DEADTIME ANALYSIS PROGRESS

9/5/2017

SALINA ALI, MONGI DLAMINI

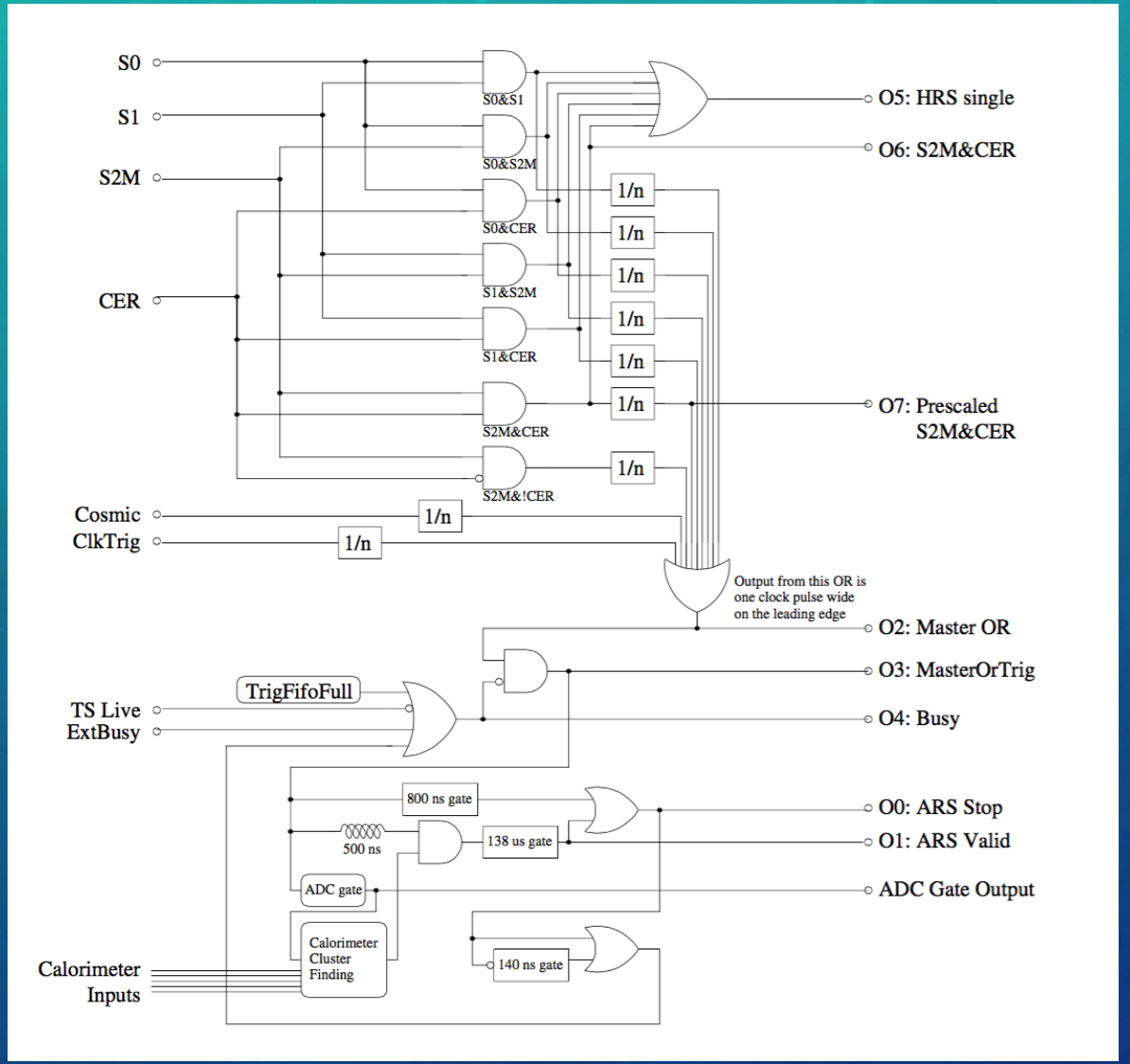
TRIGGER SETUP

LHRS

S2M&&CER

Master OR

- Master OR Trigger
- S2m&&Cer && Calo: ARS Valid
- S2m&&Cer live, Cosmics, clock trigger : ARS Stop



- Borrowed from https://hallaweb.jlab.org/wiki/index.php/Trigger

DVCS Calorimeter

Calo Cluster

- ADC Gate → Master OR Trigger
- S2m&&Cer && Calo : ARS Valid

RUN 13418 (2016): PRESCALE SETTINGS

- **PS for LHRS**: ps1=0, ps2=0, ps3=0, ps4=0, ps5=0, ps6=0, ps7=0, ps8=0, **ps9=1**, ps10=0, ps11=0, ps12=0
  - T1 = L-arm s0 && S2m trigger
  - T2 = L-arm s0 && GC trigger
  - T3 = L-arm s2 && GC trigger
  - T4 = L-arm s0 && Shower trigger
  - T5 = L-arm s2m && Shower trigger
  - T6 = L-arm GC && Shower trigger
  - T7 = L-arm EDTM trigger
  - T8 = 103.7 KHz pulser
  - **T9 = DVCS trigger**
  - T10 = Misc. trigger
  - T11 = Unknown trigger
  - T12 = Unknown trigger

- **PS Within DVCS trigger:**
  - Prescale Clock=15
  - Prescale Cosmic=0
  - Prescale S2M and NCER=0
  - Prescale S0 and S1=0
  - Prescale S0 and S2M=6
  - Prescale S0 and CER=6
  - Prescale S1 and S2M=0
  - Prescale S1 and CER=0
  - Prescale S2M and CER=1
  - Prescale S2M and CER(2)=2

DEADTIME COMPUTATIONS

- Looking at scaler rates: live and raw

$$Raw\ rate = Live\ rate \cdot \frac{1}{1 - Deadtime}$$

- Livetime and deadtime:

$$Livetime = \frac{Live\ Scaler\ Rate}{Raw\ Scaler\ Rate}$$

$$Deadtime = 1 - Livetime$$

NORMALIZED DVCS AND DIS RATES

		Normalized Rates (Hz/uA)							
I(uA)	S2M &Cer LT	**No cuts**	**Trk**	**Trk&TDC**	**Trk&TDC &Cer**	**Trk&TDC&Cer& DIS**	**Trk&TDC&Cer& DIS/S2M&CER LT**	**Trk&TDC&Cer& DVCS**	**Trk&TDC&Cer&DVCS /S2M&CER LT**
10.61	0.985	9.27	5.783	5.719	5.138	3.365	3.422	5.134	5.212
15.32	0.976	10.26	6.192	6.117	5.484	3.356	3.450	5.480	5.615
20.53	0.965	11.26	6.459	6.391	5.733	3.321	3.449	5.728	5.936

- Rates given in Hz/uA, with the following cuts:
  - Trk: tracking cut, given by “L.tr.n” >0
  - TDC: Time-to-Digital Converter, given by tdc_val[27]-tdc_val[7]/10<-24
  - CER: Cerenkov cut, given by “L.cer >500”
  - DIS: given by “triggerPatternWord&0x00080”
  - DVCS: given by “triggerPatternWord&0x00100”

Current dependence goes away..

..but for DVCS it does not.

Looking into random coincidences between the calorimeter and spectrometer.

WAVEFORM ANALYSIS

- Looking at calorimeter clustering algorithm to account for random coincidences: main coincidence peak tells us photon + electron + background.
- Accidental region is where the random events are.
- Need to subtract accidental region from coincidence window to correct for accidentals.