

VD Cold-Box Update

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Progress

- Indico page & mailing list
 - <https://indico.fnal.gov/category/1357/>
 - cenf-vd-integration-analysis@cern.ch
- Updated BDE channel mapping (docdb: 23684 v22)
- BDE decoder is working (Tom, Jake, et al.)
 - Ready for a keepup production now?
- David's dataprep module is working for checking BDE waveform quality
 - Noise filtering/coherent noise removal?
- ICEBERG DQM framework
 - Integrate with keepup production?
- Charge deconvolution
 - Nitish is preparing wire geometry file for Wire-Cell (Done)
- TDE?

Integration of TDE and BDE processing configuration?

- Decoder needs to be separately configured with different channel mapping
- The decoded format should be consistent (larsoft's RawDigits)
- David's dataprep module works on RawDigits
- Charge deconvolution is also expecting the same wire geometry (?)

November 15 review

- Proposed agenda November 15 (9:00-12:00 CST)

LBNC Review of Vertical Drift					Start	
Monday, November 15, 2021					(CST)	(CET)
1	NP02	HV test results and plans	20	Francesco Pietropaolo? Bo Yu?	9:00	16:00
2	Cold-Box	Cold box/CRP status and plan	20	Serhan? Dominique? Filippo?	9:20	
3	Electronics	BDE results	15	Cheng-Ju? Wenqiang?	9:40	
4		TDE results	15	Elisabetta? Dario? Slavic?	9:55	
5	PDS	PDS hardware layout and performance	20	Flavio?	10:10	
6		PDS goals and plan for 2022	40	Ryan Rivera	10:30	
7		Discussion	30	all	11:10	
8		Executive Session	20	all	11:40	18:40
180					12:00	19:00

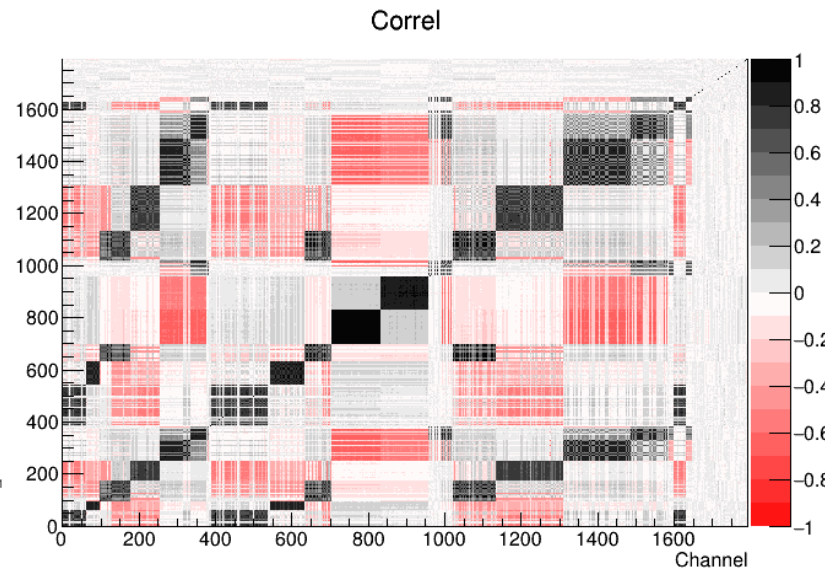
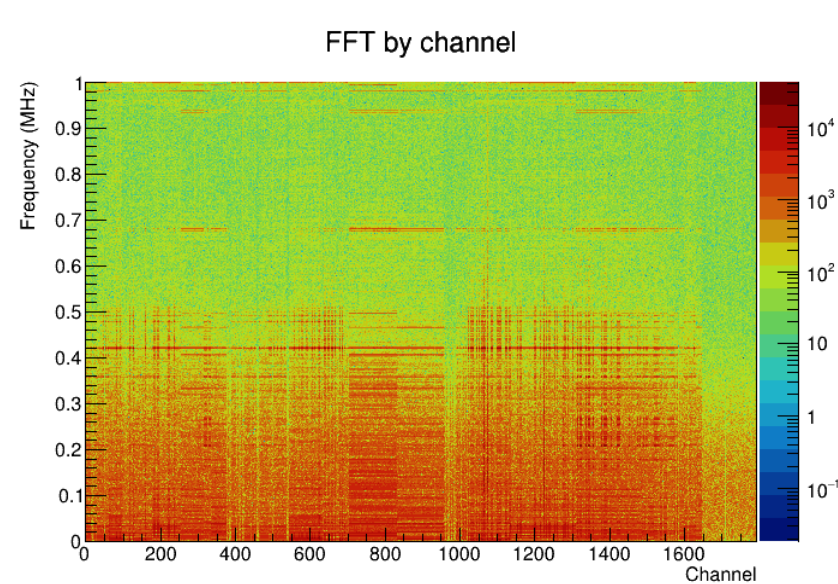
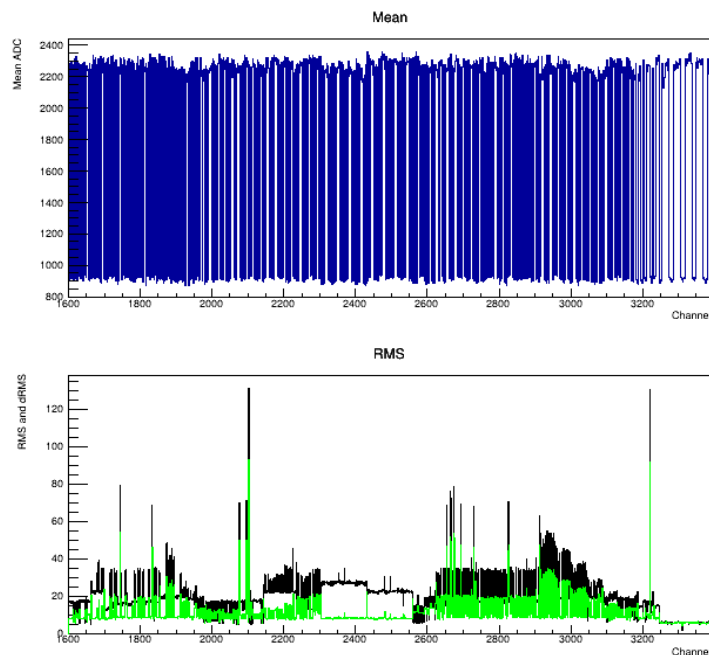
Speakers/agenda confirmed 10/27/2021

Slide review 11/12/2021 7:30 CST

- Is this agenda OK?
- Proposed review of our slides November 12 (9:00-11:00 CST) borrow Filippo's cold box time slot? Post slides by end of 11/11.

David's and Tom's plots

- <https://internal.dunescience.org/people/dladams/protodune/vdcoldbox/wfraw/run011953/plots.html>



Run 11972

Metadata is good now

```
[dunegpvm04] $ samweb get-metadata np02_bde_coldbox_run011972_0000_20211102T183237.hdf5
  File Name: np02_bde_coldbox_run011972_0000_20211102T183237.hdf5
  File Id: 60943700
  Create Date: 2021-11-02T18:42:13+00:00
  User: timm
  File Size: 1330702152
  Checksum: adler32:a88dae78
Content Status: good
  File Type: detector
  File Format: hdf5
  Data Tier: raw
  Event Count: 50
  First Event: 1
  Last Event: 50
  Data Stream: test
  Runs: _11972.0001 (vd-coldbox-bottom)
```



Updated Channel Map

- FEMBs (9, 10) and (13, 14) had their cables swapped
- For (13, 14) it was more clear since the channels corresponding to 13 were consistent with not being connected
- For (9, 10) not fully conclusive, but :
 - Powering on FEMB 9 gives outputs on FEMB 10 registers and vice versa (could be either power or signal cables)
 - Indications from pictures that signal cables were swapped
 - FEMB 10 link seemingly had larger noise for U strips => larger length => actually reading out FEMB 9 location
- Docdb – [23684v22](#) should have the updated channel map after some iteration with Tom and Cheng-Ju

data sets



Volodya 7:35 AM

According to the log, the run numbers with one link active at a time (two FMEBs powered on at a time) are

- 11952 np02_coldbox_link_7
- 11951 np02_coldbox_link_6
- 11950 np02_coldbox_link_5
- 11949 np02_coldbox_link_4
- 11948 np02_coldbox_link_3
- 11947 np02_coldbox_link_2
- 11946 np02_coldbox_link_1

All links up (all FMEBs powered on):

- 11953 np02_coldbox (edited)



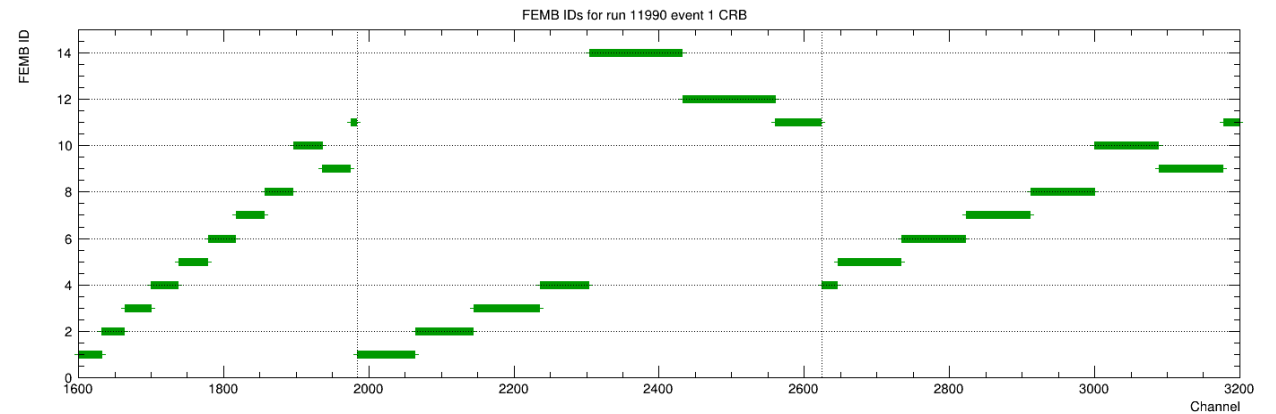
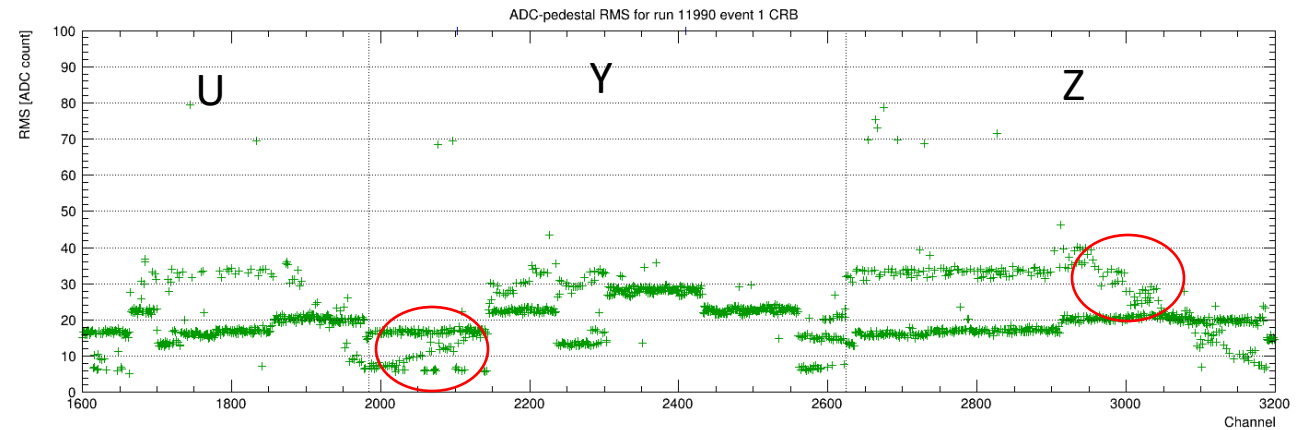
Cheng-Ju Lin 6:35 PM

@Adams Dave, you may be interested in looking at run 11970 as well. This run was taken after we replaced the power supply with the one from NP04 and also after turning off a PDS instrumentation.



Giovanna Lehmann Miotto 9:55 AM

11990 just before start of cool down



Noise much improved (2x) – David
Do we understand the noise pattern?

	A	B	C	D	E
1	FEMB		U Channels	Y Channels	Z Channels
2					
3	FEMB 1		U1-U32	Y1-Y80	
4	FEMB 2		U33-U64	Y81-Y160	
5	FEMB 3		U65-U100	Y161-Y252	
6	FEMB 4		U101-U138	Y253-Y320	Z1-Z22
7	FEMB 5		U139-U178		Z23-Z110
8	FEMB 6		U179-U217		Z111-Z199
9	FEMB 7		U218-U256		Z200-Z288
10	FEMB 8		U257-U296		Z289-Z376
11	FEMB 9		U297-U336		Z377-Z464
12	FEMB 10		U337-U375		Z465-Z553
13	FEMB 11		U376-U384	Y577-Y640	Z554-Z576
14	FEMB 12			Y449-Y576	
15	FEMB 13			Y321-Y448	
16					
17					



Cheng-Ju Lin 12:45 PM

Link 0: FEMB 1, 2

Link 1: FEMB 3, 4

Link 2: FEMB 5, 6

Link 3: FEMB 7, 8

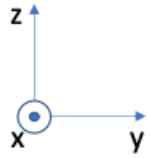
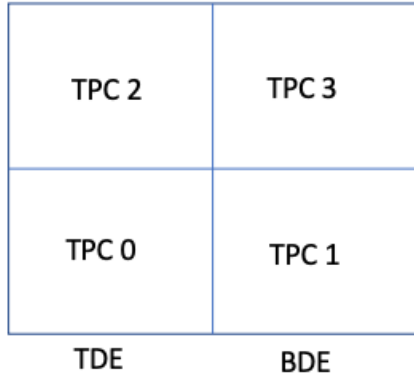
Link 4: FEMB 10, 9 (note the cable swap)

Link 5: FEMB 11, 12

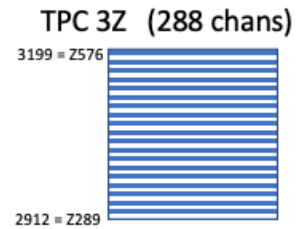
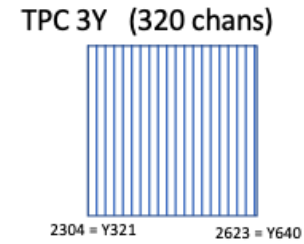
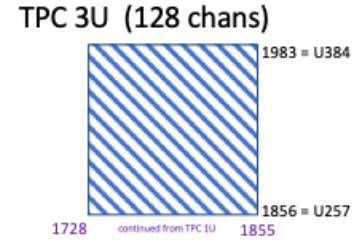
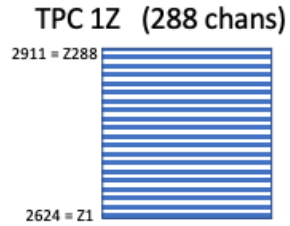
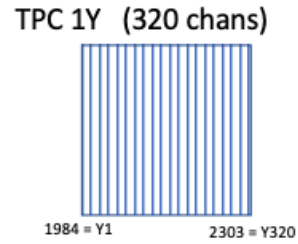
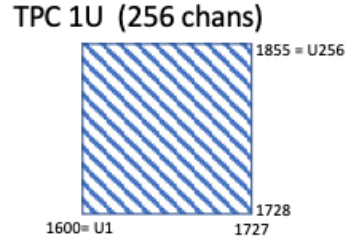
Link 6: FEMB 14, 13 (note the cable swap)

Offline Channel Numbers -- Tom Junk

Vertical Drift Coldbox BDE Online – Offline Channel Associations Try 2 – October 28, 2021

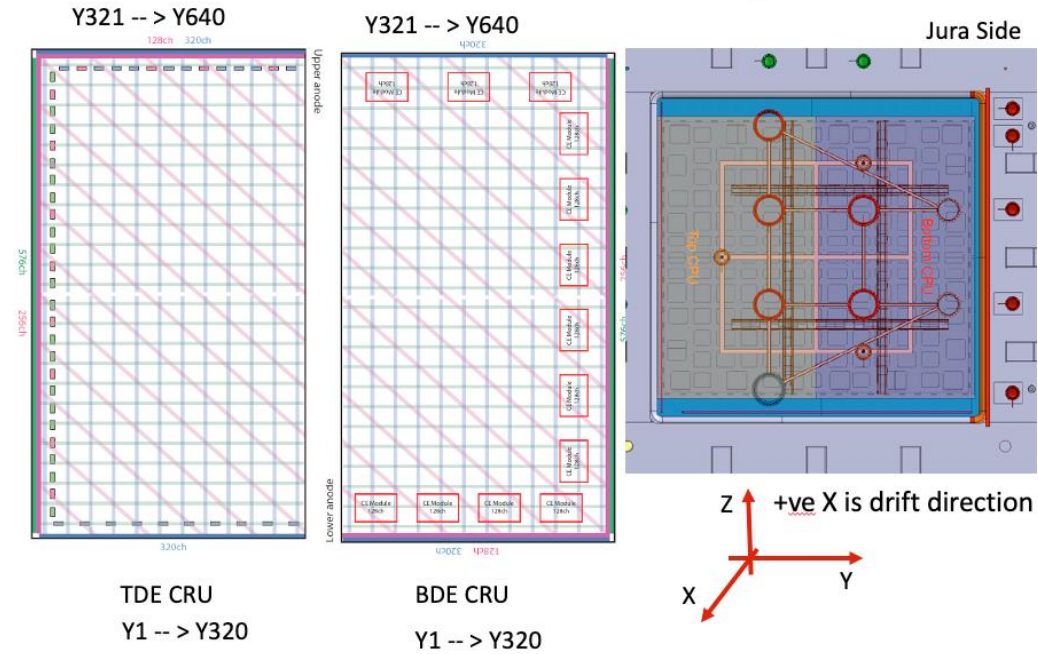


TPC numbers are from the LArSoft Geometry

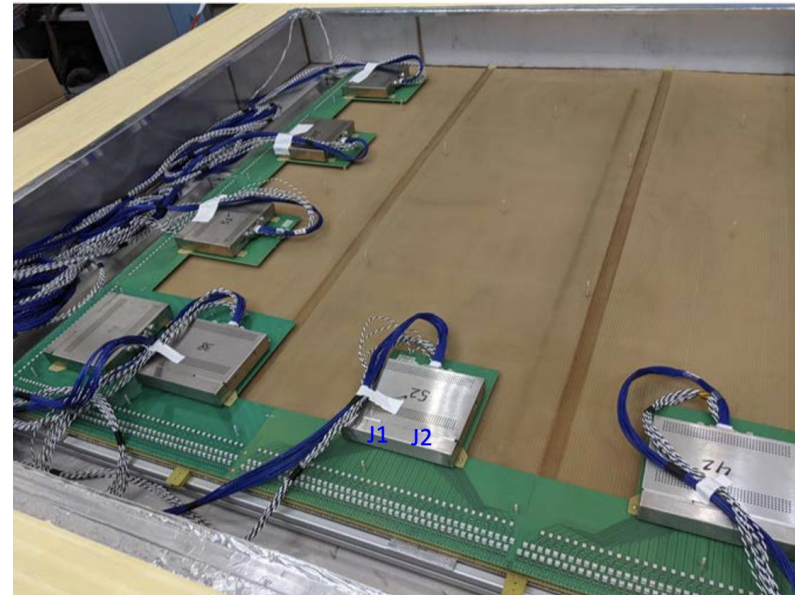
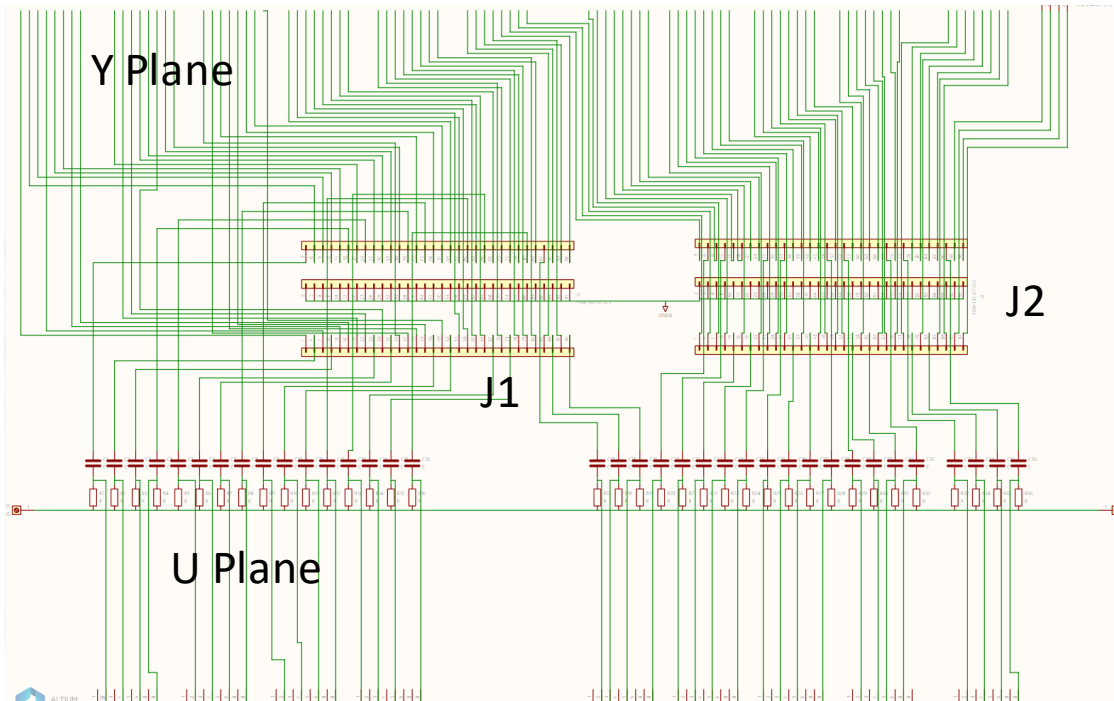


Strip ID convention -- Slavic

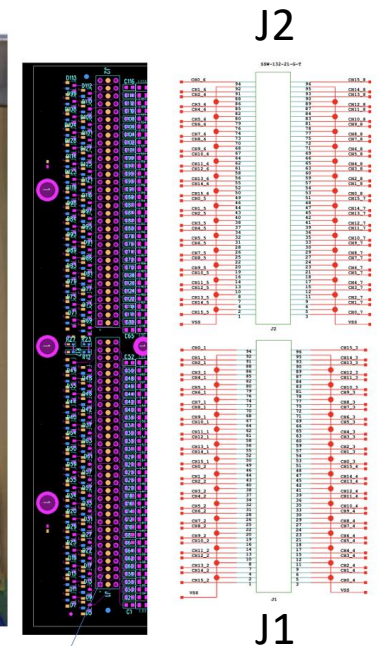
Coordinate axes to match geo



Possible Issues



Two jumpers on FEMB: J1 & J2



Analog Mother Brd (IO-1637-1C)

...
4,5,6 (5 GND/Vss)
1,2,3 (2 GND/Vss)

- Two parts to building channel map
 - Match pin numbers on adapter board connectors to strips
 - Match FEMB channel pins to adapter board pins
- The second part uses the same mapping as protodune-sp. If things got flipped here then it's possible we might mix Y and U strips

Strip Number	Connector #	Connector Pin #	CE Board #	CEB Channel #	ASIC	ASIC Channel	Strip Number	Connector #	Connector Pin #	CE Board #	CEB Channel #	ASIC	ASIC Channel
Y81	1	1	2	31	2	15	U33	1	3	2	48	4	0
U34	1	4	2	30	2	14	Y82	1	6	2	49	4	1
Y84	1	7	2	29	2	13	Y83	1	9	2	50	4	2
U35	1	10	2	28	2	12	Y85	1	12	2	51	4	3
Y87	1	13	2	27	2	11	Y86	1	15	2	52	4	4
Y88	1	16	2	26	2	10	U36	1	18	2	53	4	5
Y90	1	19	2	25	2	9	Y89	1	21	2	54	4	6
Y91	1	22	2	24	2	8	U37	1	24	2	55	4	7
U38	1	25	2	23	2	7	Y92	1	27	2	56	4	8
Y94	1	28	2	22	2	6	Y93	1	30	2	57	4	9
U39	1	31	2	21	2	5	Y95	1	33	2	58	4	10
Y97	1	34	2	20	2	4	Y96	1	36	2	59	4	11
Y98	1	37	2	19	2	3	U40	1	39	2	60	4	12
Y100	1	40	2	18	2	2	Y99	1	42	2	61	4	13
Y101	1	43	2	17	2	1	U41	1	45	2	62	4	14
U42	1	46	2	16	2	0	Y102	1	48	2	63	4	15
Y104	1	49	2	15	1	15	Y103	1	51	2	32	3	0
U43	1	52	2	14	1	14	Y105	1	54	2	33	3	1
Y107	1	55	2	13	1	13	Y106	1	57	2	34	3	2
Y108	1	58	2	12	1	12	U44	1	60	2	35	3	3
Y110	1	61	2	11	1	11	Y109	1	63	2	36	3	4
Y111	1	64	2	10	1	10	U45	1	66	2	37	3	5
U46	1	67	2	9	1	9	Y112	1	69	2	38	3	6
Y114	1	70	2	8	1	8	Y113	1	72	2	39	3	7
U47	1	73	2	7	1	7	Y115	1	75	2	40	3	8
Y117	1	76	2	6	1	6	Y116	1	78	2	41	3	9
Y118	1	79	2	5	1	5	U48	1	81	2	42	3	10
Y120	1	82	2	4	1	4	Y119	1	84	2	43	3	11

- FEMB 2 example :

- If for example, one side of the connector pins (# 3, 6, 9 etc) are on the (#1, 4, 7..) side, all the strips we assigned as U would actually be Y and some Y strips should be U
- We'd cross-checked with Cheng-Ju what we obtain as unconnected FEMB channel numbers and we found they agreed, but these are symmetric about this, so this ambiguity could still exist
- Should we maybe try to see if this actually makes David's plot more reasonable? Not sure if this could have happened to all FEMBs or just some FEMBs
- Should confirm if we can as to how these are actually connected

- Other ideas to check?