EDTM Study Run Plan

Jacob Murphy

2021/11/29

Aside from something to do if there is no beam, we want to make sure we are understanding how the EDTM is being accepted. There are some questions regarding EDTM overlap with two single-arm triggers, as well as how varying prescales affect EDTM accepted. The DAQ prescale GUI presently sets EDTM accepted rate (EDTM rate to disc) by:

$$EDTM_A = \frac{EDTM_S}{PSF_{min}} \tag{1}$$

Where $EDTM_A$ is the accepted EDTM rate, $EDTM_S$ is the scalar EDTM rate (equivalent to the clock rate), and PSF_{min} is the minimum positive prescale factor of the 6 pre-triggers used by the DAQ. To make $EDTM_A$ match the desired value in the GUI, $EDTM_S$ is adjusted.

In any run using a non-prescaled trigger, Equation 1 is correct. When this is not the case, as with most of our luminosity runs, this equation will not necessarily hold. The EDTM sent to the various pTrigs will be accepted at de-synchronous rates (such as every 2 vs every 5). In the case where there are 2 non-zero prescale factors, and the smaller is not a factor of the larger, then:

$$EDTM_A = \frac{EDTM_S}{PSF_{min}} + \frac{EDTM_S}{PSF_{max}} - \frac{EDTM_S}{PSF_{min} * PSF_{max}} \tag{2}$$

where the second term is the EDTM accepted rate through the higher prescale factor, and the third term is the EDTM accepted rate through both prescale factors. The third term is subtracted as we assume only one EDTM accepted event is saved per pulse.

The goals for this study are:

- Check EDTM accepted for single-arms only
- Confirm EDTM accepted is not double-counted for non-coin triggers
- Measure EDTM accepted rate for varying prescale factors greater than 1
  - For singles data (pTrig 2 and 4)
  - For COIN data (pTrig 1, 4, and 5)

The last item will be useful for analysis of the prescaled COIN data from early in the experiment.

EDTM Study with No Beam

PS1	PS2	PS3	PS4	PS5	PS6	EDTM Rate Set	Time
-1	0	-1	-1	-1	-1	10 Hz	5 min
-1	1	-1	-1	-1	-1	10 Hz	5 min
-1	-1	-1	0	-1	-1	10 Hz	5 min
-1	-1	-1	-1	0	-1	10 Hz	5 min
-1	-1	-1	-1	1	-1	10 Hz	5 min
-1	-1	-1	1	-1	-1	10 Hz	5 min
-1	0	-1	0	-1	-1	10 Hz	5 min
-1	0	-1	0	-1	-1	100 Hz	5 min
-1	1	-1	0	-1	-1	10 Hz	5 min
-1	1	-1	0	-1	-1	100 Hz	5 min
-1	1	-1	1	-1	-1	10 Hz	5 min
-1	1	-1	1	-1	-1	100 Hz	5 min
0	-1	-1	0	0	-1	10 Hz	5 min
3	-1	-1	2	1	-1	10 Hz	5 min
4	-1	-1	2	1	-1	10 Hz	5 min
0	-1	-1	1	2	-1	10 Hz	5 min
1	-1	-1	1	-1	-1	1 Hz	5 min
1	-1	-1	2	-1	-1	1 Hz	5 min
1	-1	-1	3	-1	-1	1 Hz	5 min
2	-1	-1	1	-1	-1	1 Hz	5 min
3	-1	-1	1	-1	-1	1 Hz	5 min
1	-1	1	-1	-1	-1	1 Hz	5 min
1	-1	2	1	-1	-1	1 Hz	5 min
1	-1	3	1	-1	-1	1 Hz	5 min
-1	2	-1	1	-1	-1	10 Hz	5 min
-1	2	-1	2	-1	-1	10 Hz	5 min
-1	2	-1	3	-1	-1	10 Hz	5 min
-1	2	-1	4	-1	-1	10 Hz	5 min
-1	2	-1	5	-1	-1	10 Hz	5 min
-1	2	-1	6	-1	-1	10 Hz	5 min
-1	2	-1	7	-1	-1	10 Hz	5 min
-1	2	-1	8	-1	-1	10 Hz	5 min
0	-1	-1	-1	-1	-1	10 Hz	5 min
1	-1	-1	-1	-1	-1	10 Hz	5 min
-1	-1	0	-1	-1	-1	10 Hz	5 min
-1	-1	1	-1	-1	-1	10 Hz	5 min

This is listed in priority order, so please just do what you have time for.