

FCS Slow Controls Progress

21 July 2020

Forward Upgrade Face to Face virtual meeting

Development To Do List updates

1. Translate between FEE board integers and human-readable values with units
 - a) Still in discussion with Gerard
2. Display Updates - version 1.0 done
 - a) Several interface screens to display overview, and individual device status
 - b) Display of map between physical row/column and DEP, Fee, Channel
 - c) Wiener crate control display
3. Add physical display of detector elements - done
4. Set Alarm levels for EPICS PV's - generic alarm limits set, will display red/green status
- integration with STAR Alarms after we have some more experience - September 2020??
5. Adapt TPC code for controlling Weiner ~~high~~ low voltage crate
 - a) 5 cards, 8 channels each, MPV 8016I modules, 16V, 5A, 50W per channel
 - b) Adapted code from TPC
 - c) Gerard requested only command line control to set voltages
 - d) Slow controls will monitor and display
6. Crate Power Supply switch - Summer 2020??

Status of Display from May

1. Read configuration files for FEE boards
2. Receive communication via MQTT messages
3. Display Sector computer status from MQTT messages
4. Display DEP board status from MQTT messages
5. Load log file from MQTT message, display current values of FEE board settings and monitor values

The screenshot shows a multi-window Qt application interface for controlling FCS sectors and DEP boards. The main window, titled 'FCS SECTORS', displays a table of sector status for 12 sectors. A secondary window, 'FCS:Main:SD0', shows detailed status for a specific sector. A third window, 'FCS Main Slow Controls Window', contains buttons for 'HCAL', 'ECAL', 'fPRE', 'HCAL DEP', 'ECAL DEP', 'fPRE DEP', 'Main DEP', and 'SECTORS'. A fourth window, 'FCS:ECAL:SD0B0F9', shows detailed status for an ECAL board. A terminal window in the background displays system logs and MQTT connection messages.

FCS SECTORS Table:

	1	2	3	4	5	6	7	8	9	10	11	12
c_state	CONFIGURED											
cpu_usage	0	0	0	0	0	0	0	0	0	0	0	0
events	0	0	0	0	0	0	0	0	0	0	0	0
uptime	11:09:55:40	0:00:00:00	0:00:00:00	0:00:00:00	0:00:00:00	0:00:00:00	0:00:00:00	0:00:00:00	0:00:00:00	0:00:00:00	0:00:00:00	0:00:00:00
run	1106222	0	0	0	0	0	0	0	0	0	0	0
time	02/03/2020, 23:56:44	12/31/1969, 19:00:00	12/31/1969, 19:00:00	12/31/1969, 19:00:00	12/31/1969, 19:00:00	12/31/1969, 19:00:00	12/31/1969, 19:00:00	12/31/1969, 19:00:00	12/31/1969, 19:00:00	12/31/1969, 19:00:00	12/31/1969, 19:00:00	12/31/1969, 19:00:00

FCS:Main:SD0 Details:

- alive: 1
- temp_c: 41
- ht_rate: 0.0000
- time: 02/03/2020, 23:56:53
- rts_id: 30
- fee_state: ?
- 1wire_id: 0x00629FAE
- firmware: HW 0x0AA7102 [03-13-19 17:13:34]
- clock: INTERNAL
- sector: 1
- rdo: 1
- mask: 0x00000003Fll

FCS:ECAL:SD0B0F9 Details:

- gain: 0
- vslope: 3366
- 0x6C0000014B3B1A70

ECAL Monitor Values:

	vset	vcmp	imon	rmon	mon
0	15669	23442	215	43503	48010
1	15664	24154	224	43395	35181
2	15679	23278	189	43672	
3	15655	23205	215	43546	33111

Terminal Log:

```

#####
## EPICS R3.14.12.8 Archived
## EPICS Base built Archived
#####
iocRun: All initialized
connecting to mqtt server
starting mqtt loop
mqtt running
Python 2.7.5 (default)
[GCC 4.8.5 20150623 (open fi
Type "help", "copyright
(InteractiveConsole) open fi
>>> Connected with re
  
```

feelInfo.ui <@forward-cr.starp.bnl.gov>

FCS:ECAL:SD0B0F0

gain

vslope

unknown

	vset	vcmp	imon	rmon	mon	ROW	COL	ID
0	15689	-999	-999	-999	-999	1	2	1
1	15691	-999	-999	-999	-999	1	1	0
2	15704	-999	-999	-999	-999	2	2	23
3	15669	-999	-999	-999	-999	2	1	22

feelInfo.ui <@forward-cr.starp.bnl.gov>

FCS:HCAL:ND0B0F0

gain

vslope

unknown

	vset	vcmp	imon	rmon	mon	ROW	COL	ID
0	15773	-999	-999	-999	-999	4	1	39
1	15791	-999	-999	-999	-999	3	1	26
2								
3					-999			

ECAL Fee Boards South

ECAL Fee Boards North

S 1wire_id S Gain S vslope S MAP

N 1wire_id N Gain N vslope N MAP

ECAL_S_MAP.ui <@forward-cr.starp.bnl.gov>

SD080F10C0	SD080F10C1	SD080F9C0	SD080F9C1	SD080F8C0	SD080F8C1	SD080F7C0	SD080F7C1	SD080F6C0	SD080F6C1	SD080F5C0	SD080F5C1	SD080F4C0	SD080F4C1
SD080F10C2	SD080F10C3	SD080F9C2	SD080F9C3	SD080F8C2	SD080F8C3	SD080F7C2	SD080F7C3	SD080F6C2	SD080F6C3	SD080F5C2	SD080F5C3	SD080F4C2	SD080F4C3
SD180F10C0	SD180F10C1	SD180F9C0	SD180F9C1	SD180F8C0	SD180F8C1	SD180F7C0	SD180F7C1	SD180F6C0	SD180F6C1	SD180F5C0	SD180F5C1	SD180F4C0	SD180F4C1
SD180F10C2	SD180F10C3	SD180F9C2	SD180F9C3	SD180F8C2	SD180F8C3	SD180F7C2	SD180F7C3	SD180F6C2	SD180F6C3	SD180F5C2	SD180F5C3	SD180F4C2	SD180F4C3
SD280F10C0	SD280F10C1	SD280F9C0	SD280F9C1	SD280F8C0	SD280F8C1	SD280F7C0	SD280F7C1	SD280F6C0	SD280F6C1	SD280F5C0	SD280F5C1	SD280F4C0	SD280F4C1
SD280F10C2	SD280F10C3	SD280F9C2	SD280F9C3	SD280F8C2	SD280F8C3	SD280F7C2	SD280F7C3	SD280F6C2	SD280F6C3	SD280F5C2	SD280F5C3	SD280F4C2	SD280F4C3
SD380F10C0	SD380F10C1	SD380F9C0	SD380F9C1	SD380F8C0	SD380F8C1	SD380F7C0	SD380F7C1	SD380F6C0	SD380F6C1	SD380F5C0	SD380F5C1	SD380F4C0	SD380F4C1
SD380F10C2	SD380F10C3	SD380F9C2	SD380F9C3	SD380F8C2	SD380F8C3	SD380F7C2	SD380F7C3	SD380F6C2	SD380F6C3	SD380F5C2	SD380F5C3	SD380F4C2	SD380F4C3
SD480F10C0	SD480F10C1	SD480F9C0	SD480F9C1	SD480F8C0	SD480F8C1	SD480F7C0	SD480F7C1	SD480F6C0	SD480F6C1	SD480F5C0	SD480F5C1	SD480F4C0	SD480F4C1
SD480F10C2	SD480F10C3	SD480F9C2	SD480F9C3	SD480F8C2	SD480F8C3	SD480F7C2	SD480F7C3	SD480F6C2	SD480F6C3	SD480F5C2	SD480F5C3	SD480F4C2	SD480F4C3
SD580F10C0	SD580F10C1	SD580F9C0	SD580F9C1	SD580F8C0	SD580F8C1	SD580F7C0	SD580F7C1	SD580F6C0	SD580F6C1	SD580F5C0	SD580F5C1	SD580F4C0	SD580F4C1
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SD680F10C0	SD680F10C1	SD680F9C0	SD680F9C1	SD680F8C0	SD680F8C1	SD680F7C0	SD680F7C1	SD680F6C0	SD680F6C1	SD680F5C0	SD680F5C1	SD680F4C0	SD680F4C1
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SD980F10C2	SD980F10C3	SD980F9C2	SD980F9C3	SD980F8C2	SD980F8C3	SD980F7C2	SD980F7C3	SD980F6C2	SD980F6C3	SD980F5C2	SD980F5C3	SD980F4C2	SD980F4C3
SD1080F10C0	SD1080F10C1	SD1080F9C0	SD1080F9C1	SD1080F8C0	SD1080F8C1	SD1080F7C0	SD1080F7C1	SD1080F6C0	SD1080F6C1	SD1080F5C0	SD1080F5C1	SD1080F4C0	SD1080F4C1
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SD1180F10C0	SD1180F10C1	SD1180F9C0	SD1180F9C1	SD1180F8C0	SD1180F8C1	SD1180F7C0	SD1180F7C1	SD1180F6C0	SD1180F6C1	SD1180F5C0	SD1180F5C1	SD1180F4C0	SD1180F4C1
SD1180F10C2	SD1180F10C3	SD1180F9C2	SD1180F9C3	SD1180F8C2	SD1180F8C3	SD1180F7C2	SD1180F7C3	SD1180F6C2	SD1180F6C3	SD1180F5C2	SD1180F5C3	SD1180F4C2	SD1180F4C3
SD1280F10C0	SD1280F10C1	SD1280F9C0	SD1280F9C1	SD1280F8C0	SD1280F8C1	SD1280F7C0	SD1280F7C1	SD1280F6C0	SD1280F6C1	SD1280F5C0	SD1280F5C1	SD1280F4C0	SD1280F4C1
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SD1380F10C2	SD1380F10C3	SD1380F9C2	SD1380F9C3	SD1380F8C2	SD1380F8C3	SD1380F7C2	SD1380F7C3	SD1380F6C2	SD1380F6C3	SD1380F5C2	SD1380F5C3	SD1380F4C2	SD1380F4C3
SD1480F10C0	SD1480F10C1	SD1480F9C0	SD1480F9C1	SD1480F8C0	SD1480F8C1	SD1480F7C0	SD1480F7C1	SD1480F6C0	SD1480F6C1	SD1480F5C0	SD1480F5C1	SD1480F4C0	SD1480F4C1
SD1480F10C2	SD1480F10C3	SD1480F9C2	SD1480F9C3	SD1480F8C2	SD1480F8C3	SD1480F7C2	SD1480F7C3	SD1480F6C2	SD1480F6C3	SD1480F5C2	SD1480F5C3	SD1480F4C2	SD1480F4C3
SD1580F10C0	SD1580F10C1	SD1580F9C0	SD1580F9C1	SD1580F8C0	SD1580F8C1	SD1580F7C0	SD1580F7C1	SD1580F6C0	SD1580F6C1	SD1580F5C0	SD1580F5C1	SD1580F4C0	SD1580F4C1
SD1580F10C2	SD1580F10C3	SD1580F9C2	SD1580F9C3	SD1580F8C2	SD1580F8C3	SD1580F7C2	SD1580F7C3	SD1580F6C2	SD1580F6C3	SD1580F5C2	SD1580F5C3	SD1580F4C2	SD1580F4C3
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SD1680F10C2	SD1680F10C3	SD1680F9C2	SD1680F9C3	SD1680F8C2	SD1680F8C3	SD1680F7C2	SD1680F7C3	SD1680F6C2	SD1680F6C3	SD1680F5C2	SD1680F5C3	SD1680F4C2	SD1680F4C3

ND080F0	ND080F1	ND080F2	ND080F3	ND080F4	ND080F5	ND080F6	ND080F7	ND080F8	ND080F9	ND080F10
ND180F0	ND180F1	ND180F2	ND180F3	ND180F4	ND180F5	ND180F6	ND180F7	ND180F8	ND180F9	ND180F10
ND280F0	ND280F1	ND280F2	ND280F3	ND280F4	ND280F5	ND280F6	ND280F7	ND280F8	ND280F9	ND280F10
ND380F0	ND380F1	ND380F2	ND380F3	ND380F4	ND380F5	ND380F6	ND380F7	ND380F8	ND380F9	ND380F10
ND480F0	ND480F1	ND480F2	ND480F3	ND480F4	ND480F5	ND480F6	ND480F7	ND480F8	ND480F9	ND480F10
ND580F0	ND580F1	ND580F2	ND580F3	ND580F4	ND580F5	ND580F6	ND580F7	ND580F8	ND580F9	ND580F10
ND680F0	ND680F1	ND680F2	ND680F3	ND680F4	ND680F5	ND680F6	ND680F7	ND680F8	ND680F9	ND680F10
ND780F0	ND780F1	ND780F2	ND780F3	ND780F4	ND780F5	ND780F6	ND780F7	ND780F8	ND780F9	ND780F10
ND880F0	ND880F1	ND880F2	ND880F3	ND880F4	ND880F5	ND880F6	ND880F7	ND880F8	ND880F9	ND880F10
ND980F0	ND980F1	ND980F2	ND980F3	ND980F4	ND980F5	ND980F6	ND980F7	ND980F8	ND980F9	ND980F10
ND1080F0	ND1080F1	ND1080F2	ND1080F3	ND1080F4	ND1080F5	ND1080F6	ND1080F7	ND1080F8	ND1080F9	ND1080F10
ND1180F0	ND1180F1	ND1180F2	ND1180F3	ND1180F4	ND1180F5	ND1180F6	ND1180F7	ND1180F8	ND1180F9	ND1180F10
ND1280F0	ND1280F1	ND1280F2	ND1280F3	ND1280F4	ND1280F5	ND1280F6	ND1280F7	ND1280F8	ND1280F9	ND1280F10
ND1380F0	ND1380F1	ND1380F2	ND1380F3	ND1380F4	ND1380F5	ND1380F6	ND1380F7	ND1380F8	ND1380F9	ND1380F10
ND1480F0	ND1480F1	ND1480F2	ND1480F3	ND1480F4	ND1480F5	ND1480F6	ND1480F7	ND1480F8	ND1480F9	ND1480F10
ND1580F0	ND1580F1	ND1580F2	ND1580F3	ND1580F4	ND1580F5	ND1580F6	ND1580F7	ND1580F8	ND1580F9	ND1580F10
ND1680F0	ND1680F1	ND1680F2	ND1680F3	ND1680F4	ND1680F5	ND1680F6	ND1680F7	ND1680F8	ND1680F9	ND1680F10

SD1180F3C0	SD1180F3C1	SD1180F2C0	SD1180F2C1	SD1180F1C0	SD1180F1C1	SD1180F0C0	SD1180F0C1	SD1180F3C2	SD1180F3C3	SD1180F2C2	SD1180F2C3	SD1180F1C2	SD1180F1C3	SD1180F0C2	SD1180F0C3
SD1280F3C0	SD1280F3C1	SD1280F2C0	SD1280F2C1	SD1280F1C0	SD1280F1C1	SD1280F0C0	SD1280F0C1	SD1280F3C2	SD1280F3C3	SD1280F2C2	SD1280F2C3	SD1280F1C2	SD1280F1C3	SD1280F0C2	SD1280F0C3
SD1380F3C0	SD1380F3C1	SD1380F2C0	SD1380F2C1	SD1380F1C0	SD1380F1C1	SD1380F0C0	SD1380F0C1	SD1380F3C2	SD1380F3C3	SD1380F2C2	SD1380F2C3	SD1380F1C2	SD1380F1C3	SD1380F0C2	SD1380F0C3
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SD1680F3C2	SD1680F3C3	SD1680F2C2	SD1680F2C3	SD1680F1C2	SD1680F1C3	SD1680F0C2	SD1680F0C3	SD1680F3C4	SD1680F3C5	SD1680F2C4	SD1680F2C5	SD1680F1C4	SD1680F1C5	SD1680F0C4	SD1680F0C5

_ N fPRE Main

fPRE DEP Main DEP

RELOAD RELOAD

fPRE Files Main Files

Power Supply

HCAL_S_MAP.ui <@forward-cr.starp.bnl.gov>

SD6B0F0C	SD6B0F1C	SD6B0F2C	SD6B0F3C	SD6B0F4C	SD6B0F5C	SD6B0F6C	SD6B0F7C	SD6B0F8C	SD6B0F9C	SD6B0F10C	SD6B0F11C	SD6B0F12C
SD6B0F0C1	SD6B0F1C1	SD6B0F2C1	SD6B0F3C1	SD6B0F4C1	SD6B0F5C1	SD6B0F6C1	SD6B0F7C1	SD6B0F8C1	SD6B0F9C1	SD6B0F10C1	SD6B0F11C1	SD6B0F12C1
SD0B0F0C	SD0B0F1C	SD0B0F2C	SD0B0F3C	SD0B0F4C	SD0B0F5C	SD0B0F6C	SD0B0F7C	SD0B0F8C	SD0B0F9C	SD0B0F10C	SD0B0F11C	SD0B0F12C
SD0B0F0C1	SD0B0F1C1	SD0B0F2C1	SD0B0F3C1	SD0B0F4C1	SD0B0F5C1	SD0B0F6C1	SD0B0F7C1	SD0B0F8C1	SD0B0F9C1	SD0B0F10C1	SD0B0F11C1	SD0B0F12C1

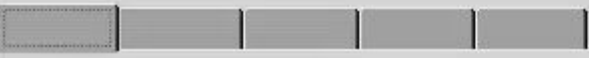
HCAL_N_MAP.ui <@forward-cr.starp.bnl.gov>

ND6B0F12C1	ND6B0F11C1	ND6B0F10C1	ND6B0F9C1	ND6B0F8C1	ND6B0F7C1	ND6B0F6C1	ND6B0F5C1	ND6B0F4C1	ND6B0F3C1	ND6B0F2C1	ND6B0F1C1	ND6B0F0C1
ND6B0F12C0	ND6B0F11C0	ND6B0F10C0	ND6B0F9C0	ND6B0F8C0	ND6B0F7C0	ND6B0F6C0	ND6B0F5C0	ND6B0F4C0	ND6B0F3C0	ND6B0F2C0	ND6B0F1C0	ND6B0F0C0
ND0B0F12C1	ND0B0F11C1	ND0B0F10C1	ND0B0F9C1	ND0B0F8C1	ND0B0F7C1	ND0B0F6C1	ND0B0F5C1	ND0B0F4C1	ND0B0F3C1	ND0B0F2C1	ND0B0F1C1	ND0B0F0C1
ND0B0F12C0	ND0B0F11C0	ND0B0F10C0	ND0B0F9C0	ND0B0F8C0	ND0B0F7C0	ND0B0F6C0	ND0B0F5C0	ND0B0F4C0	ND0B0F3C0	ND0B0F2C0	ND0B0F1C0	ND0B0F0C0
ND0B1F12C1	ND0B1F11C1	ND0B1F10C1	ND0B1F9C1	ND0B1F8C1	ND0B1F7C1	ND0B1F6C1	ND0B1F5C1	ND0B1F4C1	ND0B1F3C1	ND0B1F2C1	ND0B1F1C1	ND0B1F0C1
ND0B1F12C0	ND0B1F11C0	ND0B1F10C0	ND0B1F9C0	ND0B1F8C0	ND0B1F7C0	ND0B1F6C0	ND0B1F5C0	ND0B1F4C0	ND0B1F3C0	ND0B1F2C0	ND0B1F1C0	ND0B1F0C0
ND1B0F12C1	ND1B0F11C1	ND1B0F10C1	ND1B0F9C1	ND1B0F8C1	ND1B0F7C1	ND1B0F6C1	ND1B0F5C1	ND1B0F4C1	ND1B0F3C1	ND1B0F2C1	ND1B0F1C1	ND1B0F0C1
ND1B0F12C0	ND1B0F11C0	ND1B0F10C0	ND1B0F9C0	ND1B0F8C0	ND1B0F7C0	ND1B0F6C0	ND1B0F5C0	ND1B0F4C0	ND1B0F3C0	ND1B0F2C0	ND1B0F1C0	ND1B0F0C0
ND2B0F12C1	ND2B0F11C1	ND2B0F10C1	ND2B0F9C1	ND2B0F8C1	ND2B0F7C1	ND2B0F6C1	ND2B0F5C1	ND2B0F4C1	ND2B0F3C1	ND2B0F2C1	ND2B0F1C1	ND2B0F0C1
ND2B0F12C0	ND2B0F11C0	ND2B0F10C0	ND2B0F9C0	ND2B0F8C0	ND2B0F7C0	ND2B0F6C0	ND2B0F5C0	ND2B0F4C0	ND2B0F3C0	ND2B0F2C0	ND2B0F1C0	ND2B0F0C0
ND3B0F12C1	ND3B0F11C1	ND3B0F10C1	ND3B0F9C1	ND3B0F8C1	ND3B0F7C1	ND3B0F6C1	ND3B0F5C1	ND3B0F4C1	ND3B0F3C1	ND3B0F2C1	ND3B0F1C1	ND3B0F0C1
ND3B0F12C0	ND3B0F11C0	ND3B0F10C0	ND3B0F9C0	ND3B0F8C0	ND3B0F7C0	ND3B0F6C0	ND3B0F5C0	ND3B0F4C0	ND3B0F3C0	ND3B0F2C0	ND3B0F1C0	ND3B0F0C0
ND3B1F12C1	ND3B1F11C1	ND3B1F10C1	ND3B1F9C1	ND3B1F8C1	ND3B1F7C1	ND3B1F6C1	ND3B1F5C1	ND3B1F4C1	ND3B1F3C1	ND3B1F2C1	ND3B1F1C1	ND3B1F0C1
ND3B1F12C0	ND3B1F11C0	ND3B1F10C0	ND3B1F9C0	ND3B1F8C0	ND3B1F7C0	ND3B1F6C0	ND3B1F5C0	ND3B1F4C0	ND3B1F3C0	ND3B1F2C0	ND3B1F1C0	ND3B1F0C0
ND4B0F12C1	ND4B0F11C1	ND4B0F10C1	ND4B0F9C1	ND4B0F8C1	ND4B0F7C1	ND4B0F6C1	ND4B0F5C1	ND4B0F4C1	ND4B0F3C1	ND4B0F2C1	ND4B0F1C1	ND4B0F0C1
ND4B0F12C0	ND4B0F11C0	ND4B0F10C0	ND4B0F9C0	ND4B0F8C0	ND4B0F7C0	ND4B0F6C0	ND4B0F5C0	ND4B0F4C0	ND4B0F3C0	ND4B0F2C0	ND4B0F1C0	ND4B0F0C0
ND5B0F12C1	ND5B0F11C1	ND5B0F10C1	ND5B0F9C1	ND5B0F8C1	ND5B0F7C1	ND5B0F6C1	ND5B0F5C1	ND5B0F4C1	ND5B0F3C1	ND5B0F2C1	ND5B0F1C1	ND5B0F0C1
ND5B0F12C0	ND5B0F11C0	ND5B0F10C0	ND5B0F9C0	ND5B0F8C0	ND5B0F7C0	ND5B0F6C0	ND5B0F5C0	ND5B0F4C0	ND5B0F3C0	ND5B0F2C0	ND5B0F1C0	ND5B0F0C0
ND7B0F12C1	ND7B0F11C1	ND7B0F10C1	ND7B0F9C1	ND7B0F8C1	ND7B0F7C1	ND7B0F6C1	ND7B0F5C1	ND7B0F4C1	ND7B0F3C1	ND7B0F2C1	ND7B0F1C1	ND7B0F0C1
ND7B0F12C0	ND7B0F11C0	ND7B0F10C0	ND7B0F9C0	ND7B0F8C0	ND7B0F7C0	ND7B0F6C0	ND7B0F5C0	ND7B0F4C0	ND7B0F3C0	ND7B0F2C0	ND7B0F1C0	ND7B0F0C0

HCAL.ui <@forward-cr.starp.bnl.gov>

HCAL FEE Boards

ND0B0F0	ND0B0F1	ND0B0F2	ND0B0F3	ND0B0F4	ND0B0F5	ND0B0F6	ND0B0F7	ND0B0F8	ND0B0F9	ND0B0F10	ND0B0F11	ND0B0F12
ND0B1F0	ND0B1F1	ND0B1F2	ND0B1F3	ND0B1F4	ND0B1F5	ND0B1F6	ND0B1F7	ND0B1F8	ND0B1F9	ND0B1F10	ND0B1F11	ND0B1F12
ND1B0F0	ND1B0F1	ND1B0F2	ND1B0F3	ND1B0F4	ND1B0F5	ND1B0F6	ND1B0F7	ND1B0F8	ND1B0F9	ND1B0F10	ND1B0F11	ND1B0F12
ND2B0F0	ND2B0F1	ND2B0F2	ND2B0F3	ND2B0F4	ND2B0F5	ND2B0F6	ND2B0F7	ND2B0F8	ND2B0F9	ND2B0F10	ND2B0F11	ND2B0F12
ND3B0F0	ND3B0F1	ND3B0F2	ND3B0F3	ND3B0F4	ND3B0F5	ND3B0F6	ND3B0F7	ND3B0F8	ND3B0F9	ND3B0F10	ND3B0F11	ND3B0F12
ND3B1F0	ND3B1F1	ND3B1F2	ND3B1F3	ND3B1F4	ND3B1F5	ND3B1F6	ND3B1F7	ND3B1F8	ND3B1F9	ND3B1F10	ND3B1F11	ND3B1F12
ND4B0F0	ND4B0F1	ND4B0F2	ND4B0F3	ND4B0F4	ND4B0F5	ND4B0F6	ND4B0F7	ND4B0F8	ND4B0F9	ND4B0F10	ND4B0F11	ND4B0F12
ND5B0F0	ND5B0F1	ND5B0F2	ND5B0F3	ND5B0F4	ND5B0F5	ND5B0F6	ND5B0F7	ND5B0F8	ND5B0F9	ND5B0F10	ND5B0F11	ND5B0F12
ND6B0F0	ND6B0F1	ND6B0F2	ND6B0F3	ND6B0F4	ND6B0F5	ND6B0F6	ND6B0F7	ND6B0F8	ND6B0F9	ND6B0F10	ND6B0F11	ND6B0F12
ND7B0F0	ND7B0F1	ND7B0F2	ND7B0F3	ND7B0F4	ND7B0F5	ND7B0F6	ND7B0F7	ND7B0F8	ND7B0F9	ND7B0F10	ND7B0F11	ND7B0F12
ND8B0F0	ND8B0F1	ND8B0F2	ND8B0F3	ND8B0F4	ND8B0F5	ND8B0F6	ND8B0F7	ND8B0F8	ND8B0F9	ND8B0F10	ND8B0F11	ND8B0F12
SD0B0F0	SD0B0F1	SD0B0F2	SD0B0F3	SD0B0F4	SD0B0F5	SD0B0F6	SD0B0F7	SD0B0F8	SD0B0F9	SD0B0F10	SD0B0F11	SD0B0F12
SD0B1F0	SD0B1F1	SD0B1F2	SD0B1F3	SD0B1F4	SD0B1F5	SD0B1F6	SD0B1F7	SD0B1F8	SD0B1F9	SD0B1F10	SD0B1F11	SD0B1F12
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SD2B0F0	SD2B0F1	SD2B0F2	SD2B0F3	SD2B0F4	SD2B0F5	SD2B0F6	SD2B0F7	SD2B0F8	SD2B0F9	SD2B0F10	SD2B0F11	SD2B0F12
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SD3B1F0	SD3B1F1	SD3B1F2	SD3B1F3	SD3B1F4	SD3B1F5	SD3B1F6	SD3B1F7	SD3B1F8	SD3B1F9	SD3B1F10	SD3B1F11	SD3B1F12
SD4B0F0	SD4B0F1	SD4B0F2	SD4B0F3	SD4B0F4	SD4B0F5	SD4B0F6	SD4B0F7	SD4B0F8	SD4B0F9	SD4B0F10	SD4B0F11	SD4B0F12
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SD7B0F0	SD7B0F1	SD7B0F2	SD7B0F3	SD7B0F4	SD7B0F5	SD7B0F6	SD7B0F7	SD7B0F8	SD7B0F9	SD7B0F10	SD7B0F11	SD7B0F12
SD8B0F0	SD8B0F1	SD8B0F2	SD8B0F3	SD8B0F4	SD8B0F5	SD8B0F6	SD8B0F7	SD8B0F8	SD8B0F9	SD8B0F10	SD8B0F11	SD8B0F12



FCS LV \$(Location)



[Redacted]

Uninhibit Switch

Status

Sense V

Set V

Current

Temp.

	Uninhibit Switch	Status	Sense V	Set V	Current	Temp.
u0	<input checked="" type="checkbox"/>	0	0.0	0	0.000	0
u1	<input checked="" type="checkbox"/>	0	0.0	0	0.000	0
u2	<input checked="" type="checkbox"/>	0	0.0	0	0.000	0
u3	<input checked="" type="checkbox"/>	0	0.0	0	0.000	0
u4	<input checked="" type="checkbox"/>	0	0.0	0	0.000	0
u5	<input checked="" type="checkbox"/>	0	0.0	0	0.000	0
u6	<input checked="" type="checkbox"/>	0	0.0	0	0.000	0
u7	<input checked="" type="checkbox"/>	0	0.0	0	0.000	0

To Do

1. Verify everything
 - a. Check maps as hardware gets wired
 - b. Check reliable communication with fully-configured setup
 - c. etc.
2. Alarms
 - a. set levels as needs are identified
 - b. request integration with STAR alarms
3. Wiener Crate Control
 - a. Configure crate once installed
 - b. Verify function of Power ON/OFF, reset
 - c. Some time with Gerard or Tonko to certify function
4. Log
 - a. determine which channels require logs (by run or more frequently)
 - b. request integration with STAR logs
5. Configure Crate Power Switch controls
6. Display improvements as requested