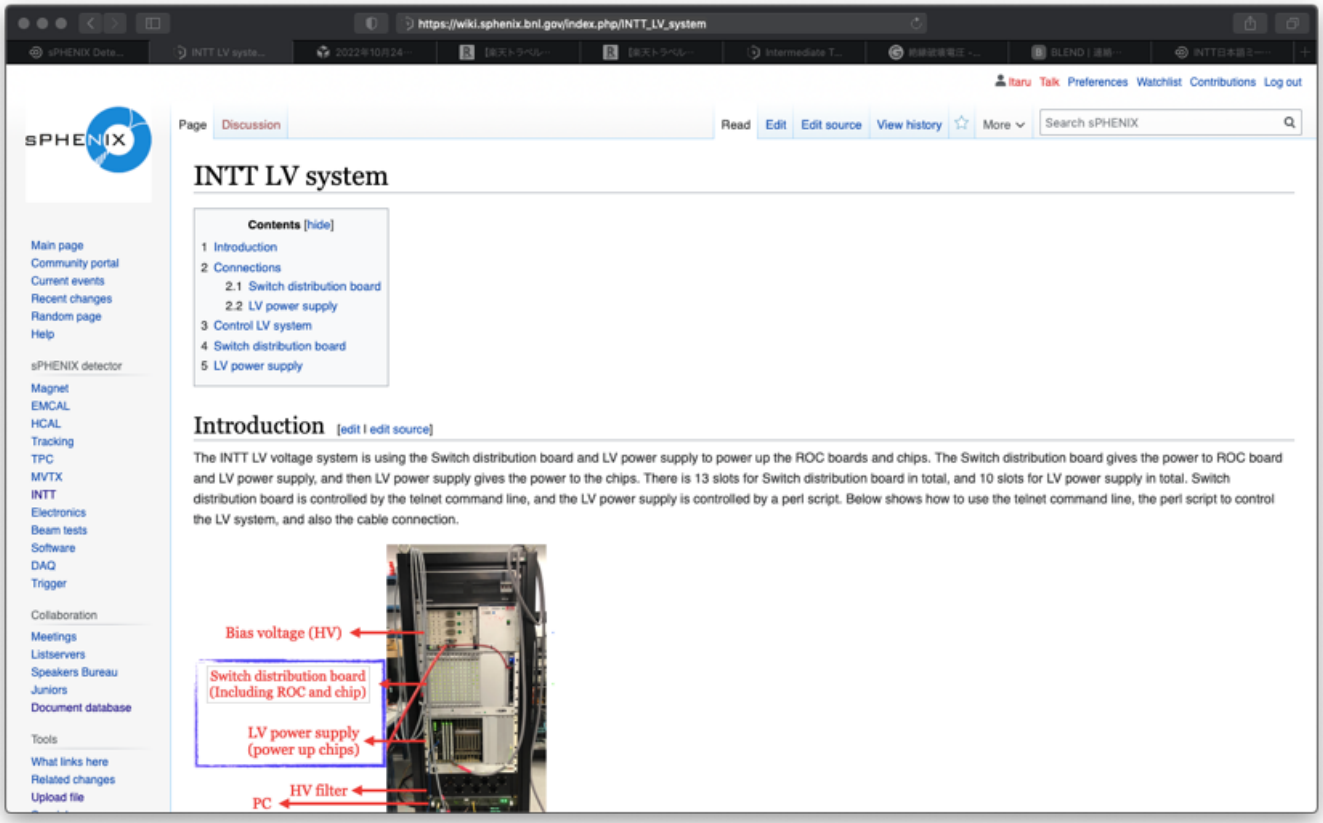
INTT Power System Status Report

RIKEN/RBRC
Itaru Nakagawa

General Instructions

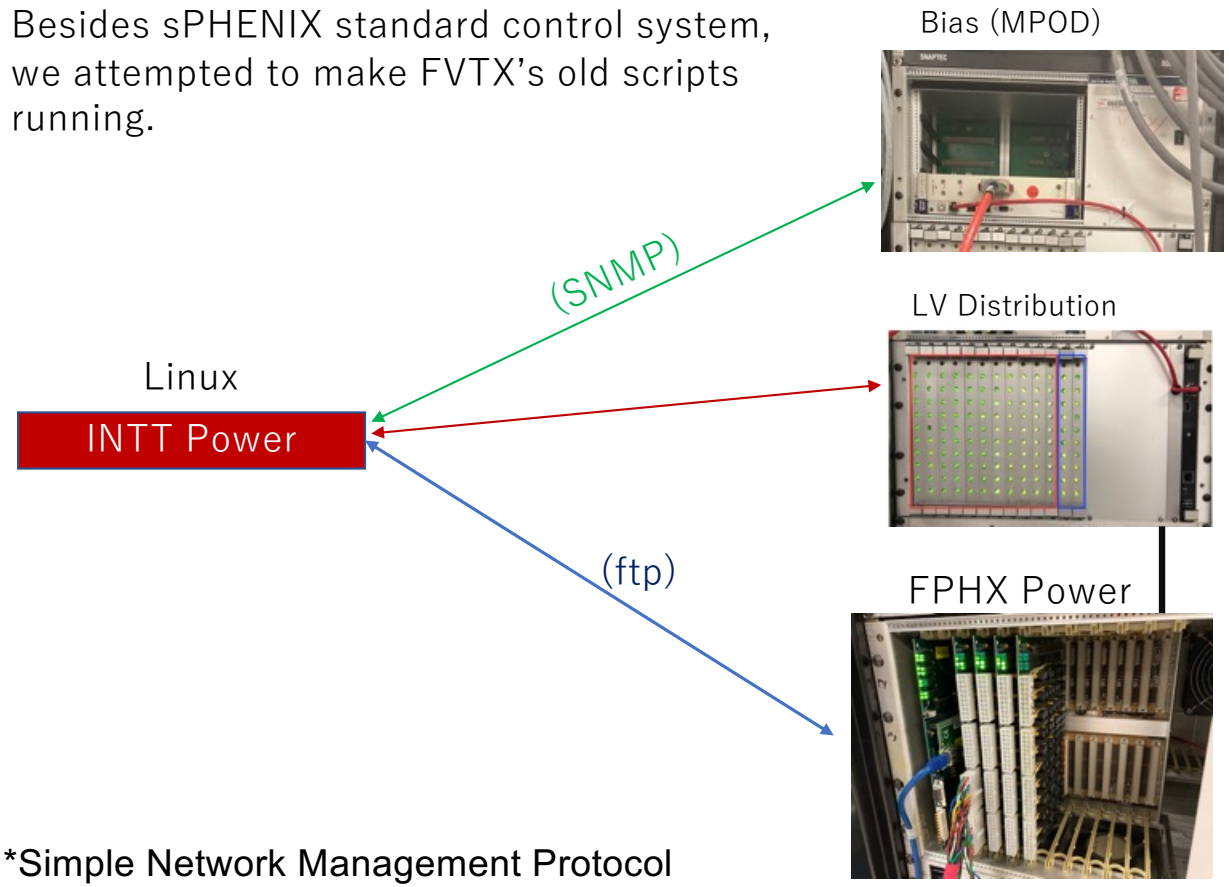
To be developed



https://wiki.sphenix.bnl.gov/index.php/INTT_LV_system

FVTX Power System

Besides sPHENIX standard control system, we attempted to make FVTX's old scripts running.



*Simple Network Management Protocol
*File Transfer Protocol

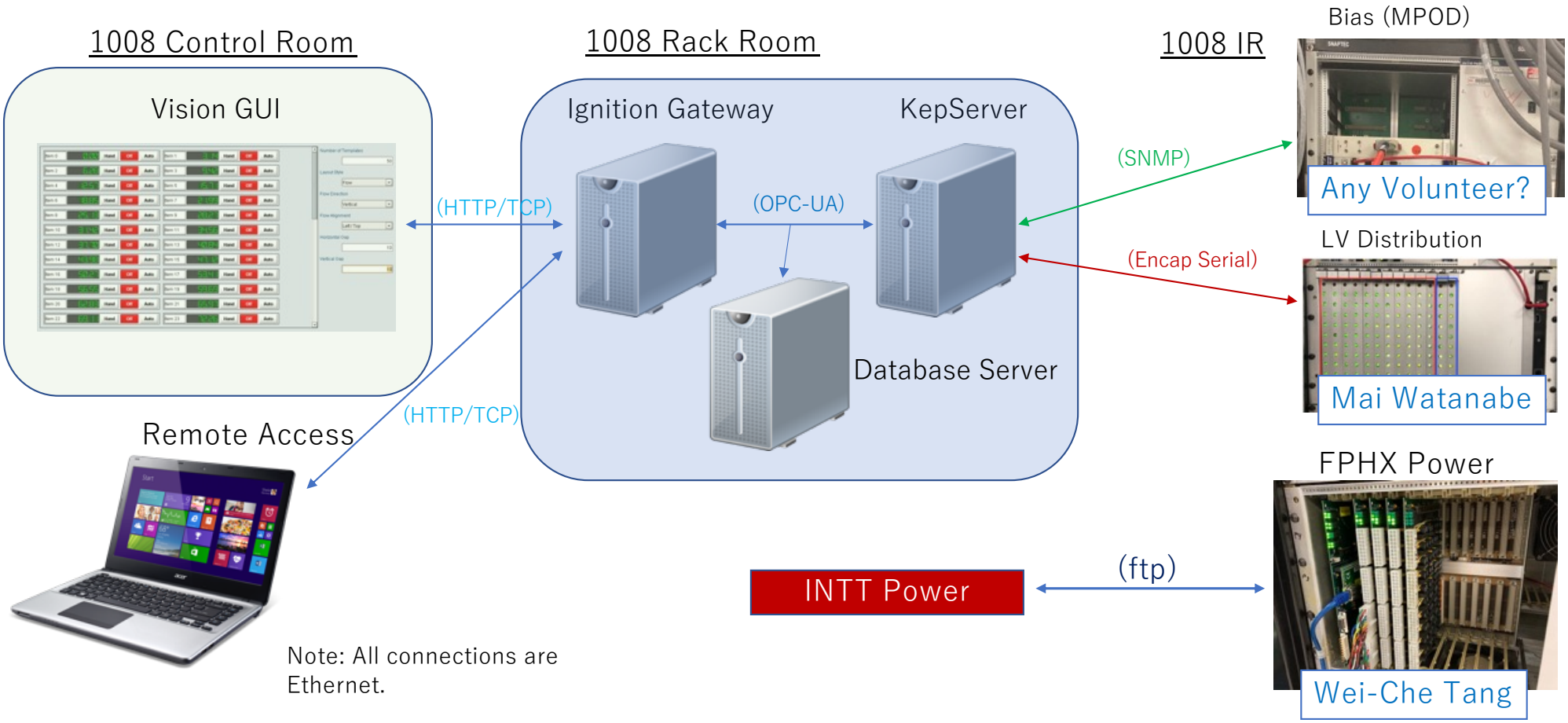
Current Status

ON/Off	Individual Control	GUI
○	○	
○	○	
○	×	

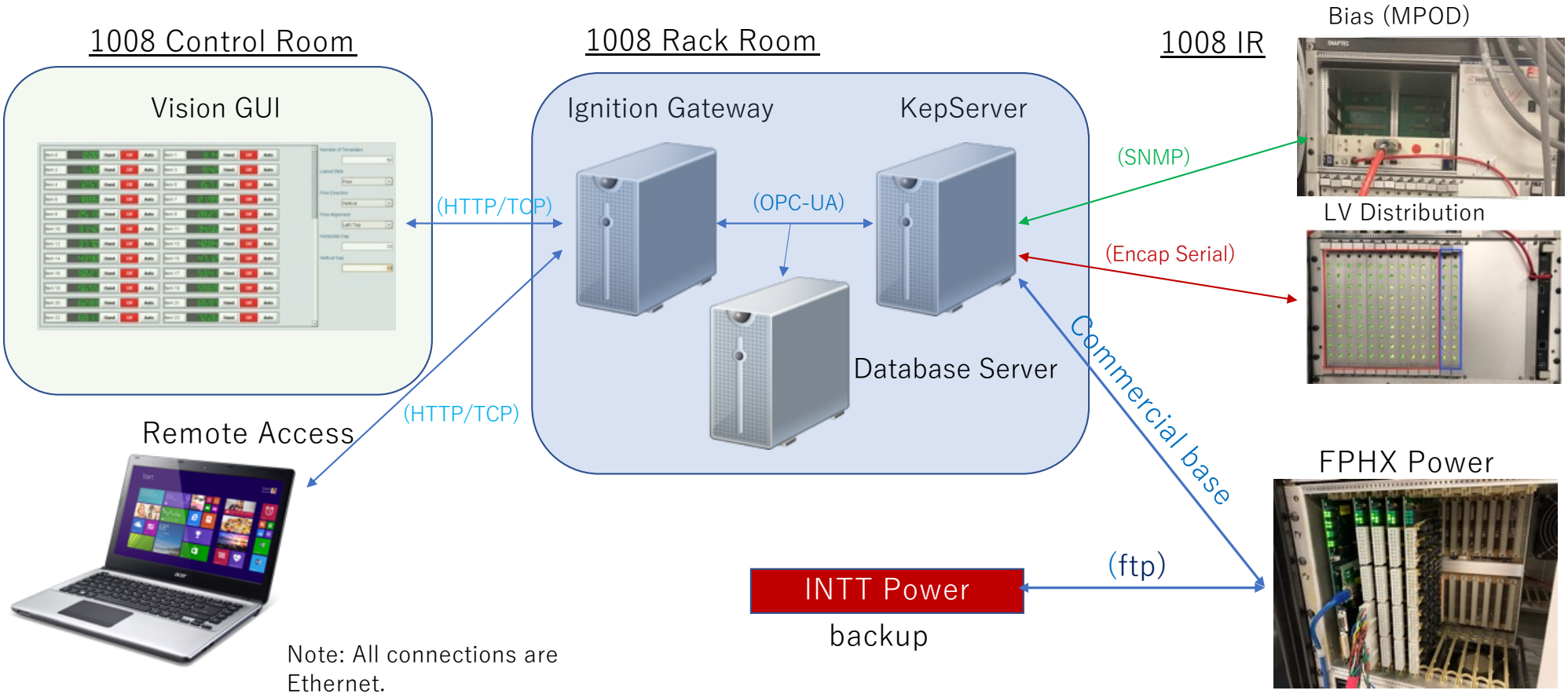
INTT Power System

INTT LV Control Flow (as of now)

Person in Charge



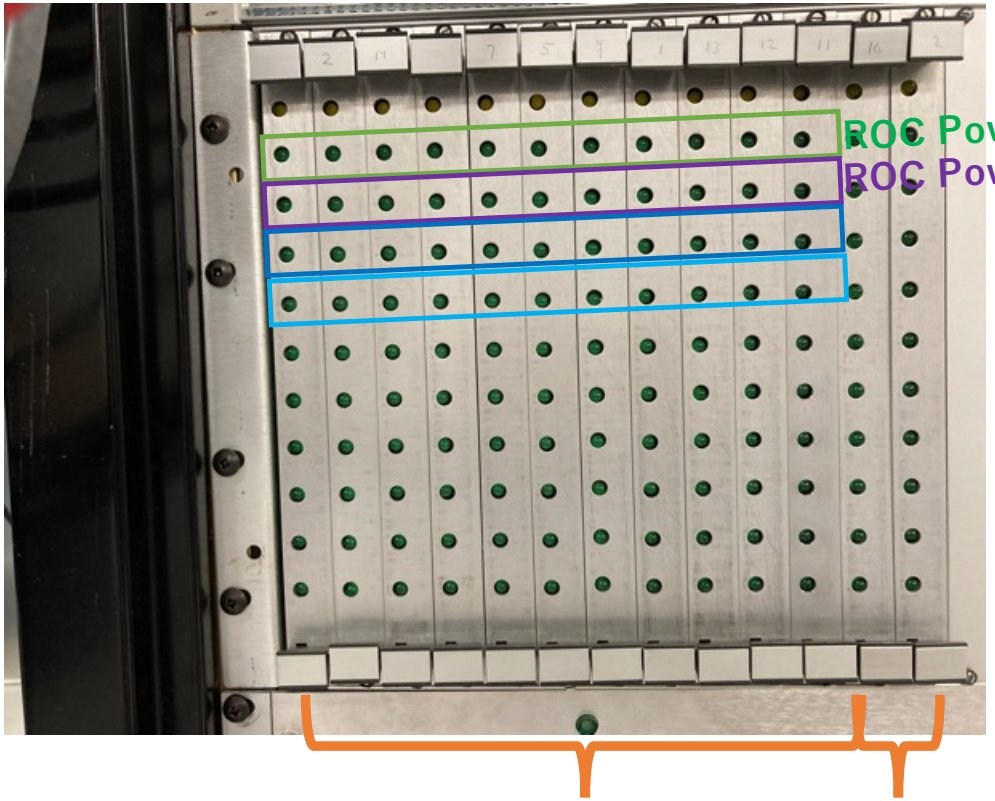
INTT LV Control Flow (Goal)



INTT Power Control System Loadmap

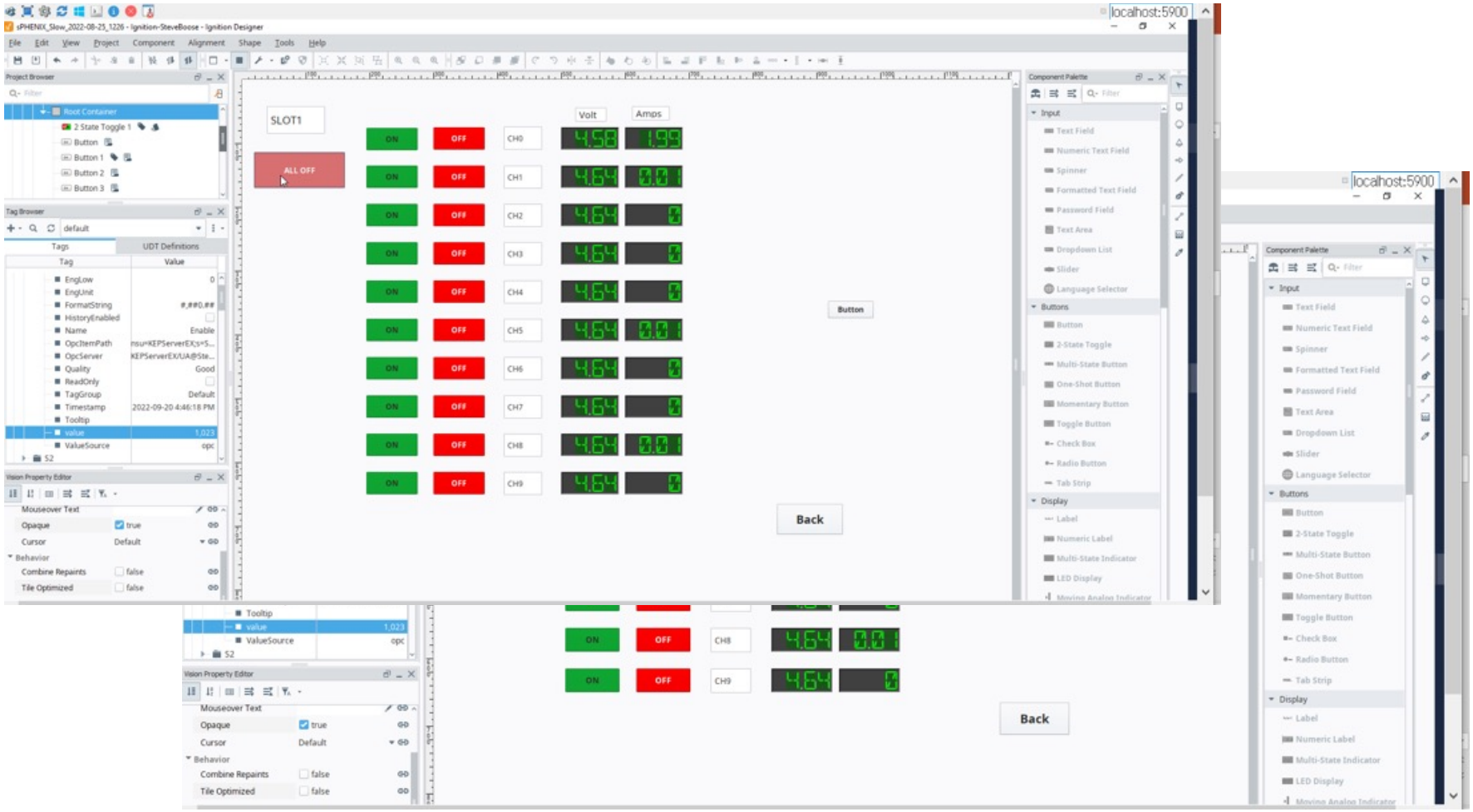
	Protocol	Communication w/ KepServer	1008 Channel Map	GUI	Person in Charge
Bias	SNMP	△ Steve can read, but cannot write	?	×	?
LV Distributor (ROC, FPHX)	Encap Serial	○	○	△	Mai
FPHX Power	Commercial	× Steve's needs to install firmware	?	×	Wei=Che

Unipolar LV Distribution Module (LVDU)



Slot 1~10 : ROC Power
Slot 12,13 : FPHX Power via LANL boards

ROC Power



Mai Watanabe is developing GUI remotely in NWU. Need the channel map for 1008 racks for further development.

Test Bench Distribution Module Channel Map

		Channel									
Slot	**Destination**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1	2.5V_FPGA_A	ROC1	ROC2	ROC3	ROC4					N/A	N/A
2	2.5V_FPGA_B	ROC1	ROC2	ROC3	ROC4					N/A	N/A
3	2.5V_FPGA_C	ROC1	ROC2	ROC3	ROC4					N/A	N/A
4	2.5V_FPGA_D	ROC1	ROC2	ROC3	ROC4					N/A	N/A
5	2.5V_FPGA_SC	ROC1	ROC2	ROC3	ROC4					N/A	N/A
6	2.5V_JTAG_FPGA	ROC1	ROC2	ROC3	ROC4					N/A	N/A
7	3.3V_FPGA_A_B_SC	ROC1	ROC2	ROC3	ROC4					N/A	N/A
8	3.3V_FPGA_C_D_BCO	ROC1	ROC2	ROC3	ROC4					N/A	N/A
9	5V_opto_iso	ROC1	ROC2	ROC3	ROC4					N/A	N/A
10	Pulser_5V_A	ROC1	ROC2	ROC3	ROC4					N/A	N/A
11	Pulser_5V_B	ROC1	ROC2	ROC3	ROC4					N/A	N/A
12	FPHX										
13	FPHX										

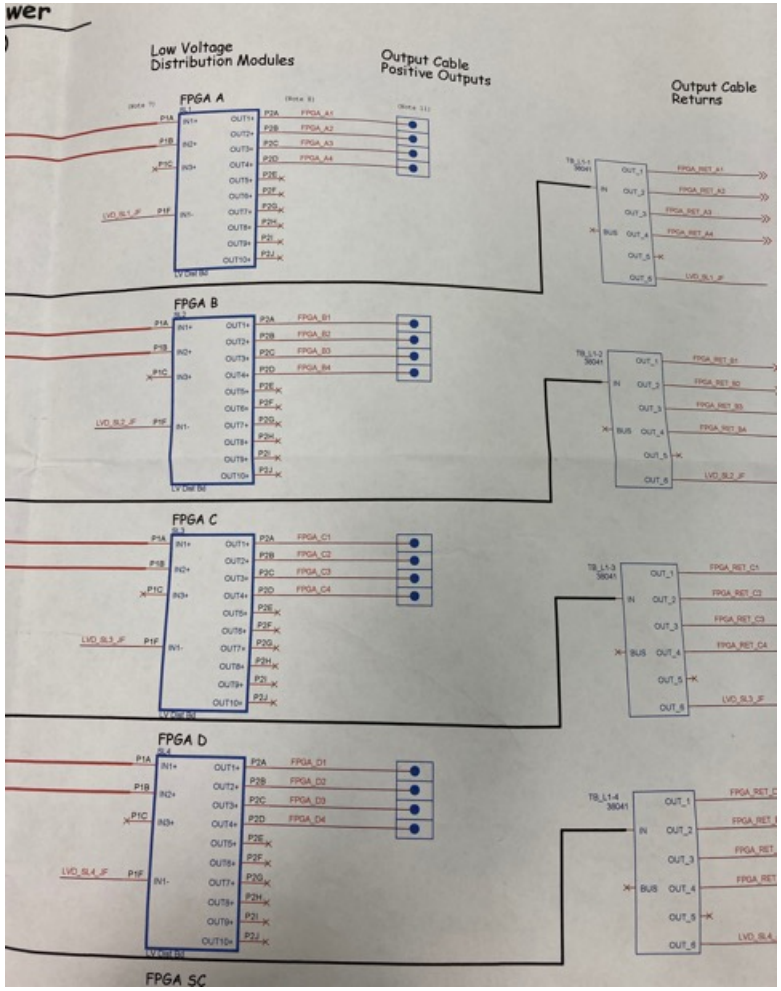
ROC-2-PowerConnector-Pinout.xlsx

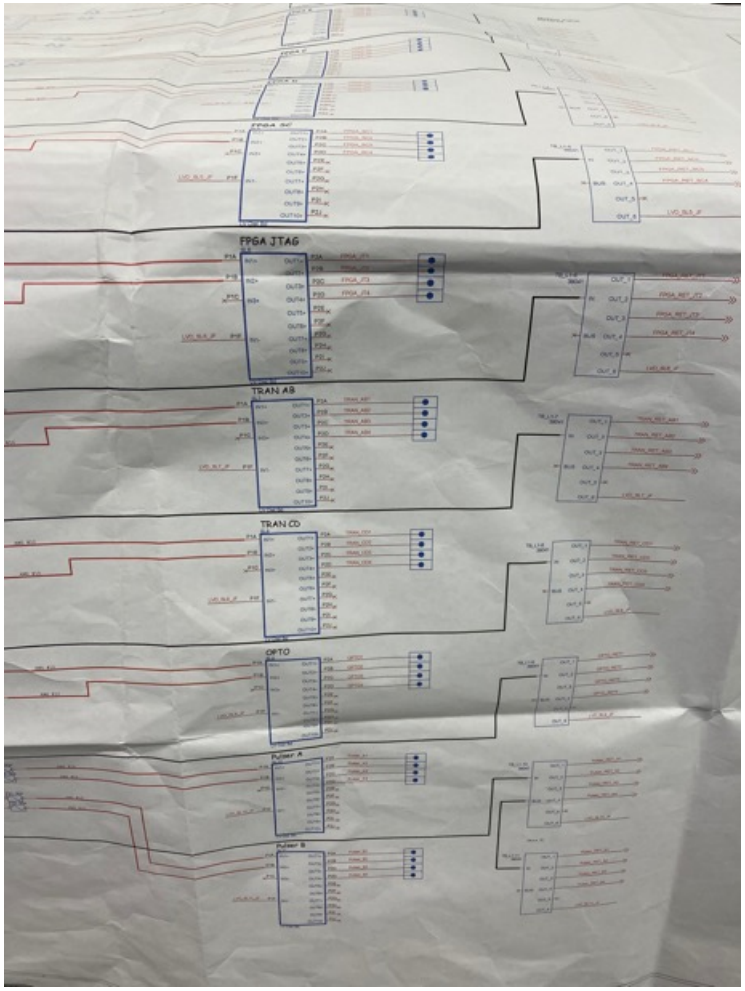
LV Distribution Board – ROC power Channel Map

ROC Connector Bundle				10 Channel Switching Module		
Signal	Pin	Pin	Signal	Slot	Channel*	Channel*
gnd_5V	1	2	Pulser_5V_A	10	1	2
gnd_5V	3	4	Pulser_5V_B	11	1	2
	5	6				
gnd_2.5V	7	8	2.5V_FPGA_A	1	1	2
gnd_2.5V	9	10	2.5V_FPGA_B	2	1	2
gnd_2.5V	11	12	2.5V_FPGA_C	3	1	2
gnd_2.5V	13	14	2.5V_FPGA_D	4	1	2
gnd_2.5V	15	16	2.5V_FPGA_SC	5	1	2
gnd_3.3V	17	18	3.3V_FPGA_A_B_SC	7	1	2
gnd_3.3V	19	20	3.3V_FPGA_C_D_BCO	8	1	2
gnd_2.5V	21	22	2.5V_JTAG_FPGA	6	1	2
gnd_5V	23	24	5V_opto_iso	9	1	2
				ROC Power Cable	1	2

Test Bench Rack Schematics

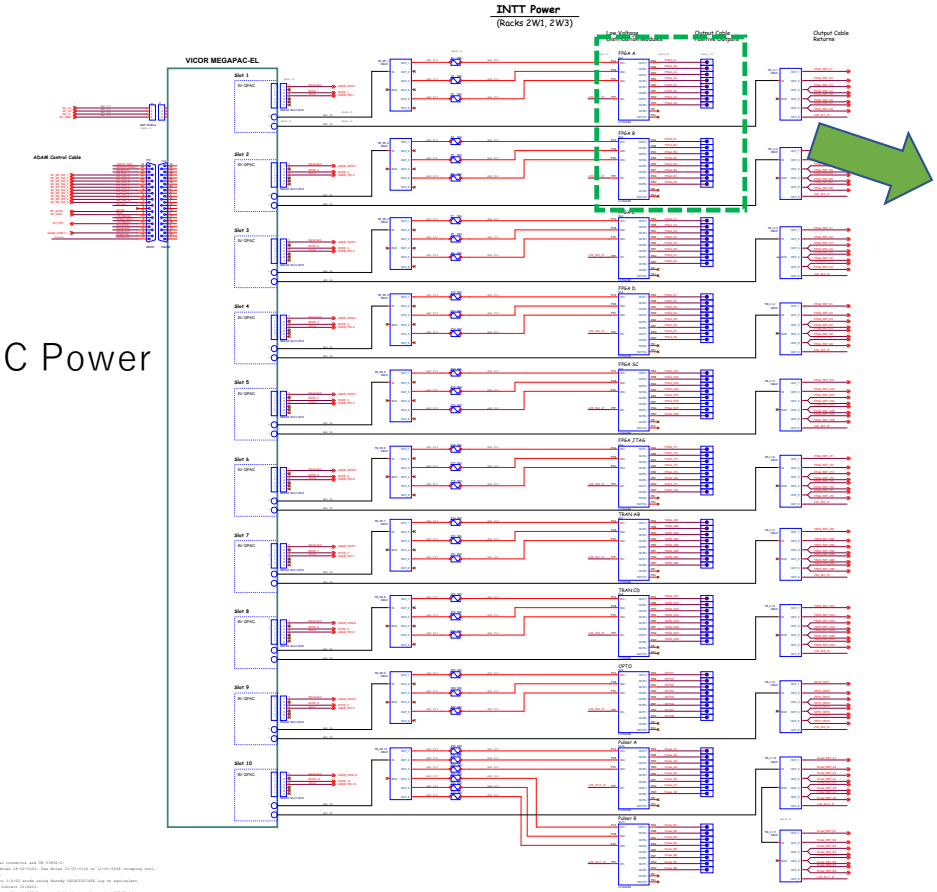
ROC Power





1008 Power Rack Schematics

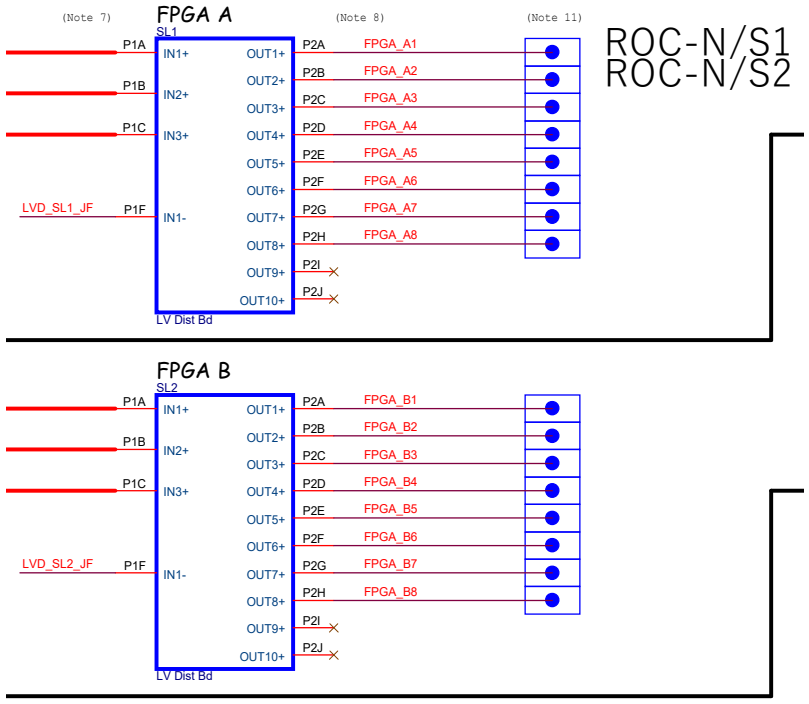
ROC Power



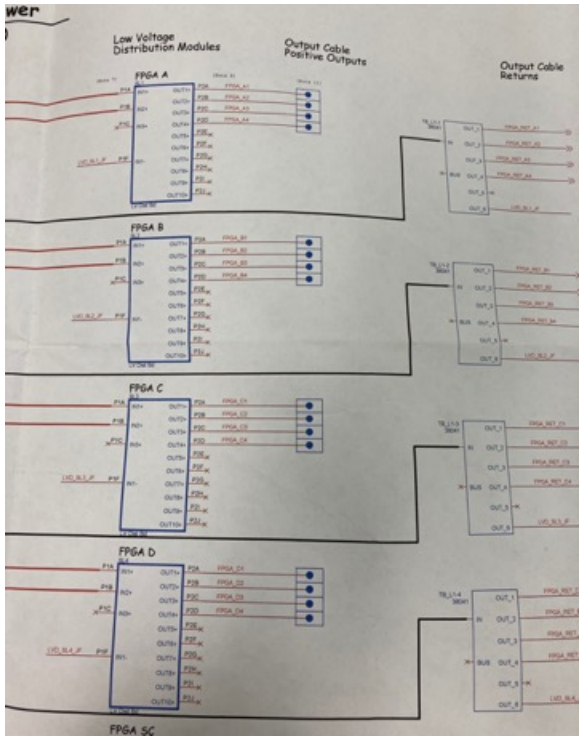
1008 Rack

Low Voltage Distribution Modules

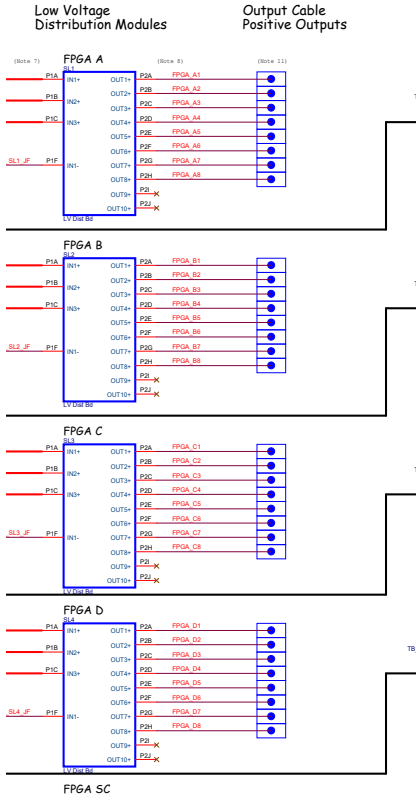
Output Cable Positive Outputs



ROC Power Schematic Drawing



Test Bench Version



1008 Rack Version

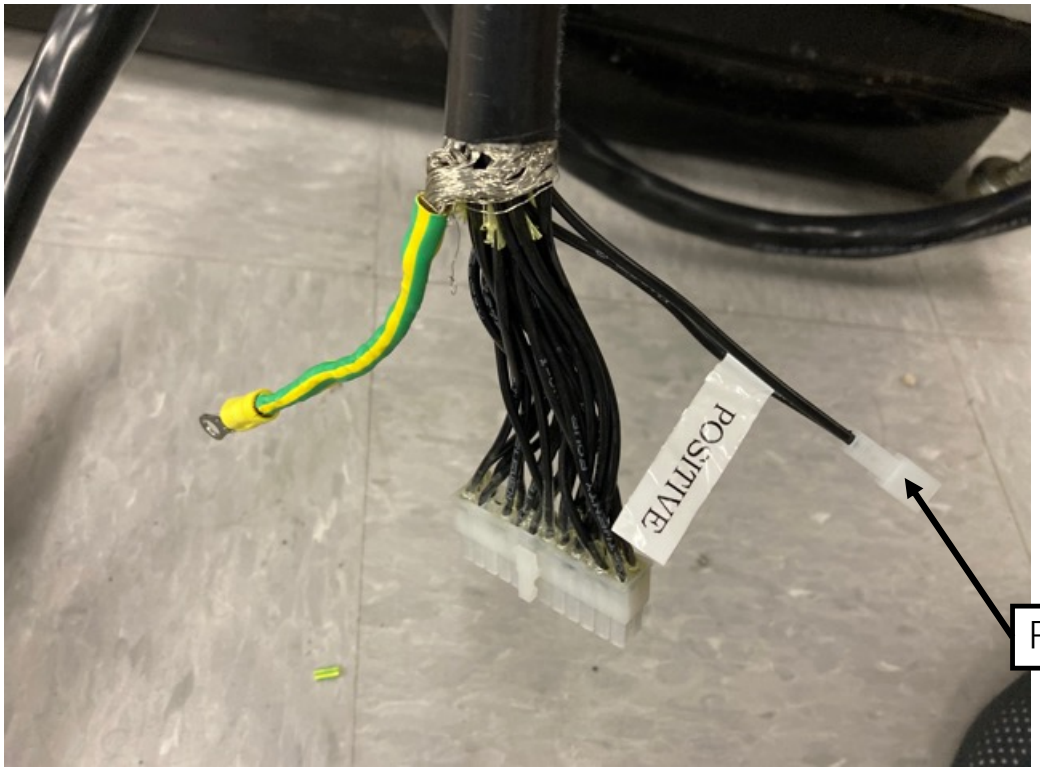
The channel map of the test bench version is fewer channel version of 1008. GUI can be developed and being tested at the test bench rack.

1008 Distribution Module Channel Map

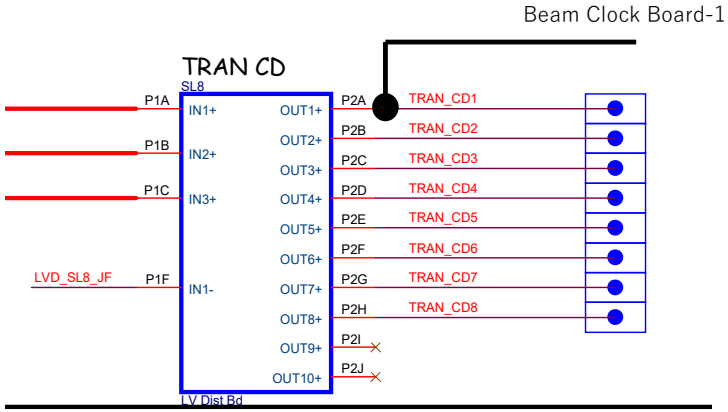
		Channel									
Slot	**Destination**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
1	2.5V_FPGA_A	ROC1	ROC2	ROC3	ROC4	ROC5	ROC6	ROC7	ROC8	N/A	N/A
2	2.5V_FPGA_B	ROC1	ROC2	ROC3	ROC4	ROC5	ROC6	ROC7	ROC8	N/A	N/A
3	2.5V_FPGA_C	ROC1	ROC2	ROC3	ROC4	ROC5	ROC6	ROC7	ROC8	N/A	N/A
4	2.5V_FPGA_D	ROC1	ROC2	ROC3	ROC4	ROC5	ROC6	ROC7	ROC8	N/A	N/A
5	2.5V_FPGA_SC	ROC1	ROC2	ROC3	ROC4	ROC5	ROC6	ROC7	ROC8	N/A	N/A
6	2.5V_JTAG_FPGA	ROC1	ROC2	ROC3	ROC4	ROC5	ROC6	ROC7	ROC8	N/A	N/A
7	3.3V_FPGA_A_B_SC	ROC1	ROC2	ROC3	ROC4	ROC5	ROC6	ROC7	ROC8	N/A	N/A
8	3.3V_FPGA_C_D_BCO	ROC1	ROC2	ROC3	ROC4	ROC5	ROC6	ROC7	ROC8	N/A	N/A
9	5V_opto_iso	ROC1	ROC2	ROC3	ROC4	ROC5	ROC6	ROC7	ROC8	N/A	N/A
10	Pulser_5V_A	ROC1	ROC2	ROC3	ROC4	ROC5	ROC6	ROC7	ROC8	N/A	N/A
11	Pulser_5V_B	ROC1	ROC2	ROC3	ROC4	ROC5	ROC6	ROC7	ROC8	N/A	N/A
12	FPHX										
13	FPHX										

ROC-2-PowerConnector-Pinout.xlsx

Power for Beam Clock Cable



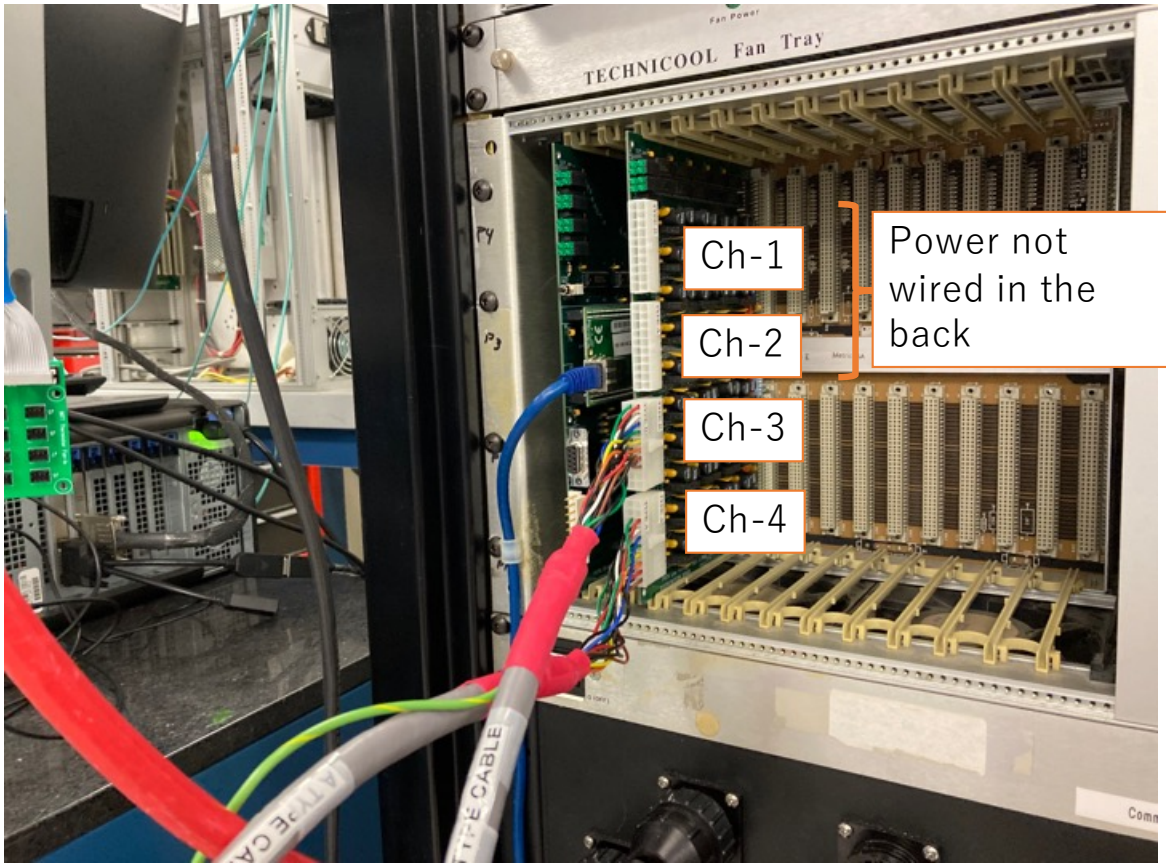
Power Cable for a Beam Clock Board

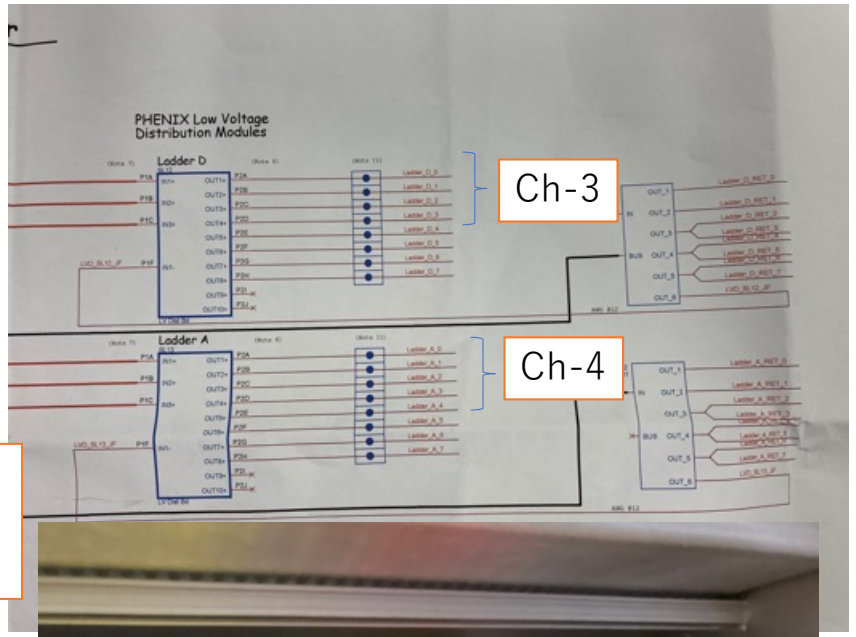


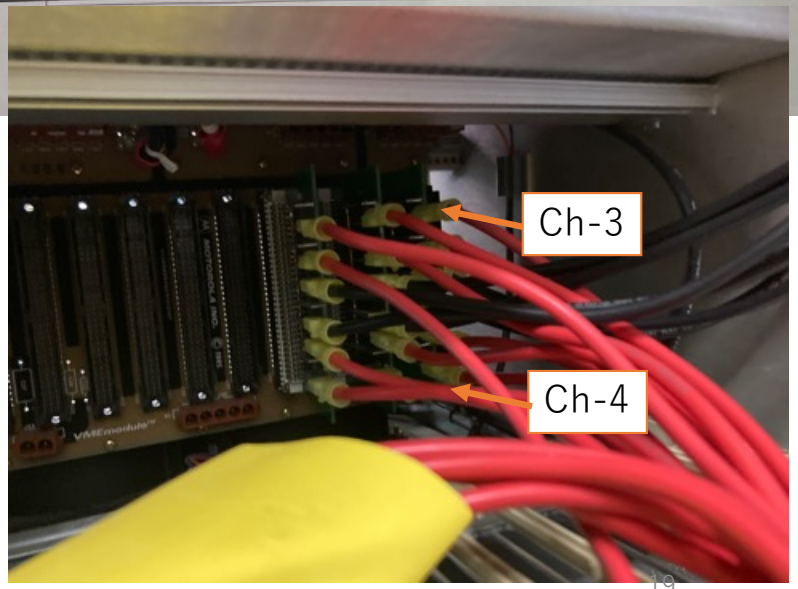
The power is branched out from the LV distribution module for 3.3V_FPGA_C_D_BCO output.

FPHX Power

FPHX Power Crate

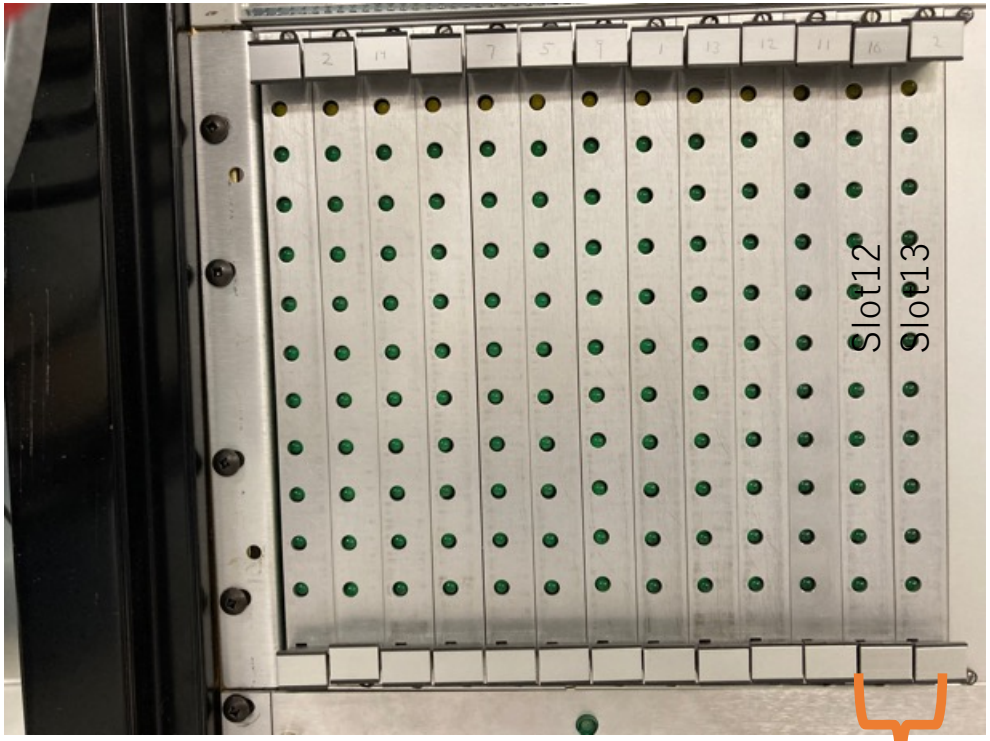


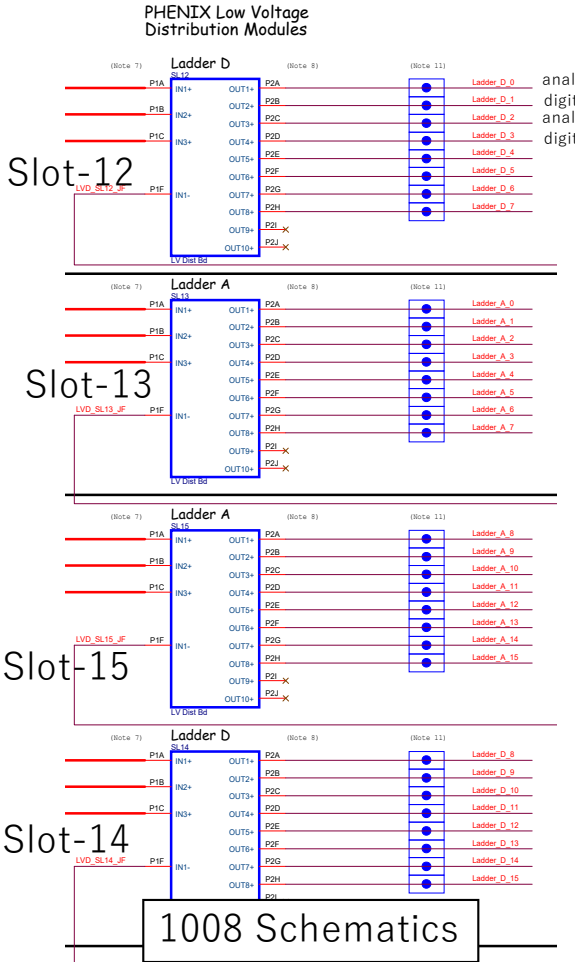




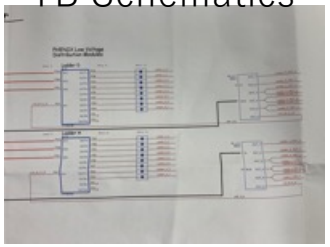
This channel map is assumption. Needs to be confirmed.

FPHX LV Distribution Module Map





TB Schematics

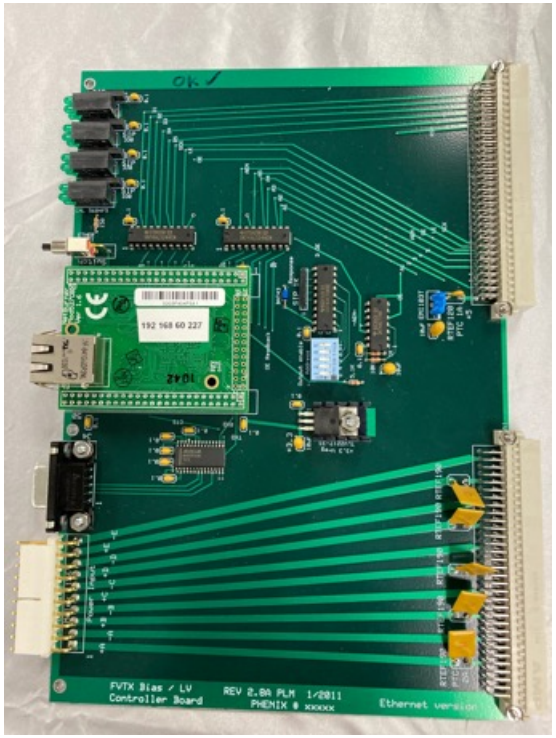


Consistent with the test Bench configuration

FVTX Bias/LV Controller Boards

TIPs: we can ping these card from the inttpower machine, but not from felix2 server for unknown reason.

Controller Board-1



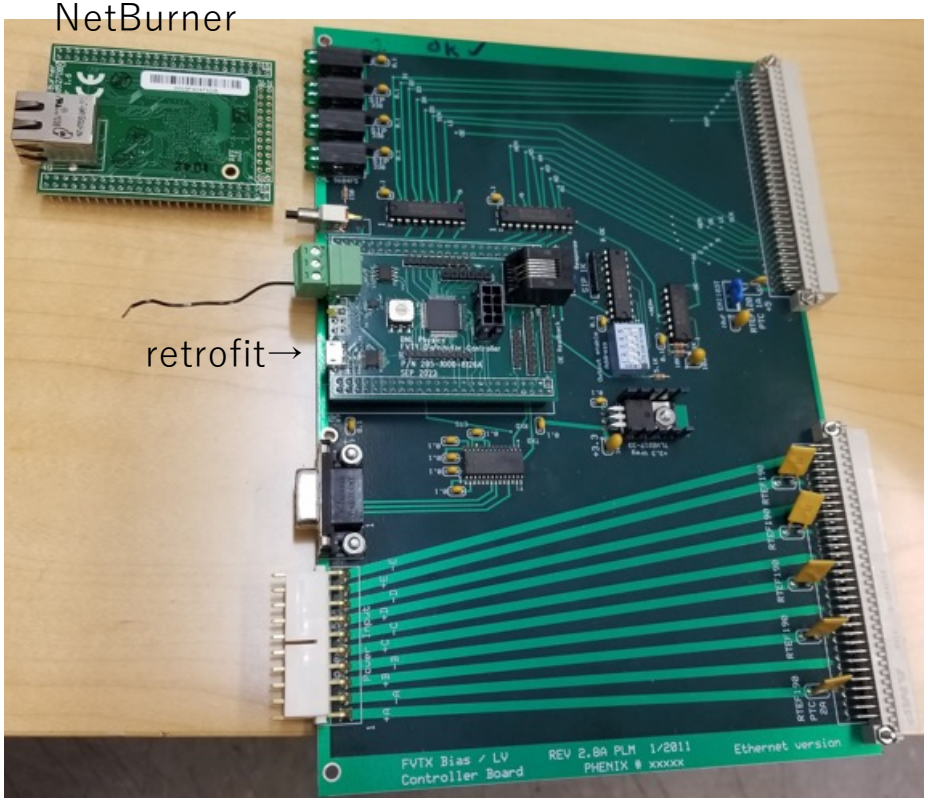
north 1 21 **192.168.60.227**

Controller Board-2

north 3 21 **192.168.60.227**

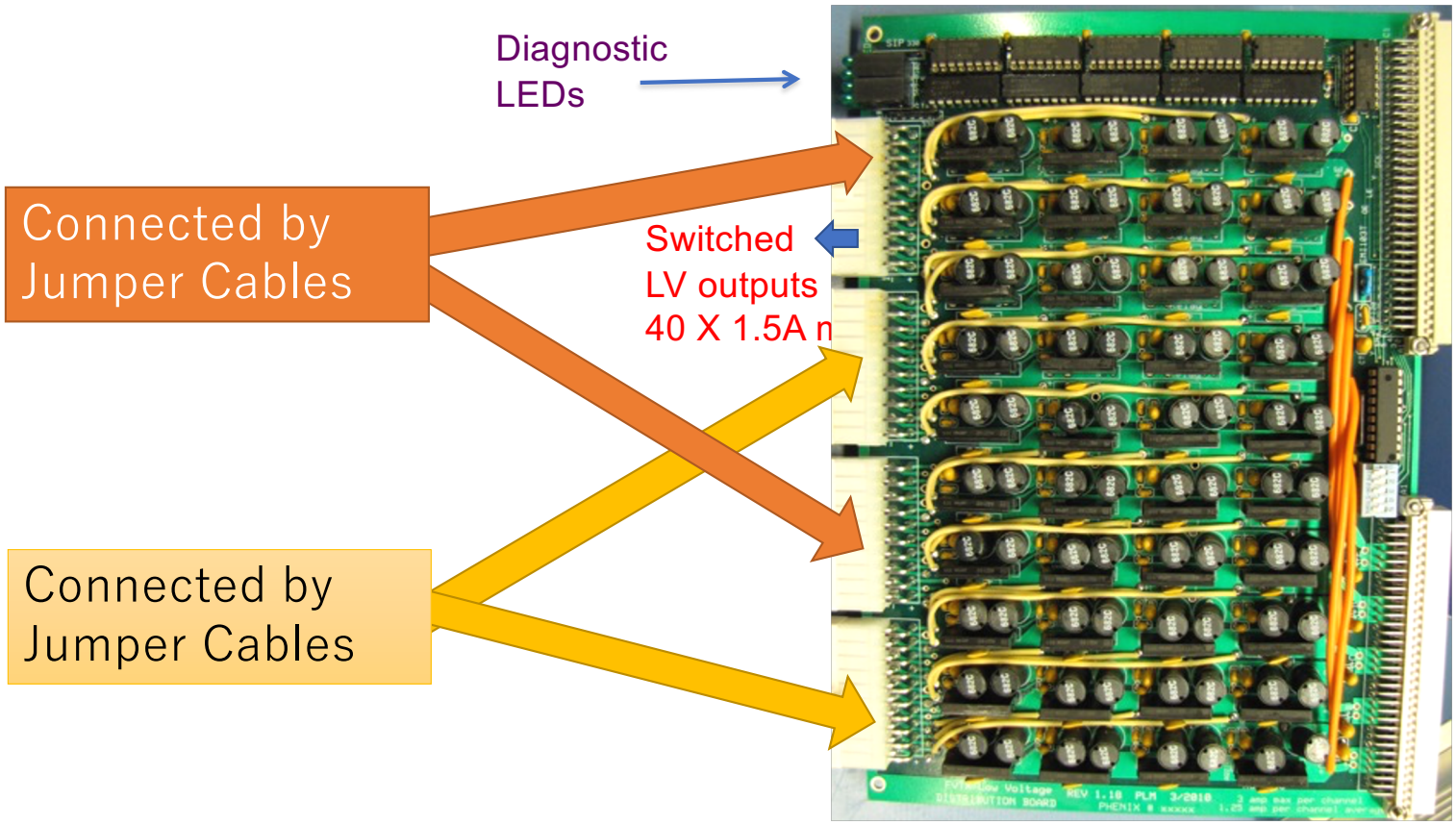
There will be 3rd one in IR. Rachid will bring it over to the silicon lab.

New Controller Daughter Board



- Steve is planning to replace the commercial ”NetBurner”.
  - No more ftp protocol requirement
- Steve fabricated new retrofit controller board used for other subsystems.
- KepServer communication is already proven and no development needed from scratch.
- The boards were delivered already.
- Waiting for Steve’s implementation of firmware to the board and testing.

40 Channel LV FPHX Filtering Board VME Card

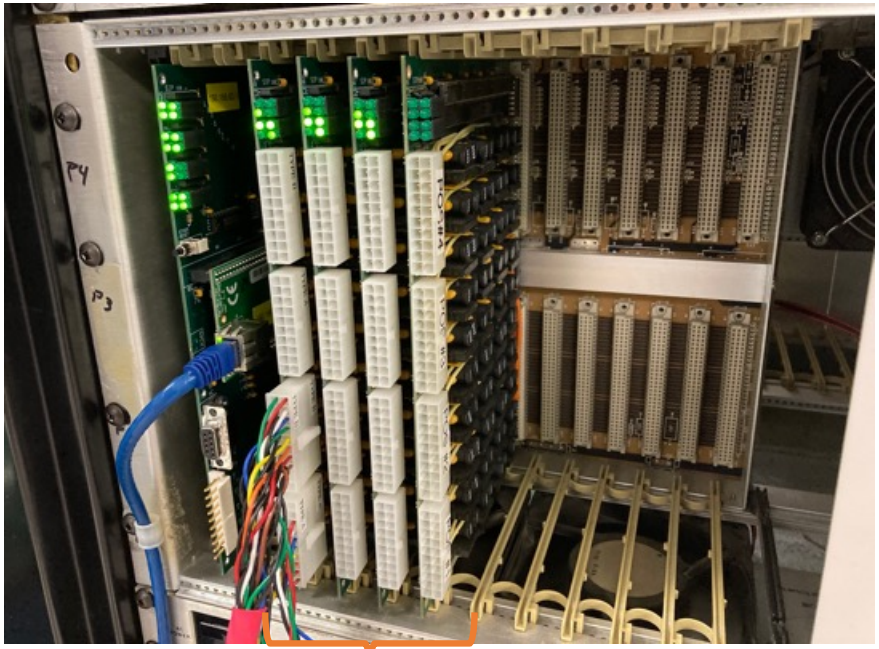


LV Filtering Board

*The board is labeled as distribution board, but we call it LV filtering board to avoid confusion with LVDU distribution board.

From FVTX_LV_9.ppt

FEM Power Status

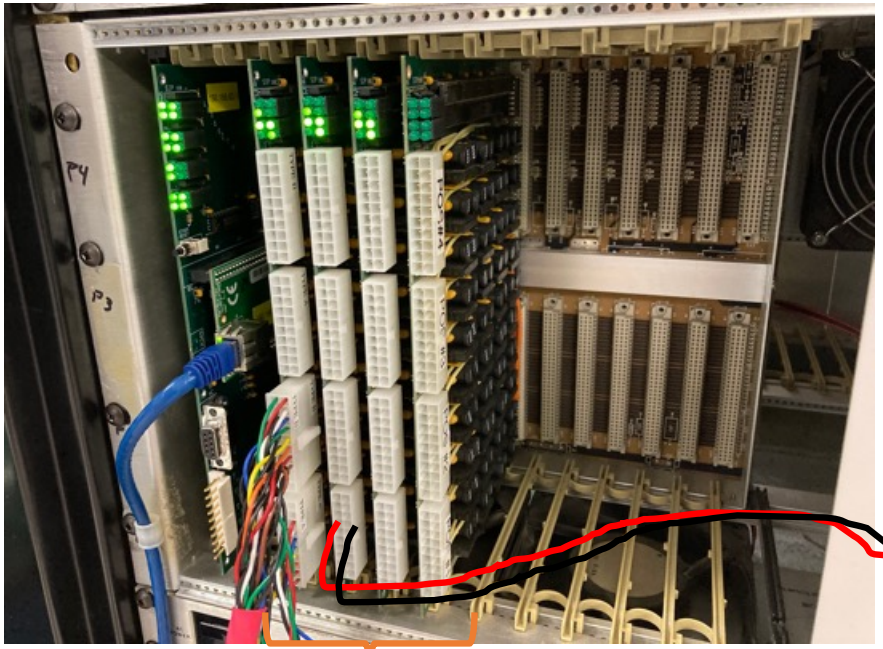


40 channel FPHX Filtering Boards

- The power output is only observed with the controller board-1. The controller board-2 doesn't allow any output voltage from the FPHX filtering boards.
- We need Wei-Che to make this working.

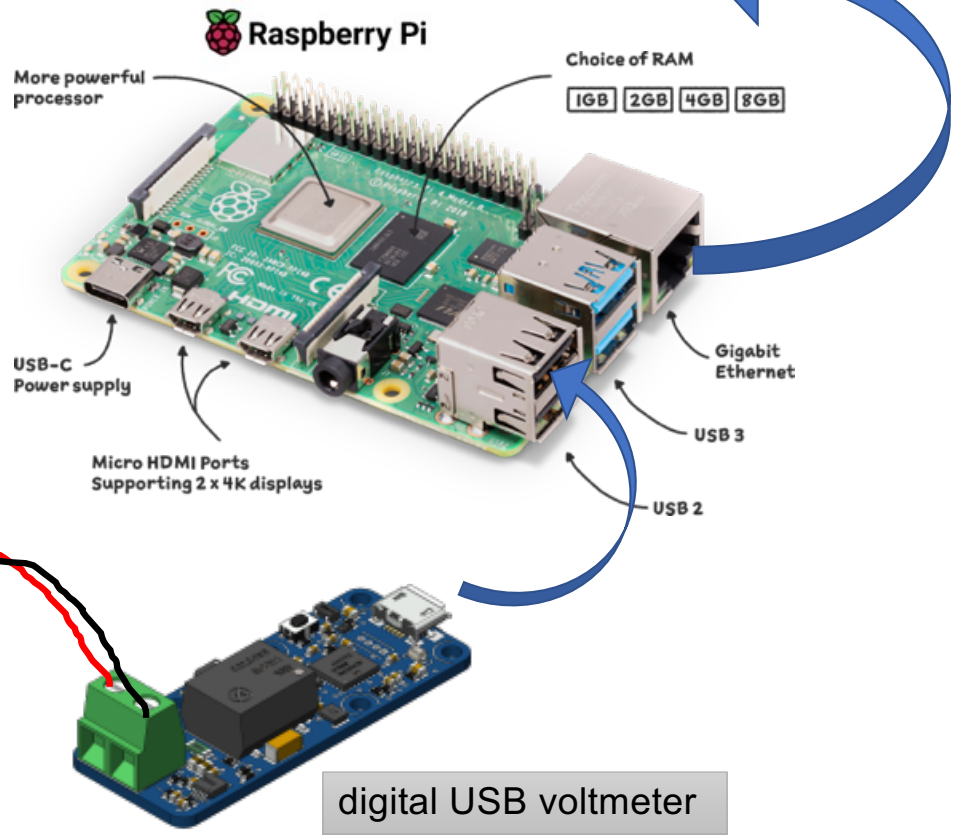
Output Voltage Remote Monitoring System

For the remote developer



40 channel FPHX Filtering Boards

Ethernet hub



digital USB voltmeter

http://www.yoctopuce.com/EN/products/usb-electrical-sensors/yocto-volt

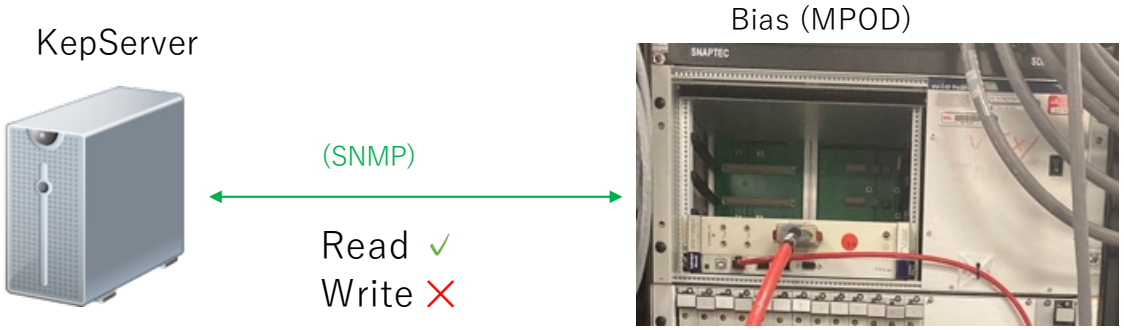
This is useful for other (FPHX/Bias) GUI developers

FPHX Power Control Roadmap

1. Establish remote output voltage monitoring system in Taiwan using a raspberry-pi and a digital USB voltmeter. Once it is established, send the system to BNL. Onsite crew will install it and let Wei-Che know the IP address.
2. Wei-Che work on the 2nd controller board (and/or 3rd one) and make the controller enable LV filter board's outputs using the monitoring system remotely. Onsite crews will assist you up on necessity.
3. As a step towards the migration to sPHENIX standard LV control system, run the perl script on the KepServer instead of inttpower. Since the ftp communication is established for the controller boards, we should stick with ftp scheme on the KepServer as well.
4. Once the communication is successful between KepServer and the controller board, start developing GUI on the ignition GW.

Bias Power

Bias Voltage Control Status



- Steve successfully make “read” function working.
- Write function is not functioning yet. Perhaps permission issue on the MPOD.
- Steve is in contact with a company for the possible solution.
- Once he makes read/write functions working, it is ready for us to develop GUI on the ignition. Volunteer?

New Policy for the INTT Power

In order to avoid messy home directory

- Account :
  - intt : for operation
  - inttdev : for developers