** Work with Wesley Moore to define/develop Cryo EPICS screens for Distribution Can and Torus Service Tower.
Background: Familiarity with the Hall D and Cryo group practices, specifically those regarding valve control. Programmer will need to be able to navigate the PLC programs to determine which tags are relevant, understand the underlying data structures, simplify the P&ID's in order to get 'enough' information onto the EPICS screens for Cryo control.
Time estimated: 1 week each for Distribution Can and Torus Service Tower.
- **No Activity**
 - * Leak checks and repairs in progress; vacuum has improved and turbo pumps can be used.
- 2.4 Task 3:** Solenoid Bore Heater control.
Background: Krister and Josh have put together a preliminary control system for the solenoid bore heaters. If their preliminary system is approved, this could be a stand-alone task within the overall Solenoid PLC program. This is ON-OFF control of 32 heaters based on the readout of 16 thermocouples. Task would include some definition of wiring, generation of wiring diagrams, hardware configuration, and actual control code.
Time Estimated: 2-3 man-weeks.
- **De-scoped.**
- 2.5 Task 3b:** Work with Wesley Moore to define/develop EPICS screen for Solenoid Bore Heater Control.
Background: Not available
Time Estimate: 1 week
- **De-scoped.**
- 2.6 Task 4:** Coordinate checkout of Distribution Box PLC program after Distribution Box installation.
Background: Download PLC code to PLC, verify all IO, verify operation and read-back from valves, perform initial setup of temperature readout units and LN2 readout unit. Ensure data is being transferred to/from EPICS correctly. During checkout, identify and correct any wiring problems or software bugs.
Time Estimated: 2 weeks.
- **Not started.**

3. HDICE

- 3.1 Fabricate RF Attenuation/Switching Unit.**
- Working on software to test unit.
- 3.2 Develop NMR program.**
- Integrating current shunt into NMR program.
- 3.3 Write drivers for power supply.**
- Wrote and tested LabVIEW sub-VIs.



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3.4 Mathematica

- **No progress.**

4. RICH

4.1 Develop air cooling system.

- Waiting on approval of system layout on forward carriage.

4.2 Develop interlock system.

- No progress.

5 Hall D PLC Systems

5.1 Sync PLC timestamp with MPS timestamp.

- Wrote code to send time clock to Danfysik System 8000 magnet power supply every 4 hours.
 - * Tested code on RS-Logix Emulator.
 - * Needs to be tested on Solenoid PLC system in Hall D.

5.2 Troubleshoot sporadic signal in Coil 1 strain gauges.

- Continued monitoring.
 - * Will discuss solution with Tim and Nick.

5.3 Re-write PLC code to prevent CAEN HV crates from crashing when PLC reboots.

- No progress.

5.4 Replace batteries in all PLC controllers.

- **Not started.**
 - * Batteries yet to be ordered.

5.5 Update documentation and schematics.

- In progress.
 - * Updating documentation as systems are being reviewed.



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Antonioli, Mary Ann

Hall B

HDice

- Continued writing LabVIEW code to test RF Attenuation/Switching Unit.
 - * Wrote and debugged test for six cables and termination keys. Needs further testing.
 - * Wrote and debugged test for attenuator A. Needs further testing.

DSG

- Completed edits to and re-formatting of Amanda's note on voltage taps and posted to webpage as DSG Note 2016-009.

Arslan, Sahin

Hall B

MVT

- Converted surge protector from 220 [V] European to 110 [V].
- Added, with George, 40 [psi] pressure relief valve and pressure gauge to supply line for Isobutane (C₄H₁₀).

SVT

- Replaced N₂ gas bottle.

Bonneau, Peter

Hall B

HDice

- Programming, debugging, and testing for NMR.
 - * Integrated CAEN's CT-Box current shunt LabVIEW device drivers into NMR program project file.
 - * Developed and tested stand-alone CT-Box hardware verification subroutines into NMR program.
 - * Programmed, debugged, and tested CT-box communication initialization sequence to NMR program.
 - * Started sub-routines to read CT-box during NMR scans and integrate current measurements into lock-in amplifier data stream.
- Retested newly assembled RF Attenuation/Switching Unit.

SVT

- Started upgrading Hardware Interlock System to LabVIEW version 2015.
 - * Added debugging features to expert user interface.
- Monitored Hardware Interlock System on a daily basis.

Hall D

- Attended Hall D Slow Controls Meeting.
 - * Issues with Mya archiver were discussed.
 - * Changes to Accelerator Mya servers resulted in some signals not being available on Hall D network.



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- Three FCAL HV boards were replaced due to current problems.
 - * Boards are being sent to IU for repair.

DSG

- Programmed firmware and tested FPGA-based Weiner VME Controller, which will be used in VME test station to communicate between backplane and board under test.
 - * Board has two inputs and two outputs (NIM/TTL levels) on the front panel that can be programmed via FPGA firmware for custom test purposes.
 - * Gave tested controller and code to Amanda.
- Supervised setup of SVT hardware test stand consisting of logic analyzer, spy board interface, VXS crate, and computer.
 - * Showed Tyler, Amanda, and Pablo how to assemble and run test station.

Campero, Pablo

Hall B

HDice

- Worked on Mercury*iPS* magnet power supply.
 - * Wrote and tested LabVIEW sub-VIs for signal commands.

SVT

- Set up VSCM test station with Peter, Tyler, and Amanda
 - * Set up new tables and space in EEL 121C.
 - * Moved cRIO test station to be used as new station.
 - * Located all hardware components (SVT DAq crate, Logix Analyzer, power supply, signal/data cables, HFCBs) required for test station.
 - * Set up and ran Ethernet cables to connect to PC-PCBWIN7PC3.
 - * Set up Logix Analyzer to connect to Hall B network.
 - * Turned on and tested equipment and devices.
 - * Performed register test and gain scan on one HFCB.

Hall D

Slow Controls

- Worked on synchronization of time clocks between PLC and MPS.
 - * Wrote code to send time clock to Danfysik System 8000 magnet power supply every four hours.
 - * Tested code on RS-Logix Emulator.
 - * Needs to be tested on Solenoid PLC system in hall.

DSG

- Troubleshoot problem with AB-FTVIEW 7.0 software.
 - * Opening software gives message “cannot allow authentication with SQL server 2008”.
 - * Received tech notes from Rockwell Automation technical support.
 - * Reset FTVIEWUSER account, allowing authentication with SQL Server 2008; this seems to have solved the problem.



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Eng. Brian

Hall B

Attended RICH and MVT ERR.

SVT

- Replaced bellows valve with needle valve for R4 for better control over flow distribution between two areas.
 - * Gas bottle ran out before flows stabilized so valve adjustment not completed.

Hall D

Solenoid

- Went over PXI time syncing (both SNTP and manual) with Pablo.

Hoebel, Amanda

Hall B

SVT

- Set up HFCB test station and tested FSSR2 chips with Tyler and Pablo.
 - * Ran gain scan, results for noise plotted in Fig. 1.
 - * U3 FSSR2 chip failed register test and has high noise levels.

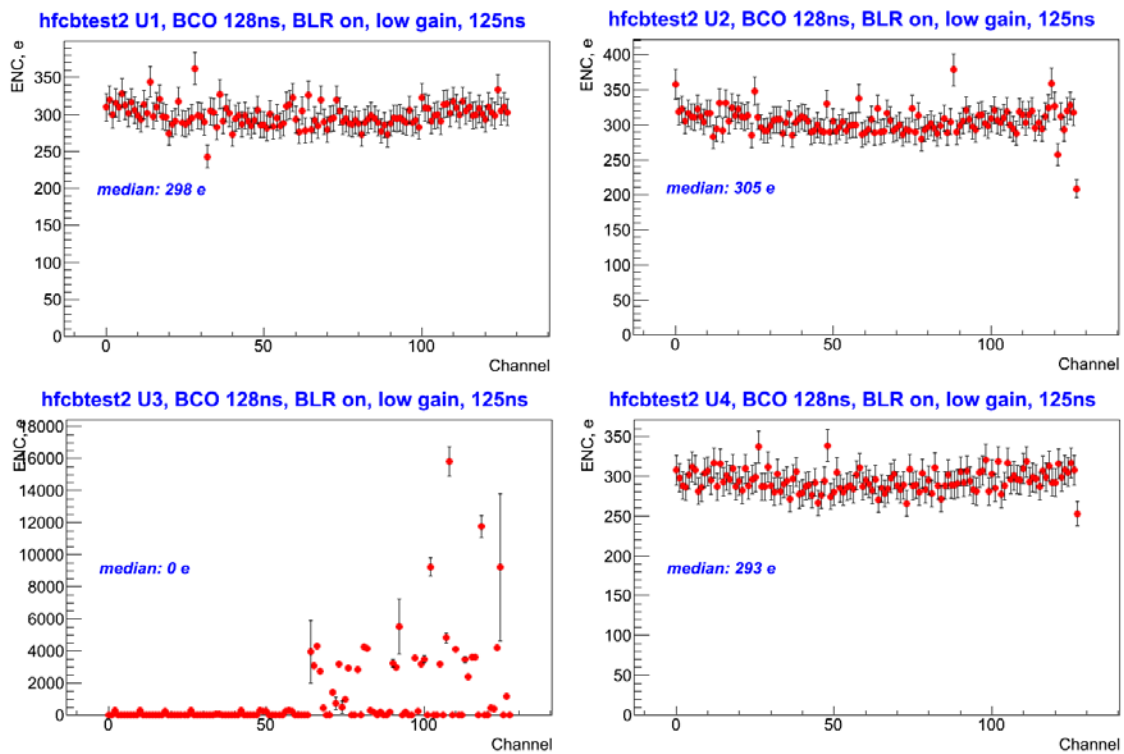


Fig. 1 Results of gain scan noise of four FSSR2 chips for one HFCB. Chips should have ~300e noise. Chip U3 failed register test and has high noise level.



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- Created Mathematica plots of SVT spares.
 - ★ Eight modules total- five new modules replaced modules from previous group of tests from Feb-March. Three old modules were left from Feb-March tests.
 - ★ Total current draws of five new modules (Fig. 2) and total current draws of three old modules (Fig. 3).
 - ★ Delta mean values and standard error of five new modules (Fig. 4) and delta mean values and standard error of three old modules (Fig. 5).

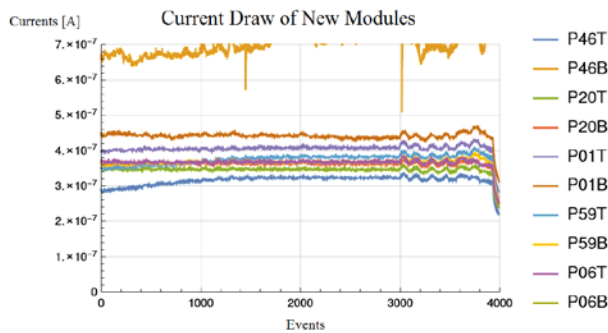


Fig. 2 Current draw of five new modules over four weeks.

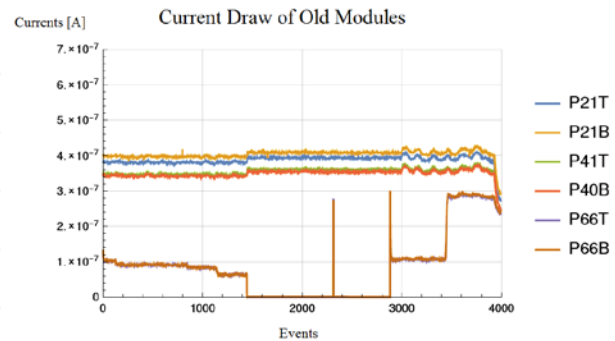


Fig. 3 Current draw of three old modules over four weeks

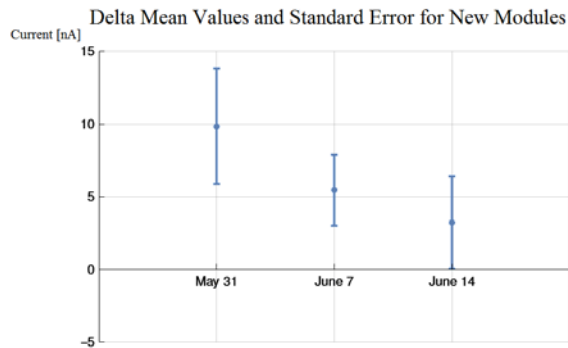


Fig. 4 Change of mean values and standard error from one week to the next, for five new modules

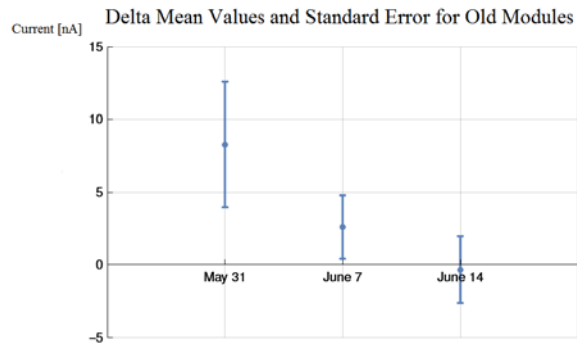


Fig. 5 Change of mean values and standard error from one week to the next, for three old modules

HDice

- Wrote work request document.

RICH

- Updated safety system interlocks report.

Hall D

Magnet

- Edited second voltage taps paper.

DSG

- Installed Xilinx Vivado.
- Installed VME VM-USB controller driver.



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Jacobs, George

Hall B

MVT

- Started designing valve panel for five-gas mixing system.
- Added pressure gauge and replaced 20 [psi] relief valve with 40 [psi] on EEL 124-125 10% C₄H₁₀ in argon mixing system, with Sahin.
- Attended ERR.

RICH

- After discussions with Saptarshi, finalized ASME relief valve specs for air cooling system.
 - * 240 gal ASME tank relief - McMaster Carr part # 4700K15 set press 175 psi.
 - * Downstream of pressure regulator - McMaster Carr part # 4700K83 set press 90 psi.
- Provided detailed feedback to Valery on THA.
- Attended ERR.

DC

- Began discussions with Mac on DCGAS flow rates for experiments, down times, and contingency for budget considerations.

Leffel, Mindy

Hall B

HDice

- Worked on cables for second RF Switching/Attenuation Unit.
 - * Received and soldered SMA connectors to all nine cables.
 - * Waiting for delivery of N connectors to complete all nine cables.

DSG

- Worked with Pablo and Tyler setting up test stand work station.
- Began populating and wiring National Instruments cRIO test station to be used on detectors, as needed.

Lemon, Tyler

Hall B

HDice

- Reviewed CT-Box driver VIs.

SVT

- HFCB Test Station.
 - * Rearranged EEL 121c with Mindy, Pablo, and Peter to make room for test station.
 - * Ran Ethernet cables for PC and VXS crate with Amanda and Pablo.
 - * Performed register tests on HFCB with Amanda and Pablo.
 - Chip 2 (U3) on HFCB fails Differential Line Tests. All other chips on HFCB pass.
 - * Studied C program for register test to understand test results.



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- * Reviewed CLAS-Notes and DSG-Notes for information on register tests.
- * Ran gain scan on HFCB.
 - Had to troubleshoot root analysis of results and copy data files to correct directory.

Hall D

Magnet

- Monitored Coil 1 strain gauges in MYA Viewer.
 - * No additional significant spikes seen.
 - * Seems main cause of spikes is moving the cabling near connection to coil.

Detectors

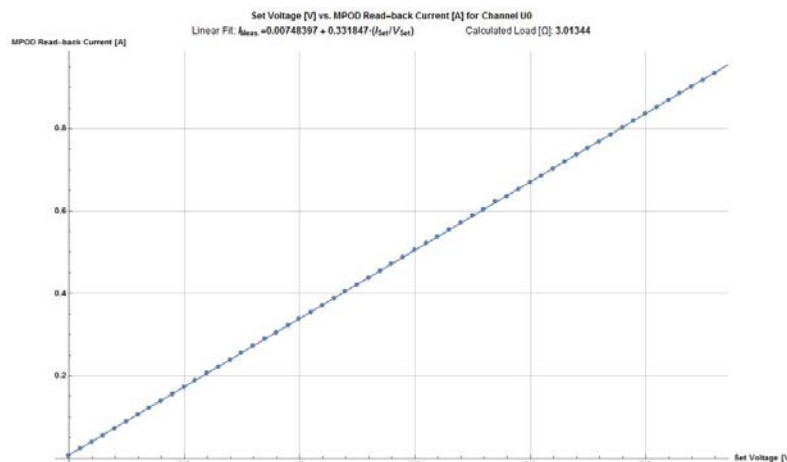
- Monitored logbook on a daily basis.

DSG

- Formatted project section of DSG weekly report into new format.

MPOD Test Station

- Guided Anatoly's work on LV card 5 current and voltage tests.
- Analyzed data from current tests on LV card #4 using Mathematica.
 - * Plotted data and calculated linear fit and load for each channel.
 - * Noted a linear relationship between the set voltage and the readback current.



Plot of data from channel U0 current test for MPOD LV card #4. As shown, there is a linear relationship between the set voltage and MPOD readback current.

McMullen, Marc

Hall B

Gas System

- DC
 - * Monitoring R1S4 in EEL 125 using LabVIEW.
 - * Looked into CPU usage by cRIO in entire project. Gas shed usage was 60–95% (Fig.1).

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- Troubleshooting of new LTCC tab revealed that duplication of PID graphs account for over half of usage, increasing once the graph starts scrolling.
- Removed both graphs (DC and LTCC) and usage reduced to 30–40% (Fig.3); this graph still exists in individual detector PIDvi front panel for user viewing.
- ★ Wrote code for control to replace PID graphs in gas shed controls panel with gauge that displays pressure (main needle), indicators for PID set point (additional needle), and high and low boundaries (two needles).



- HTCC
 - ★ Monitored gas flow.
- SVT
 - ★ Began arranging gas controls tab on LabView code.
- LTCC
 - ★ Completed coding controls panel.



New LTCC controls tab. Pressure chart and pressure control buffer differential pressure gauge will be replaced by new pressure control gauge.

DSG/Safety

- Wrote THA for testing MVT on bench. The MVT group is testing forward portion of the detector with 600 V @ 1mA in EEL 125.
 - ★ There is no exposed HV and the test will be only for a few days.
 - ★ Posted signage.



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Sitnikov, Anatoly

Hall B

SVT

- Completed voltage test for MPOD LV card 5.
 - * 1280 measurements.
- Began MPOD current test LV card 5.
 - * 228 measurements.