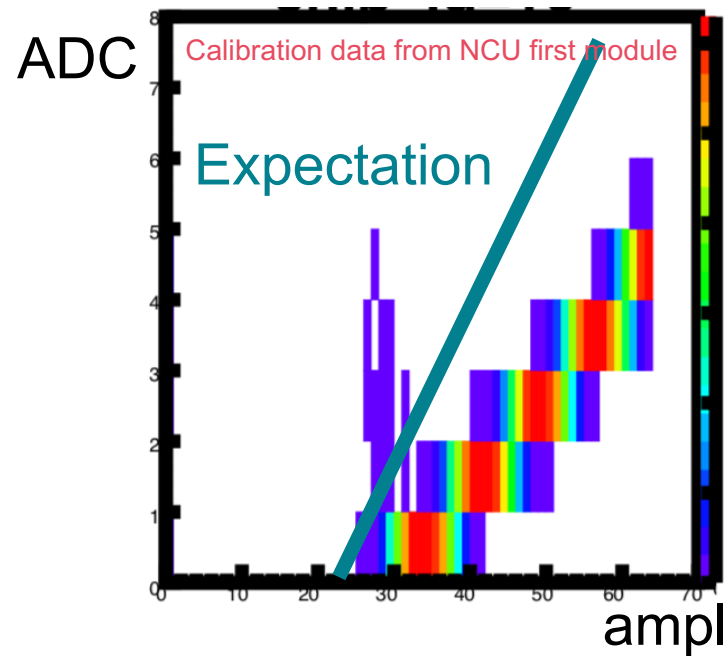


Calibration Pulse Amplitude Loss Measurement

RIKEN/RBRC
Itaru Nakagawa

Question Raised by Cheng-Wei



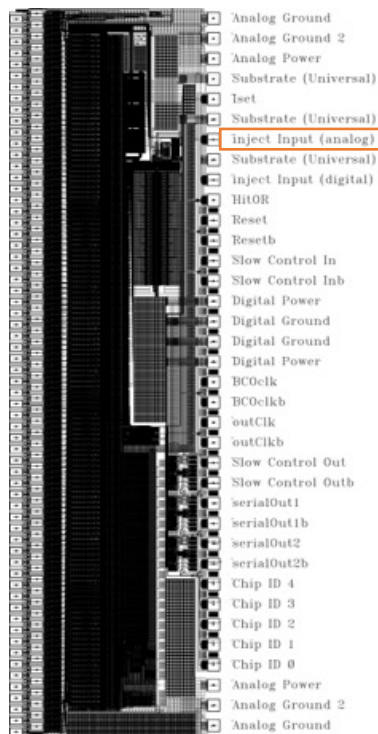
The threshold setting on GUI in NCU TestBench

DAC0	20	Read	Write	Set	Reset	Default
DAC1	25	Read	Write	Set	Reset	Default
DAC2	30	Read	Write	Set	Reset	Default
DAC3	35	Read	Write	Set	Reset	Default
DAC4	40	Read	Write	Set	Reset	Default
DAC5	45	Read	Write	Set	Reset	Default
DAC6	50	Read	Write	Set	Reset	Default
DAC7	55	Read	Write	Set	Reset	Default

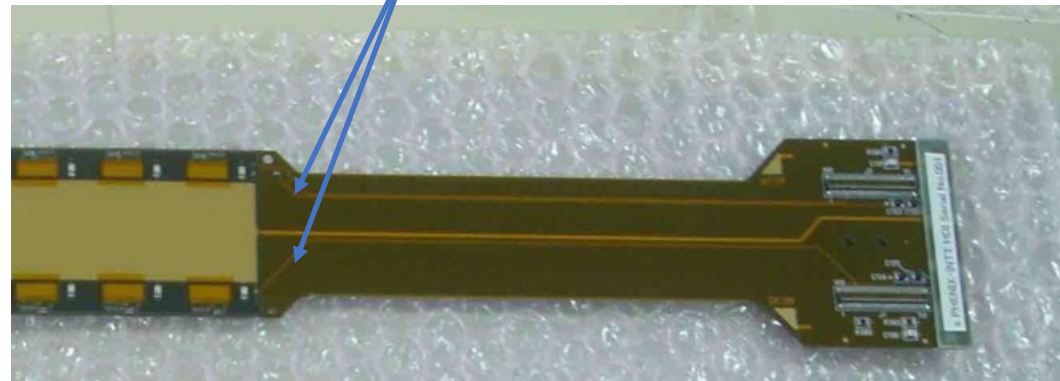
How much is the amplitude loss of the calibration pulse?

- At this moment, we don't have quantitative estimate of the amplitude loss in HDI+Conversion cable + ROC.
- I think this is not fatal, but it will be nice to know for our knowledge.
- We can actually measure it using a oscilloscope.
- Can this be done in NWU/NCU?

Calibration Input Line

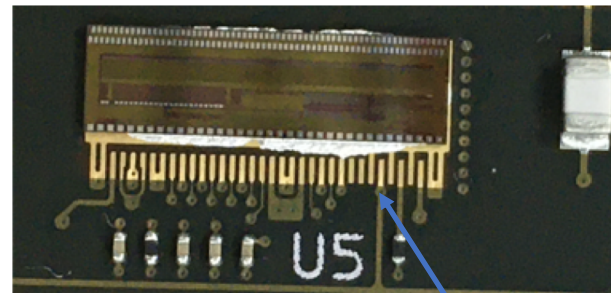
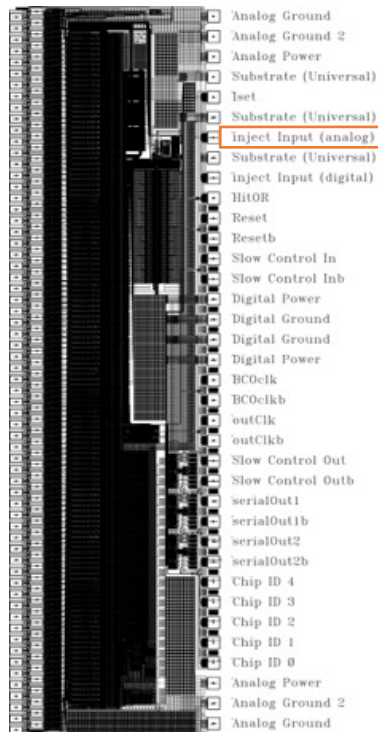


Layer-1



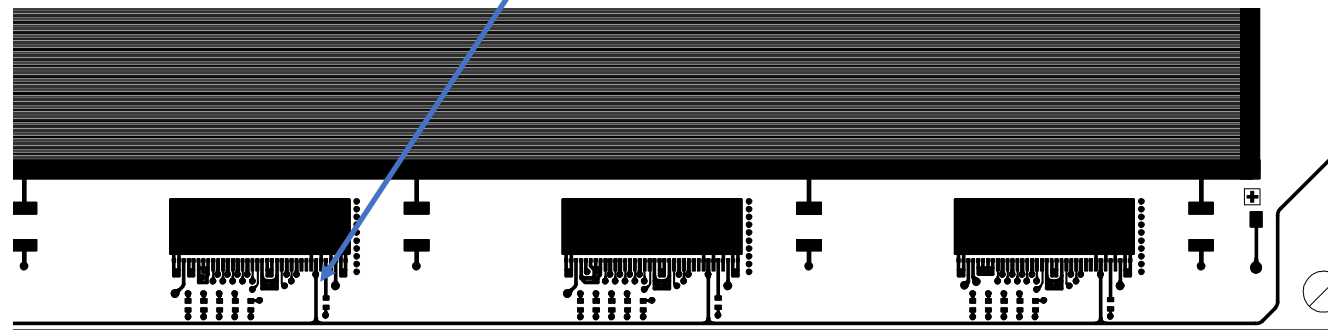
Line width $150\mu\text{m} > \text{LVDS data lines } 60\mu\text{m} @ \text{inner layers}$

Calibration Input Line



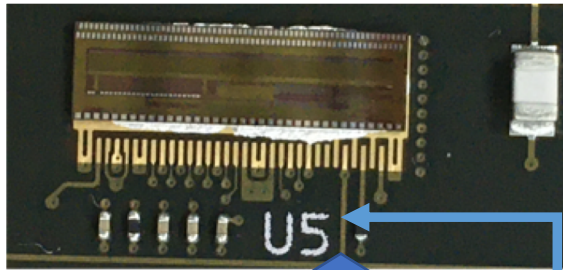
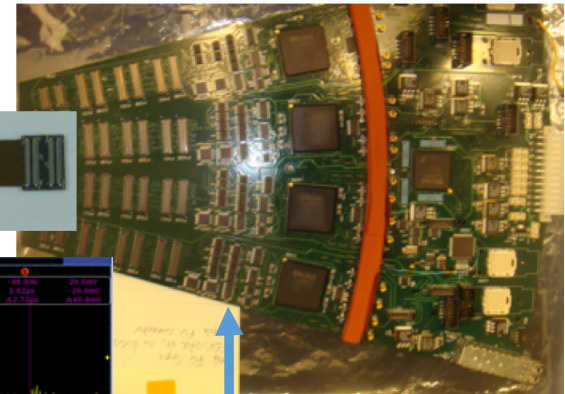
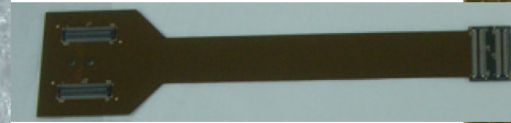
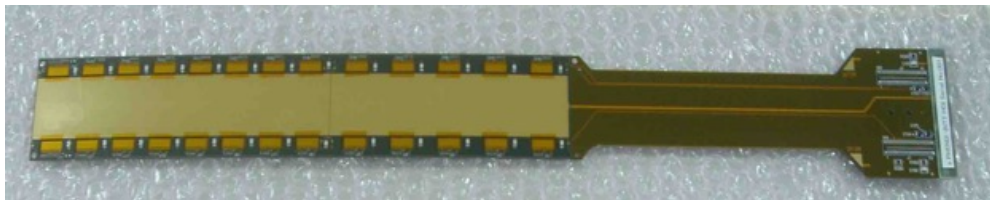
Calibration Input Line

Layer-1

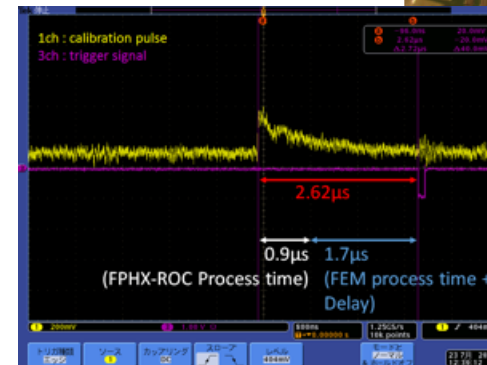


Proposed Measurement of the amplitude loss

Can monitor the amplitude loss by comparing the calibration pulse at ROC and FPHX chips.

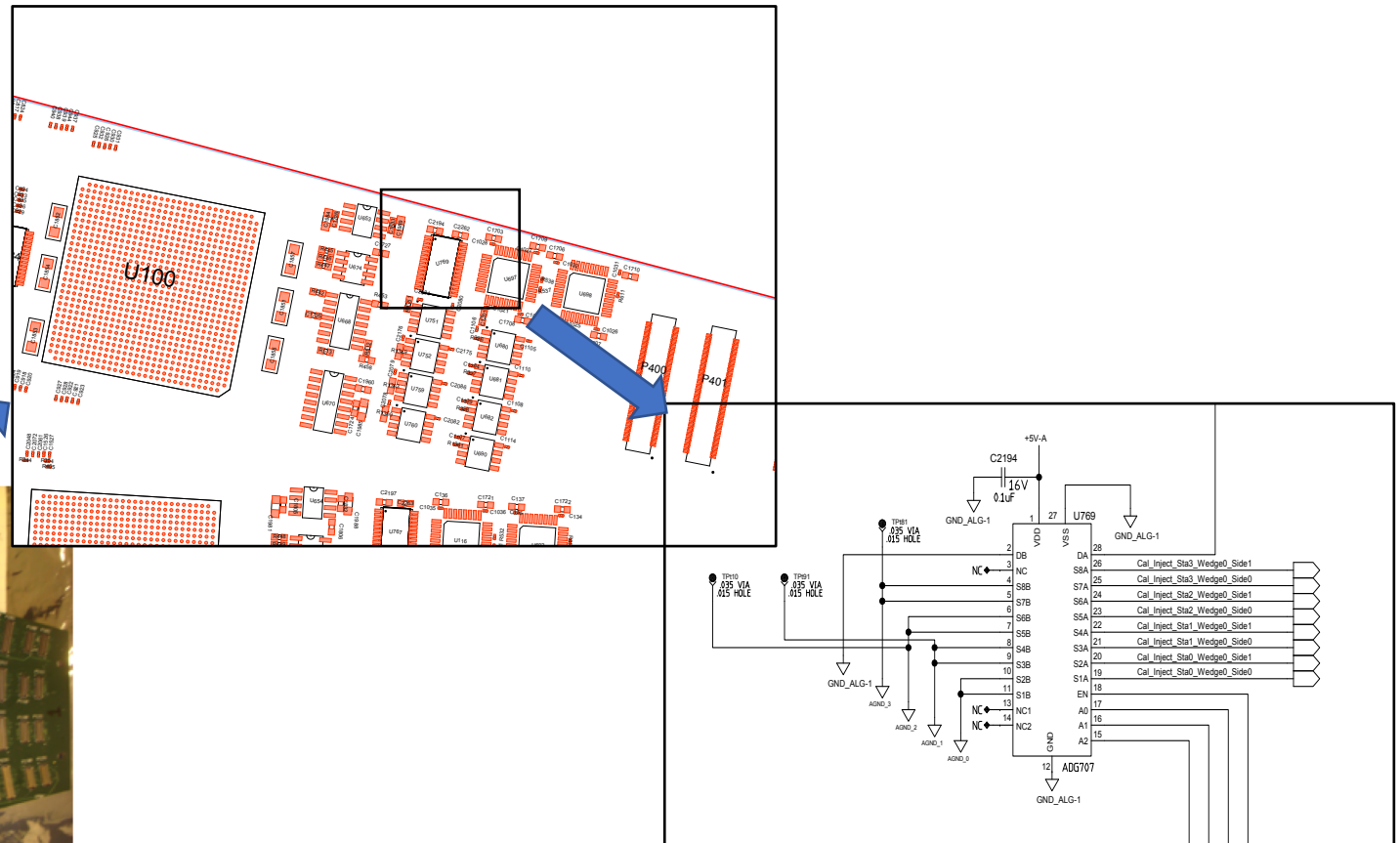


Line width $150\mu\text{m}$
(Need a fine probe here)



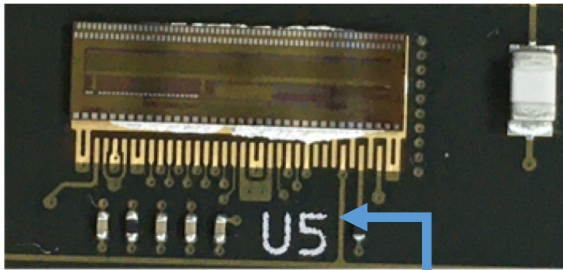
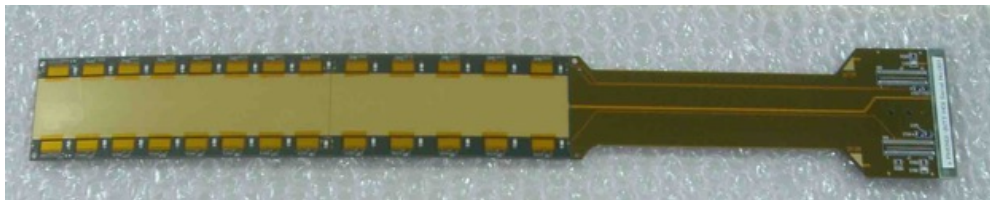
Pulse fanout

Oscilloscope



Backup

Measurement of the amplitude loss in HDI/Conv. Cable



Oscilloscope

Pulse Generator

Mimic Calibration pulse

Channel Mapping of the Conversion Cable

HDI Side								ROC Side							
HEADER (TOP)								RECEPTACLE (TOP)							
J1 (out side)				J2 (in side)				J1 (out side)				J2 (in side)			
#	name (net)	#	name (net)	#	name (net)	#	name (net)	#	name (net)	#	name (net)	#	name (net)	#	name (net)
1	DCOM	100	ACOM	1	ACOM	100	DCOM	1	AGND	100	DGND	1	AGND	100	DGND
2	OUT2_1	99	OUT1_1	2	OUT2_14	99	OUT1_14	2	DS1_CP01_OUT	99	DS1_CP01	2	SC_IN1P	99	RESET1P
3	OUT2_1N	98	OUT1_1N	3	OUT2_14N	98	OUT1_14N	3	DS1_CP01_OUT	98	DS1_CP01	3	SC_IN1N	98	RESET1N
4	OUT2_2	97	OUT1_2	4	OUT2_15	97	OUT1_15	4	DS1_CP02_OUT	97	DS1_CP02	4	DGND	97	BCO_CLK1P
5	OUT2_2N	96	OUT1_2N	5	OUT2_15N	96	OUT1_15N	5	DS1_CP02_OUT	96	DS1_CP02	5	DGND	96	BCO_CLK1N
6	OUT2_3	95	OUT1_3	6	OUT2_16	95	OUT1_16	6	DS1_CP03_OUT	95	DS1_CP03	6	OUT_CLK1P	95	SC_OUT1P
7	OUT2_3N	94	OUT1_3N	7	OUT2_16N	94	OUT1_16N	7	DS1_CP03_OUT	94	DS1_CP03	7	OUT_CLK1N	94	SC_OUT1N
8	OUT2_4	93	OUT1_4	8	OUT2_17	93	OUT1_17	8	DS1_CP04_OUT	93	DS1_CP04	8	DGND	93	DGND
9	OUT2_4N	92	OUT1_4N	9	OUT2_17N	92	OUT1_17N	9	DS1_CP04_OUT	92	DS1_CP04	9	DGND	92	DGND
10	DCOM	91	CAL_INJECT	10	CAL_INJECT	91	DCOM	10	CAL_INJECT	91	DGND	10	DS1_CP06_OUT	91	DS1_CP06_OUT0P
11	DCOM	90	ACOM	11	ACOM	90	DCOM	11	AGND	90	DGND	11	DS1_CP06_OUT	90	DS1_CP06_OUT0N
12	OUT2_5	89	OUT1_5	12	OUT2_18	89	OUT1_18	12	DS1_CP05_OUT	89	DS1_CP05	12	DS1_CP08_OUT	89	DS1_CP08_OUT0P
13	OUT2_5N	88	OUT1_5N	13	OUT2_18N	88	OUT1_18N	13	DS1_CP05_OUT	88	DS1_CP05	13	DS1_CP08_OUT	88	DS1_CP08_OUT0N
14	OUT2_7	87	OUT1_7	14	OUT2_20	87	OUT1_20	14	DS1_CP07_OUT	87	DS1_CP07	14	DS1_CP10_OUT	87	DS1_CP10_OUT0P
15	OUT2_7N	86	OUT1_7N	15	OUT2_20N	86	OUT1_20N	15	DS1_CP07_OUT	86	DS1_CP07	15	DS1_CP10_OUT	86	DS1_CP10_OUT0N
16	OUT2_9	85	OUT1_9	16	OUT2_22	85	OUT1_22	16	DS1_CP09_OUT	85	DS1_CP09	16	DS1_CP12_OUT	85	DS1_CP12_OUT0P
17	OUT2_9N	84	OUT1_9N	17	OUT2_22N	84	OUT1_22N	17	DS1_CP09_OUT	84	DS1_CP09	17	DS1_CP12_OUT	84	DS1_CP12_OUT0N
18	OUT2_11	83	OUT1_11	18	OUT2_24	83	OUT1_24	18	DS1_CP11_OUT	83	DS1_CP11	18	AGND	83	DGND
19	OUT2_11N	82	OUT1_11N	19	OUT2_24N	82	OUT1_24N	19	DS1_CP11_OUT	82	DS1_CP11	19	AGND	82	DGND
20	OUT2_13	81	OUT1_13	20	OUT2_26	81	OUT1_26	20	DS1_CP13_OUT	81	DS1_CP13	20	AGND	81	DGND
21	OUT2_13N	80	OUT1_13N	21	OUT2_26N	80	OUT1_26N	21	DS1_CP13_OUT	80	DS1_CP13	21	AGND	80	VDD(+2.5V)
22	DCOM	79	ACOM	22	ACOM	79	DCOM	22	AGND	79	DGND	22	AGND	79	VDD(+2.5V)
23	DCOM	78	ACOM	23	ACOM	78	DCOM	23	AGND	78	DGND	23	VAI(+2.5V)	78	VDD(+2.5V)
24	OUT2_6	77	OUT1_6	24	OUT2_19	77	OUT1_19	24	VAI(+2.5V)	77	VDD(+2.5V)	24	VAI(+2.5V)	77	VDD(+2.5V)
25	OUT2_6N	76	OUT1_6N	25	OUT2_19N	76	OUT1_19N	25	VAI(+2.5V)	76	VDD(+2.5V)	25	VAI(+2.5V)	76	VDD(+2.5V)
26	OUT2_8	75	OUT1_8	26	OUT2_21	75	OUT1_21	26	VAI(+2.5V)	75	VDD(+2.5V)	26	VAI(+2.5V)	75	VDD(+2.5V)
27	OUT2_8N	74	OUT1_8N	27	OUT2_21N	74	OUT1_21N	27	VAI(+2.5V)	74	VDD(+2.5V)	27	VAI(+2.5V)	74	VDD(+2.5V)
28	OUT2_10	73	OUT1_10	28	OUT2_23	73	OUT1_23	28	AGND	73	DGND	28	VAI(+2.5V)	73	VDD(+2.5V)
29	OUT2_10N	72	OUT1_10N	29	OUT2_23N	72	OUT1_23N	29	AGND	72	DGND	29	AGND	72	VDD(+2.5V)
30	OUT2_12	71	OUT1_12	30	OUT2_25	71	OUT1_25	30	DS0_CP13_OUT	71	DS0_CP13	30	AGND	71	VDD(+2.5V)
31	OUT2_12N	70	OUT1_12N	31	OUT2_25N	70	OUT1_25N	31	DS0_CP13_OUT	70	DS0_CP13	31	AGND	70	DGND
32	DCOM	69	ACOM	32	ACOM	69	DCOM	32	DS0_CP11_OUT	69	DS0_CP11	32	AGND	69	DGND
33	DCOM	68	ACOM	33	ACOM	68	DCOM	33	DS0_CP11_OUT	68	DS0_CP11	33	AGND	68	DGND
34	SC_OUT1N	67	OUT_CLK1N	34	OUT_CLK2N	67	SC_OUT2N	34	DS0_CP09_OUT	67	DS0_CP09	34	DS0_CP12_OUT	67	DS0_CP12_OUTIN
35	SC_OUT1	66	OUT_CLK1	35	OUT_CLK2	66	SC_OUT2	35	DS0_CP09_OUT	66	DS0_CP09	35	DS0_CP12_OUT	66	DS0_CP12_OUTIP
36	DCOM	65	BCO_CLK1N	36	BCO_CLK2N	65	DCOM	36	DS0_CP07_OUT	65	DS0_CP07	36	DS0_CP10_OUT	65	DS0_CP10_OUTIN
37	DCOM	64	BCO_CLK1	37	BCO_CLK2	64	DCOM	37	DS0_CP07_OUT	64	DS0_CP07	37	DS0_CP10_OUT	64	DS0_CP10_OUTIP
38	DCOM	63	SC_IN1N	38	SC_IN2N	63	DCOM	38	DS0_CP05_OUT	63	DS0_CP05	38	DS0_CP08_OUT	63	DS0_CP08_OUTIN
39	DCOM	62	SC_IN1	39	SC_IN2	62	DCOM	39	DS0_CP05_OUT	62	DS0_CP05	39	DS0_CP08_OUT	62	DS0_CP08_OUTIP
40	DCOM	61	RESET1N	40	RESET2N	61	DCOM	40	AGND	61	DGND	40	DS0_CP06_OUT	61	DS0_CP06_OUTIN
41	DCOM	60	RESET1	41	RESET2	60	DCOM	41	CAL_INJECT0	60	DGND	41	DS0_CP06_OUT	60	DS0_CP06_OUTIP
42	DCOM	59	ACOM	42	ACOM	59	DCOM	42	DS0_CP04_OUT	59	DS0_CP04	42	DGND	59	DGND
43	DCOM	58	ACOM	43	ACOM	58	DCOM	43	DS0_CP04_OUT	58	DS0_CP04	43	DGND	58	DGND
44	+2.5V-A	57	ACOM	44	+2.5V-D	57	+2.5V-D	44	DS0_CP03_OUT	57	DS0_CP03	44	OUT_CLK0N	57	SC_OUT0P
45	+2.5V-A	56	ACOM	45	+2.5V-D	56	+2.5V-D	45	DS0_CP03_OUT	56	DS0_CP03	45	OUT_CLK0P	56	SC_OUT0N
46	+2.5V-A	55	+2.5V-A	46	+2.5V-D	55	+2.5V-D	46	DS0_CP02_OUT	55	DS0_CP02	46	DGND	55	RESET0P
47	+2.5V-A	54	+2.5V-A	47	+2.5V-D	54	+2.5V-D	47	DS0_CP02_OUT	54	DS0_CP02	47	DGND	54	RESET0N
48	+2.5V-A	53	+2.5V-A	48	+2.5V-D	53	+2.5V-D	48	DS0_CP01_OUT	53	DS0_CP01	48	SC_IN0P	53	BCO_CLK0P
49	+2.5V-A	52	+2.5V-A	49	+2.5V-D	52	+2.5V-D	49	DS0_CP01_OUT	52	DS0_CP01	49	SC_IN0N	52	BCO_CLK0N
50	+2.5V-A	51	+2.5V-A	50	+2.5V-D	51	+2.5V-D	50	AGND	51	DGND	50	AGND	51	DGND

Calibration Pulse Injection Channel

2020/7/1

https://wiki.bnl.gov/sPHENIX/index.php/Conversion_Cable

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