## **Tritium Trigger Overview**

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# **Trigger Considerations**

- Switching between single arm and coincidence mode fast, easy and as little hardware changes as possible
- Implementation of triggers in NIM logic
- No "cheating" in coincidence mode as during Argon run
- No Retiming of signals (no RT module)
- RHRS TS is controlling DAQ in coincidence mode



#### Trigger Logic for 2 DAQ mode (single arm configuration)



- Some of the signals on the RHRS have to be delayed to be in time with LHRS triggers
- T1 T3 LHRS single triggers similar for all experiments
- T4 T6 RHRS single triggers

#### Single Arm Triggers (S0&S2); (S0&S2)&GC; (S0||S2)&GC



#### Trigger Logic for 1 DAQ mode (concidence configuration)



- Some of the signals on the RHRS have to be delayed to be in time with LHRS triggers
- T1 T3 LHRS single triggers
- C1 C3 Coincidence triggers

#### **Coincidence triggers**



(S0||S2)&GC<sub>LHRS</sub> timed on SO<sub>LHRS</sub> if S0 fires

## Status

- Done:
  - Single arm trigger setup (connections and timing)
  - Coincidence trigger connections
- Current work:
  - Coincidence trigger timing with physics simulation using the clock
  - Connection of TM remote signals
- Next steps:
  - Coincidence simulation with additional randoms
  - Timing of trigger inputs in TS

### Signals Exchange LHRS and RHRS

Necessary signal exchange:

- T1: NIM, fast timing
- T2: NIM, fast timing
- T3: NIM, fast timing
- LHRS clock: NIM, could be slow timing
- RHRS clock: NIM, could be slow timing
- Retiming signal: NIM, fast timing
- Scaler: ECL with LEMO TWINNAX connectors, could be slow timing
- Busy: ECL with LEMO TWINNAX connectors, could be slow timing
- L1A: ECL with LEMO TWINNAX connectors, fast timing
- Flatband RS485 connection TS to LHRS Fastbus crates

Available cables (found):

- 6 fast coax cables (222ns, Lemo connectors)
- 3 slower cables (240ns, Lemo connectors)
- 1 Flatband RS485 cable (not fully operational -> has to be tested)

Not Available:

• 2 cables with LEMO TWINNAX connectors