

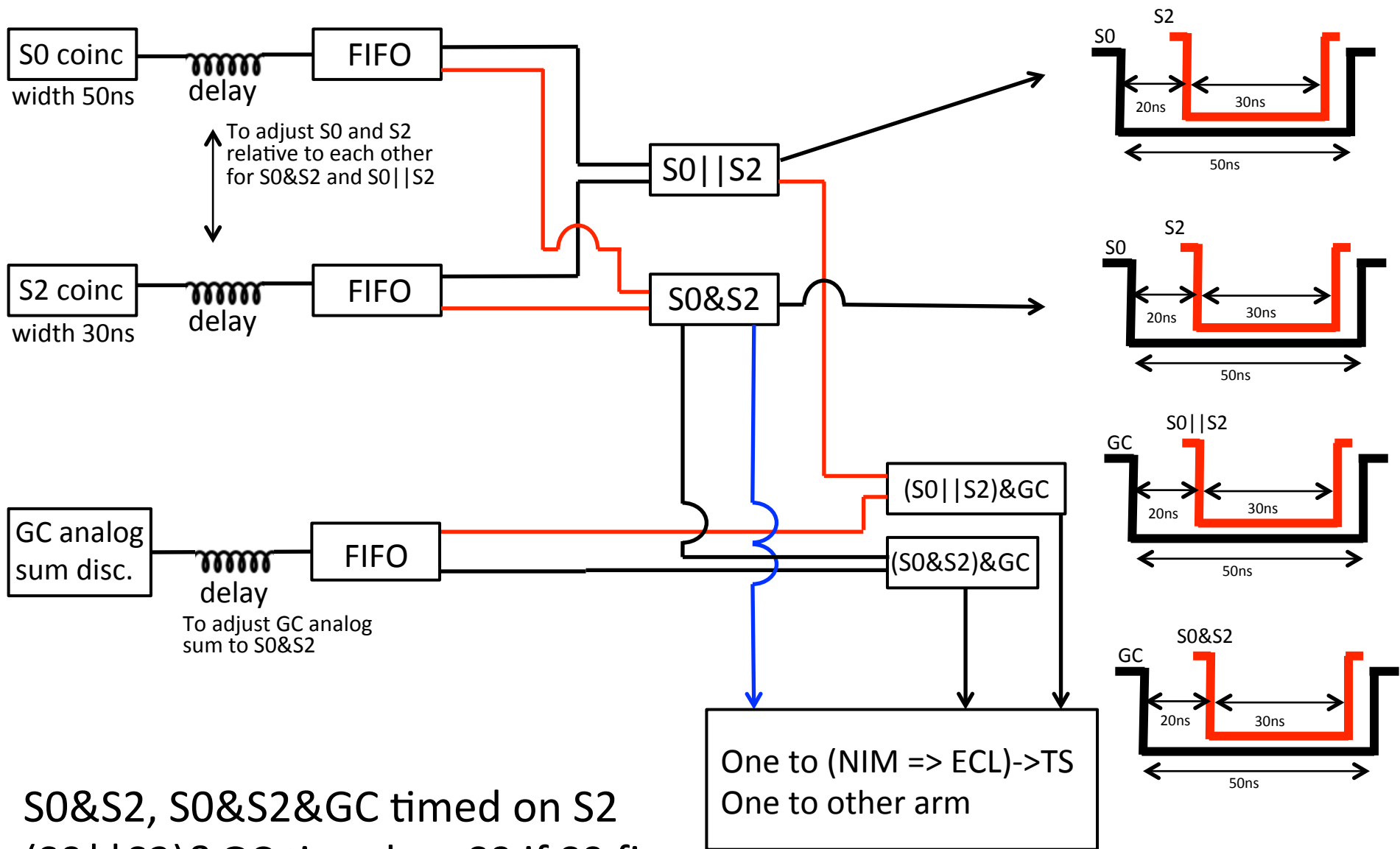
# Update on triggers



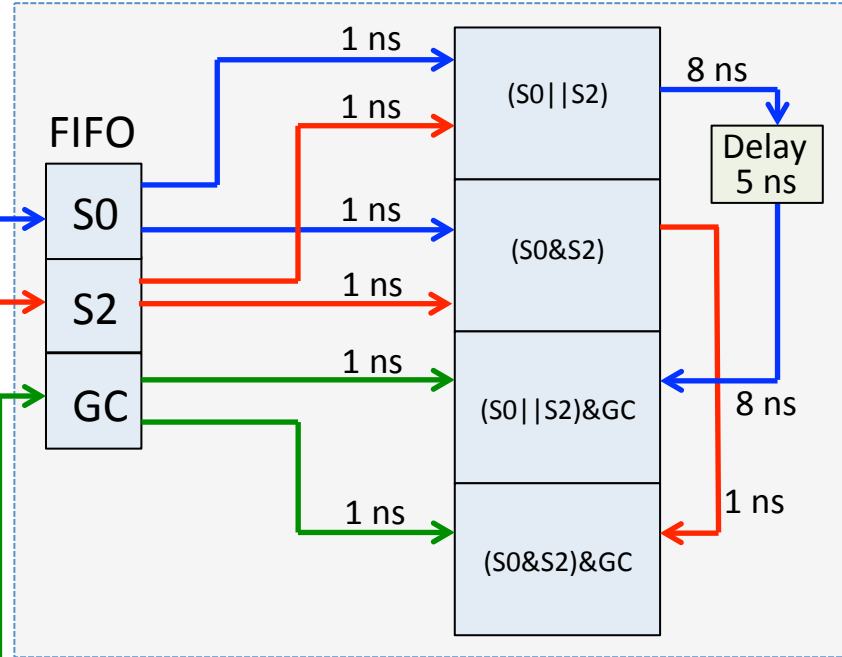
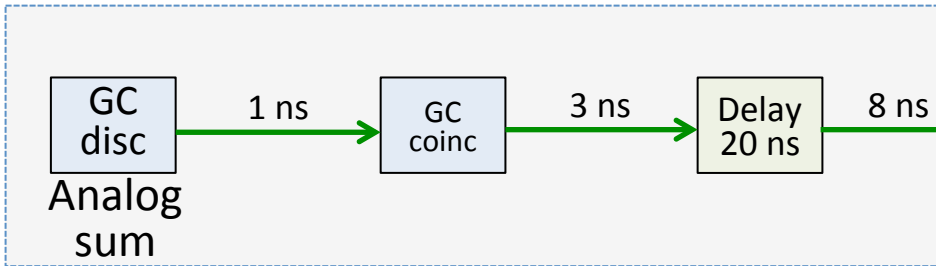
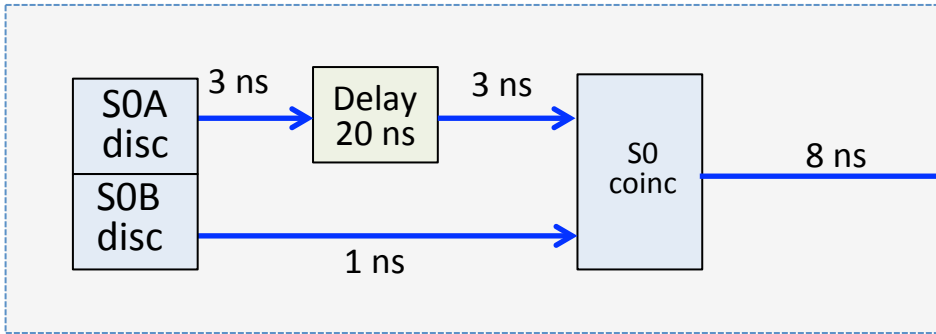
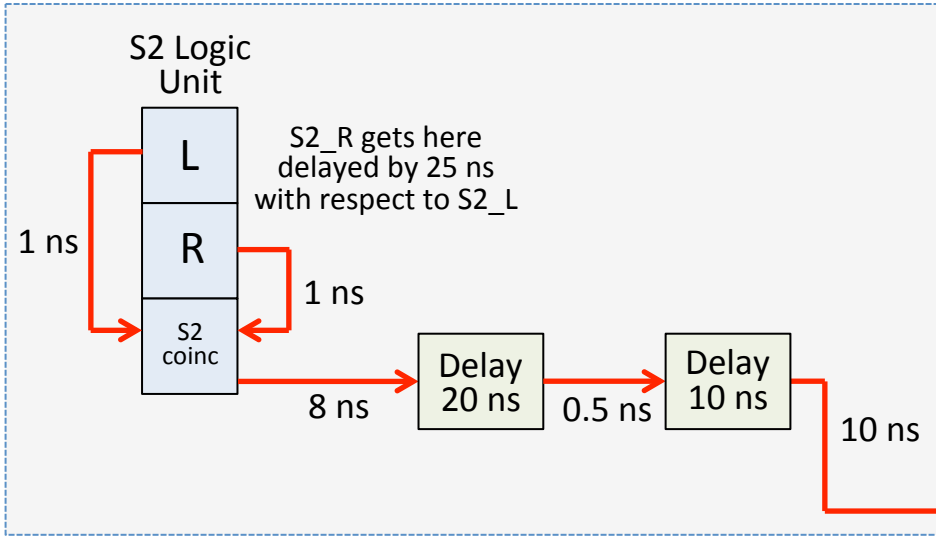
Florian, Tyler, & Rey  
(with lots of help from Jonathan and Shujie)

# Previously, on Florian's talk

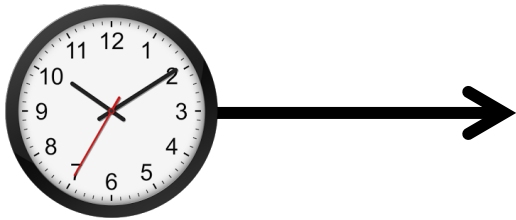
Single Arm Triggers (S0&S2); (S0&S2)&GC; (S0 || S2)&GC



S0&S2, S0&S2&GC timed on S2  
 (S0 || S2)&GC timed on S0 if S0 fires



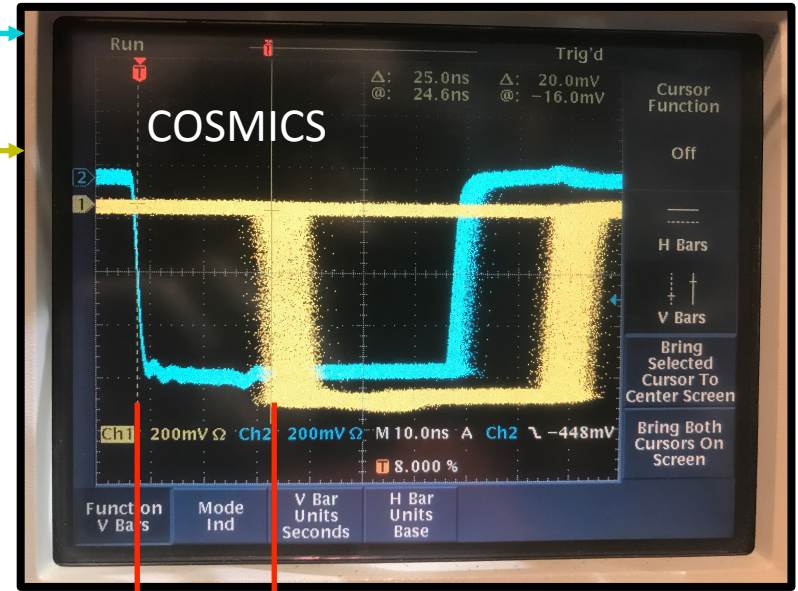
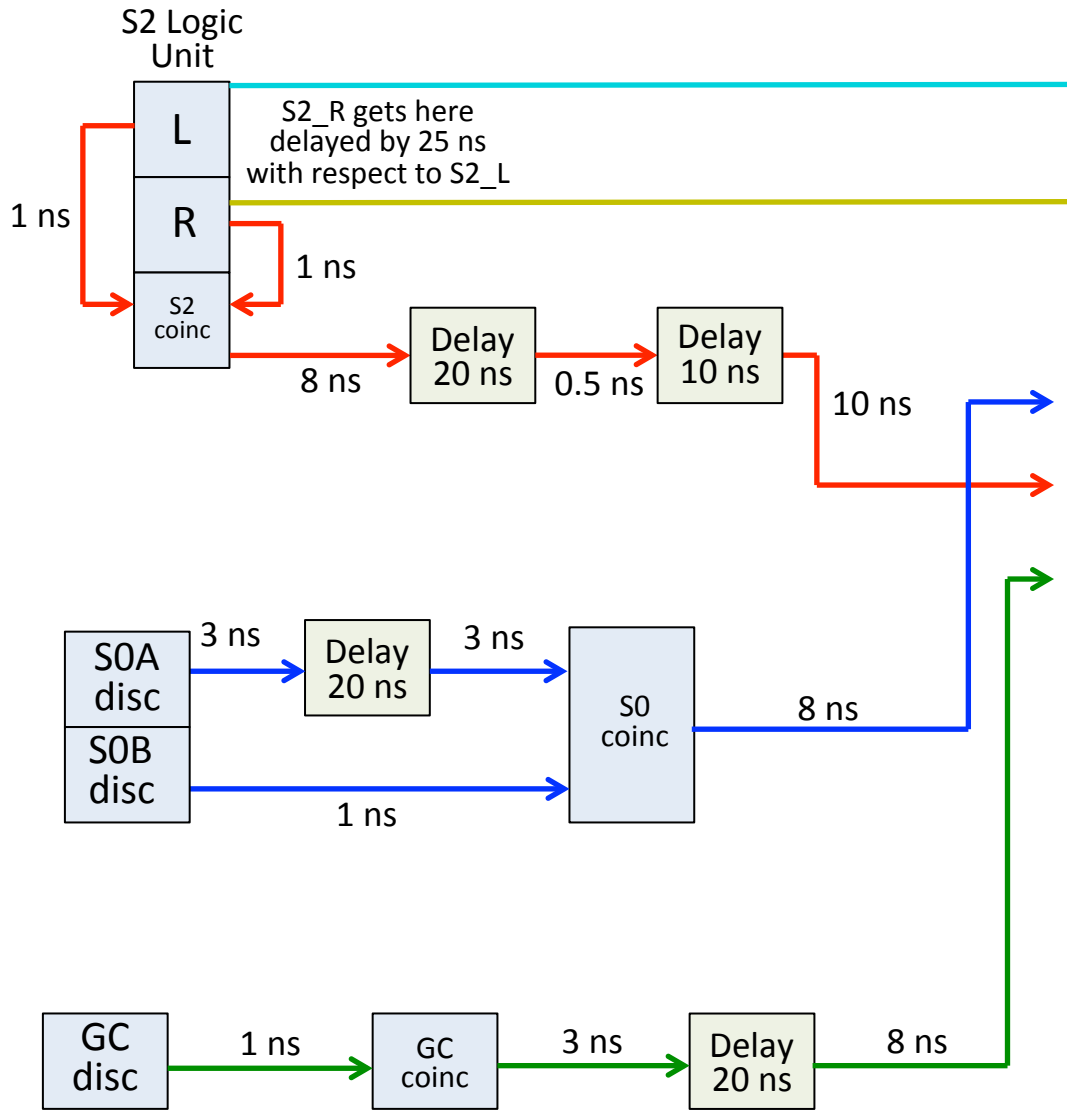
# Legend



Clock input

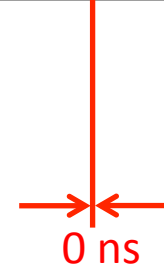
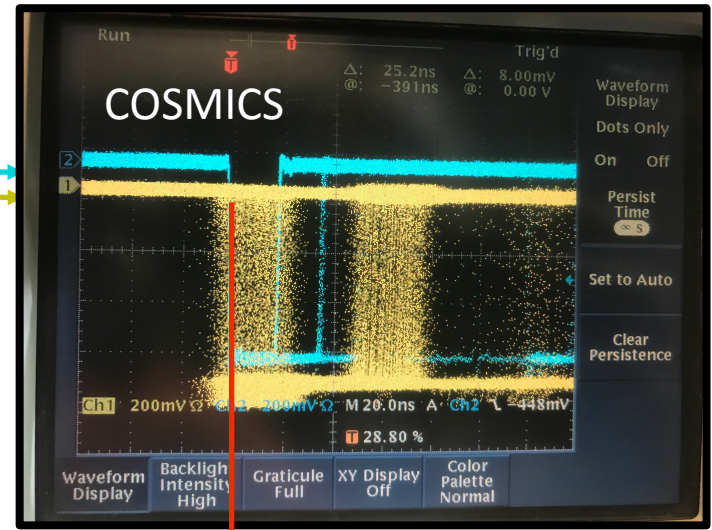
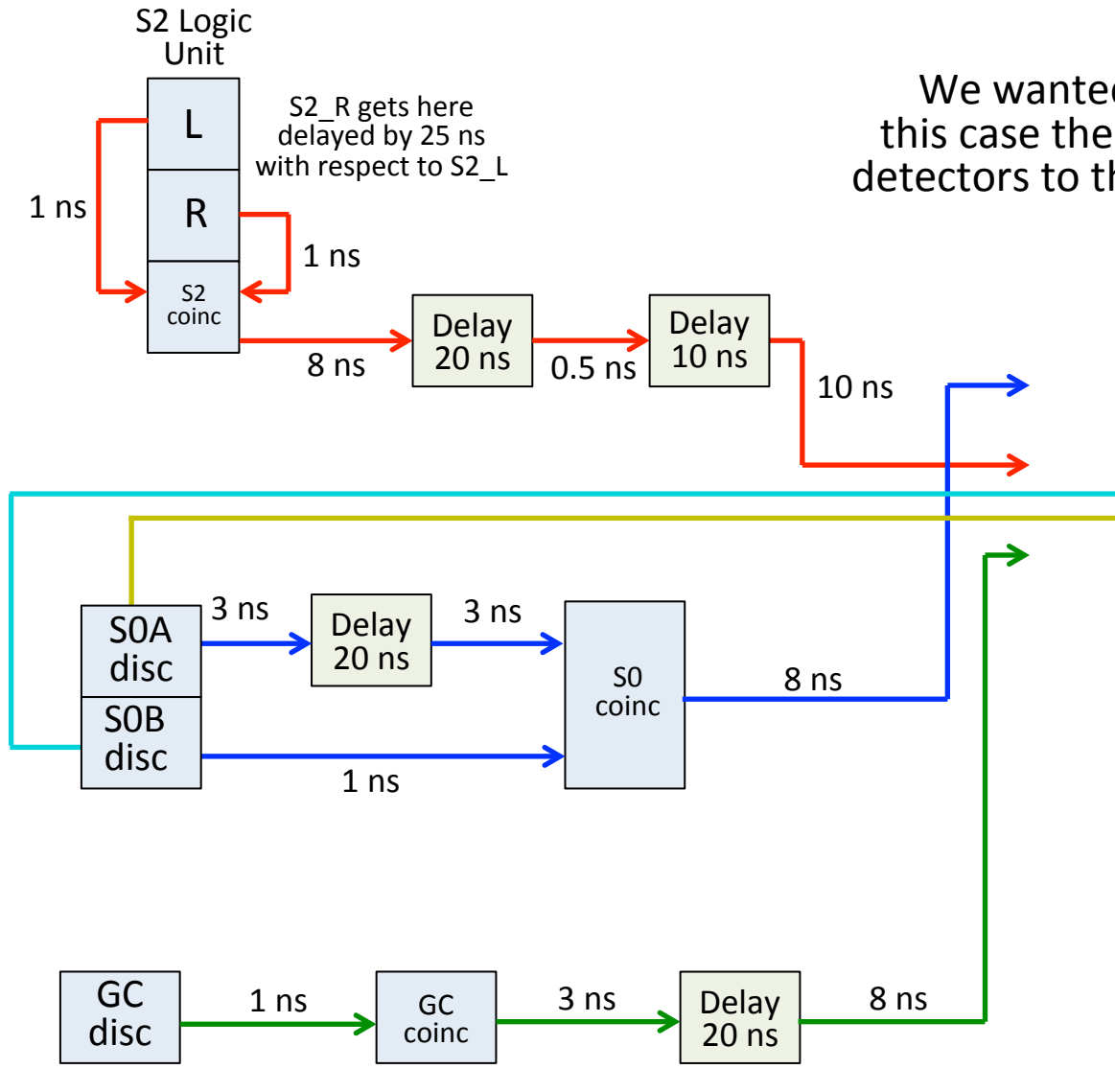


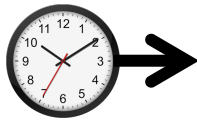
(Same length) cables used to project information onto the scope.



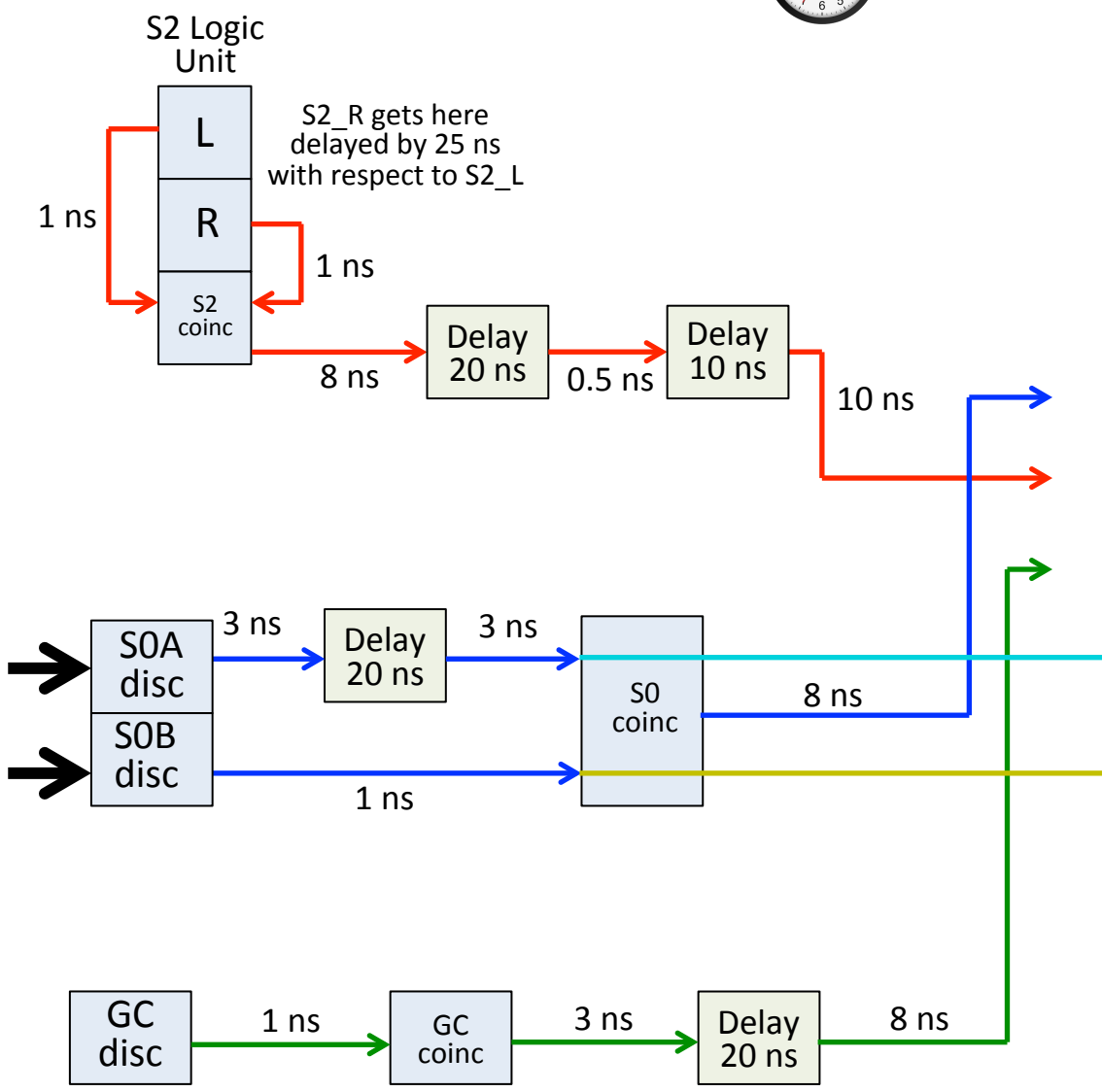
We wanted for S2\_R to lead the S2 time, and S2\_R is already delayed (by 25 ns) with respect to S2\_L in the cables from the detectors to the electronics

We wanted for SOA to lead the SO time, and in this case there is no delay in the cables from the detectors to the electronics, so we need to create this delay ourselves.



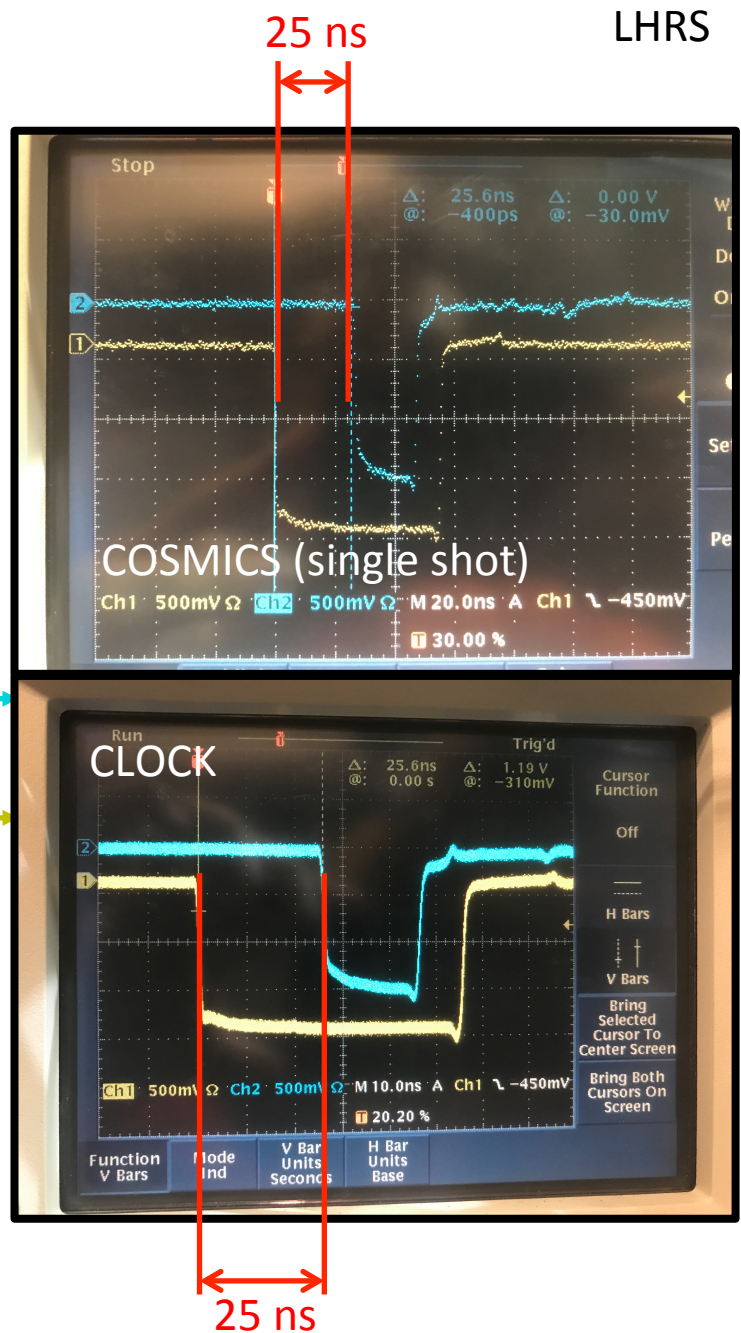


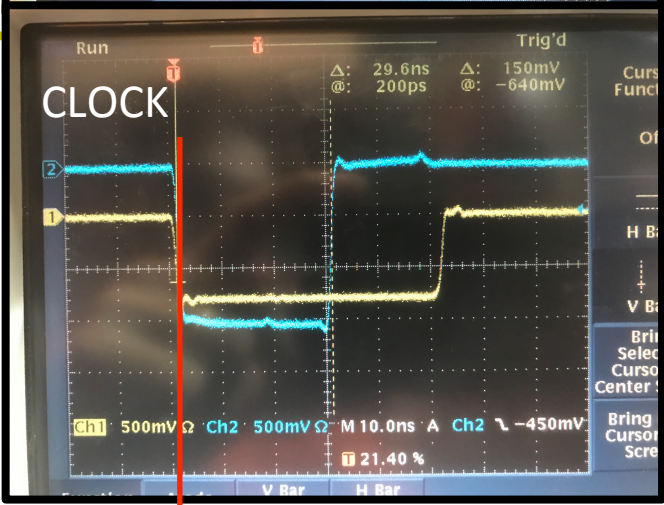
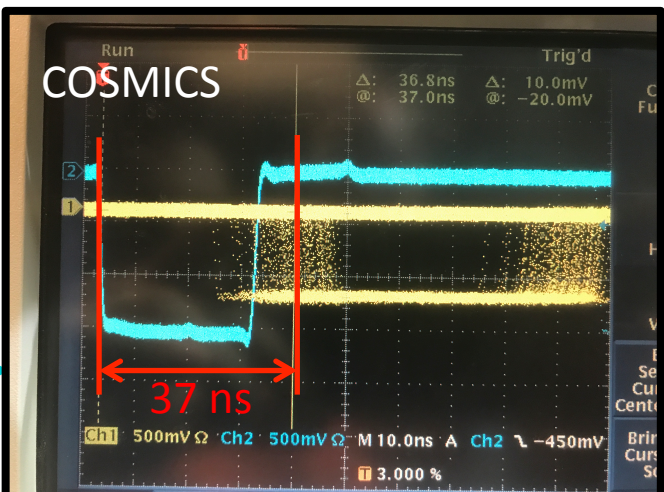
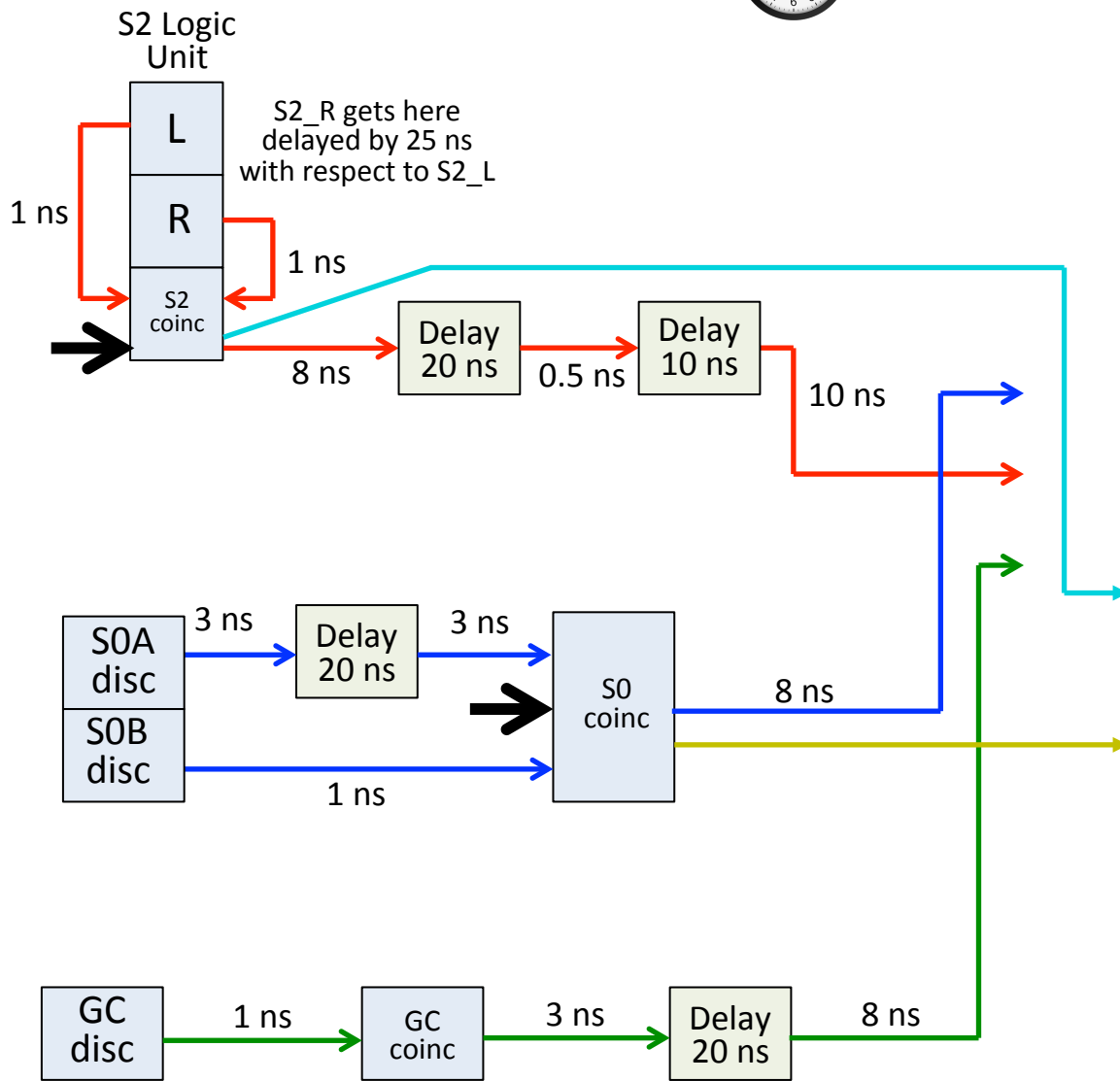
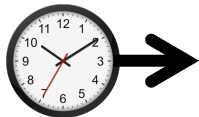
LHRS



S2\_R gets here delayed by 25 ns with respect to S2\_L

SOA delayed with respect to SOB by ~25ns





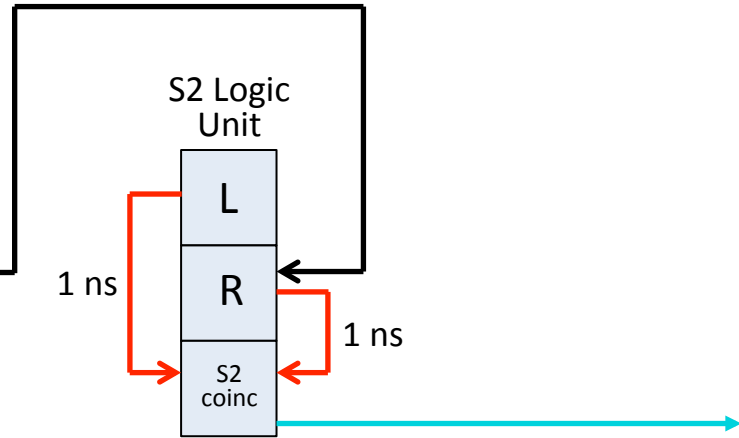
0 ns



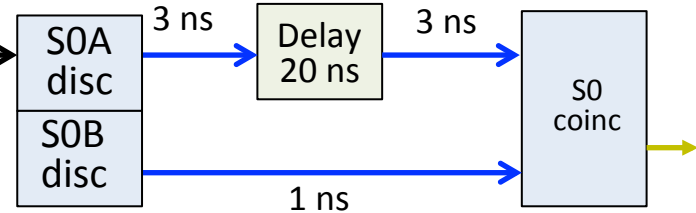
COSMICS



cable to electronics



cable to electronics



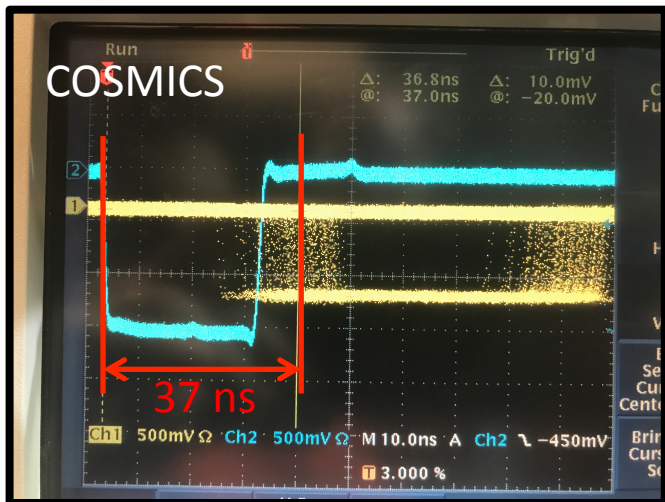
$$(S0 \text{ cable to electronics}) + 8\text{ns} + 26\text{ns} + 8\text{ns} + \text{TOF} \\ - (S2 \text{ cable to electronics} + 8\text{ns} + 1\text{ns} + 8\text{ns}) = 37\text{ns}$$

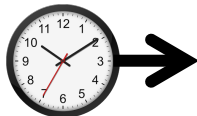
$$\Delta(S2-S0 \text{ cable length}) = 12\text{ns} - \text{TOF}$$

$$\text{TOF} \sim 5\text{ns}$$

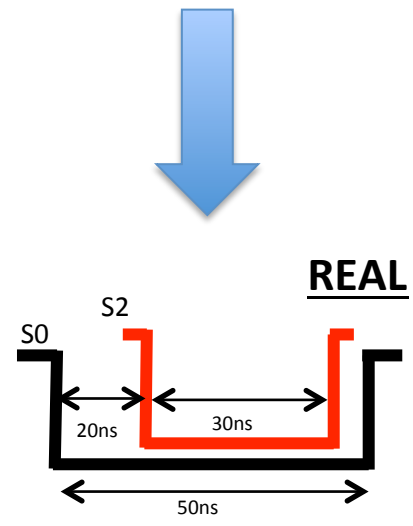
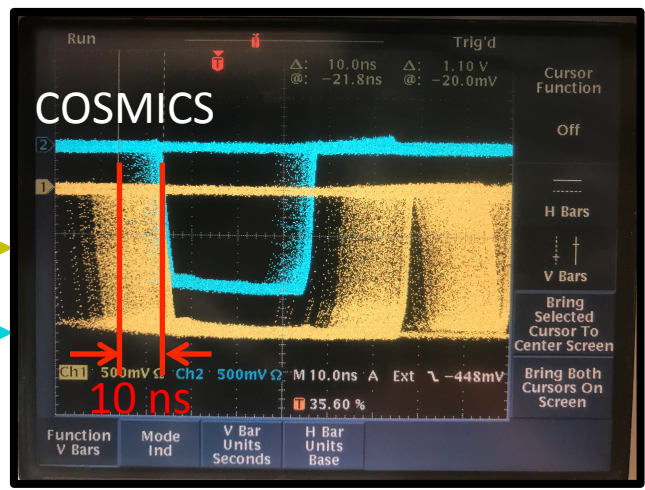
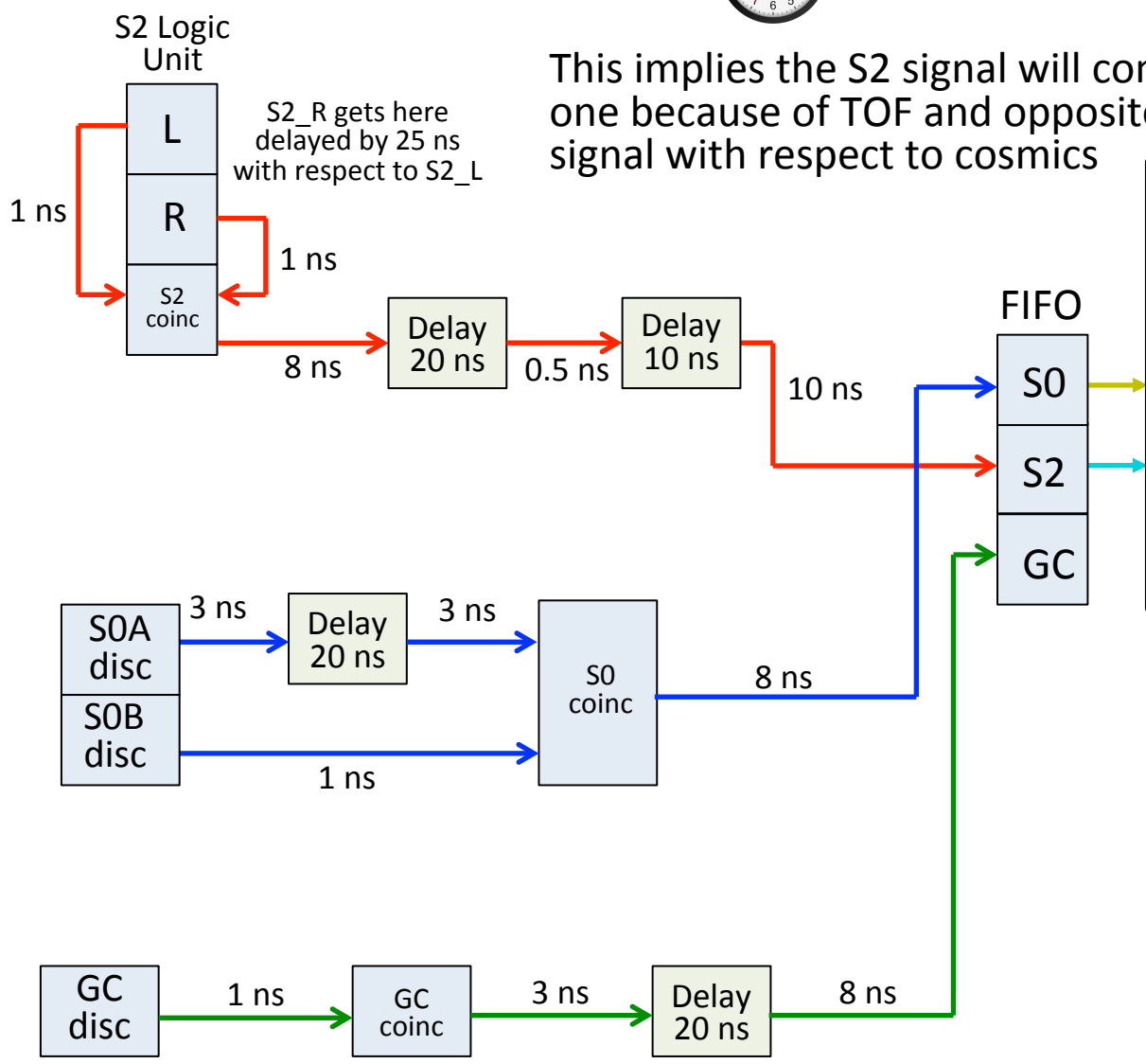
$$\Delta(S2-S0 \text{ cable length}) = 7\text{ns}$$

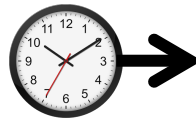
S0A cable is longer than S2\_R by 7ns



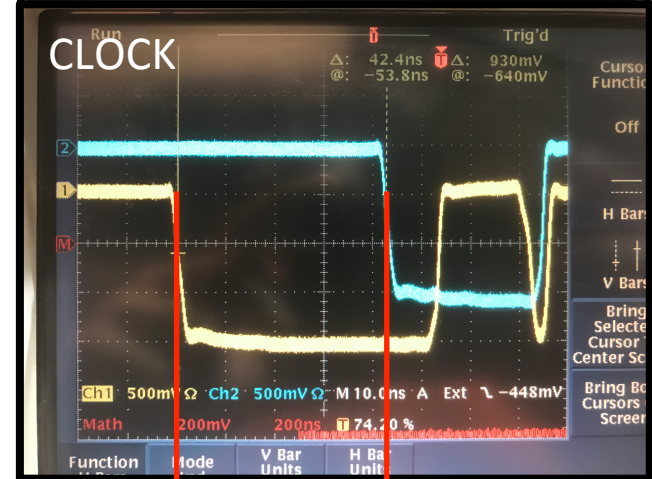
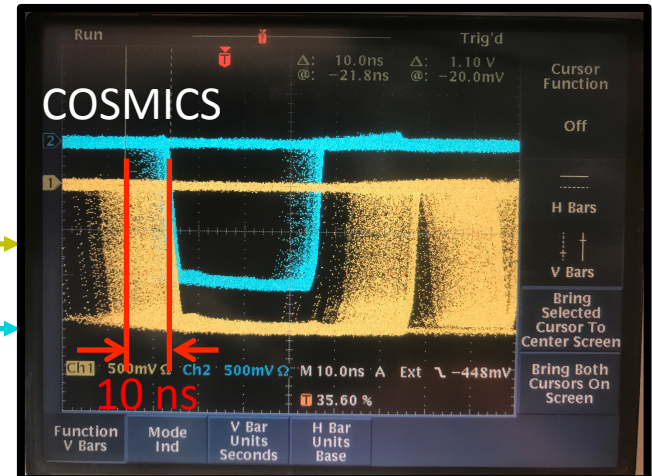
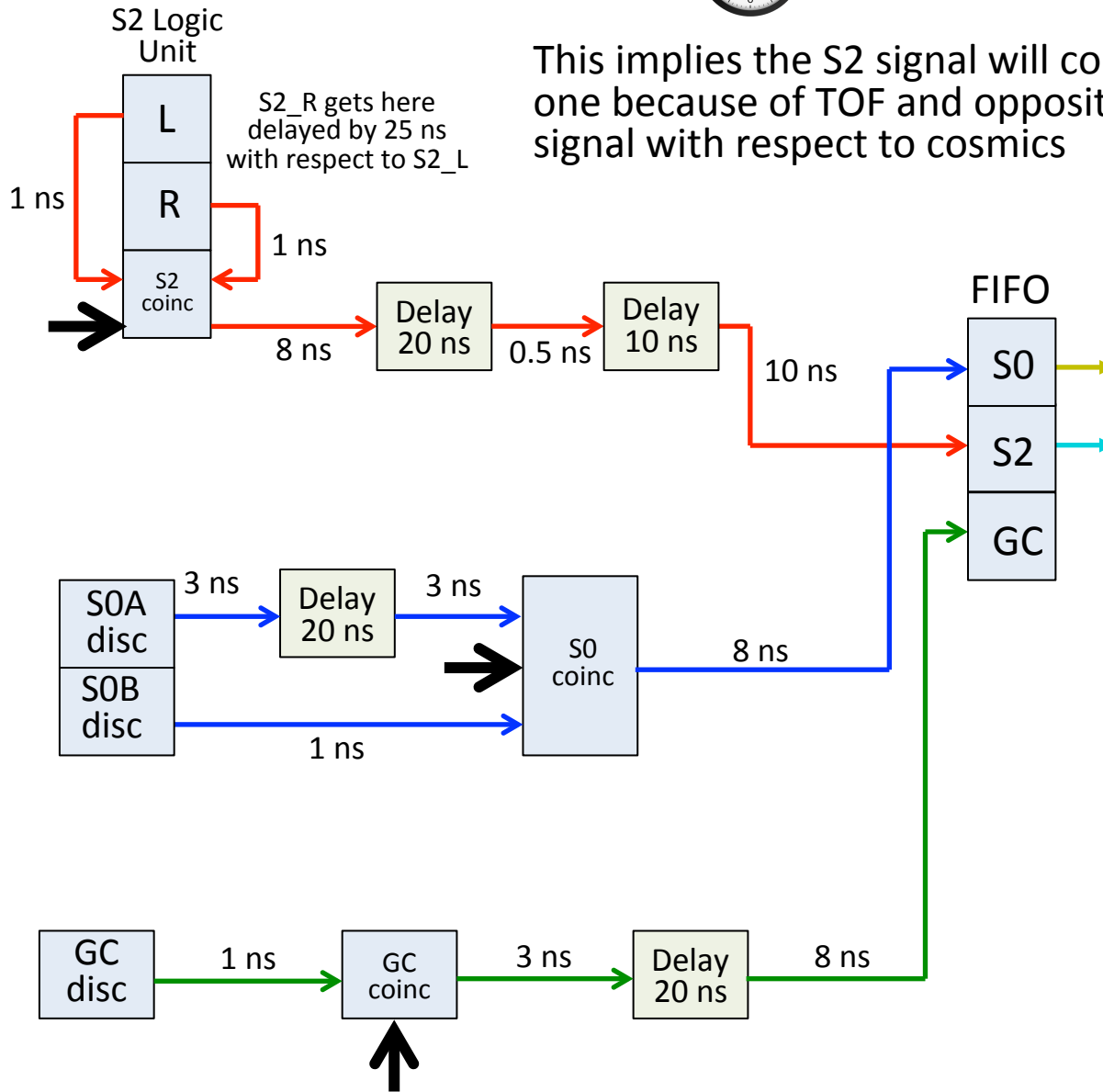


This implies the S2 signal will come 20ns after the S0 one because of TOF and opposite direction of real signal with respect to cosmics





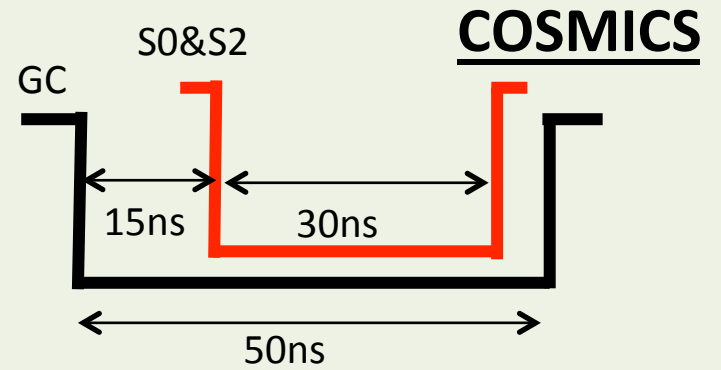
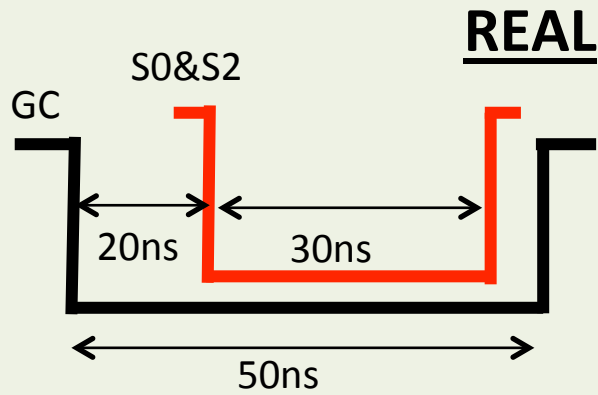
This implies the S2 signal will come 20ns after the S0 one because of TOF and opposite direction of real signal with respect to cosmics



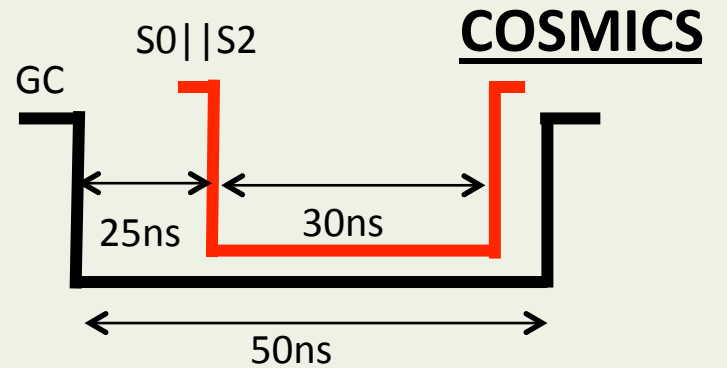
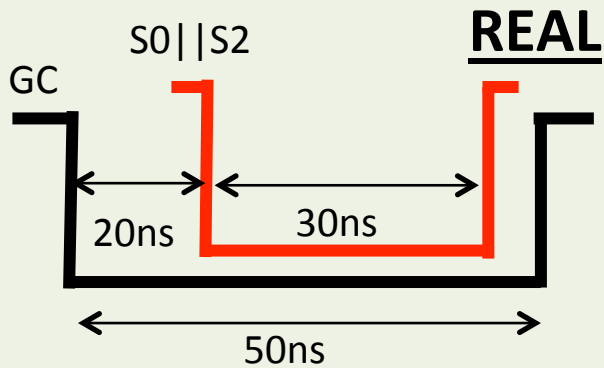
42 ns

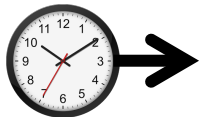
(Assuming 2.5ns TOF between scintillator and GC)

### (S0&S2)&GC

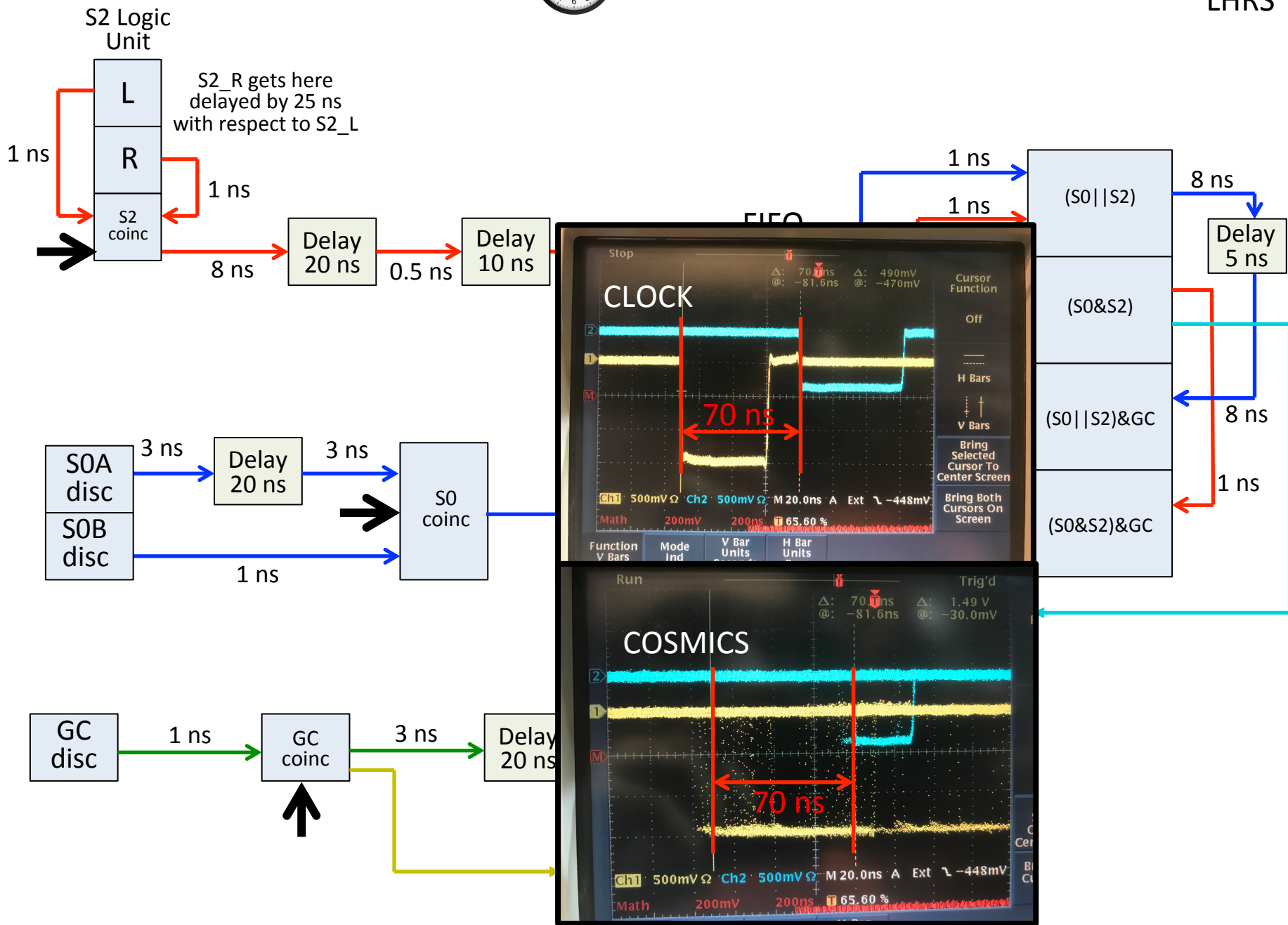


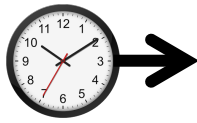
### (S0 || S2)&GC



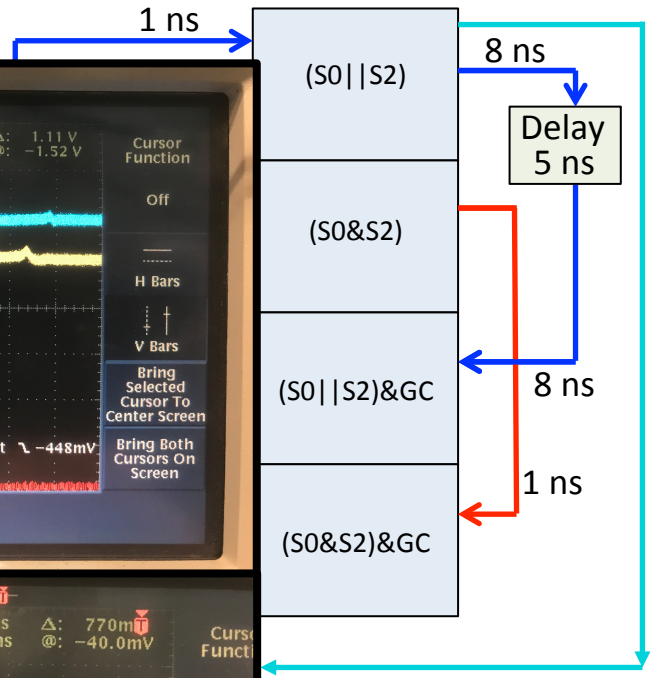
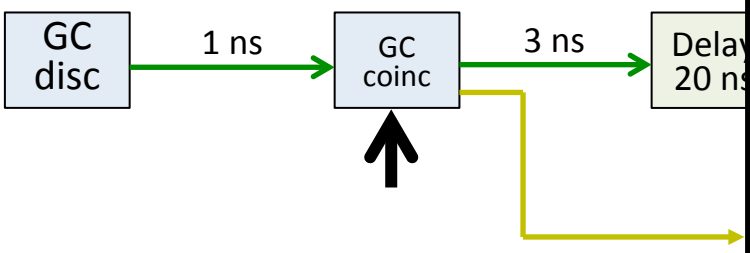
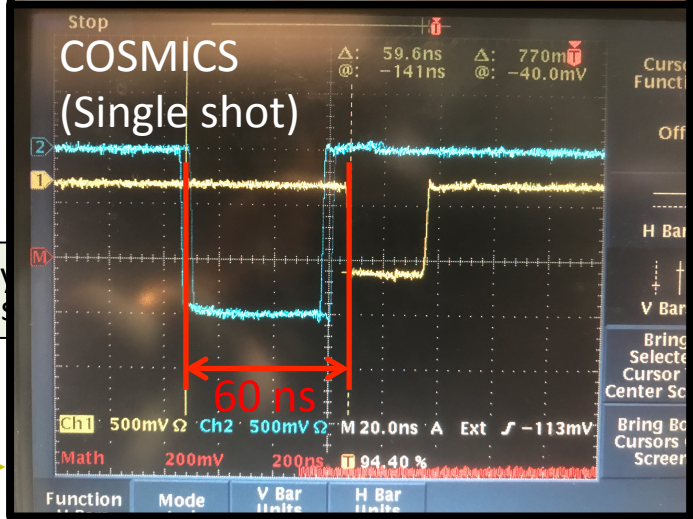
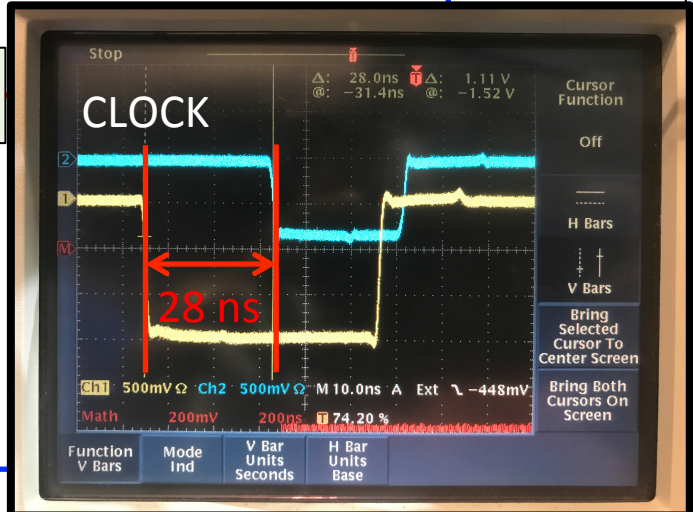
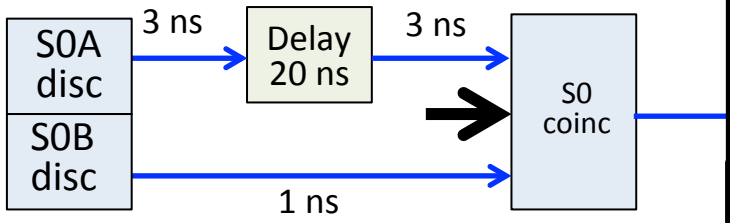
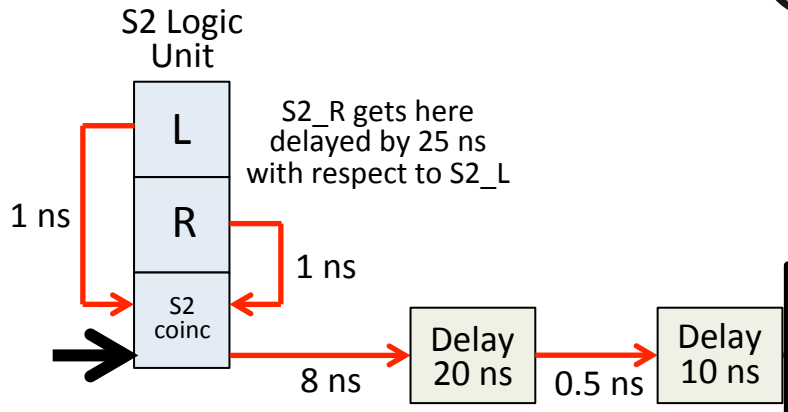


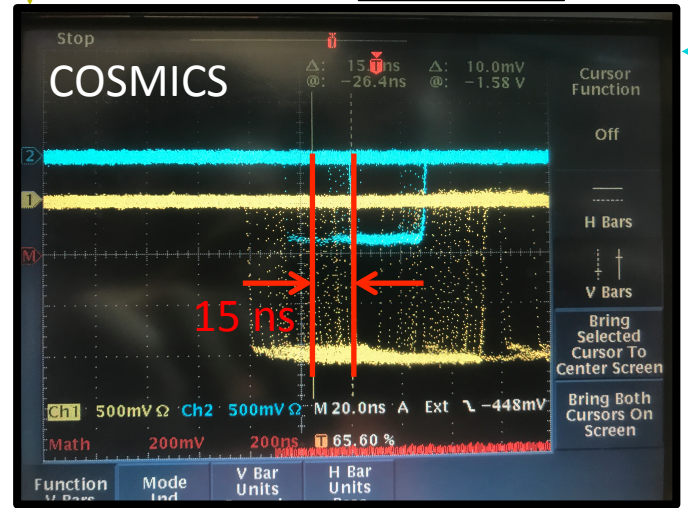
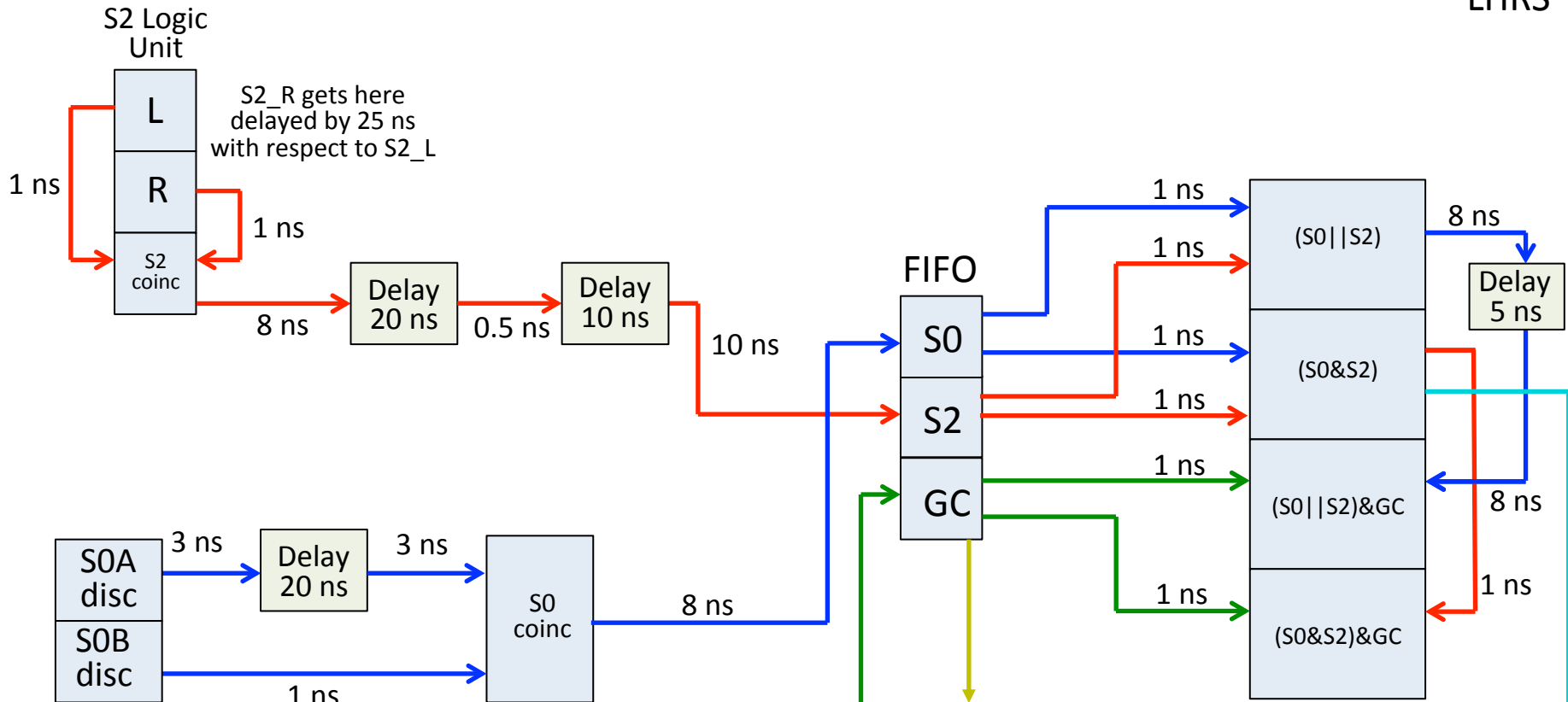
LHRS

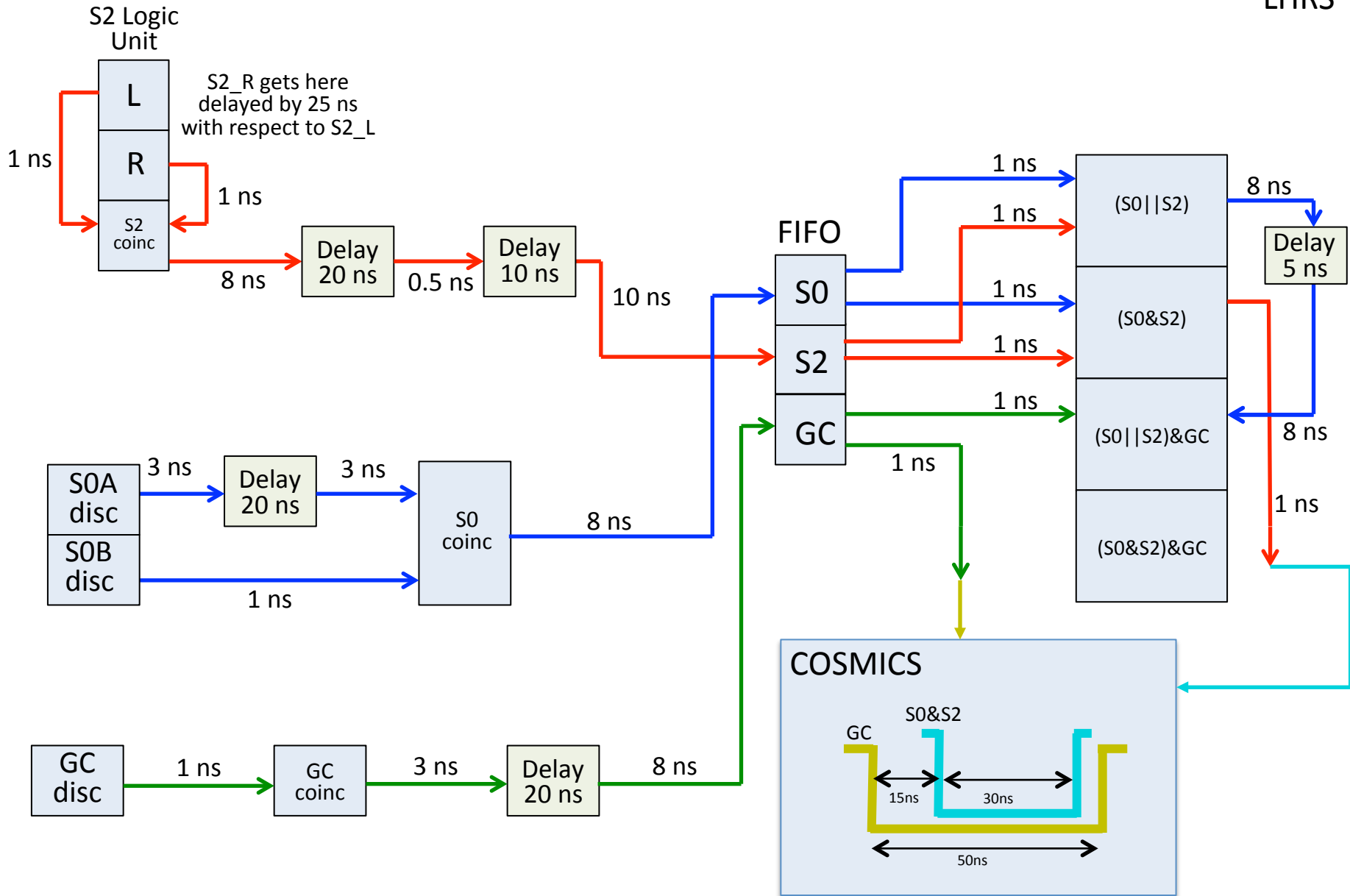




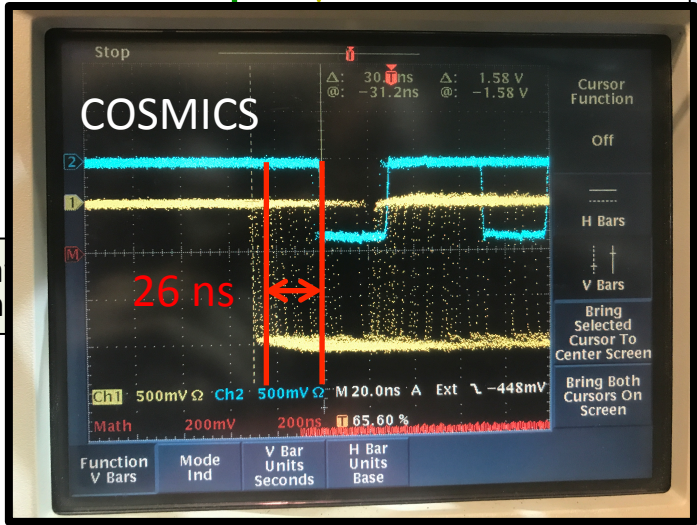
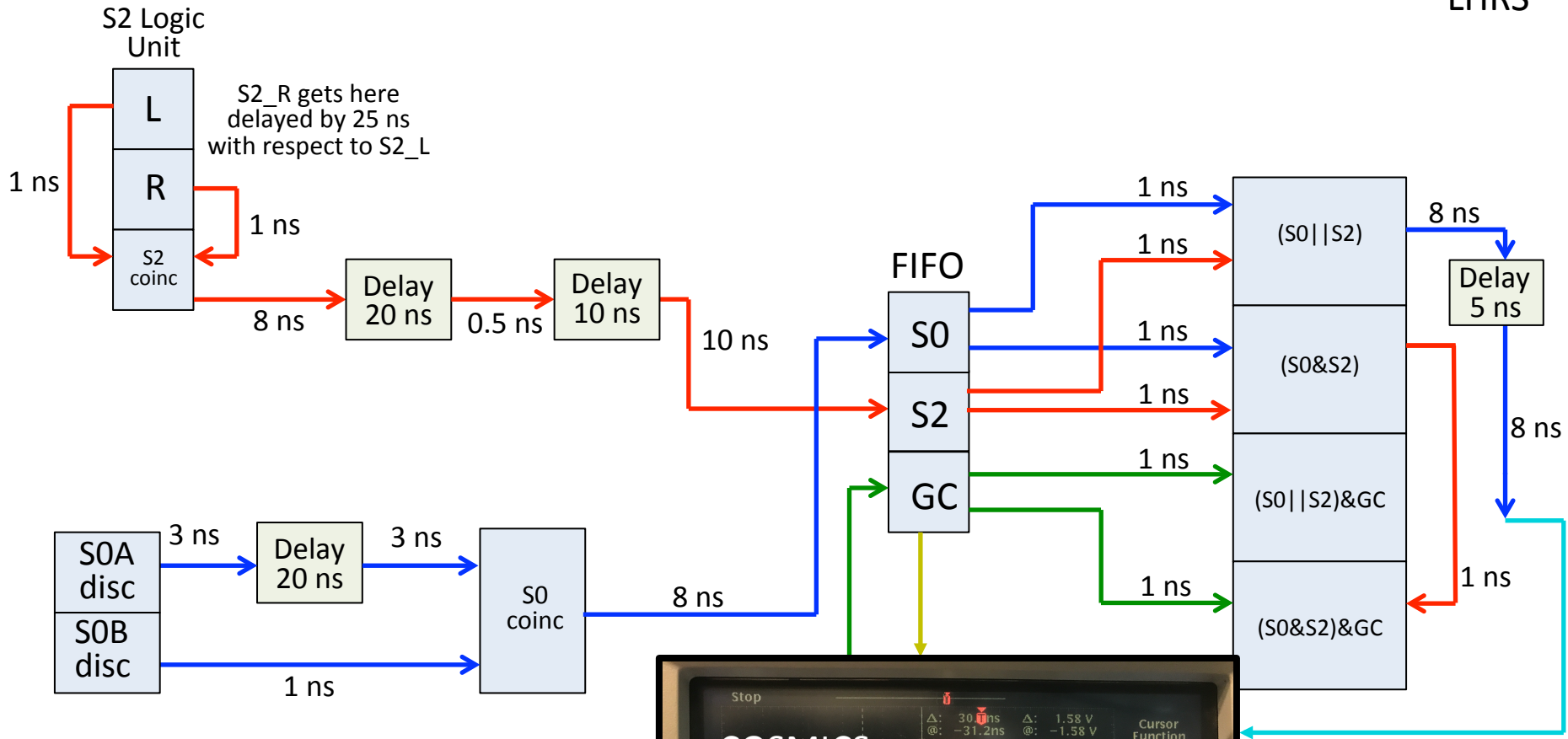
LHRS

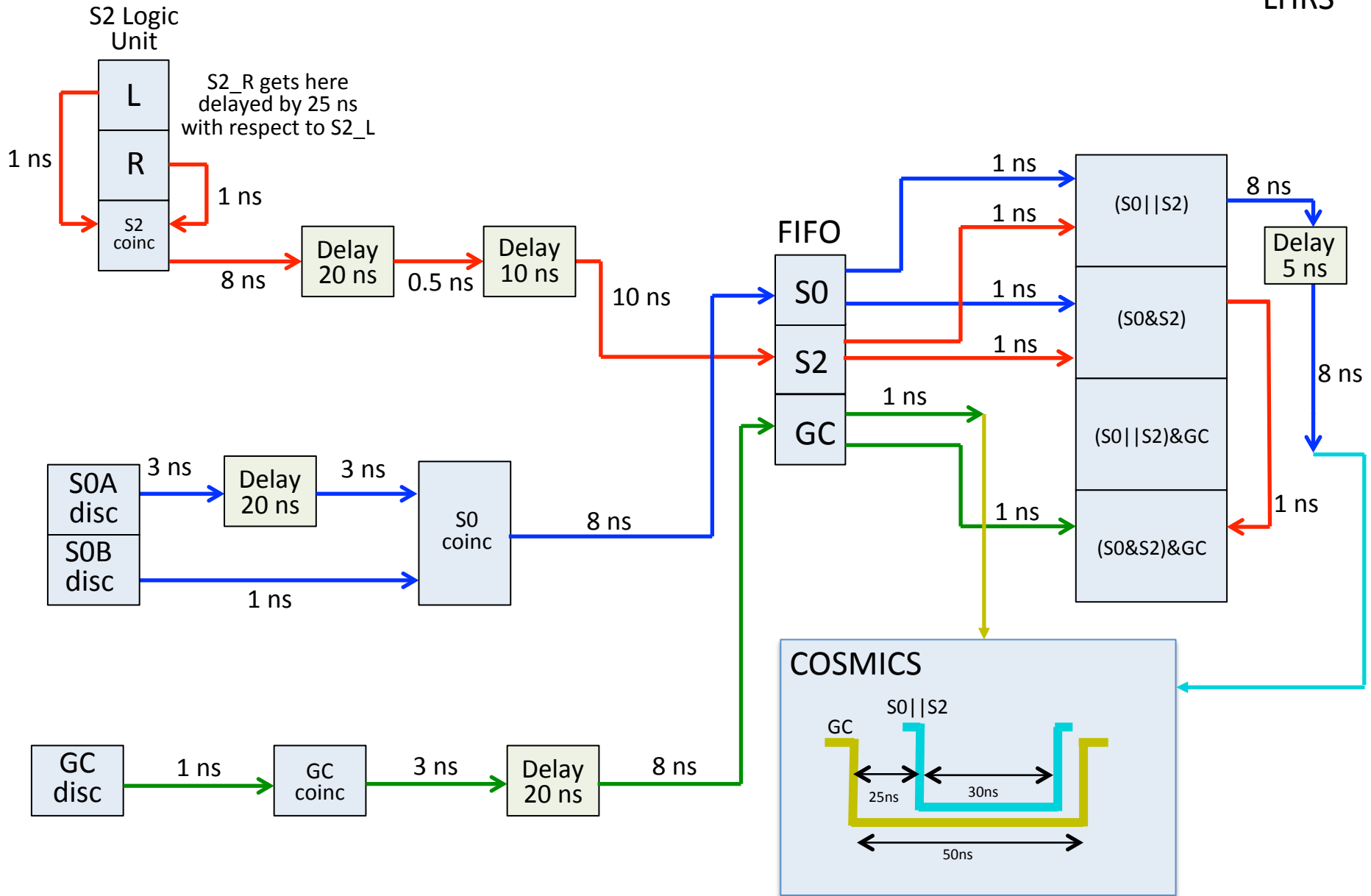




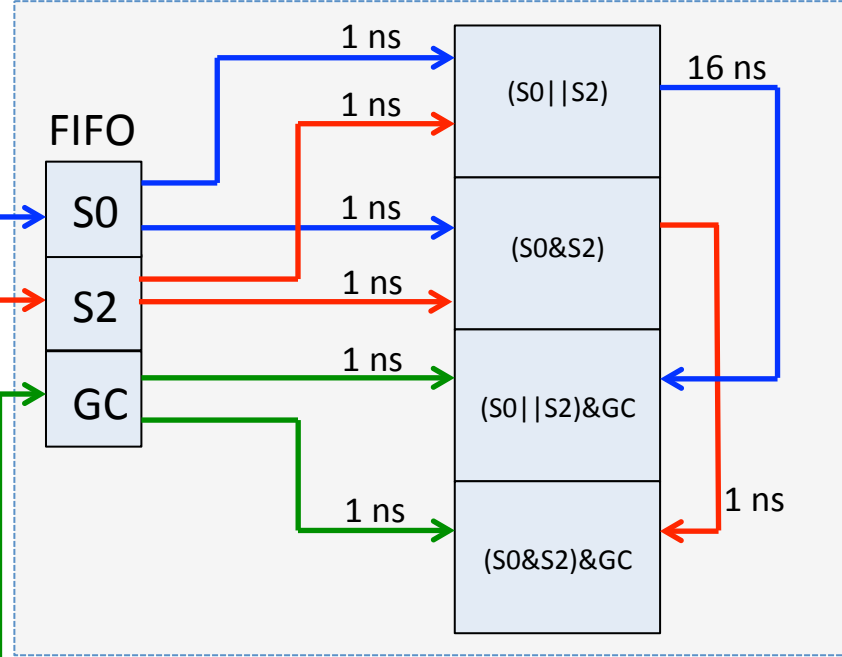
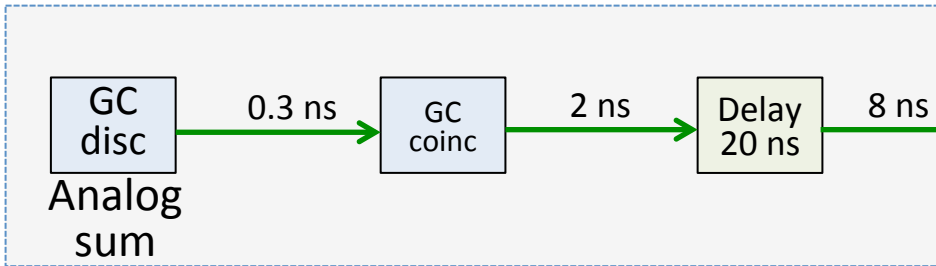
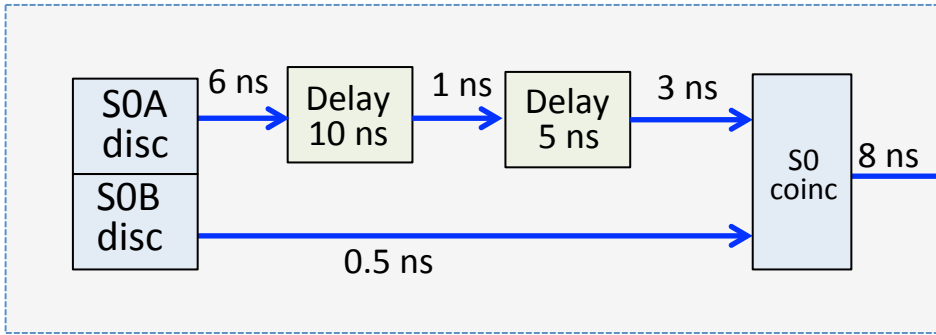
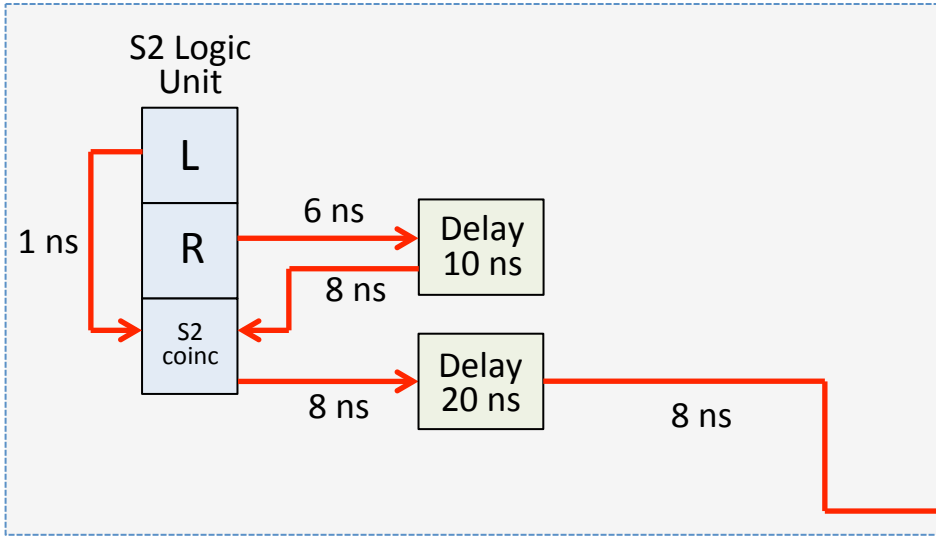


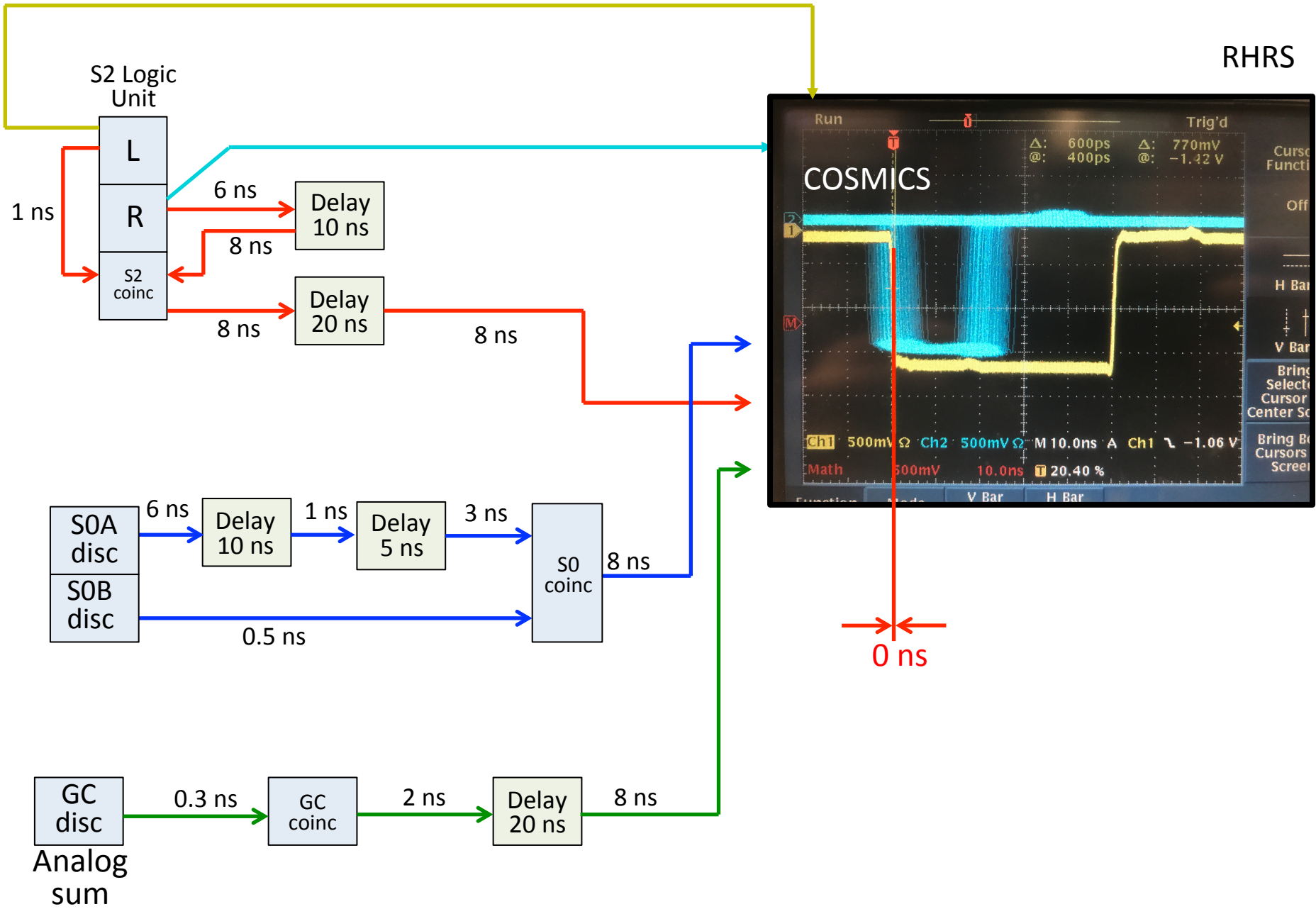


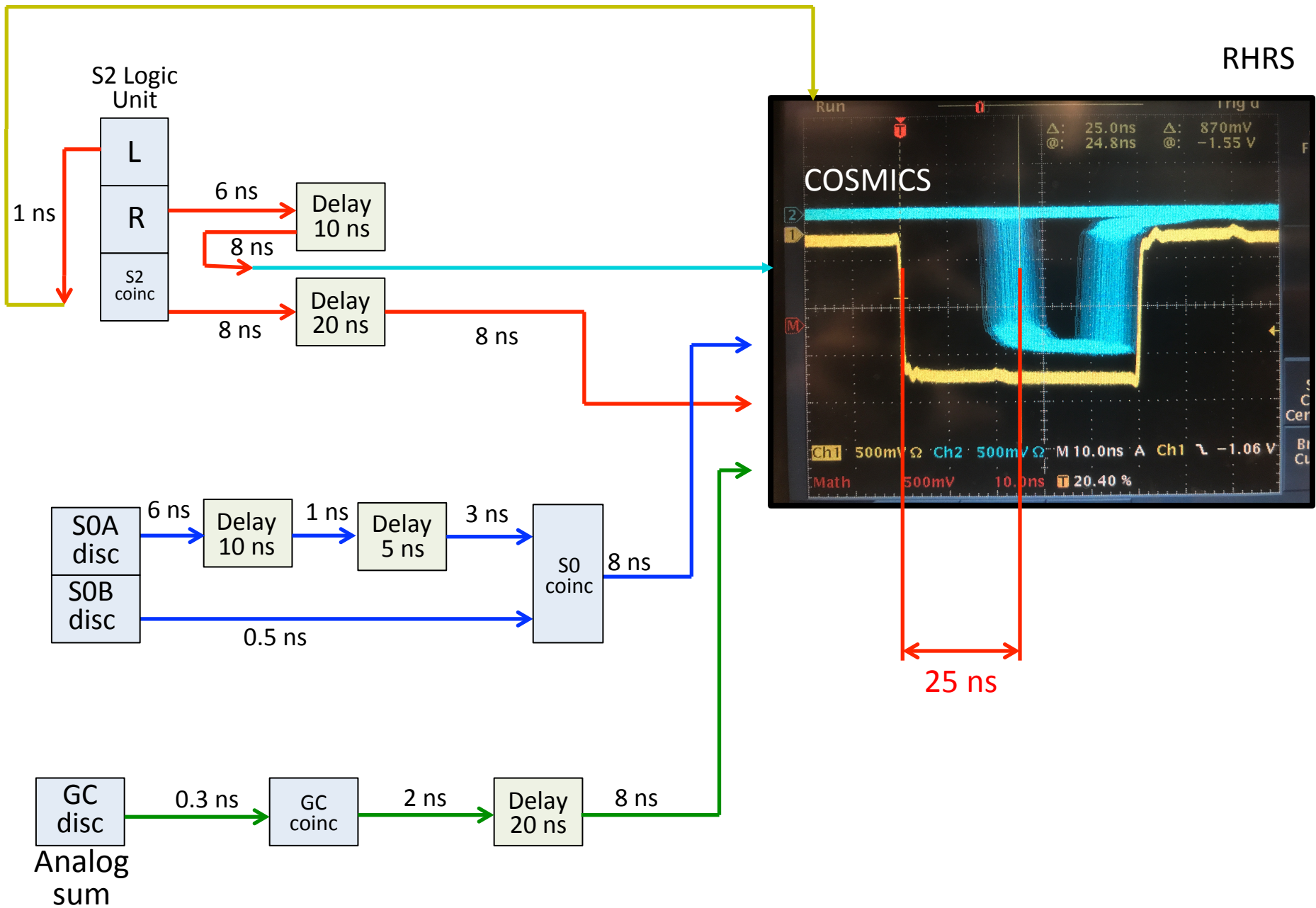


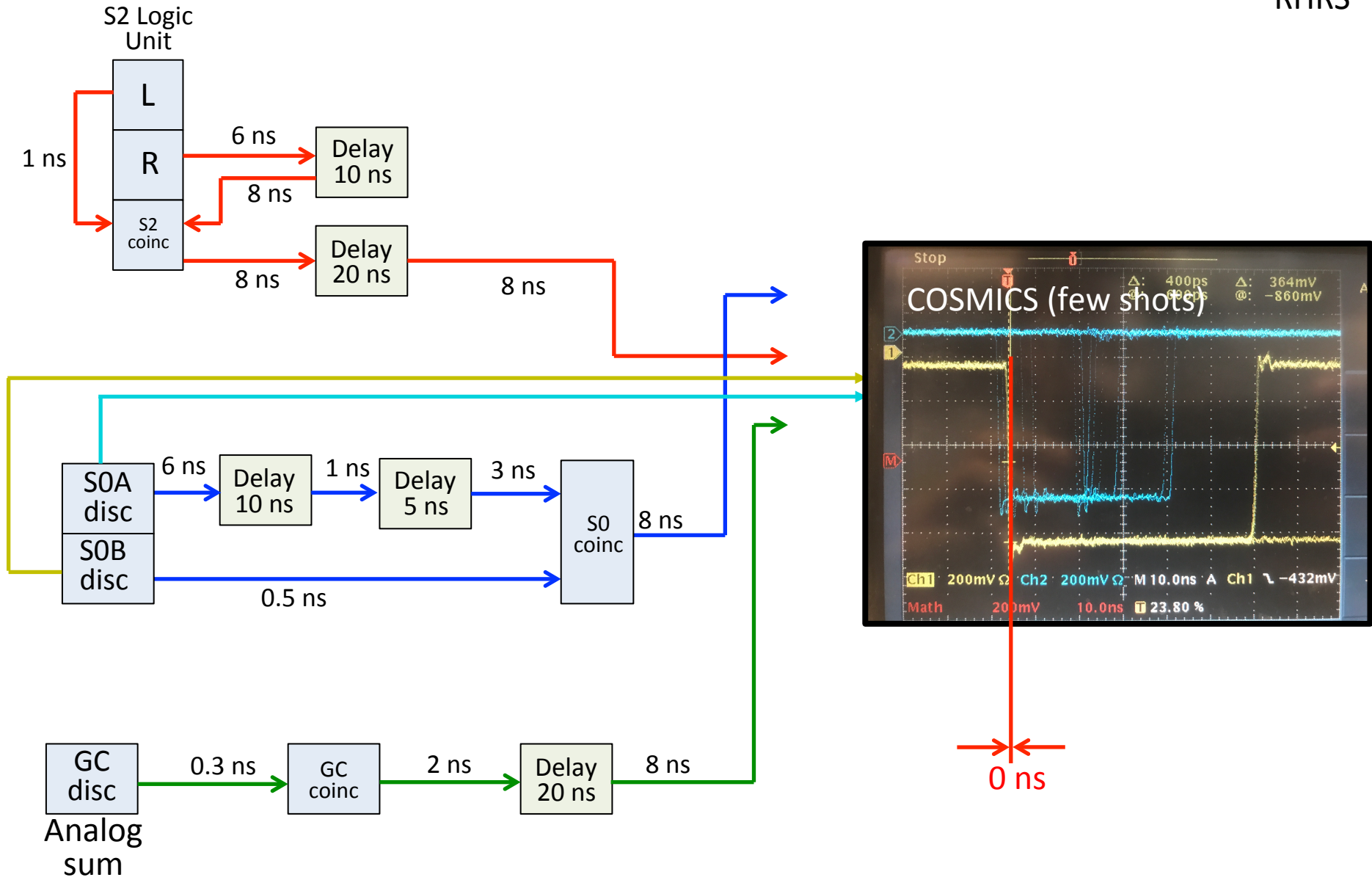


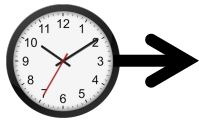
RHRS



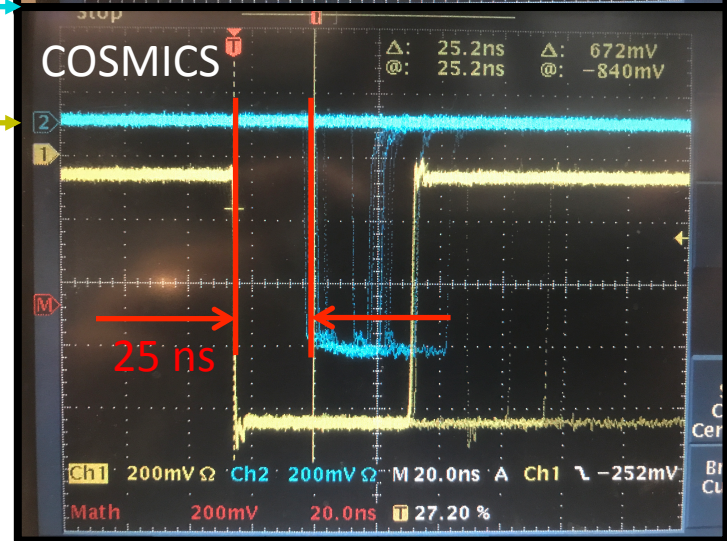
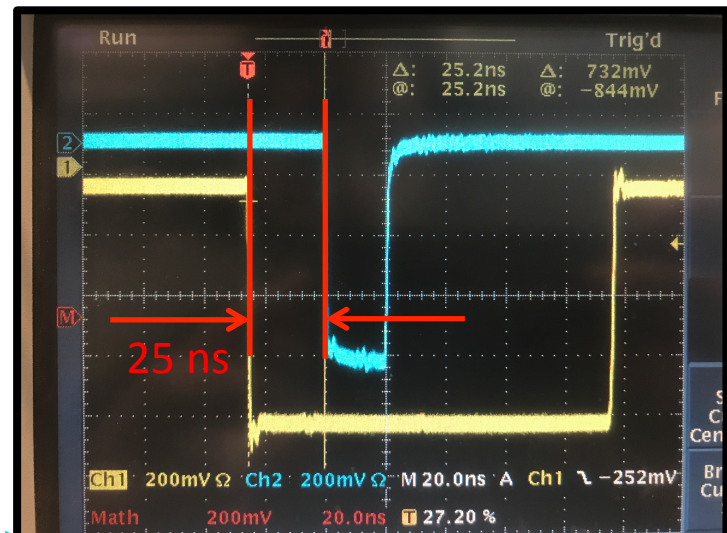
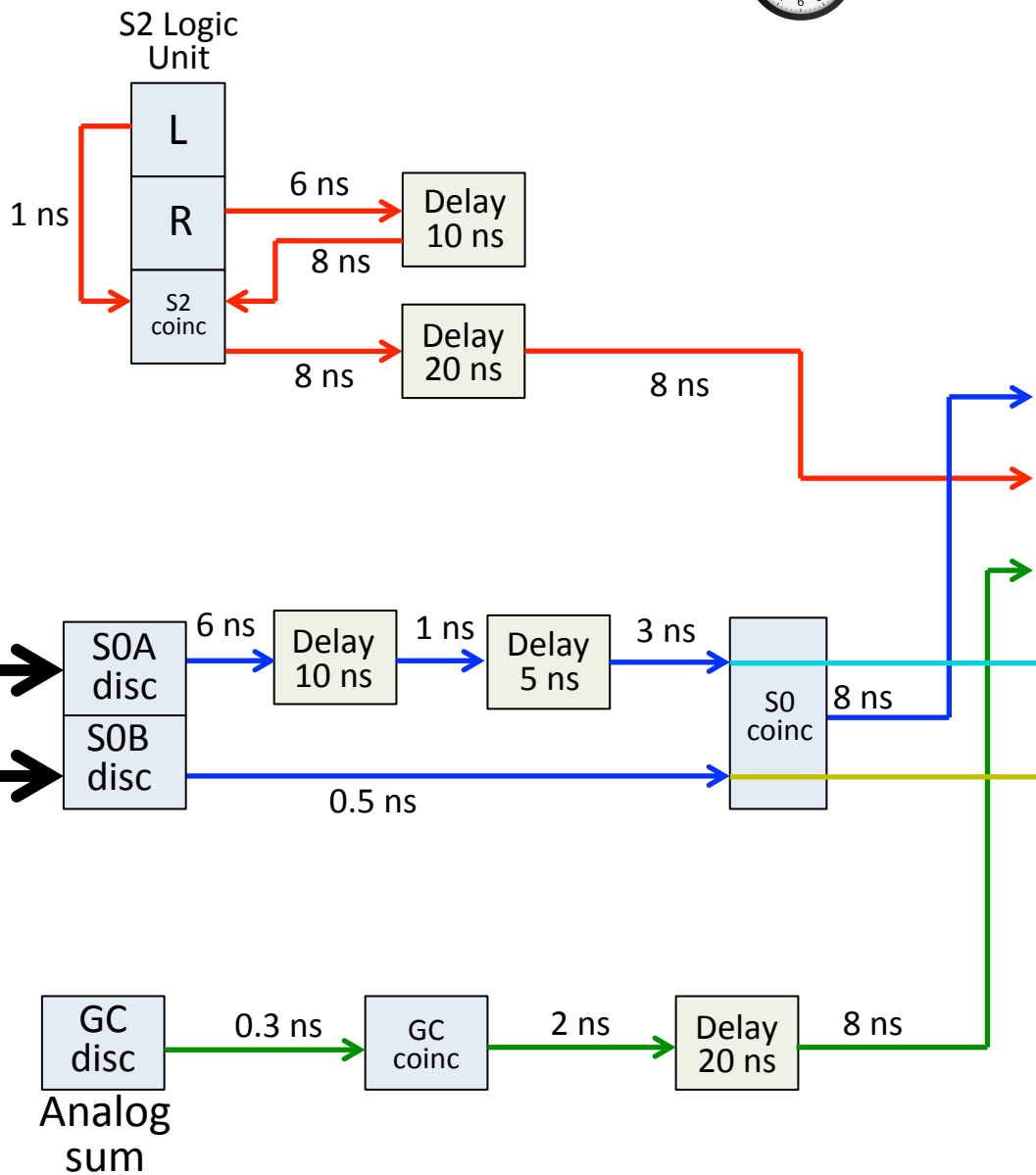




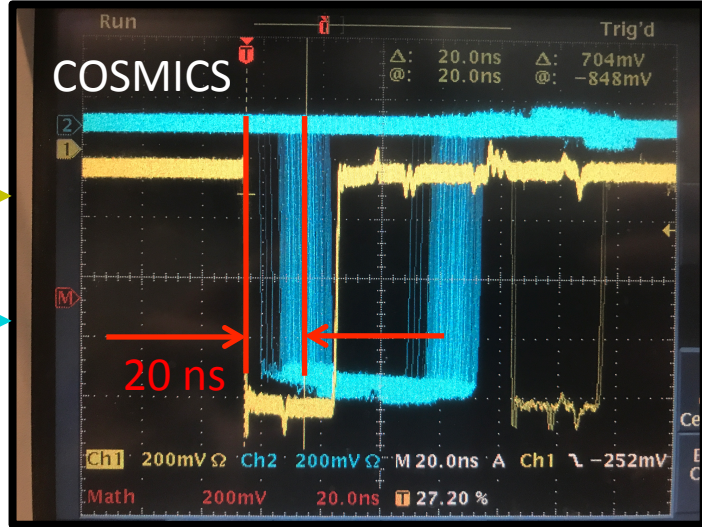
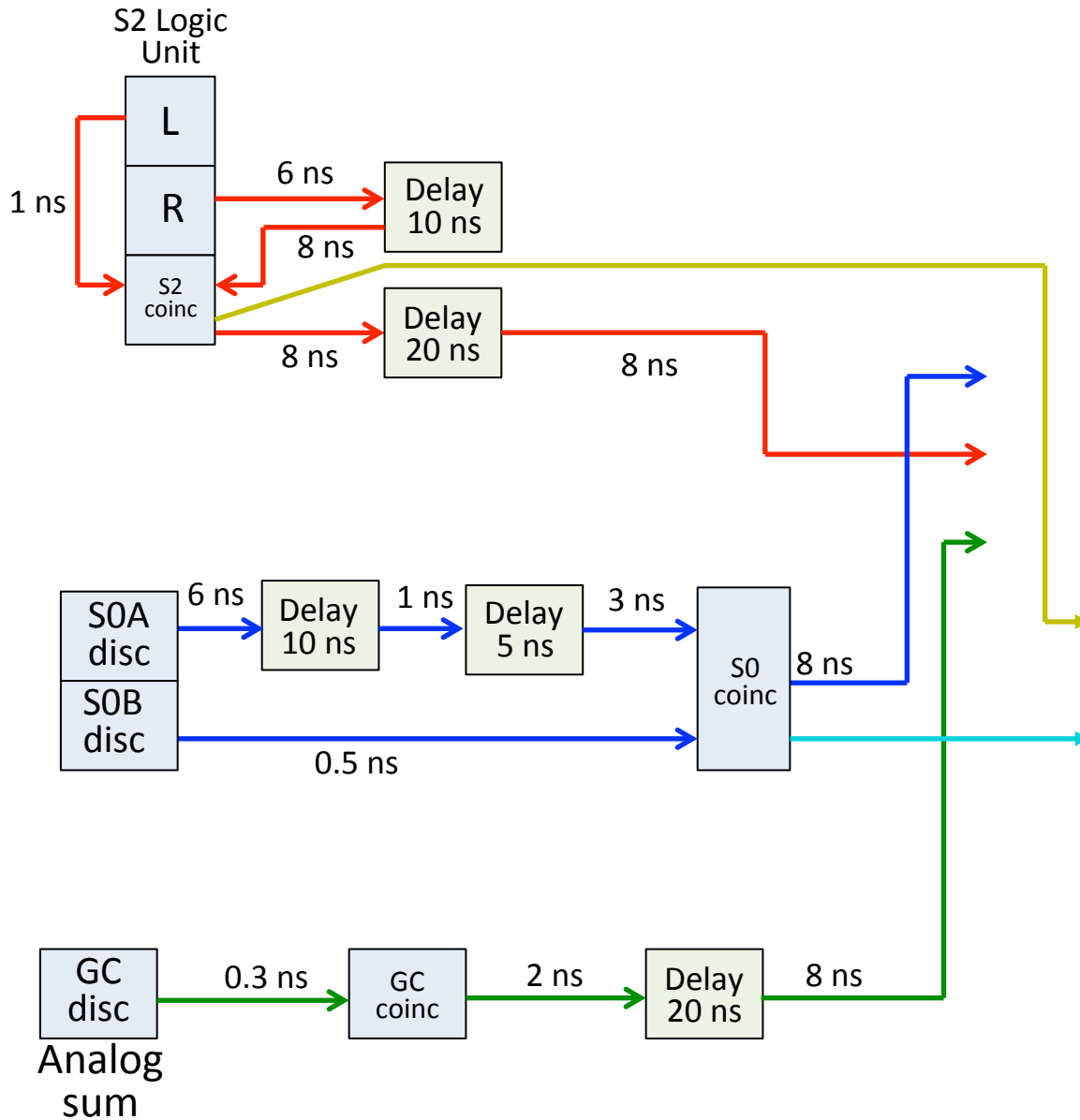




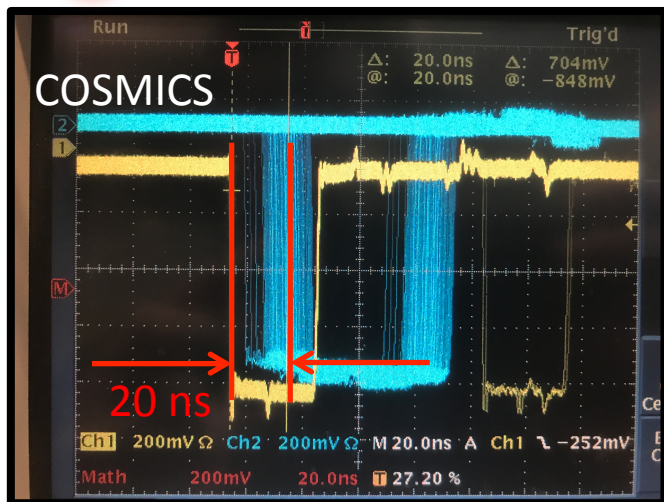
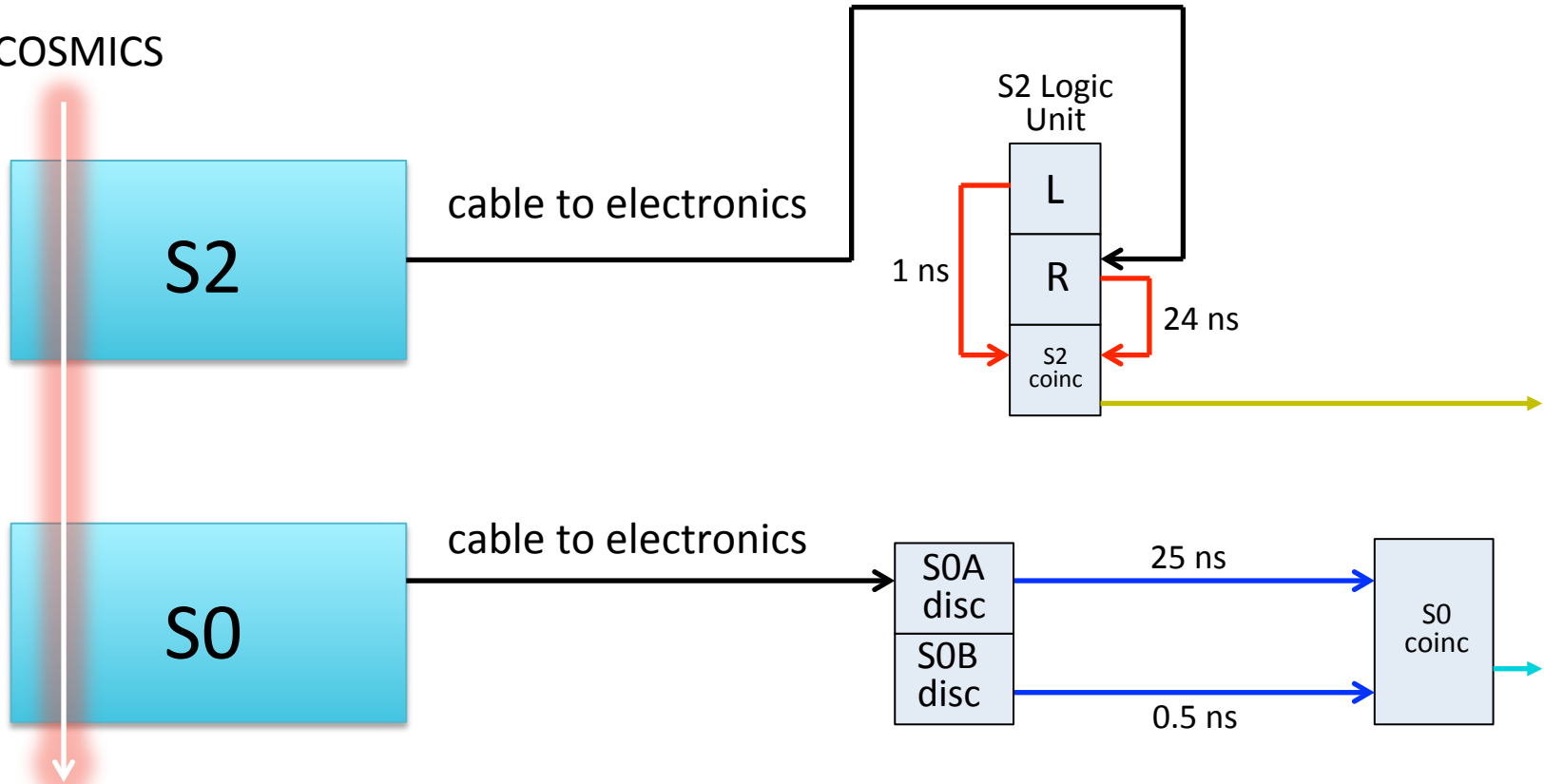
RHRS







COSMICS



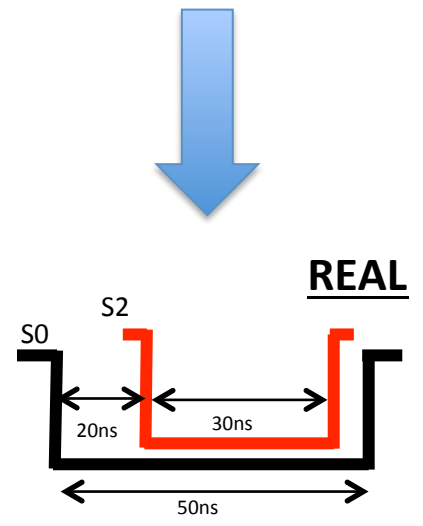
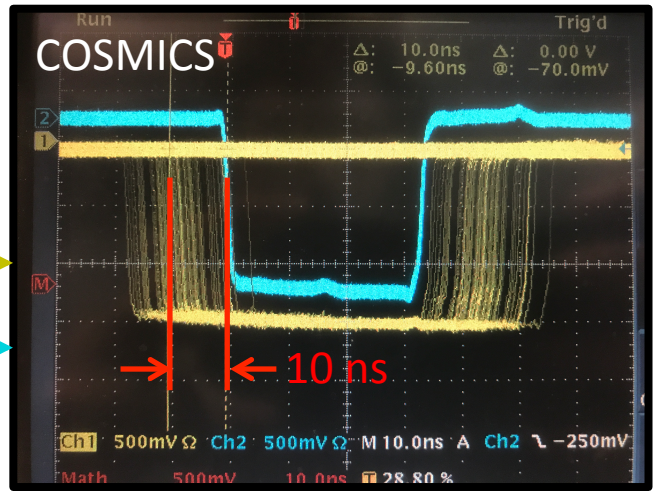
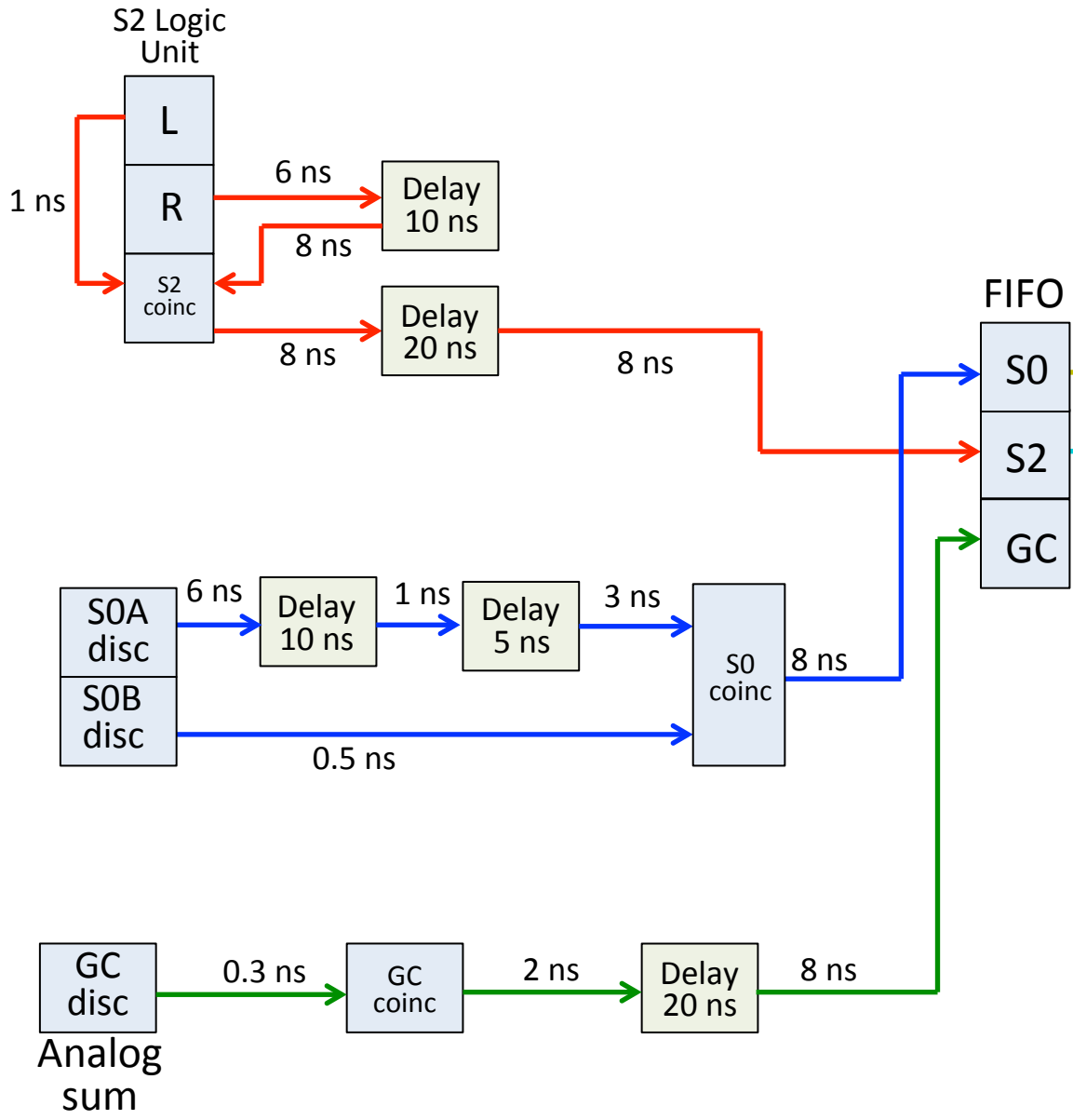
$$(S0 \text{ cable to electronics}) + 8\text{ns} + 25\text{ns} + 8\text{ns} + \text{TOF} \\ - (S2 \text{ cable to electronics} + 8\text{ns} + 25\text{ns} + 8\text{ns}) = 20\text{ns}$$

$$\Delta(S2-S0 \text{ cable length}) = 20\text{ns} - \text{TOF}$$

$$\text{TOF} \sim 5\text{ns}$$

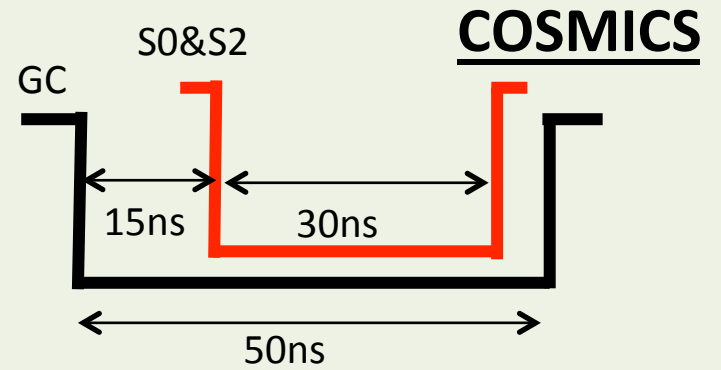
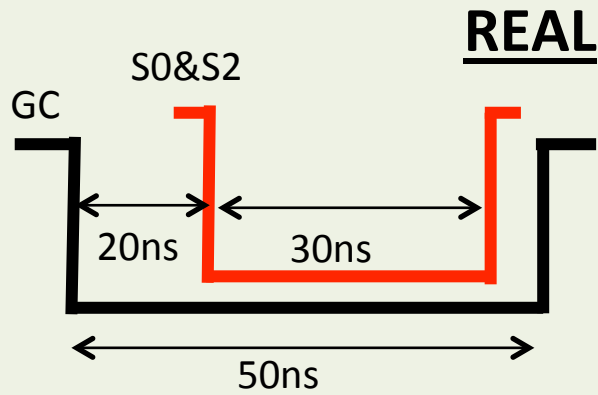
$$\Delta(S2-S0 \text{ cable length}) = 15\text{ns}$$

SOA cable is longer than S2\_R by 15ns



(Assuming 2.5ns TOF between scintillator and GC)

### (S0&S2)&GC



### (S0 || S2)&GC

