

Production Status

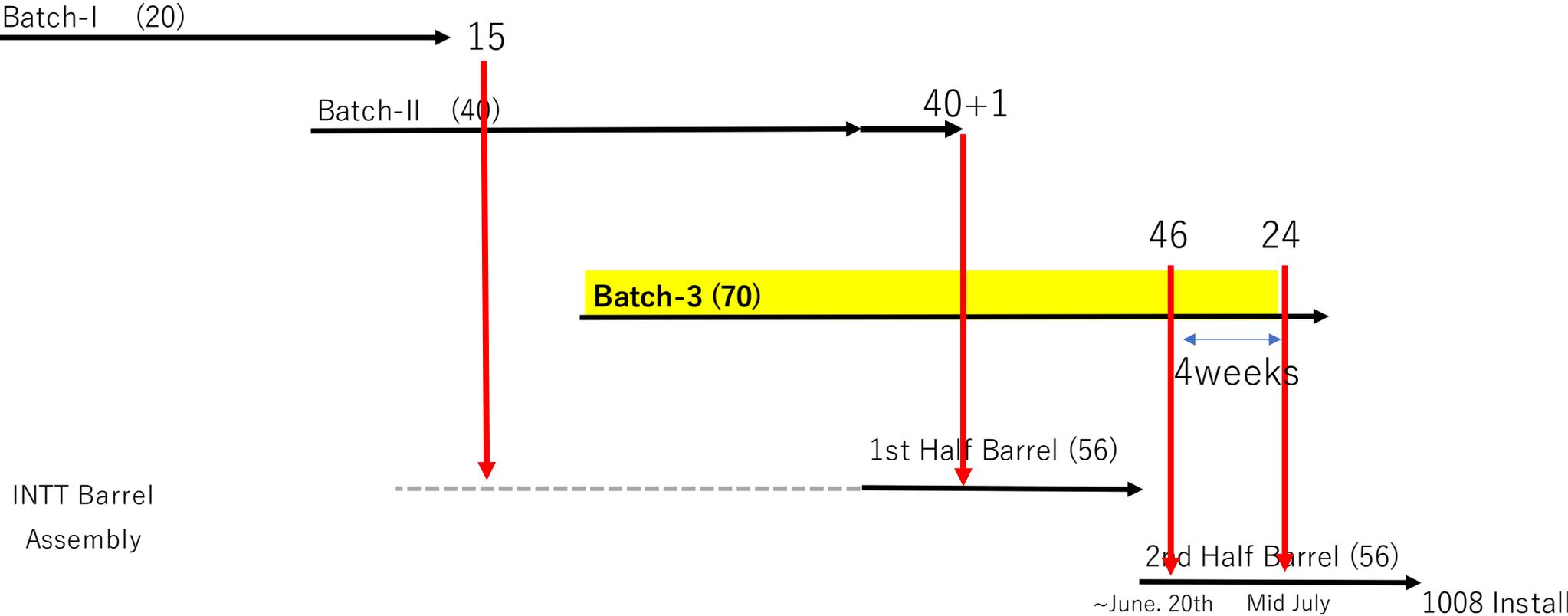
RIKEN/RBRC

Itaru Nakagawa

Bus Extender Production Batch-II, III

Schedule

2021 11 12 2022 1 2 3 4 5 6 7 8 9



Total Qty. in BNL	15	56	102	126
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INTT Production Status

Today

* Beyond 112 are spares

2022	1	2	3	4	5	6	7	8	Qty*	Status
Silicon									135	Done
HDI									176	Done
Stave									204	Done
Bus Extender		Batch-1(20)			Batch-2(40)				130	Production
			Contract				Batch-3(70)			
Conversion Cable	Prototype-1		Contract	Prototype-2					130	Prototype
					Test		Production (130)			
Beam Clock Board	Design		Public bid	Preproduction(2)		Test			20	Prototype
				Parts procurement	fabrication		Production(18)			
Barrel Assembly										

- 47 BEX are to be delivered in week of June 20th.
- Finalize design of the conversion cable for production.
- To be delivered beam clock board by the end of of June. Cables need to be prepared

3rd batch bus extender LOT-1

- There are 46 good BEX confirmed before DF18 implementation and the implementations should be completed by today.
- The BEX are then tested at Hayashi-REPIC using CN-50 on Monday ~ Tuesday next week and then delivered to RIKEN in the late afternoon on Tuesday.
- The paper works for the export has pre-processed and arranged pick up date on June 22nd Wednesday. (Expected delivery to BNL by the end of June).



CN-50 Harness Checker

BCB Parts Procurement Trouble

Shortage of EOL parts found on June 11th

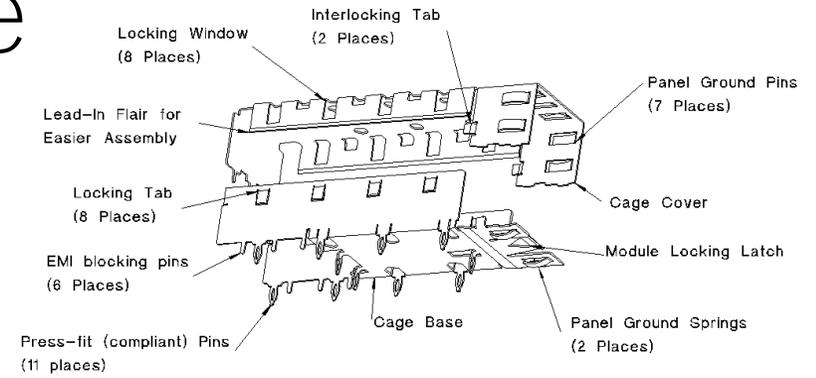


Received from Rob

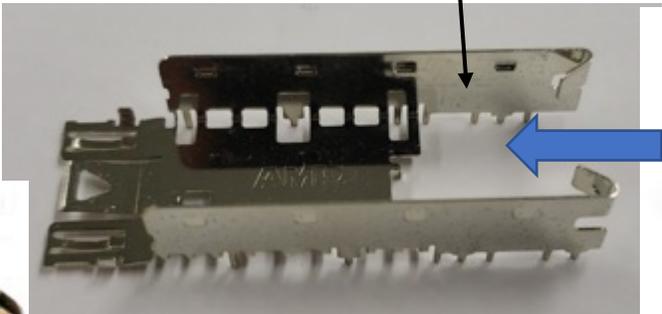


Optical Driver

Cage (base)



	Available	Shortage
Plug I/O connector	40+	0
Optical Driver	40+	0
Cage Base	10	30
Cage Cover	0	40



Plug I/O connector



BCB Parts Procurement Trouble

- 2 BCB pre-production boards are to be delivered by the end of June.
- The parts are under immediate search by Rob in US market since this week.
- In case we cannot find the cage covers by the implementation, I let the company to deliver 2 pre-production without them.
- BDB function test can be done without the cage cover hopefully, but not adequate for the long-term operation for sure.
- We keep searching for available parts in the market or/and even look for the same parts in PHENIX used electronics.

ROC Boards Export

index	shipped	A1	A2	A3	B1	B2	B3	C1	C2	C3	D1	D2	D3
1	NE0	Yellow									Yellow		
2	NE1												
3	NE2												
4	NE3				Pink	Pink	Pink						
5	NE4												
6	NE5										Pink		
7	SW5												
8	NW1												
9	NW2												
10	NW3			Yellow							Yellow		
11	NW4				Pink	Pink		Pink			Pink	Pink	
12	SE0												
13	SE1												
14	SE2												
15	SE3												
16	SE4		Yellow								Yellow		
17	29												



index	packed	A1	A2	A3	B1	B2	B3	C1	C2	C3	D1	D2	D3
1	ROC7		Pink	Pink			Pink				Pink	Pink	Yellow
2	ROC9			Yellow									

6/14 Regulator Upgrade & DF18 Replacement

class 1	11	class 1 → All good!
class 2	5	class 2 → Bad port less than 2
class 3	3	class 3 → Bad port more than 3

Shipped to BNL already

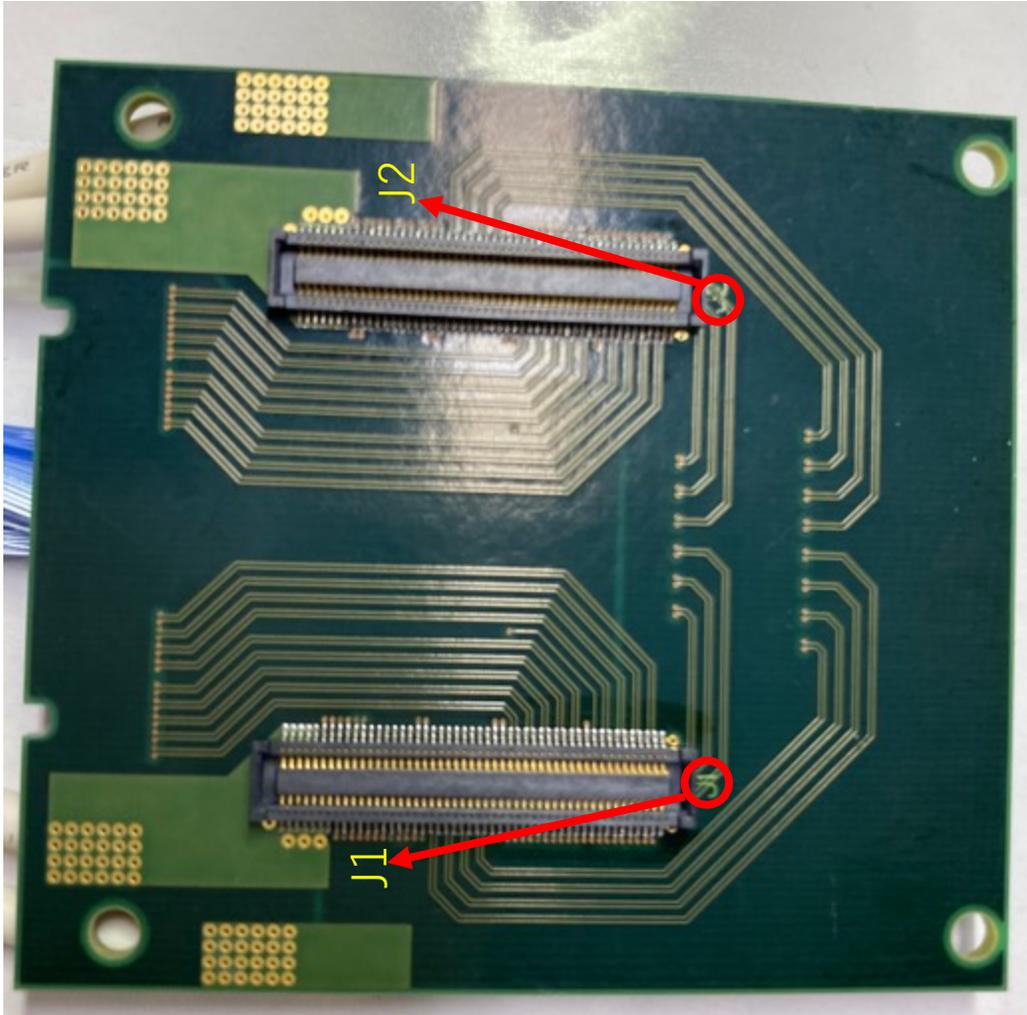
6/14 Shipping to BNL (➡ 5 good ROCs + *NE5)

*NE5 has port which doesn't latch data fiber

BNL suppose to have 6+5=11 class 1 ROCs. (Goal is 16 Class-1 ROCs)

Micro Coax Design Modification Request for the Production

Silk Pattern ROC Side Connector Board Serial No Sticker



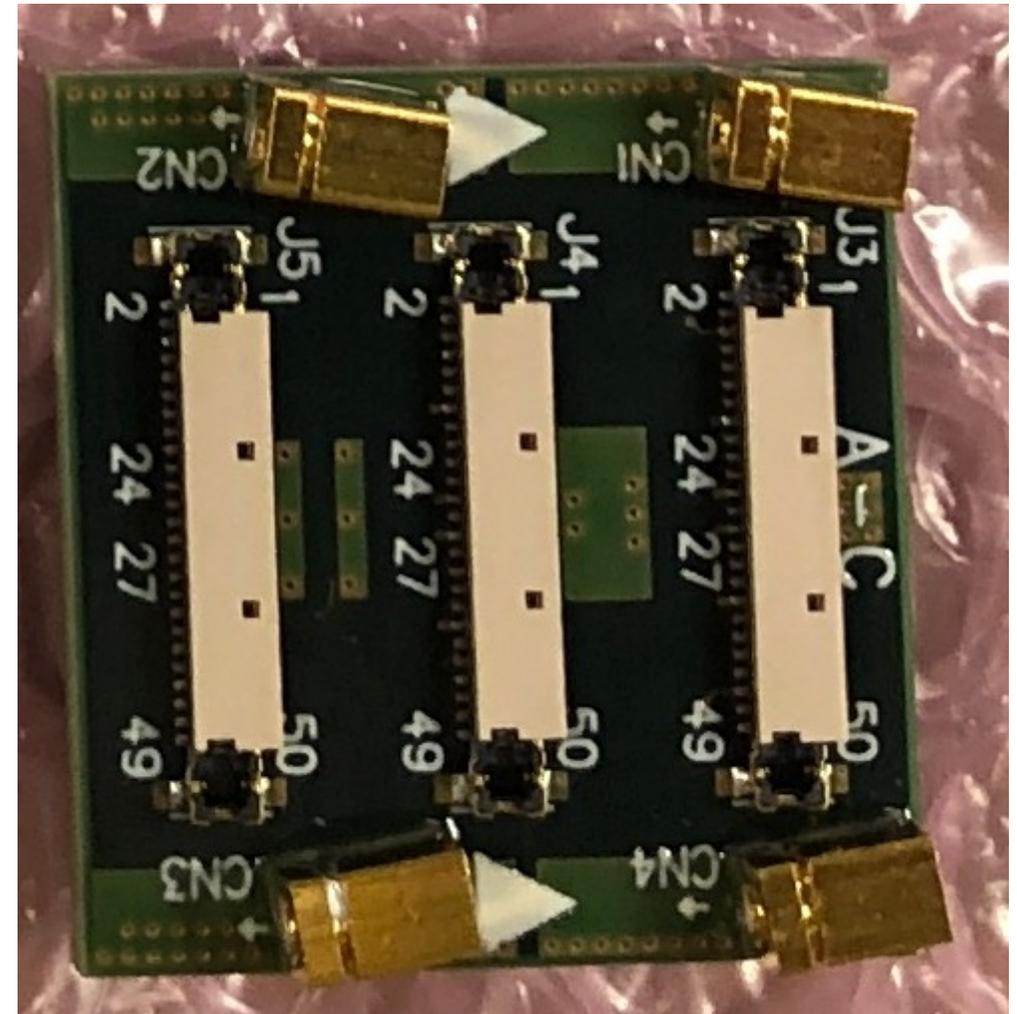
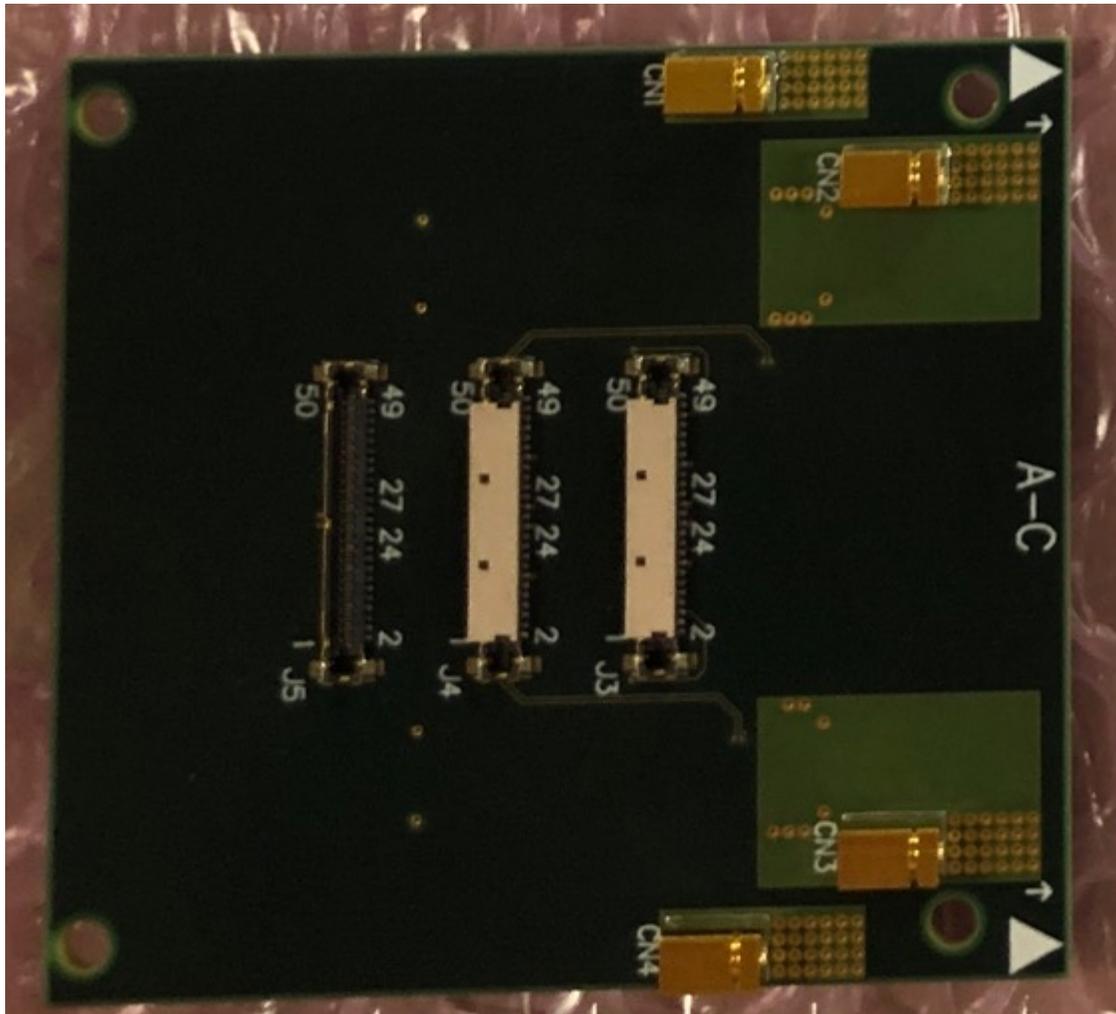
J1/J2 の印がパターンと重なって見にくいのでDF18コネクタ脇に配置してください。



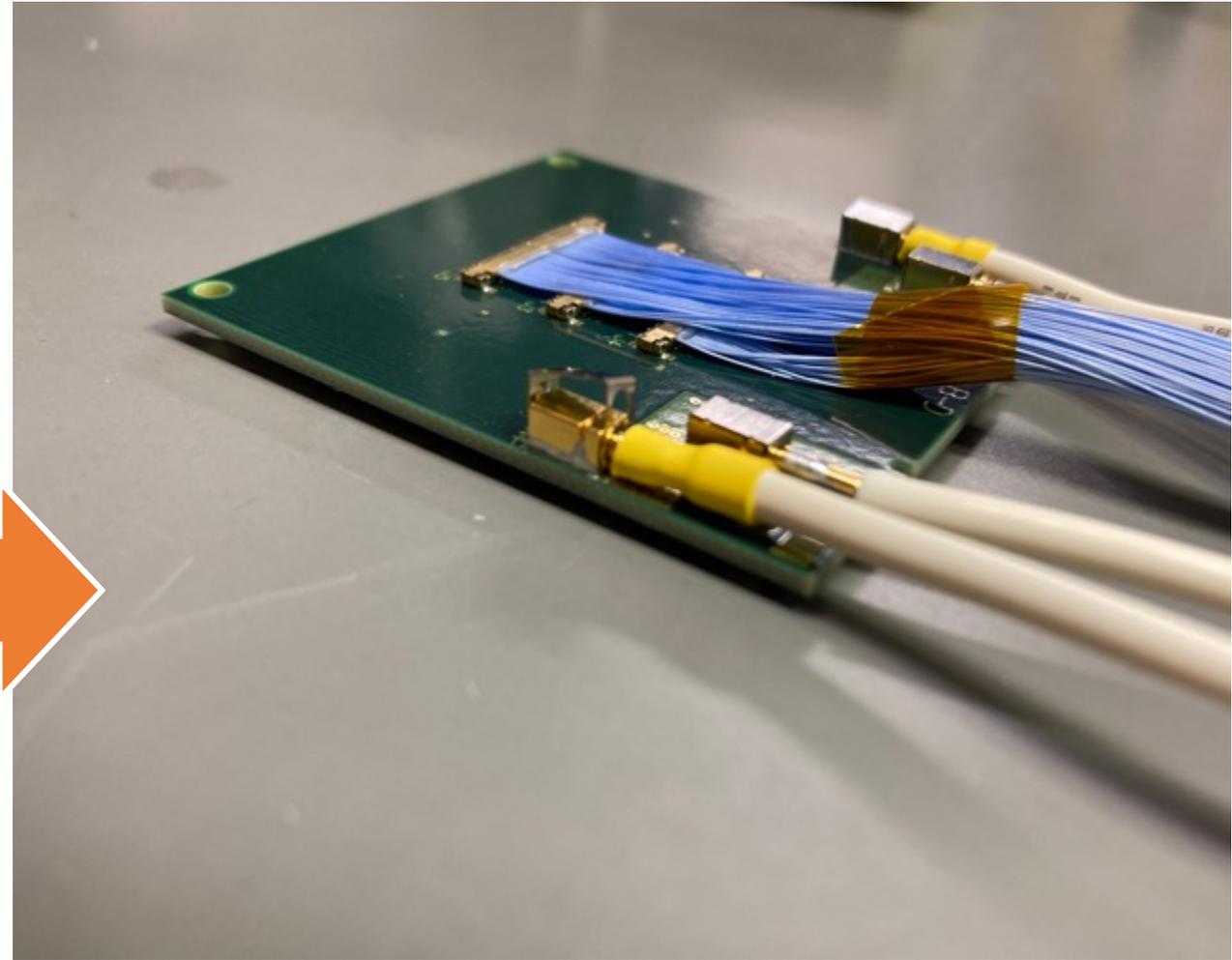
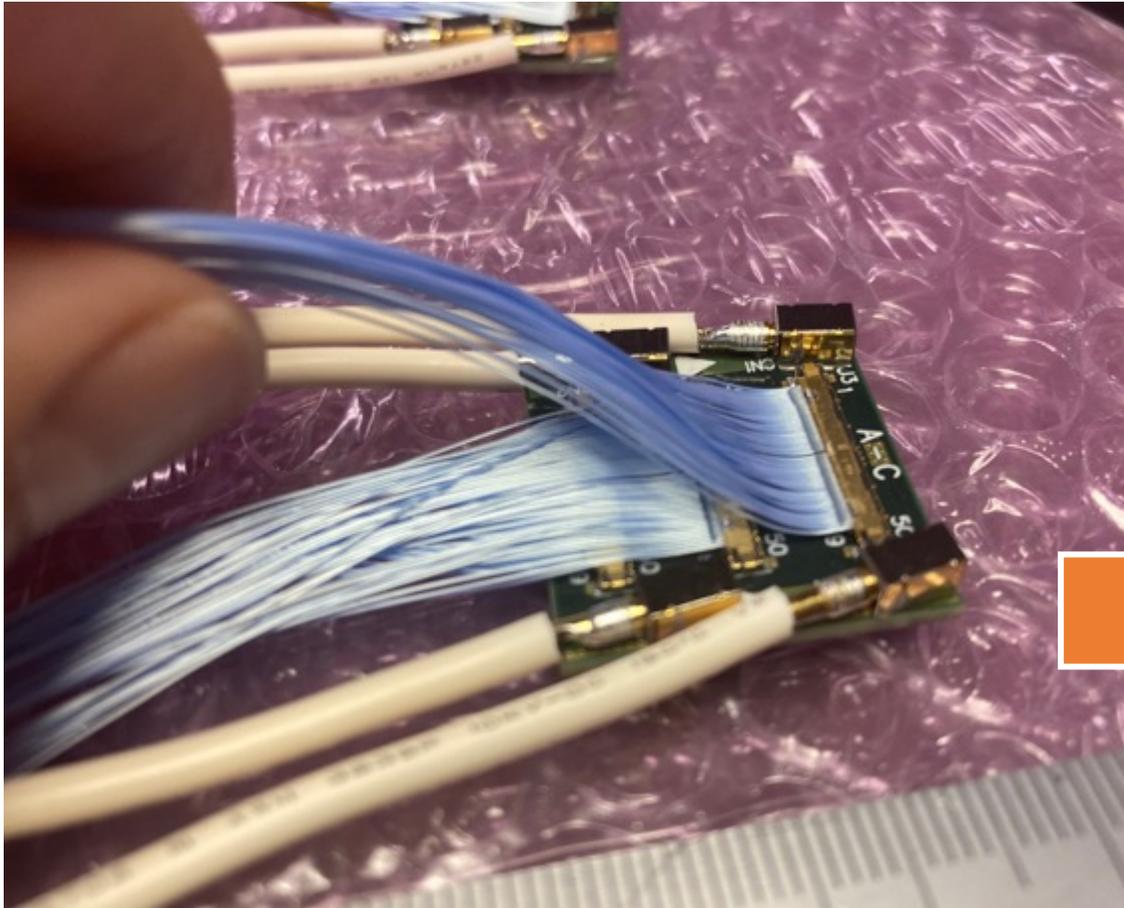
AC/BD の印がハーネスで隠れてしまうので、ボードの反対側に配置してください。

AGND/DGND/APWR/DPWR

CN1/CN2/CN3/CN4 marks are to be changed to be AGND/DGND/APWR/DPWR



Insulation of GND/Power Cables



The tip of GND/Power cables are to be insulated by heat shrink tubes.

Assembly and Serial Numbers



- Conversion cables are to be delivered in assembled style and tested conductivities of each channel.
- Harness and GND/Power cables are to be bundled by a tapes.
- Serial numbers are assigned odd for AC while even for BD types.
- Serial number stickers are white for AC and yellow for BD types.

Quantities

	Conversion Cable	Harness	GND/Power Cables
Type	15cm	25cm	25cm
AC	56 + 10 spares	3sets x 1port x 16ROCs	4 x 1port x 16ROCs
BD	56 + 10 spares	3sets x 1port x 16ROCs	4 x 1port x 16ROCs
Total	112 + 20 spares	96 sets	128 Cables
Product	Assembled	Spare Parts	

Concern towards Production

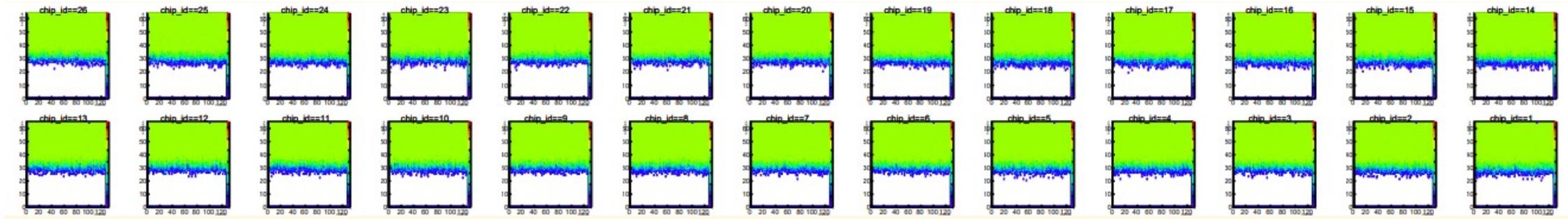
Partially dropped data observation in D3 port

Partially Dropped Data in Calibration

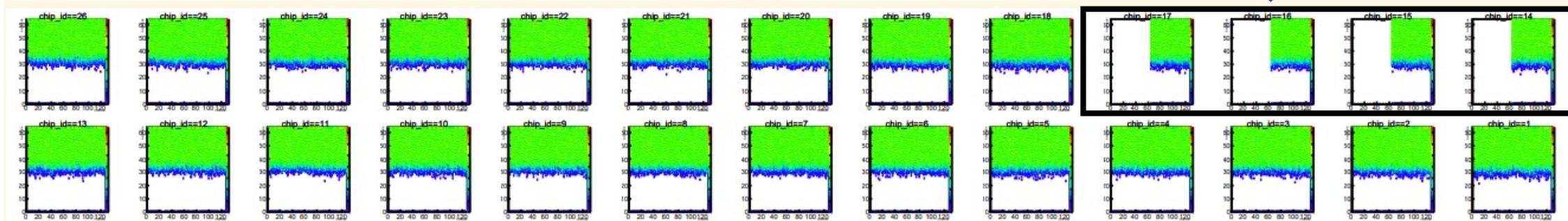


Perfect calibration in B-ports (B1, B2, B3)

Study by Hikaru Imai

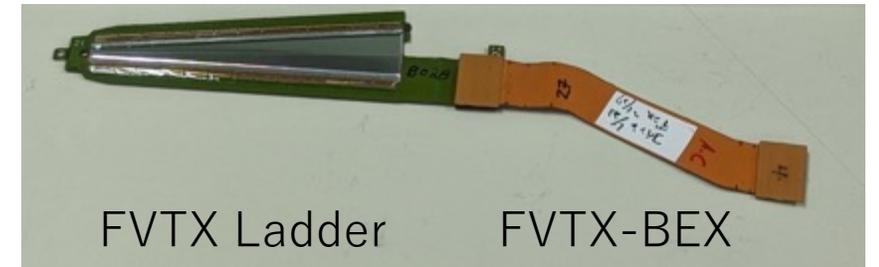
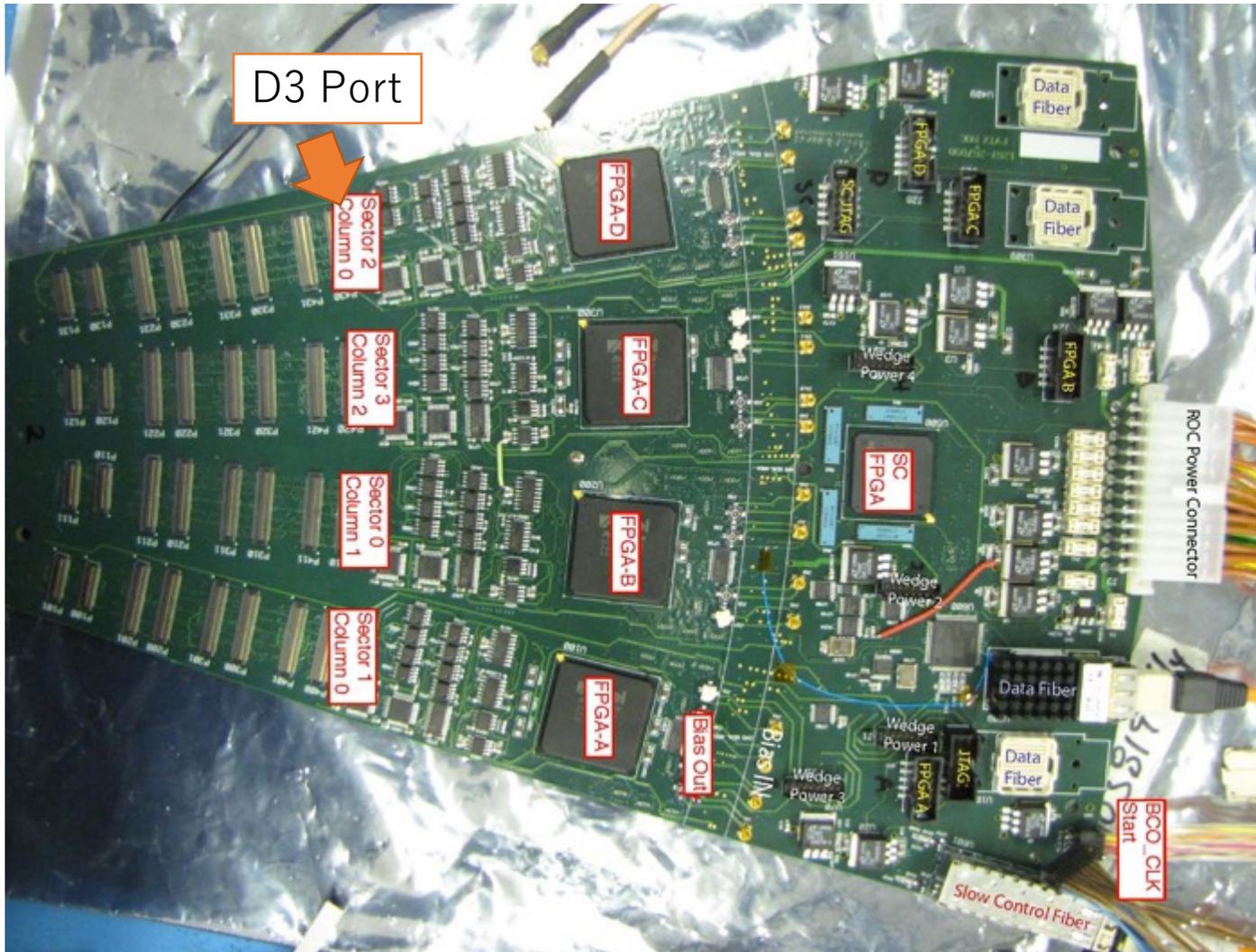


Occurs particularly in D-port of ROC.
Worst in D3 port.



Typically, missing data strip#0~64 of Chip 14 ~17

Boundary Conditions



- The partial data drop won't be observed in D-ports with FVTX ladder + FVTX BEX.
- More frequency fails with BEX+ μ -Coax compared to w/o BEX.
- Increasing LVDS current from 2mA (default) to 8mA doesn't help. (hard to explain the phenomena by signal degradation in the transmission line.)

Next Step

- Attempted to change conditions like LVDS current, w/ or w/o BEX, power cycles, cable reconnections, etc, but hard to identify the exact cause.
- There are still few more to be checked like power supplies to Column-D FPGA or slow control transmission. They are to be addressed.
- It is time to arrange the actual signal observation using a high-speed oscilloscope probing at the back of ROC
- The measurement is arranged on June 20th at RIKEN with a help from Takashi Kondo (TIRI)

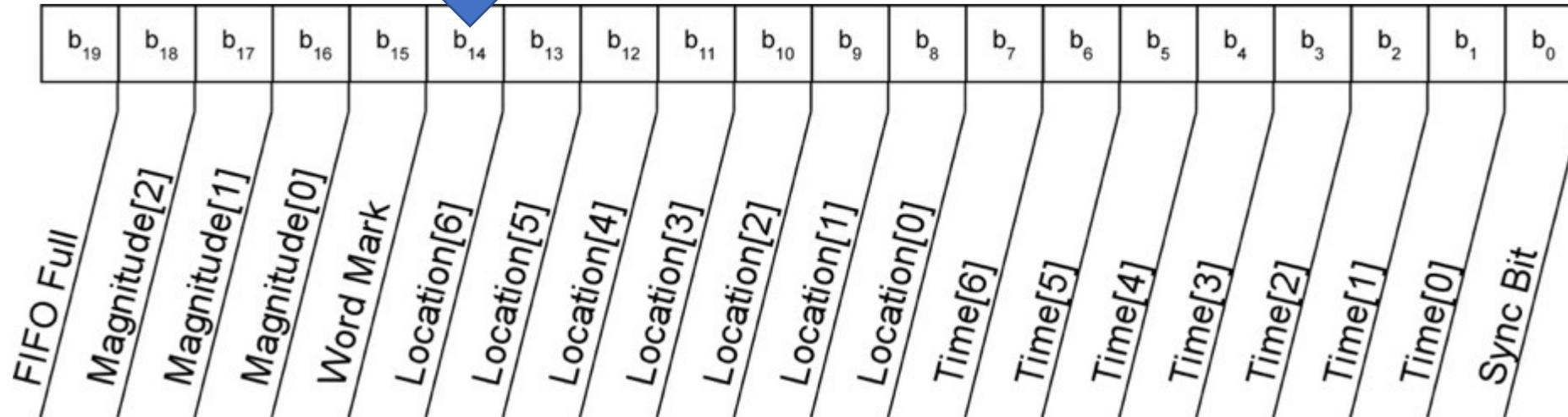
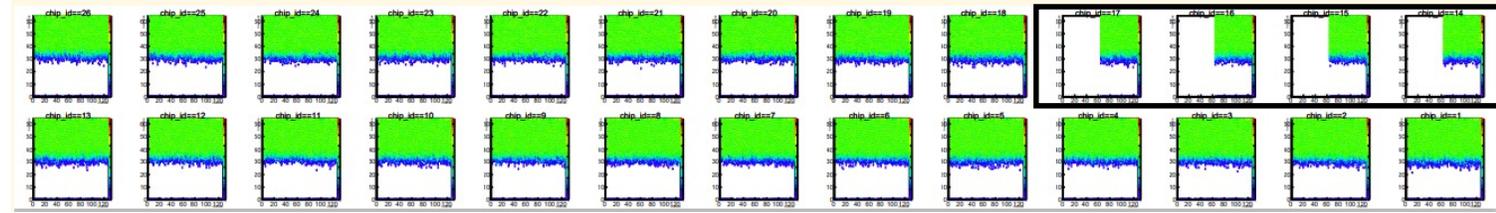
Half entry debugging @ RIKEN
(July 2021)



- Starts from 9AM in JST on June 20th
- Indico page
<https://indico2.riken.jp/event/4157/>
- Zoom:
<https://zoom.us/j/adlmUqtJ8b>

Strategy

1: Strip #64 ~ 127
0: Strip #0 ~ 63



Note that in time order, the Sync bit comes out first and the FIFO full bit comes out last.

- If we observe data pattern $b_{14} = \text{false}$, then the problem is in down stream, i.e. data is healthy. The problem is in the ROC.
- If we don't observe data pattern always $b_{14} = \text{true}$, then the problem is in upstream. Most likely the initialization failure of FPHX chip. Slow control transmission issue of μ -Coax?

How Severe?

- Hard to judge at this moment.
- If this issue requires significant change in the μ -coax conversion cable, then yes.
- However, it is not yet sure if it is the problem of the μ -coax. We did observe ***perfect data*** from D3 port the other day with μ -coax.
- We just cannot reproduce it on the next day.
- Since similar “partially dropped data” phenomena have been observed from time-to-time in every test benches. We would like to understand what’s going on in this opportunity (reproducible).