

Plan for using variable-rate random pulse generator.

1.) Test ADCs at high rate

- Test with clock trigger. (To check effect of rate on pedestals)
 - 1.) Set the trigger to the clock (t8)
 - 2.) Input an analog signal from the random pulser into the patch-panel spot for a specific ADC Channel.
 - 3.) Repeat for different rates and different channels
- Test with real cosmic triggers. (To check effect of rate on signal)
 - 1.) Set the trigger to cosmics (t1)
 - 2.) Mix the signal from the random with the signal from a PMT using our passive splitter (i.e. EDTM mixer).
 - 3.) Repeat for different rates and different channels.

2.) Test Re-timing module with various prescale factors and multiple triggers.

- 1.) Split the signal from the random pulser into three copies. Send one to the scope and the other two to different triggers (e.g. t1 and t2). Make sure one of the triggers is always coming later than the other.
- 2.) Take the retiming signal (OR of t1-t4) and put in into the scope. Trigger on the copy sent from the pulser. The retiming signal should be seen even when the daq is not running.
- 3.) Start the DAQ and see if there is any effect on the retiming signal. (There should not be any).
- 4.) Repeat at different rates and prescale factors.

3.) Test Trigger Supervisor Module with various prescale factors and multiple triggers. (During the Spring 2015 run, we saw multiple timing peaks during high pre-scale runs. This may indicate a problem with the trigger supervisor. To test this we would ideally want to enable two triggers which have different raw rates but are still highly correlated.)

- 1.) Split the signal from the random pulser into two copies. Delay one copy and send it to t1. Create an OR between the second copy and the cherenkov sum. Then send this copy to t2.
- 2.) Make sure the delay is such that the first copy arrives later than the second copy, but they are still in coincidence.
- 3.) Now we have two triggers which have different raw rates but are still highly correlated.
- 4.) Enable both triggers, and run the DAQ at different rates and prescale factors.
- 5.) Look for multiple timing peaks using the DL.t1 and DL.t2 variables

4.) Perform stress test on DAQ

- 1.) Send the signal from the random pulser to one trigger channel (e.g. t1).
- 2.) Enable that trigger and start the DAQ
- 3.) Check (and compare) the dead-time using three methods: Evtpebits/scalers, the Trigger Supervisor on-board scalers, and a gated/ungated pulse (EDTM)
- 4.) Repeat at different rates and prescale factors

- 5.) Check consistency of Evtpebits at different rates and prescale factor
 - 1.) Split the signal from the random pulser and send to two triggers (e.g t1 and t2)
 - 2.) Enable one trigger and look at the Evtpebits for the other trigger
 - 3.) Repeat at different rates and prescale factors