

Data selection preparations for VD coldbox tests

Philip Rodrigues

University of Oxford

October 11, 2021

Outline

1. Triggering on hardware signals (eg scintillator coincidence)
2. Random triggers
3. Basic trigger monitoring
4. Horizontal tracks trigger using TPs

Hardware signal triggering

- ▶ Current trigger app in `minidaqapp` receives `HSIEvents` from HSI and converts to trigger candidates
- ▶ TC gets start and end times from config based on type
 - ▶ Will need map from HSI trigger type to readout window from VD folks/HSI
- ▶ Each TC results in a trigger decision

Random triggers

- ▶ Easy if just another HSI signal
- ▶ Some work if MLT generates: has to infer a suitable timestamp (experience with TimeSync messages in `minidaqapp` makes me wary of doing this)

Operational monitoring for trigger

- ▶ We send a complete set of variables to operational monitoring:

`tc_received_count` total number of TCs received

`td_sent_count` number of TDs actually sent to DF

`td_queue_timeout_expired_err_count` number of times the push to TD queue timed out

`td_inhibited_count` number of TDs that weren't sent out for lack of tokens

`td_paused_count` number of TDs that weren't sent out because triggers were paused

`td_total_count` total number of TDs created (including the ones that were paused or inhibited)

TP-based triggering

- ▶ Existing trigger app supports full TP -> TA -> TC -> TD triggering chain. Tested on ProtoDUNE-I single-phase data so far
- ▶ With TPs sent from readout app in the same format, this will Just Work for VD too
 - ▶ But of course, devil will be in the details
- ▶ Existing algorithm from Alex Booth: trigger on sum ADC in a sliding window above some threshold
- ▶ Alex is modifying this to look for \sim horizontal muons: trigger on number of channels hit in sliding window above threshold
 - ▶ Needs channel map from VD team