TSF/2D/onsite work
2023/6/2
T.Koga

Motivation

-On-site work status

-TSF firmware update

-2D firmware update

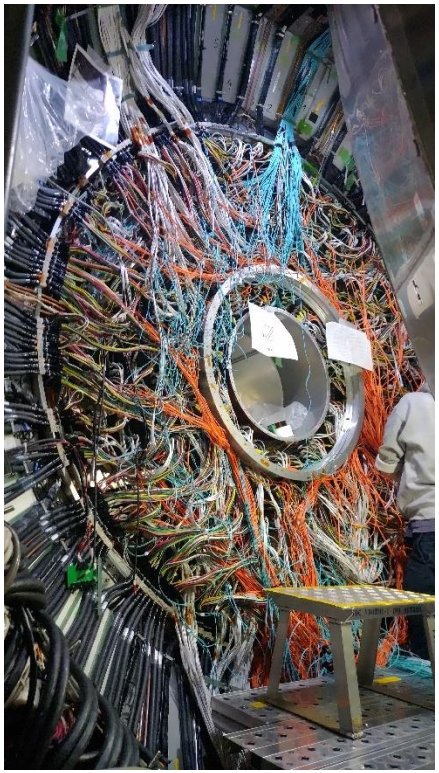
-Remained task to implement ADC

CDCTRG onsite work status

-March: replace old sellotape label on cable

-May: all cables are re-attached

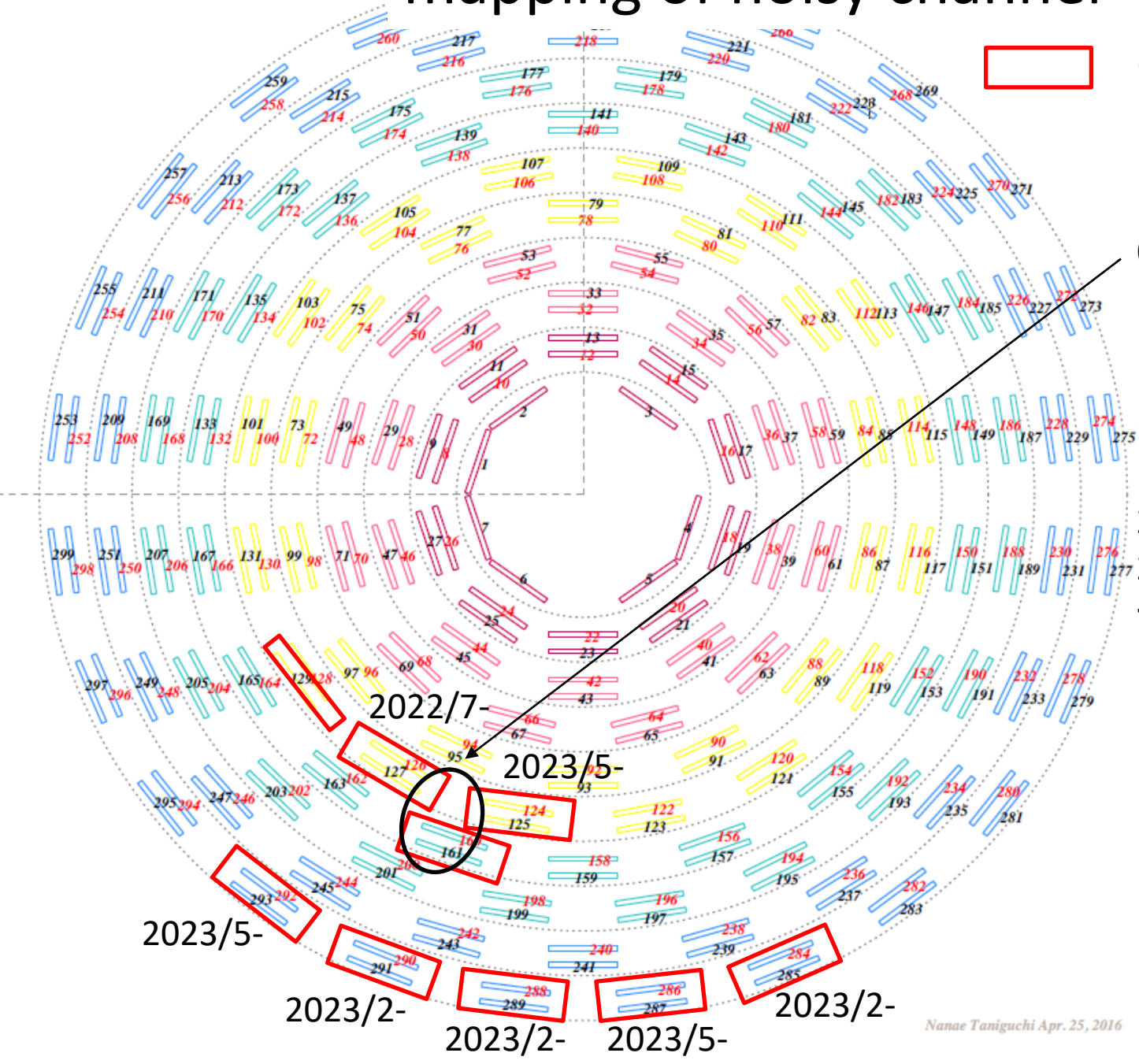
- -all CDCFEs are linked up, except for CDCFE240 (B2L,TRG link unstable)
- -channel mapping is checked by mgrmon
- -some channels are noisy: no big issue for physics run but investigating



-June: plan to put aluminum cover

-Many thanks to on-site workers !
Erfei, Liu, Sudo-san, Yun-Tsung, Nakazawa-san

mapping of noisy channel



一部チャンネルの
ヒットレートが高い

124-127, 160-161:
6つのFEの境界部分

129:
129の全チャンネル
均一にレート高い

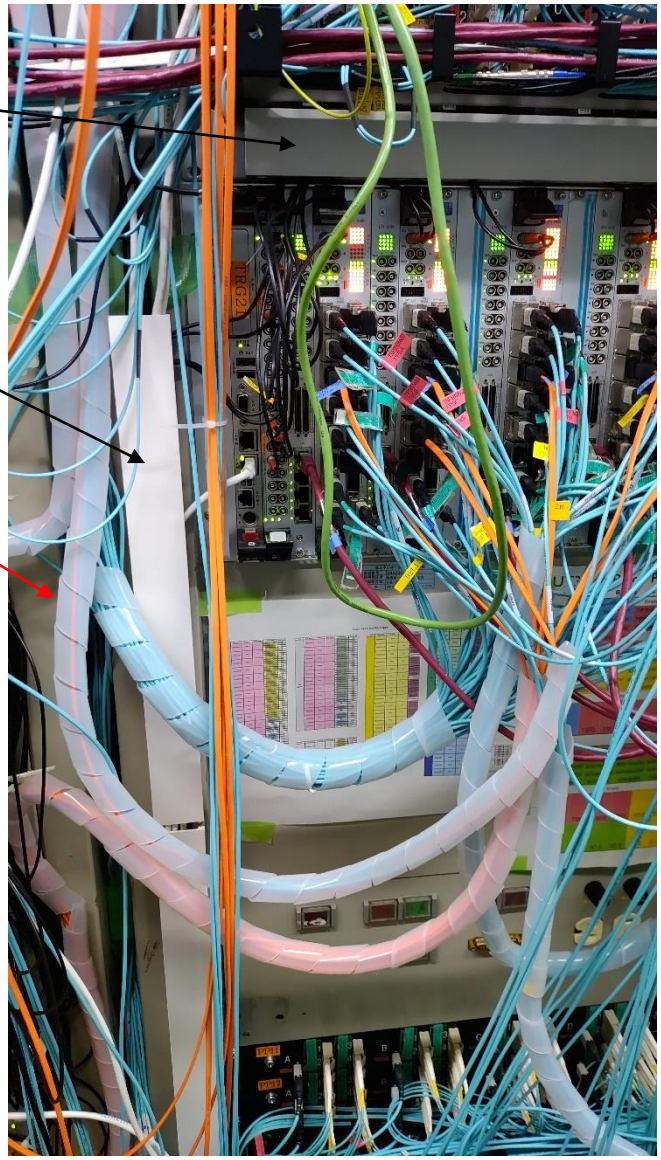
284-293:
284-293の全チャンネル
チャンネルごとにムラ

Nanae Taniguchi Apr. 25, 2016

Ehut cabling arrangement

-I am gradually trying to arrange CDCTRG cabling at Ehut..

- -add cable tray
- -bundle cable
- -change cable length

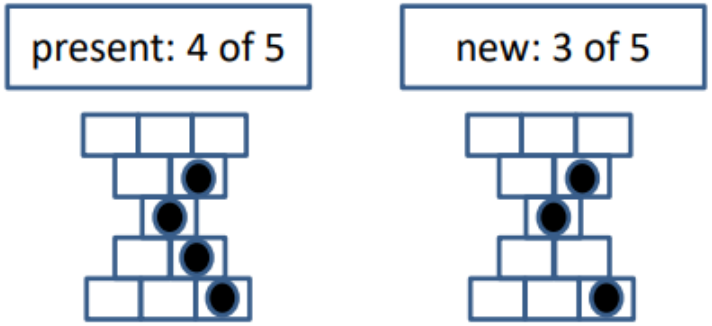


Update of TSF firmware

-TSF->2D Transceiver speed is updated from 12Gbps to 25Gbps
- -stable link more than a few days
- ->latency will be checked with cosmic

-B2L is implemented to TSF0-6
- -no spare port in TSF7-8
- -local run succeeded
- ->DQM will be checked with cosmic

-TSF with 3/5 layers is ready
- -tentative LUT prepared by Felix
- -compile succeeded
- ->will be checked with cosmic

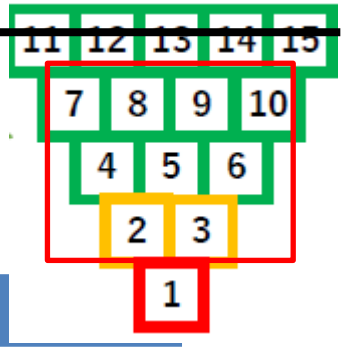


-Plan to make a new firmware with increased persistence
- -timing window is not changed (512ns)
- -add persistent deadtime (~800ns) after TSF is found to avoid fake TS

New bitmap TSF0->2D with 25Gbps

-SL0

-Example to send all wires TDC with 32ns timing resolution



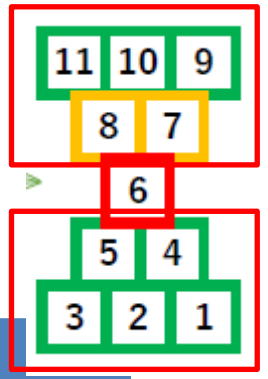
bit number	
1536-1315	spare
1314-1265	TSF0 hit pattern TDC (cc of each wire, 5bit × 10wire=50bit, 32ns)
…	…
614-565	TSF14 hit pattern TDC (cc of each wire, 5bit × 10wire=50bit, 32ns)
564-550	TSF0 hit pattern (existence of wire hit, 1bit × 15wire = 15bit)
…	…
354-340	TSF14 hit pattern (existence of wire hit, 1bit × 15wire = 15bit)
339-331	cc
330-310	TSF0 (TSID(8), priority timing(9), LRflag(2), priority flag(2))
..	…
36-16	TSF14 (TSID(8), priority timing(9), LRflag(2), priority flag(2))
15-0	Spare, cc

new tdc 32ns

New bitmap TSF2-8 ->2D with 25Gbps

-SL2,4,6,8

-Example to send all wires TDC with 32ns timing resolution



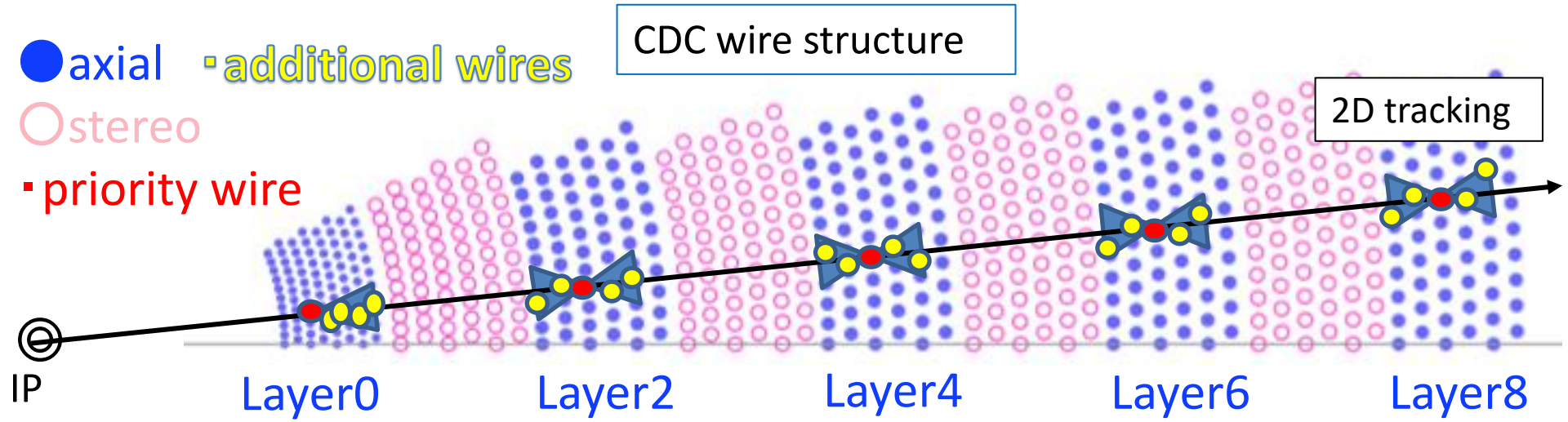
bit number	
1536-1110	spare
1109-1065	TSF14 hit pattern TDC (cc of each wire, 5bit × 11wire=55bit, 32ns)
…	…
559-505	TSF14 hit pattern TDC (cc of each wire, 5bit × 11wire=55bit, 32ns)
504-404	TSF0 hit pattern (existence of wire hit, 1bit × 11wire = 11bit)
…	…
350-340	TSF14 hit pattern (existence of wire hit, 1bit × 11wire = 11bit)
339-331	cc
330-310	TSF0 (TSID(8), priority timing(9), LRflag(2), priority flag(2))
..	…
36-16	TSF14 (TSID(8), priority timing(9), LRflag(2), priority flag(2))
15-0	Spare, cc

new tdc 32ns

Update of 2D firmware

-TSF->2D Transceiver speed is updated from 12Gbps to 25Gbps

-Core logic has been updated to use full hit



-Commissioning has been done with cosmic

-Plan to use this from the beginning of physics run

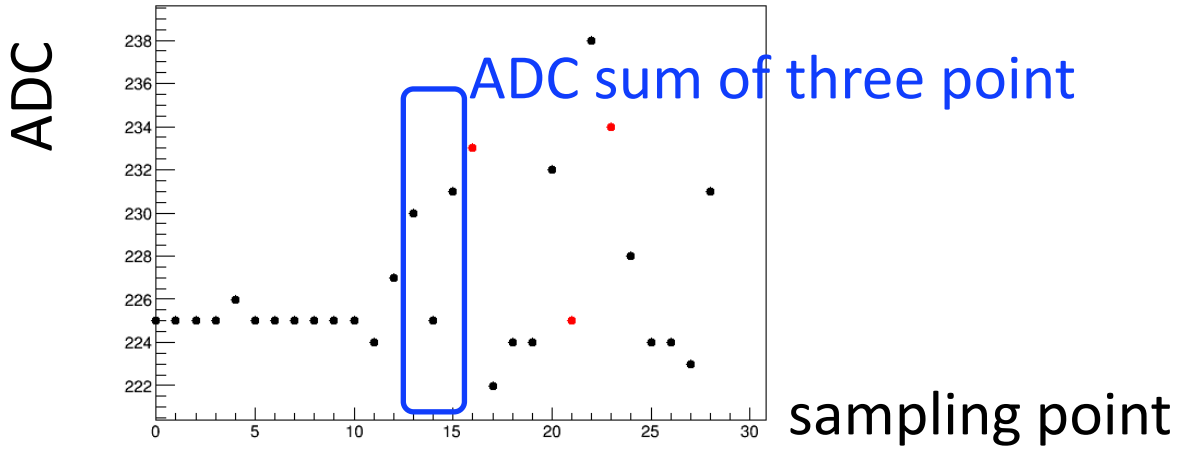
- -with threshold of #hit>16
- -threshold scan will be performed after reaching some luminosity

Implementation of ADC

-It is planned to modify CDCFE (and MGR/TSF) to send ADC

-We can add ADC information with 1 bit with 4 of 5 layers

- -ADC sum of 3 sampling points is calculated in every clock
- -a flag, if summed ADC>10 or not, is send to TSF in every clock



-Firmware modification has been delayed..

- -bitmap design at last B2GM
- -need firmware implementation and test in this month

Schedule

-June:
- -cosmic test for TSF,2D
- -firmware implementation of CDCFE to send ADC
- -Installation of UT4 3D/NN and test (with Sudo-san)

-July, August:
- -test new CDCFE firmware with new MGR, TSF
- -firmware implementation of new 3D/NN, for a few month (with Sudo-san, Liu)

-September, October:
- -SLC and software modification
- -Remained tasks
- -Commissioning of new NN/3D (with Sudo-san, Liu)

Summary

-On-site work status
  -all channels are connected, need to solve CDCFE240 issue (and noise)

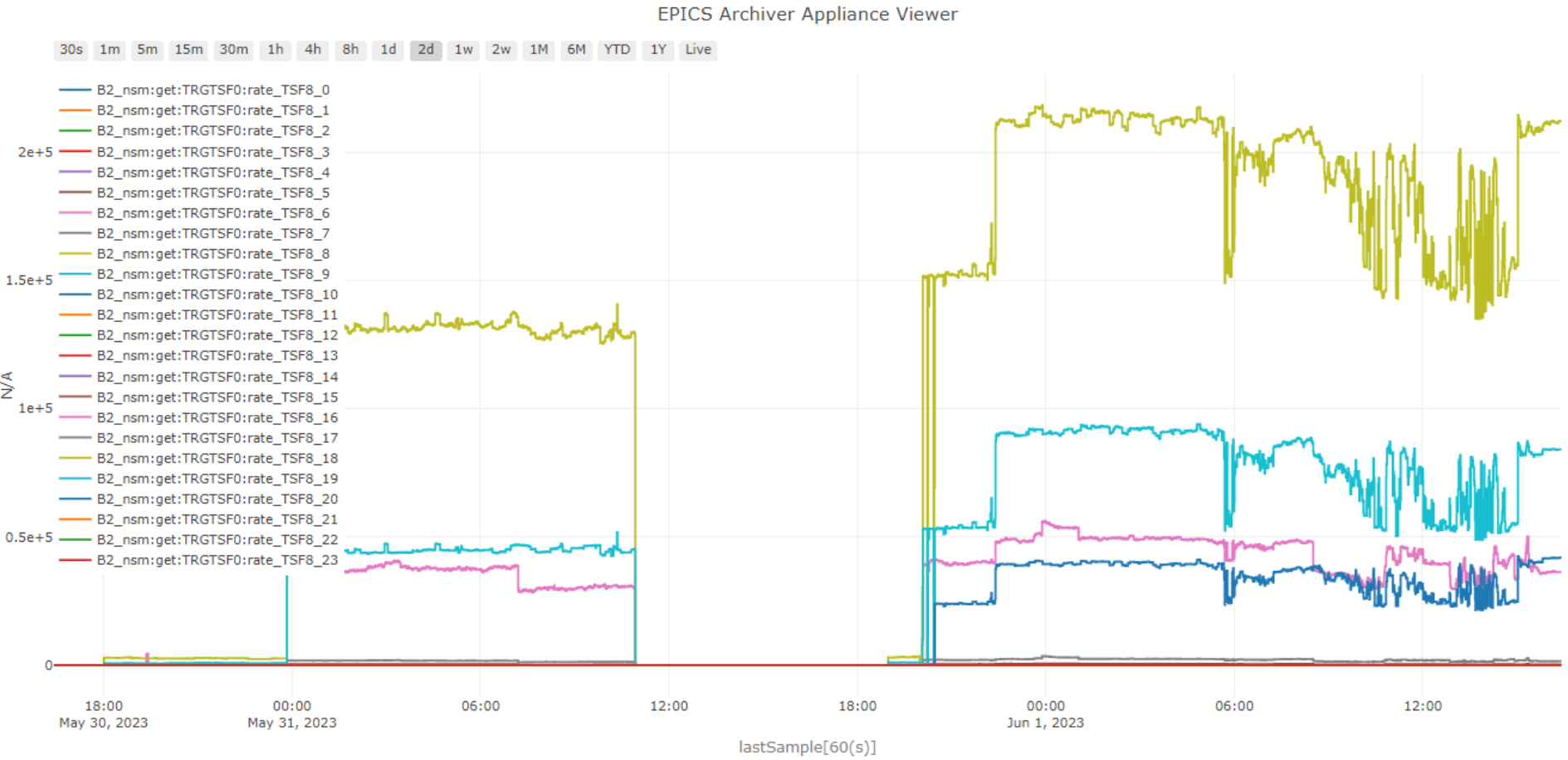
-TSF firmware update
  -25Gbps, B2L, 3/5 layer, extend persistent time
  ->cosmic test

-2D firmware update
  -25Gbps, full hit

-Remained task to implement ADC

backup

PV


EPICS Archiver Appliance Viewer
30s 1m 5m 15m 30m 1h 4h 8h 1d 2d 1w 2w 1M 6M YTD 1Y Live
B2_nsm:get:TRGTSF0:rate_TSF8_0
B2_nsm:get:TRGTSF0:rate_TSF8_1
B2_nsm:get:TRGTSF0:rate_TSF8_2
B2_nsm:get:TRGTSF0:rate_TSF8_3
B2_nsm:get:TRGTSF0:rate_TSF8_4
B2_nsm:get:TRGTSF0:rate_TSF8_5
B2_nsm:get:TRGTSF0:rate_TSF8_6
B2_nsm:get:TRGTSF0:rate_TSF8_7
B2_nsm:get:TRGTSF0:rate_TSF8_8
B2_nsm:get:TRGTSF0:rate_TSF8_9
B2_nsm:get:TRGTSF0:rate_TSF8_10
B2_nsm:get:TRGTSF0:rate_TSF8_11
B2_nsm:get:TRGTSF0:rate_TSF8_12
B2_nsm:get:TRGTSF0:rate_TSF8_13
B2_nsm:get:TRGTSF0:rate_TSF8_14
B2_nsm:get:TRGTSF0:rate_TSF8_15
B2_nsm:get:TRGTSF0:rate_TSF8_16
B2_nsm:get:TRGTSF0:rate_TSF8_17
B2_nsm:get:TRGTSF0:rate_TSF8_18
B2_nsm:get:TRGTSF0:rate_TSF8_19
B2_nsm:get:TRGTSF0:rate_TSF8_20
B2_nsm:get:TRGTSF0:rate_TSF8_21
B2_nsm:get:TRGTSF0:rate_TSF8_22
B2_nsm:get:TRGTSF0:rate_TSF8_23
2e+5
1.5e+5
1e+5
0.5e+5
0
N/A
18:00
May 30, 2023
00:00
May 31, 2023
06:00
12:00
18:00
00:00
Jun 1, 2023
06:00
12:00
lastSample[60(s)]

25Gbps operation

-Protocol of TSF->2D is updated with 25Gbps

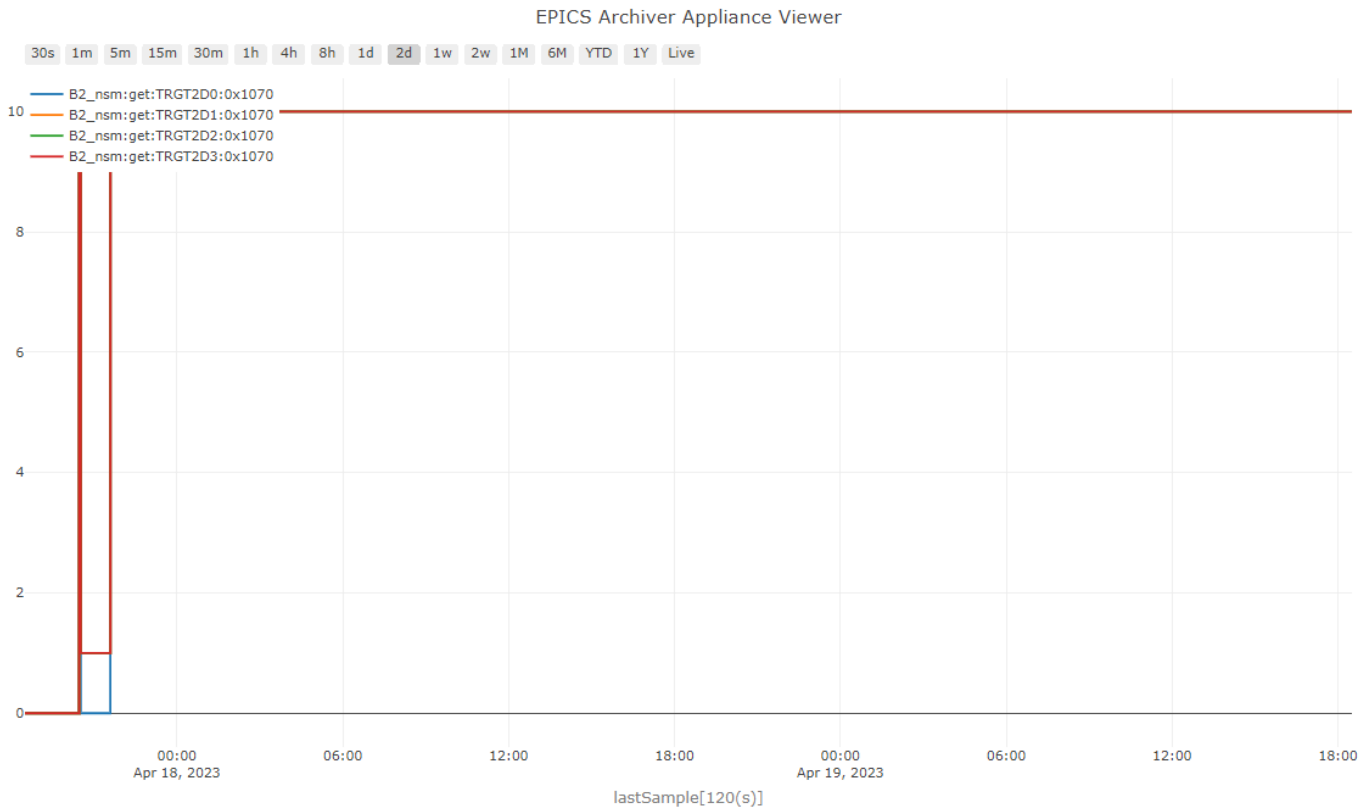
-all axial TSF (5 UT4 modules) and all 2D (4 UT4 modules)

-#bit/32MHz/2lanes increased from 768 to 1536

-Optical link and cc are stable for a few days

-Latency will be checked later, when cosmic can be taken with CDC

link on



link off

time

present bitmap

-SL0

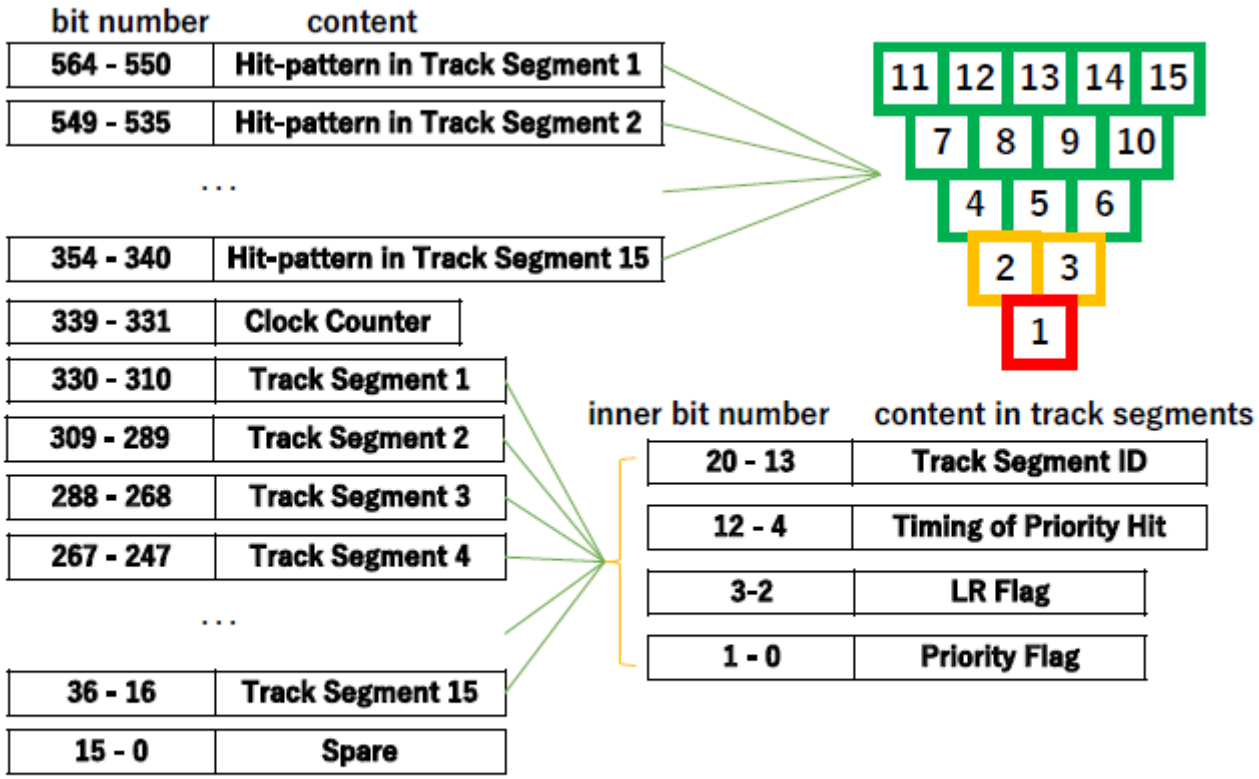


Figure 6.1: Bitmap from the TSF0 module to the 2D tracker module.

https://wiki.kek.jp/pages/viewpage.action?pageId=133075316

present bitmap

-SL2,4,6,8

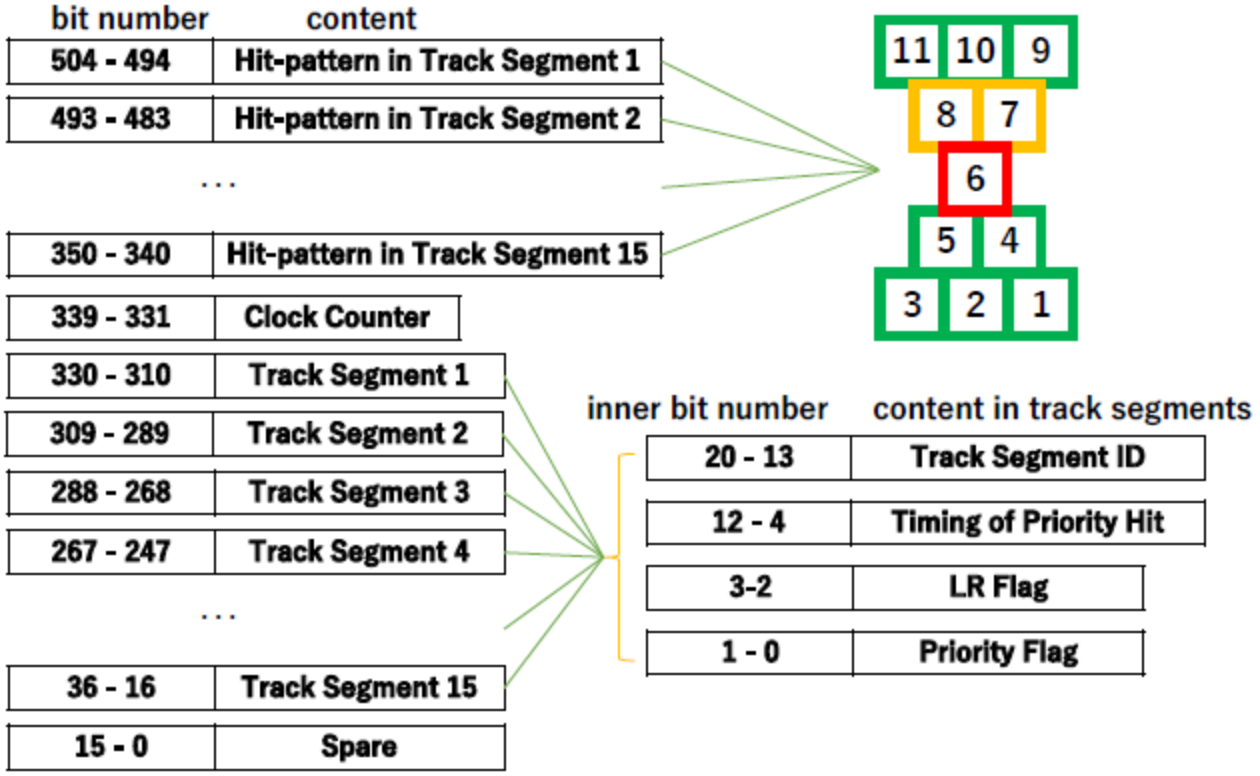


Figure 6.2: Bitmap from the TSF2, TSF4, TSF6 and TSF8 modules to the 2D tracker module.

https://wiki.kek.jp/pages/viewpage.action?pageId=133075316