Detector Support Group
Weekly Report, 2016-05-04

Ongoing Projects

I. Hall B Magnet Slow Controls (**Brian**, Tyler, Peter, Amanda)

Task: Define/develop EPICS screen(s) for power supply status/control
EDC: 03/15/2016
Activity: None
Comments: Fixing leaks
Status: Delayed

II. Hall B Gas System: Slow Controls (**Marc**, Brian, George, Mary Ann,)

Task: Deploy LabVIEW based slow controls software system for **DC, LTCC, HTCC, SVT, MicroMegas, Forward Tagger,** and **RICH**.
EDC: 07/31/2016.
Activity: Developing software.
Comments: Present status:

† Waiting on Hall B Engineering. †† Waiting for more information.

#	Location	Detector	Gas	Hardware		Software	Deployed	Tested
				Piping	Instrumentation			
1	Hall B	DC	Ar/CO_2	X†	✓	✓	✓	X
2		HTCC	N_2	X†	X	✓	✓	X
4		LTCC	C_4F_{10}	X†	✓	✓	X	X
5		SVT	N_2	X†	X	✓	✓	X
6		RICH	N_2	X†	X	X	X	X
7		MicroMegas	Ar, C_4H_{10}, C_2H_6, Ne††, CF_4	X††	X††	X††	X††	X††
8		Forward Tagger	N_2	X	X	X	X	
9	EEL	SVT	N_2	✓	✓	✓	✓	✓
10		MicroMegas V.1	Pre-mix Ar/C_4H_{10}	✓	✓	N/A	N/A	N/A

11		Micromegas V.2	Mix Ar/C_4H_{10}	✓	✓	**N/A**	**N/A**	**N/A**
12		Forward Tagger	N_2	✓	✓	**N/A**	**N/A**	**N/A**
13	**TEDF**	HTCC	N_2	✓	✓	✓	✓	✓

Status: **Work in progress.**

II. Hall B Gas System: DC Hardware in hall (**George**, Marc, Mindy, Sahin, Anatoly)

Task: Install Gas System hardware.
EDC: N/A (Depends on Hall B Engineering)
Activity: None.
Comments: George: *"I updated the DCGAS and LTCC gas system critical path documents. In both cases we are waiting for critical path items to be completed by Hall B Engineering before we can continue."*
Status: **No progress.**

III. Hall B Gas System: LTCC Hardware in hall (**George**, Marc, Mindy, Sahin,Anatoly)

Task: Install Gas System hardware.
EDC: N/A (Depends on Hall B Engineering)
Activity: LTCC instrumentation hardware done.
Comments: *George: "I updated the DCGAS and LTCC gas system critical path documents. In both cases we are waiting for critical path items to be completed by Hall B Engineering before we can continue."*
Status: **No progress.**

IV. Hall B HDICE (**Mary Ann**, Peter, Amanda, Tyler, Mindy, Sahin)

Task: Fabricate RF box. Task includes draw fabrication drawing in AutoCAD, write drivers for DIO modules, and develop RF box test program review.
EDC: N/A.
Activity: Layout and wiring of RF Box DC power distribution.
Comments: None
Status: **Work in progress.**

V. Hall B HDICE (**Peter**, Amanda, Tyler, Mary Ann, Mindy, Sahin)

Task
- Develop calibration test program for the CAEN current transducer box.
- Develop and test instrument drivers.
- Calibration test 0—25 A, step size 1 A, 1000 measurements/step.

EDC: N/A.
Activity: Completed all measurements.
Comments: None.
Status: Completed on 05/04/2016

VI. Hall B RICH (**Tyler**, Amanda, Peter, Brian, Mary Ann, George, Mindy, Sahin, Marc, Anatoly)

Task: Meeting on gas system, cooling system, interlocks, and assembly structure anchoring.
EDC: N/A.
Activity: DSG Planning Meeting
Comments: None.
Status: Work in progress

VII. Hall D PLC Systems (**Pablo**, Peter, Brian, Tyler, Amanda, Mary Ann, Marc)

Task: Generate Allen Bradley report for solenoid and check voltage tap channels.
EDC: 04/27/2016
Activity: Reviewed PLC wiring schematic for inconsistencies with Allen Bradley programming tags
Comments: None
Status: Work in progress.

VIII. Hall D Data basing of solenoid Voltage Taps (**Amanda**)

Task: Develop ROOT code to analyze PXI data
EDC: 07/31/2016
Activity: Investigating current ROOT code.
Comments: None.
Status: Work in progress.

Antonioli, Mary Ann

Hall B

HDIce

- Began wiring of DC power in RF Switching/Attenuation Unit.

DSG

- Edited and posted Note 2016-005 (Testing of SVT module spares).
- Edited and posted Note 2016-006 (The Hall B Low Threshold Cerenkov Counter Gas System).
- Laid out, edited, and posted Note 2016-007 (Voltage tap database in SQLite).

Arslan, Sahin

Hall B

Forward Tagger

- Provided N2 gas bottle

DC

- Replaced Argon / CO2 gas bottle

SVT

- Replaced N2 gas bottle

DSG

- Cleaned up and reorganized DSG cabinets and mezzanine area with Mindy.
- Cleaned up and tested CAEN SY 527 HV power supply.

Safety

- The Consumer Product Safety Commission issued the recall of APC7 and APC8 American Power Conversion (APC) multi-plug surge protectors.
- Replaced two recalled surge protectors in test setup for DC R1S4 and Forward Tagger in the EEL semi-cleanroom.
    - ✶ Project owners (Mac, Marco) have been informed.

Bonneau, Peter

Hall B

HDICE

- Troubleshooting of status read-back and front panel display program for RF Switching/Attenuation Unit.
    - ✶ Front panel display intermittently fails – displays random incorrect characters.
    - ✶ Baud rate lowered to 9600 – still failed.
    - ✶ Ran same program on new front panel display on 3rd unit under construction.
        - ▪ Display worked correctly at 19200 baud rate.
    - ✶ Contacted HDice group and ordered new display for unit.

- Working with Mary Ann on DC power distribution for 3rd RF Switching/Attenuation Unit.
  - ✶ Hand sketched drawings for fusing scheme and power distribution block.
  - ✶ Determined routing of supply voltages to components.
  - ✶ Planned power supply connections for LEDs, front panel display, and coax switch.
  - ✶ Determined connections from the ground distribution block.

SVT

- Monitored SVT Hardware Interlock System on a daily basis.
- Noted on morning of 5/2 the user interface computer for Hardware Interlock System had been rebooted.
  - ✶ Linux based NI cRIO was running normally.
  - ✶ Coolant temperature interlock had tripped at ~ 22C.
  - ✶ Restarted user interface and reset interlocks.
  - ✶ Wrote procedure for system recovery.

Hall D

- Attended Slow Controls meeting.
  - ✶ Discussed the disconnected PLC system to reset CAEN HV.
    - System runs down the HV supply on PLC reboot.
- Conducted Hall D PLC planning meeting to review task list for summer down-time.

DSG

- Ownership group change for DSG website completed.
  - ✶ Added dsgwww group to CC online ownership utility.
- Purchased and installed license for jAlbum utility for DSG Photo Log.

Campero, Pablo

Hall D

Slow Controls

- ✶ Printed wiring schematics for Solenoid PLC control system.
- ✶ Reviewed wiring schematic 107, 108, and 109 that correspond to Voltage Tags.
- Met with Nick Sandoval, Brian, Peter, Amanda and Tyler on 5/2/16.
  - ✶ Discussed PLC system maintenance tasks for summer shutdown.
  - ✶ DSG will assist with replacing PLC controller batteries, checking cabling of Coil 3 He return sensor, and verifying documentation.

Detectors

- Monitored logbook
  - ✶ Noted on 4/27/16 that solenoid dumped from 1345 [A] due to a blown fuse in the 24 [V] power supply control panel.
- Monitored EPICS.
  - ✶ Solenoid, Interlock Status, CDC HV channels and Gas System running stable.

DSG

- Discussed Mercury iPS power supply with Peter.
  - Created new user account on Oxford-Instruments web site.
  - Established communication drivers for power supply.
  - Downloaded latest power supply firmware (version 2.2.6.20).
  - Downloaded latest version of iPS and iTC user manuals.
  - Obtained samples USB driver for communication between PC and power supply.
- Installed NX 9, AutoCAD 2015, PLC Software, PLC license software, CSS-EPICS, and Adobe CS5.5 on PC: DSGPLC1.
- Installed NX 9 for PC: HallDSC9.

Eng, Brian

Hall B

SVT

- Increased N_2 flow, closed R4 valve more due to increasing humidity on R1-3
- Tried running gain scans on spare modules.
  - Plotting program is not working.
  - Filed Github issue for problem with Homebrew on OS X.
    - Plotting program used to run with Homebrew on OS X.
  - Filed CCPR to port plotting program to Linux.

Hall D

- Reviewed proposed work list for summer shutdown with Nick and DSG.

Hoebel, Amanda

Hall D

Magnet

- Wrote Visual Basic for Applications program to use with SQLiteforExcel (from Github).
  - Program will help technicians query voltage tap database easily.

Detectors

- Monitored logbook.
  - Fuse F3 in power supply was overloaded and caused solenoid trip.

DSG

- Installed RS Studio 5000 on DSGControls1.
- Created PowerPoint presentation on voltage tap databasing.

Jacobs, George

Hall B

Gas Systems

- Created Gas Mixing Diagram for DC Test Stand in EEL rm 125.
- Assembled mixing system components for DC Test Stand.

- Met with Saptarshi Mandal to discuss ASME relief valve requirement for DCGAS storage tanks at 96B.
- Produced requested project status document for Wednesday morning meeting.
- Received quote and placed order for relief valves for DCGAS Test Stand Gas Mixing System.
- Discussed painting 96B storage tanks and modifications of ladder and platform with Suresh Chandra.
- Ordered and received heavy duty cart for oversize gas cylinders.
- Ordered more gas for PRAD.

Leffel, Mindy

Hall B

SVT

- Continued wire bonding.
  - Finished U1 and started U4.
  - Ordered adaptor for attaching camera to wire bonder microscope.
  - Researched ways to improve wire bonding process.

DSG

- Reorganized storage areas with Sahin.
  - Purged excess equipment from storage cabinets.
  - Organized mezzanine storage area to make space for cleanroom equipment.

Lemon, Tyler

Hall B

RICH

- Attended DSG meeting to discuss gas system, cooling system, interlocks, and assembly structure anchoring.

HDICE

- Completed CT-Box calibration test note.
- Gave talk on CT-Box calibration test in DSG weekly meeting.

Hall D

Detectors

- Monitored Logbook and EPICS.
  - Noted that solenoid tripped on 4/27 due to blown MPS fuse.
  - Noted that 0.5 [A] slow blow fuse will be replaced with 1 [A] slow blow fuse.
- Met with Nick Sandoval, Pablo, Amanda, Brian, and Pete to discuss maintenance tasks.

DSG

MPOD Test Station

- Guided Anatoly's work in performing voltage test for LV card 2.
- Analyzed data from voltage and current test of LV card 1 using Mathematica.
  - Calculated linear regression curves for voltage and current test for each channel.

- Calculated for both set voltage vs. MPOD readback and set voltage vs. meter readback.

★ Used regression curve to calculate load resistance for each channel in current test.

Linear Fit for MPOD Voltage Test- LV Card 1: 4791026

Channel	Set vs. MPOD: $I_{Meas.} =$	Set vs. Meter: $I_{Meas.} =$
U0	$0.00223787 + 0.999611 \cdot I_{Set}$	$0.00150566 + 0.999639 \cdot I_{Set}$
U1	$-0.0032634 + 1.00061 \cdot I_{Set}$	$-0.00338367 + 1.00018 \cdot I_{Set}$
U2	$-0.000424661 + 0.999836 \cdot I_{Set}$	$0.0000602715 + 0.999552 \cdot I_{Set}$
U3	$-0.00127559 + 1.00012 \cdot I_{Set}$	$-0.00136154 + 0.999751 \cdot I_{Set}$
U4	$-0.00276213 + 1.00055 \cdot I_{Set}$	$-0.00294854 + 1.00031 \cdot I_{Set}$
U5	$-0.0049694 + 1.0008 \cdot I_{Set}$	$-0.00444398 + 1.00023 \cdot I_{Set}$
U6	$-0.00232137 + 1.00005 \cdot I_{Set}$	$-0.00198236 + 0.999805 \cdot I_{Set}$
U7	$-0.0032006 + 1.00052 \cdot I_{Set}$	$-0.00351948 + 1.00045 \cdot I_{Set}$

Regression curves for MPOD LV card 1 voltage test.

MPOD Current Test- LV card 1: 4791026
Set vs. MPOD Readback

Channel	Linear Fit: $I_{Meas.} =$	Specified Resistance [Ω]	Calculated Resistance [Ω]
U0	$-0.00549477 + 0.655006 \cdot I_{Set}$	1.0	1.5267
U1	$0.0150889 + 0.648846 \cdot I_{Set}$	1.0	1.5412
U2	$0.013317 + 0.615613 \cdot I_{Set}$	1.1	1.6244
U3	$0.0118457 + 0.611614 \cdot I_{Set}$	1.1	1.63502
U4	$-0.00138959 + 0.625341 \cdot I_{Set}$	1.0	1.59913
U5	$-0.00717846 + 0.638749 \cdot I_{Set}$	1.0	1.56556
U6	$-0.00168058 + 0.607704 \cdot I_{Set}$	1.1	1.64554
U7	$0.00122747 + 0.607908 \cdot I_{Set}$	1.1	1.64499

Results for MPOD LV card 1 current test using MPOD current readback. The calculated resistance is the inverse of the slope of the regression curve.

MPOD Current Test- LV card 1: 4791026
Set vs. Meter Readback

Channel	Linear Fit: $I_{Meas.} =$	Specified Resistance [Ω]	Calculated Resistance [Ω]
U0	$0.0178484 + 0.653134 \cdot I_{Set}$	1.0	1.53108
U1	$0.0119087 + 0.651356 \cdot I_{Set}$	1.0	1.53526
U2	$0.013484 + 0.615644 \cdot I_{Set}$	1.1	1.62432
U3	$0.0128947 + 0.611541 \cdot I_{Set}$	1.1	1.63521
U4	$0.0123345 + 0.62535 \cdot I_{Set}$	1.0	1.5991
U5	$0.00948397 + 0.638915 \cdot I_{Set}$	1.0	1.56515
U6	$0.0111978 + 0.608656 \cdot I_{Set}$	1.1	1.64296
U7	$0.0104822 + 0.608428 \cdot I_{Set}$	1.1	1.64358

Results for MPOD LV card 1 current test using meter current readback. The calculated resistance is the inverse of the slope of the regression curve.

McMullen, Marc

Hall B

Gas System

- Added “Total Flow” option to the DC mix gas system controls.
  - ★ Allows for total flow of a mix circuit to be adjusted for a given set of gas flow percentages.
  - ★ Automatically updates the mass flow controller (MFC) set points.
- Met with Hall B engineer and Jacobs to discuss ASME relief valve for DC mix gas system.
  - ★ Estimate of one month given to complete Hall B engineering work.

RICH

- Attended DSG meeting to discuss RICH safety and interlocks.

HTCC

- Monitored HTCC gas flow.
- Met with Jacobs and Eng to discuss switching gas from nitrogen to carbon dioxide.
  - ✶ MFC's gas setting will need to be changed to monitor CO_2 flow.

DSG

- Wrote midyear status document for the Gas System controls.

Safety

- Performed monthly safety walkthrough.

Sitnikov, Anatoly

Hall B

- Calibrated MPOD LV card #2 (voltage, 810 channels).