

Blue: Included in experimental set-up

Red: Added for this test

NB: PMT Pulse (f_1) is random,
while EDTM pulse is synchronous;
 $f_1 \gg f_2$

- Check if $DT(PMT) = DT(EDTM)$
 1. Enable Triggers 1 & 3
 2. $N_{t1} / N_{\text{scalar4}} =? N_{t3} / N_{\text{scalar5}}$
- Check if able to reconstruct real PMT rate
 1. Enable Triggers 1 & 2
 2. $LT = N_{\text{TDC2|t1}} / N_{\text{scalar4}}$
 3. $\text{Real-Rate} = (N_{\text{TDC2}} - N_{\text{TDC2|trig1}}) / LT$
- How to use EDTM during experiment
 1. For S2m: Only activate EDTM pulse for one PMT on left and one on right at same time. If more are activated, an EDTM pulse can be lost, but will not be recorded as lost in trigger containing S2m.
 2. For S0: EDTM can be activated for both PMTs
 3. For GC: Only activate EDTM for one PMT at a time

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User name adaq

Log entry time 16:14:56 on September 24, 2014

Entry number 401514

keyword=End_of_Run_1926

 Run Number: 1926
 End of Run Comment:
 Run_type=Other,target_type=Home(no target, or empty),comment_text=EDTM Test

PRESALE FACTORS:ps1=1 ps2=0 ps3=0 ps4=0 ps5=0 ps6=0 ps7=1 ps8=0

EVENTS : 2884802

TIME : 4.141 mins

DEAD TIME: 53.79%

TRIGGER RATES: PRES/REAL
 T1:T1:25105.3/25105.3 Hz T2:T2: 0.0/25119.4 Hz T3:T3: 0.0/23.2 Hz T4:T4: 0.0/0.0 Hz T5:T5: 0.0/25128.7 Hz T6:T6: 0.0/0.5 Hz T7:T7:23.2/23.2 Hz T8:T8: 0.0/103700.0 Hz

TRIGGER TOTALS: PRES/REAL
 T1:T1:6238343/6238343 T2:T2: 0/6241838 T3:T3: 0/5763 T4:T4: 0/0 T5:T5: 0/6244148 T6:T6: 0/119 T7:T7: 5763/5763 T8:T8: 0/25768063

AVERAGE CURRENT
 BCM 1 : -0.0342uA

APPROXIMATE BCM CHARGES (C)
 BCM u1 : -10.39
 BCM d1 : -6.613

 End-of-run EPICS data for Run Number 1926 at Wed Sep 24 16:14:56 EDT 2014

Target Info

General Run Info

Misc Epics Info

PMT Real Rate: 25119.4 HZ
 PMT Rate through MLU: 25105.3 HZ
 EDTM Real Rate: 23.2 HZ
 EDTM Rate through MLU: 23.2 HZ
 Mixed Rate = 25128.7 HZ

Comparison of live time between PMT and EDTM signals

PMT rate	N(t3)/N(scalar 5)	N(t3)/N(scalar 3)	N(t1)/N(scalar 1)
550 Hz	0.8993 +- .0039	0.8993 +- .0039	0.9159 +- .0142
3.5 kHz	0.7055 +- .0013	0.7055 +- .0013	0.7120 +- .0120
25 kHz	0.2309 +- .0002	0.2310 +- .0002	0.2410 +- .0065
200 kHz	0.0308 +- 3e-5	0.0309 +- 2e-5	0.0305 +- .0028
1.1 MHz	0.0055 +- 5e-6	0.0057 +- 5e-6	0.0047 +- .0011

PMT ONLY

$$N_{\text{PMT, tot}} = f_{\text{PMT}} T = N_{\text{PMT, rec}} + N_{\text{PMT, rec}} f_{\text{PMT}} \tau$$

T = Total time

τ = Dead time

~~XXXXXXXXXX~~

$$L_{\text{PMT}} = \frac{N_{\text{PMT, rec}}}{N_{\text{PMT, tot}}} = \frac{1}{1 + f_{\text{PMT}} \tau}$$

PMT & EDTM sent to different triggers

$$N_{\text{EDTM, tot}} = f_{\text{EDTM}} T = N_{\text{EDTM, rec}} + N_{\text{PMT, rec}} f_{\text{EDTM}} \tau$$

$$\text{For } N_{\text{PMT, rec}} = \frac{f_{\text{PMT}} T}{1 + f_{\text{PMT}} \tau} ,$$

$$L_{\text{EDTM}} = \frac{1}{1 + f_{\text{PMT}} \tau}$$

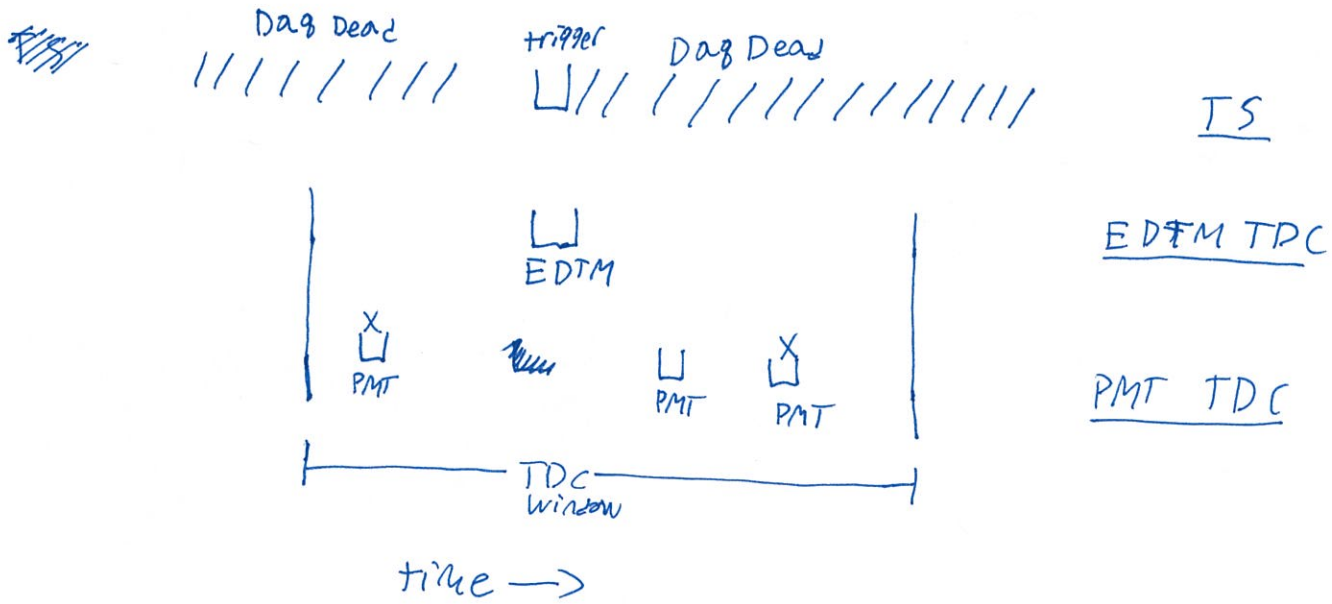
$$N_{\text{PMT, tot}} = f_{\text{PMT}} T = N_{\text{PMT, rec}} + N_{\text{PMT, rec}} f_{\text{PMT}} \tau + N_{\text{EDTM, rec}} \times f_{\text{PMT}} \tau$$

$$\text{For } N_{\text{EDTM, rec}} = \frac{f_{\text{EDTM}} T}{1 + f_{\text{PMT}} \tau}$$

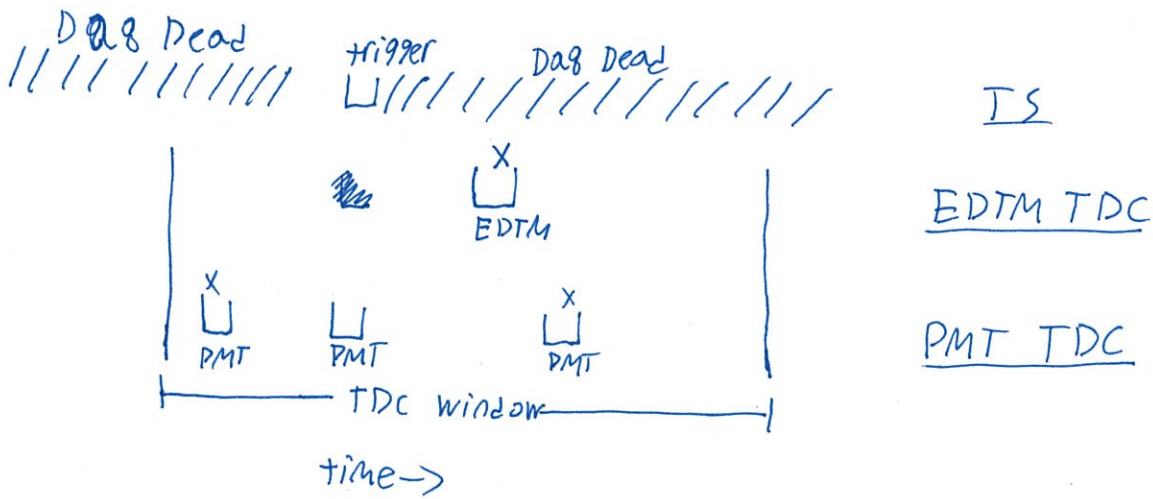
$$L_{\text{PMT}} = L_{\text{EDTM}} - \frac{f_{\text{EDTM}} \tau}{(1 + f_{\text{PMT}} \tau)^2}$$

EDTM & PMT sent to different triggers

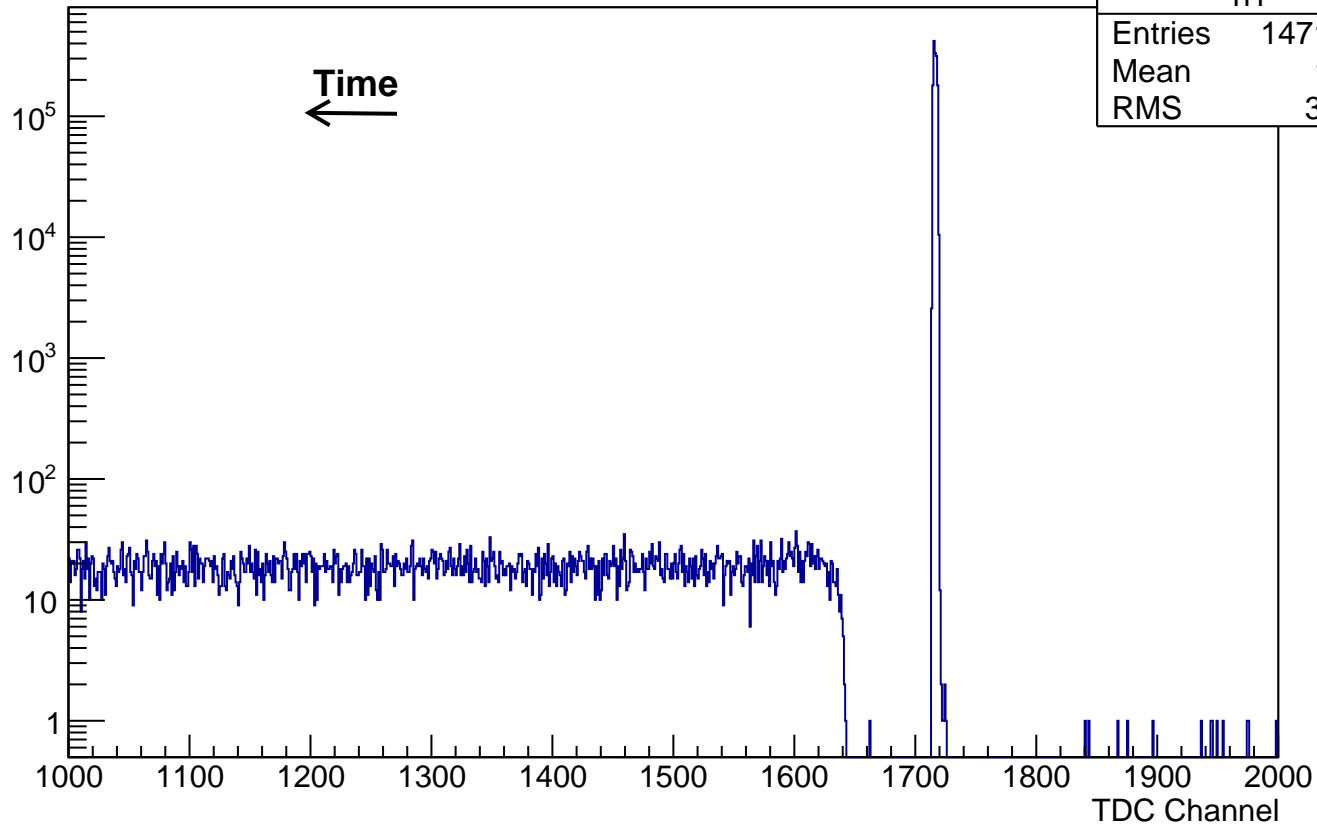
EDTM trigger:



PMT trigger:



All PMT Hits



All EDTM Hits

