# Front End System Test


- Yellow
  - Fanout board output
- Magenta
  - Probe on ADC data bus
  - See cursors (~37ns)
- Cyan
  - CTP Trigger Out

# Complete Trigger Path

- Yellow
  - Fanout board output
- Blue
  - CTP Trigger Out
- Magenta
  - SSP Trigger Out
- Green
  - Front end SD Trig1 Out

# Trigger Path Measurements

**Sync to Data**

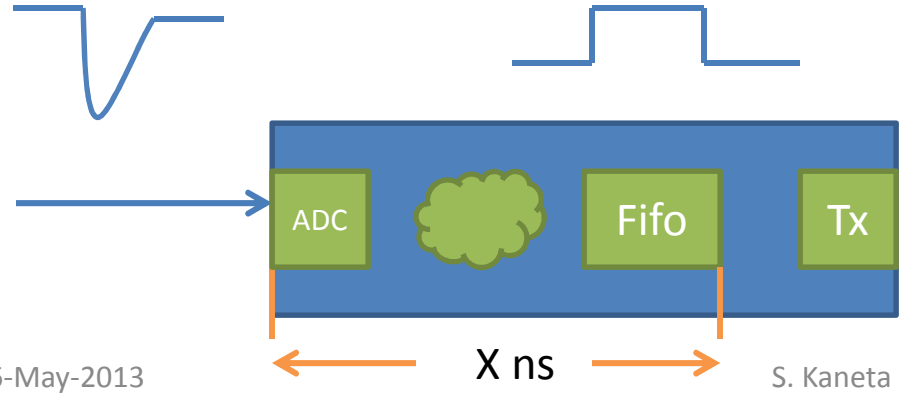
- 0ns – Sync released
- 432ns – Data at CTP
- 1.628us – Data at SSP
  - ~750 ns fiber delay (150m)
- 1.760us – Data at GTP

- Sync to Data shows the time from sync release to data appearing at the deserializer output of each module
- Processing is included
- Calculated by each module and reported by register

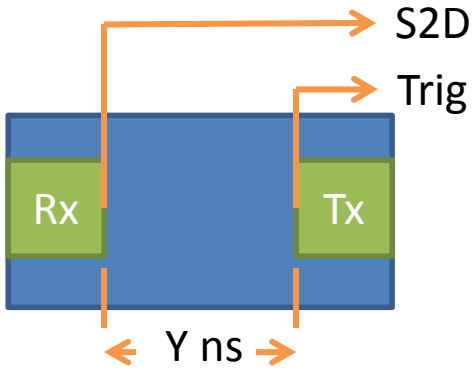
# Trigger Path Measurements

**Pulse into FADC**

- 0ns – Fanout board out
- 686ns – CTP Trigger Out
- 1.89us – SSP Trigger Out
- 2.035us – GTP Trigger Out
- 2.954us – FE SD Trig 1 Out

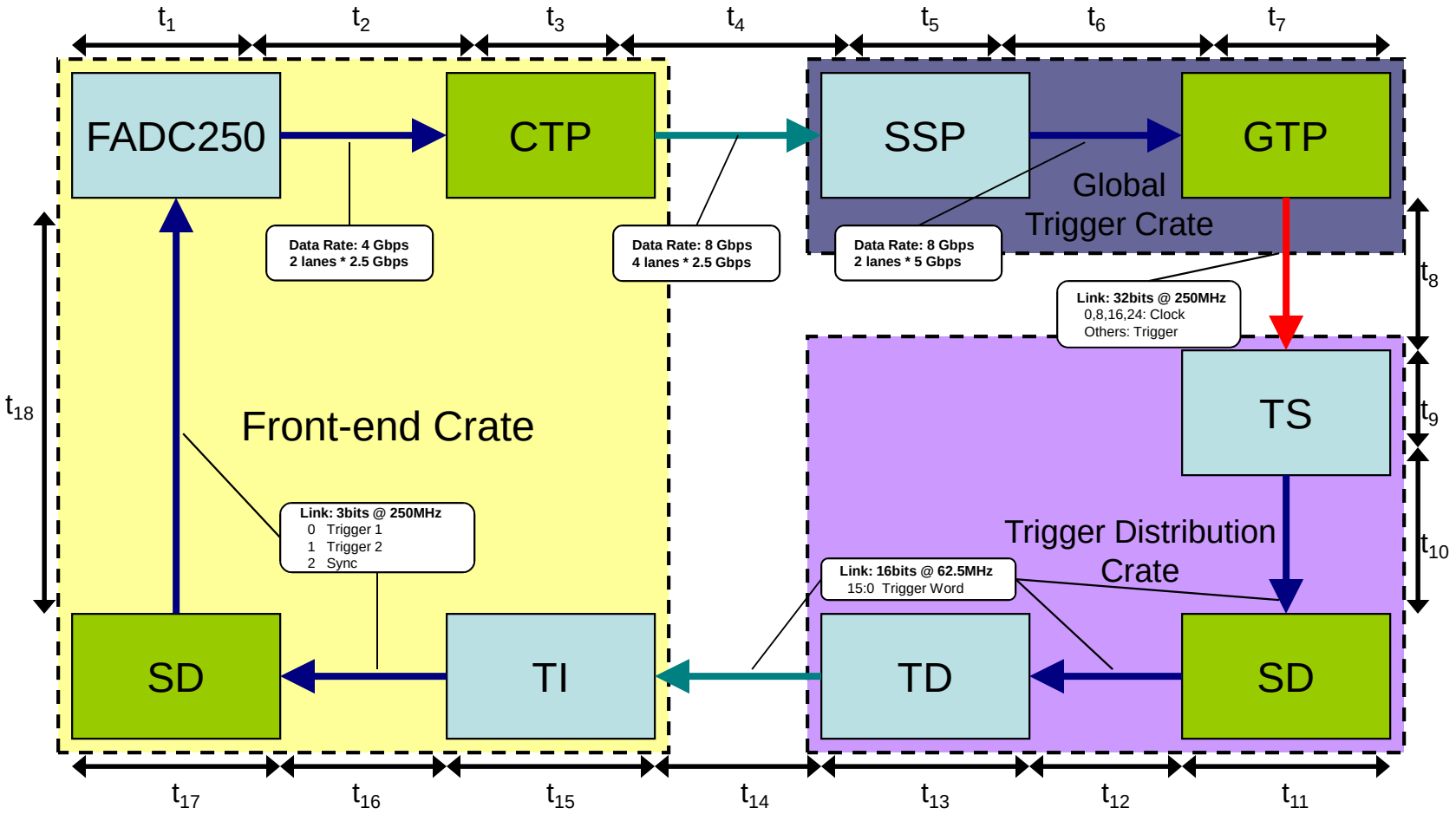



- This measures the actual trigger latencies
- Trigger Out - Sync to Data
  - X + Y = ~260ns
  - Includes
    - ADC to Fifo
      - A/D conversion ~37ns
    - Module processing
      - Varies by module (+/- 10ns)



# Measured D Level 1 Trigger Timing

Fill in the ?




| | | | |
|---|---|---|---|
| $t_0$: Fanout | | 0 ns | 0 ns |
| $t_1$: FADC250 | (ADC->Tx) | | ? |
| $t_2$: FADC250->CTP | (SERDES + VXS) | | |
| $t_3$: CTP | (Rx->Tx) | | 686 ns |
| $t_4$: CTP->SSP | (SERDES + Fiber) | | |
| $t_5$: SSP | (FiberRx->Tx) | | 1.89 us |
| $t_6$: SSP->GTP | (SERDES + VXS) | | |
| $t_7$: GTP | (Rx->TrigBit) | | |
| $t_8$: GTP->TS | (Densishield) | | 2.035 us |
| $t_9$: TS | (TriggerBitIn->Tx) | | ? |
| $t_{10}$: TS->SD | (Serializer) | | |
| **Total:** | | | |

| | | |
|---|---|---|
| $t_{11}$: SD | (Px->Px) | Passive? |
| $t_{12}$: SD->TD | (Px->P0) | |
| $t_{13}$: TD | (P0->FiberTx) | Passive? |
| $t_{14}$: TD->TI | (Deserializer) | |
| $t_{15}$: TI | (FiberRx->P0) | ? |
| $t_{16}$: TI->SD | (P0->Px) | |
| $t_{17}$: SD | (Px->Px) | 2.954 us |
| $t_{18}$: SD->FADC250 | (Px->P0) | |
| $t_{19}$(?): FADC Buffer Processing | | |

**Fiber Optic Link**
**Densishield Cable**
**VXS Backplane**

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