Post Timing Issue Fixed Run Plan

RIKEN/RBRC

Itaru Nakagawa

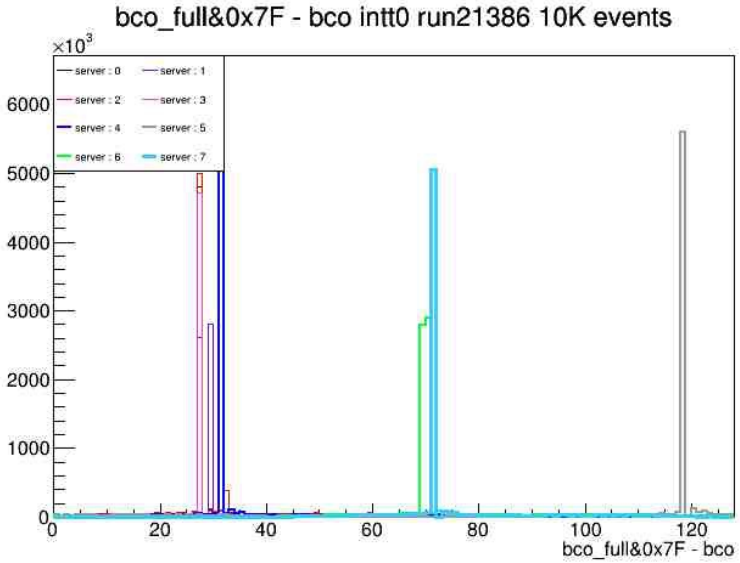
Pedestal run without beam (7/19 day)

- Pedestal Run
  - Remove all masks (no masks except for no-bias).
  - DAC0=15
  - Run pedestal with the clock trigger ~ 1kHz
  - It the felix hangs, then retry with DAC0=25 without masks.
- Once the pedestal run is successful, then create moderate and tighter versions of mask files.

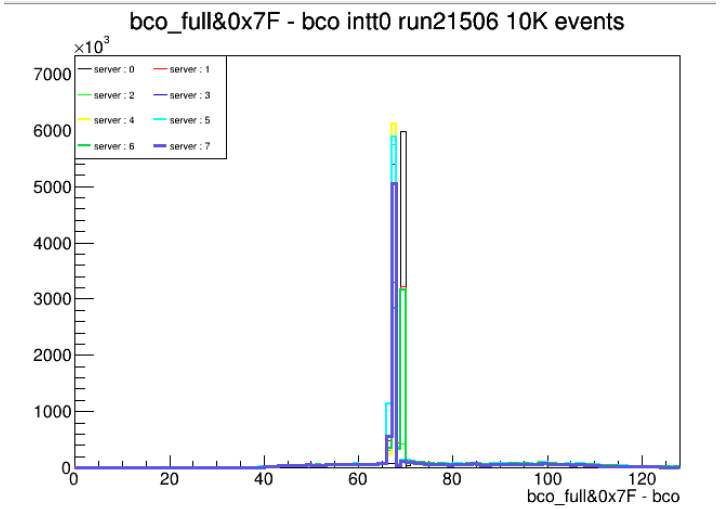
Commissioning with Beam

Interfelix Timing Issue Resolved

Run # 21386 (global)



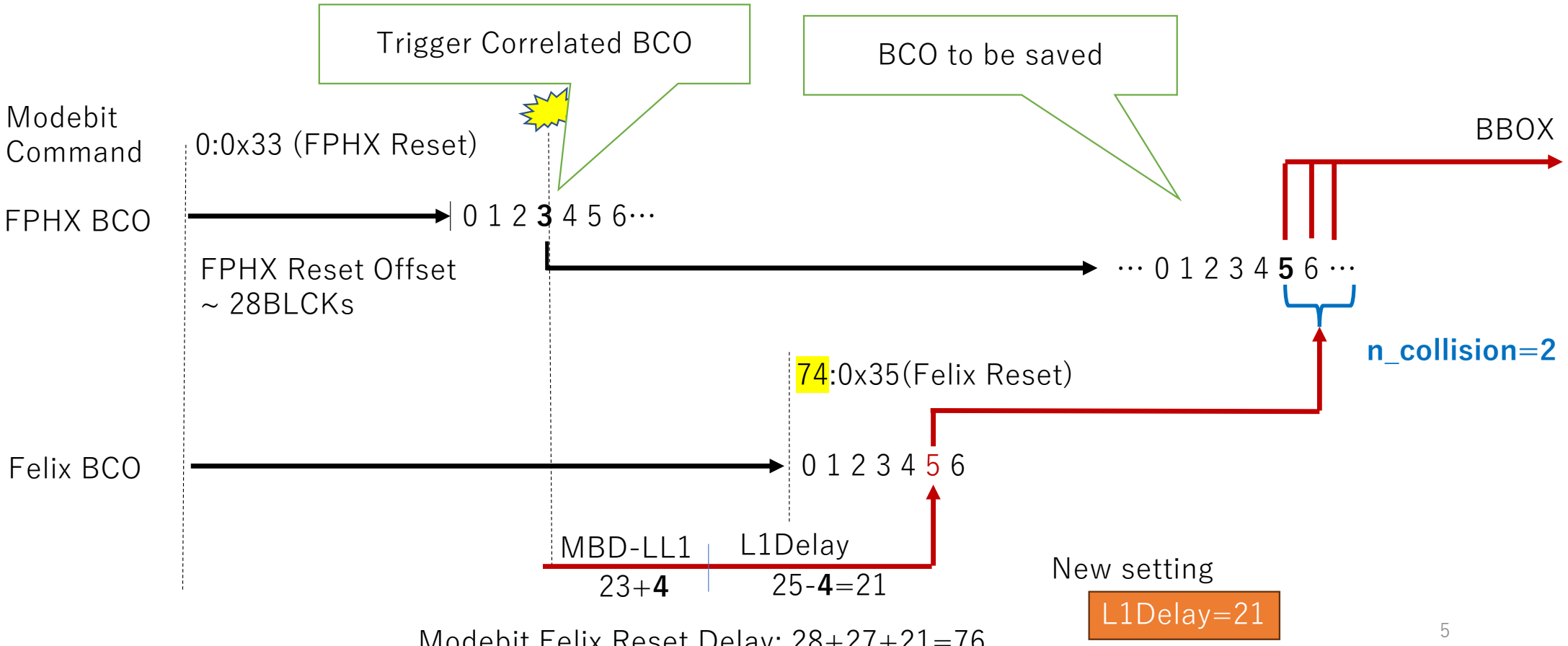
Run # 21506(global mode)



2023/7/14 Raul's new firmware which processes FPHX reset signal in the slow control

L1Delay Change after MBD-LL1 Timing Tune

2023/7/13 Dan tuned MBD-LL1 timing to match with ZDC trigger by introducing additional delay to MBD-LL1 by 4BCLKs. The compensation is to subtract 4 from the L1Delay 25 for the INTT GTM.



Timing Re-tune Procedure

STEP1: Run runs with present n_collision=127 configuration for 3 runs (~5 minutes/run). Check if all 8 servers line up at the same spot of the BCO_FULL&0x7F-FPHX_BCO distribution. Make sure the consistency stable and doesn't change run-by-run.

STEP2: Execute modebit scan with n_collision=0. (~1 hour).

STEP3: Change the setting to be L1Delay=21, modebit=78:0x35 and n_collision=4. If any of ROC is out of time, then adjust modebit value by +/-1 BCLK (77 or 79).

Run overnight and make sure any timing change. It should be monitored by the BCO_FULL&0x7F-FPHX_BCO. If timing change is > 4BCLK, the server may be dropped out.

Modebit Timing Scan with 8 servers

- Purpose : Actual measurement of felix-to-felix timing difference with all 8 servers.

Scan #	1	2	3	4	5	6	7	8	9	10	11
Modebit delay	71	72	73	74	75	76	77	78	79	80	81

Conditions:

- L1Delay=21
- n_collision=0
- Open time=35
- DAC setting 15, 30, 60, 90, 120, 150, 180, 210
- 300 kEvents (5minutes @ 1kHz) /setting x 11 setting ~ 1.5 hour

Preparation and Analysis:

- Script development to change modebits and log : Jaein
- Time in plots are to be made in felix-by-felix basis: Jaein

DAC0 Scan

Run	1	2	3	4	5	6	7	8	9	10	11
minutes	**5**	**5**	**5**	**5**	**10**	**20**	**60**	**5**	**5**	**5**	**5**
DAC0	**17**	**16**	**15**	**18**	**20**	**30**	**40**	**14**	**13**	**12**	**11**
DAC1	44	44	44	44	44	44	44	44	44	44	44
DAC2	48	48	48	48	48	48	48	48	48	48	48
DAC3	52	52	52	52	52	52	52	52	52	52	52
DAC4	56	56	56	56	56	56	56	56	56	56	56
DAC5	60	60	60	60	60	60	60	60	60	60	60
DAC6	64	64	64	64	64	64	64	64	64	64	64
DAC7	68	68	68	68	68	68	68	68	68	68	68

Execute DAC0 scan. High threshold runs can be done by shift crews, but low threshold runs may be done by experts.

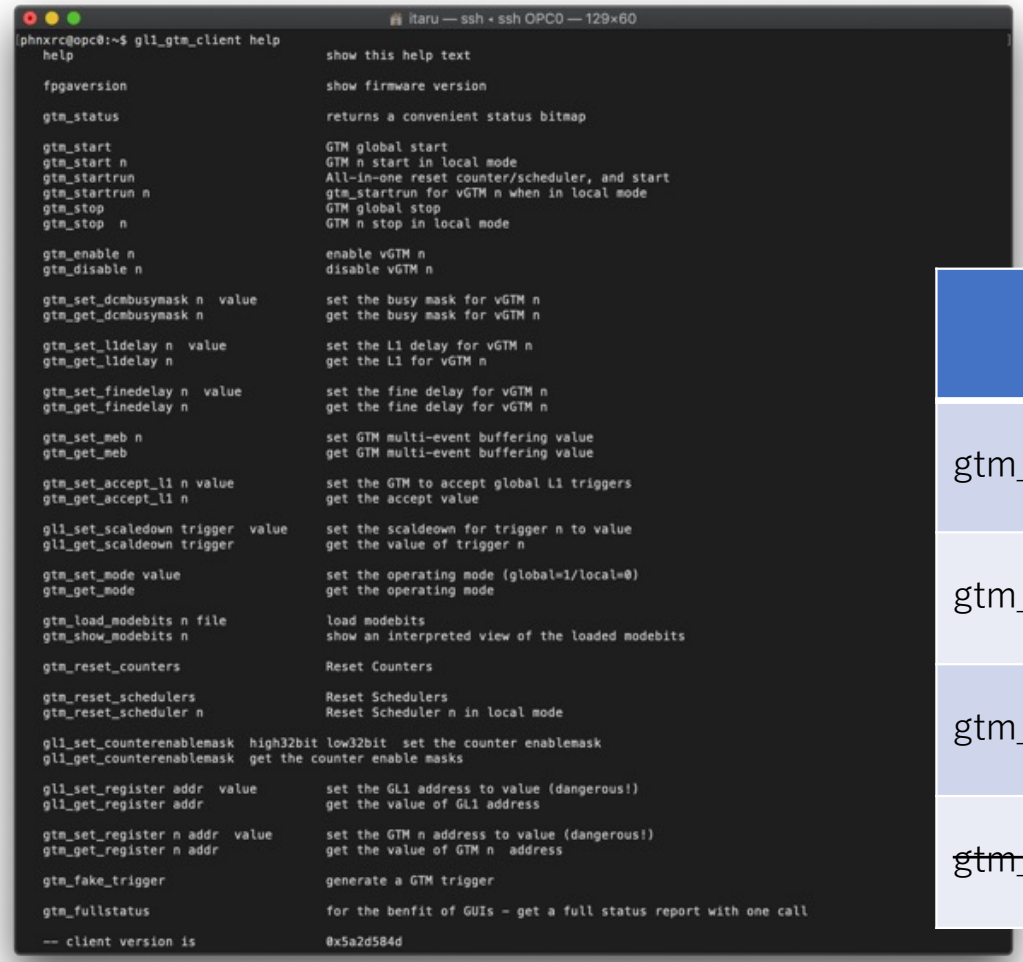
Fine delay scan

If the timing peak of each ROC is <2BLKS, then move on to this program

Fine Scan

- Once n_collision=0 is established, then we would like to execute the timing scan again for +/-5 BCLKs around modebit=76 and then scan the fine L1 delay.
- Once fine delay scan is completed, Itaru will come up with further studies such as bias scan, gain parameter studies, etc.

Changing LV1 Delay from the command line



- No GUI is available
- Change the LV1 delay from command line

command	explanation
gtm_set_l1delay n value	set the L1 delay for vGTM n
gtm_get_l1delay n	get the L1 for vGTM n
gtm_set_finedelay n value	set the fine delay for vGTM n
~~gtm_get_finedelay n~~	~~get the fine delay for vGTM n~~

17.76ns

80ps

No readback available now

BCO Phase Scan

L1 Coase Delay= L1Delay

Delay Set #	1	2	3	4	5	6	7	8	9	10	11	12	13
L1 Coase Delay	123	123	124	124	125	125	126	126	127	127	128	128	129
Fine Delay	0	111	0	111	0	111	0	111	0	111	0	111	0
Total Delay [BCLK]	20.50	20.58	20.67	20.75	20.83	20.92	**21.00**	21.08	21.17	21.25	21.33	21.42	21.50
Total Delay [ns]	2180.85	2189.73	2198.58	2207.46	2216.31	2225.19	2234.04	2242.91	2251.77	2260.65	2269.50	2278.38	2287.23

- L1Delay=21
- n_collision=0
- Modebit 76:0x35
- 300 kEvents (5minutes @ 1kHz) x 13 runs ~ 1.5 hour

Perhaps we do this scan with n_collision=4 at modebit=78 and analyze data in offline.