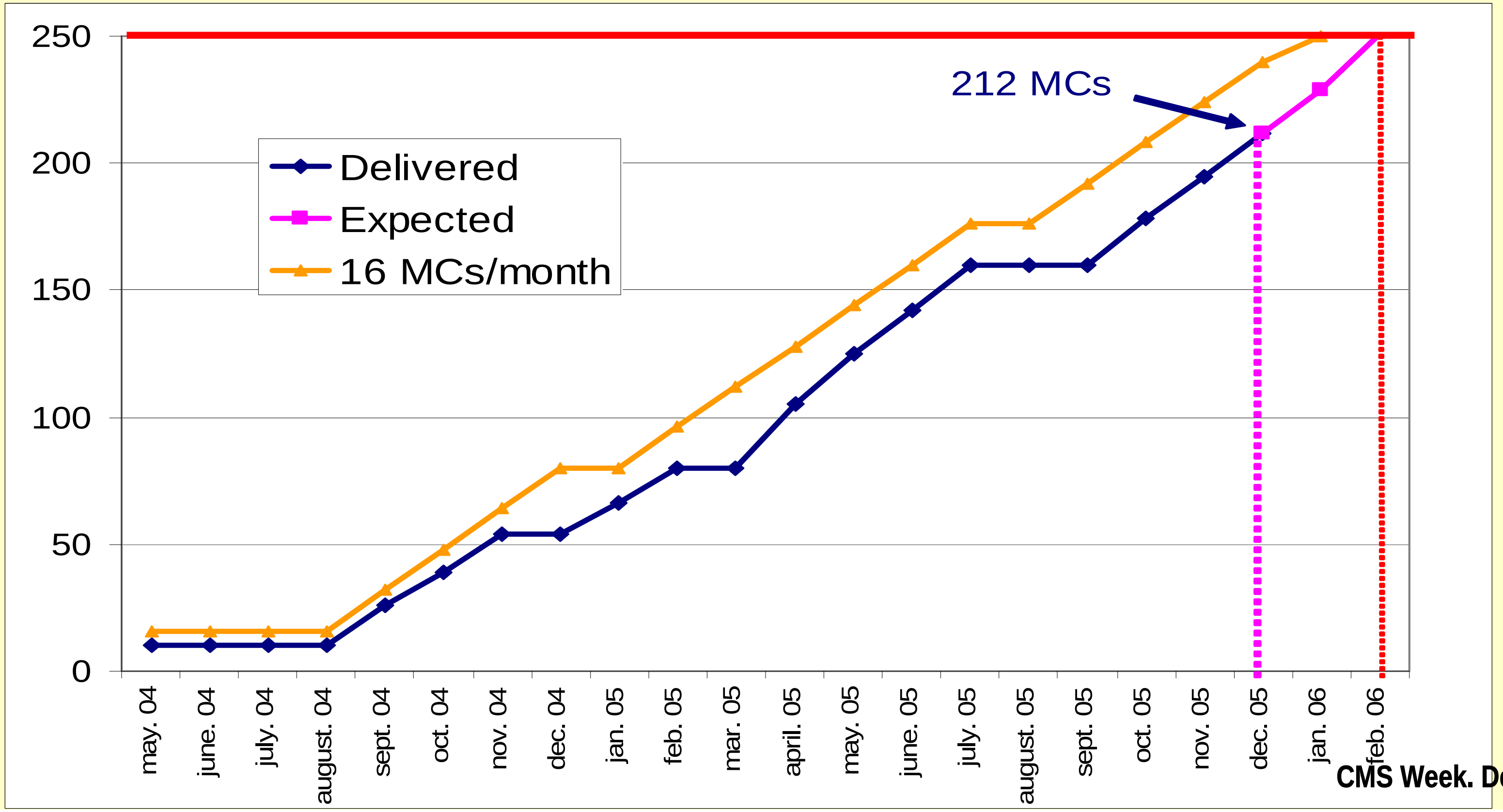
RO-MC production
ROS-25 status
40 MHz patterns

RO MINICRATE PRODUCTION STATUS

- Up to 212 MCs have already been delivered to Legnaro, 85% of the production is finished.

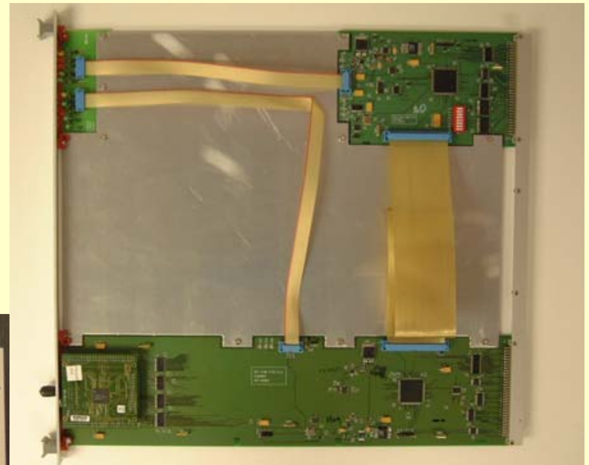
- Production of 250 MCs will be finished by february:
  - 17 MCs will be delivered as soon as possible in january.
  - 22 MCs will be delivered by beginning of february.

- Afterwards, the spares will be assembled (between 14 – 19 MCs spares, according to the availability of parts).



ROS-25 STATUS

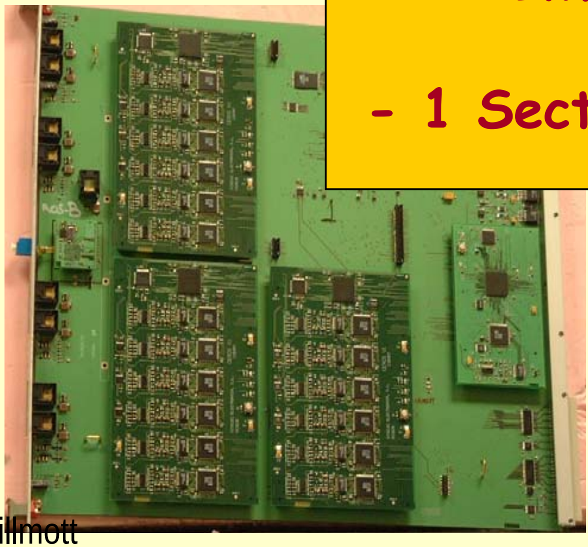
- The part needed to test the interface with the DDU is already finished. The tests could start as soon as Torino is ready.
- For the full ROS-25, we had a problem with one of the piggy boards and we had to produce the PCB again.
- New PCB is now at CIEMAT and we are finishing the tests.
- Hopefully, by the end of next week we could deliver to Legnaro:

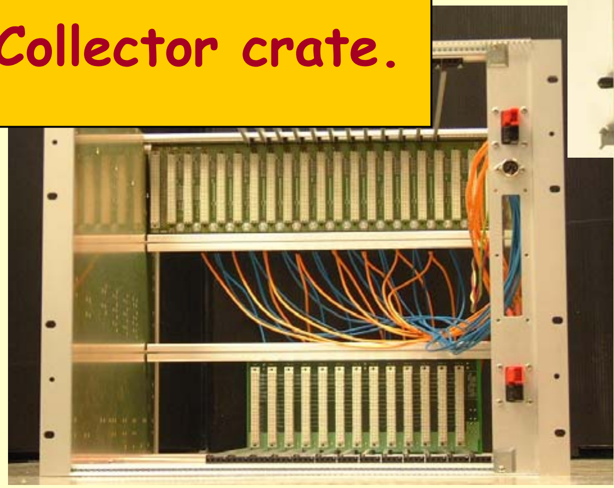


- 1 ROS-25.

- 1 TIM board.

- 1 Sector Collector crate.

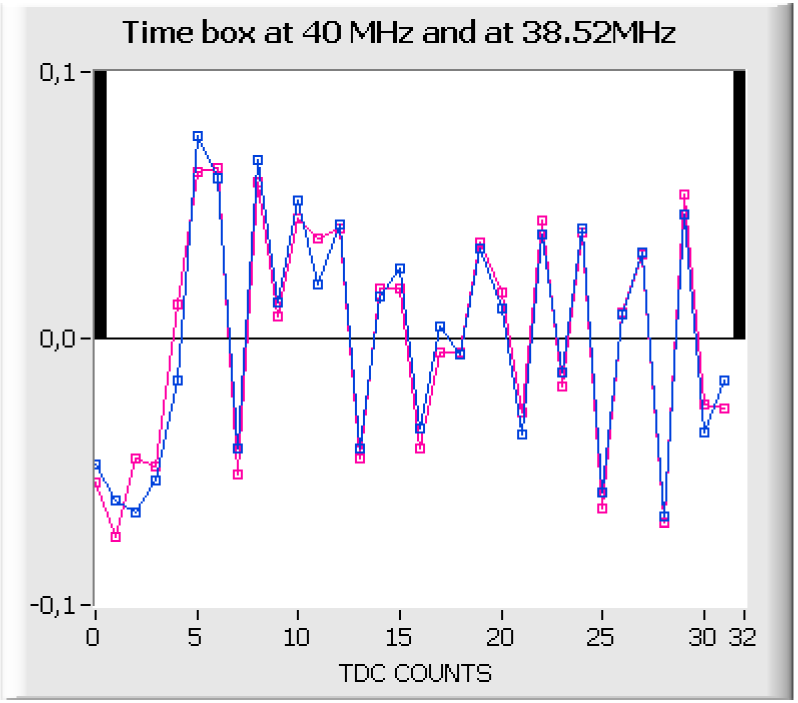


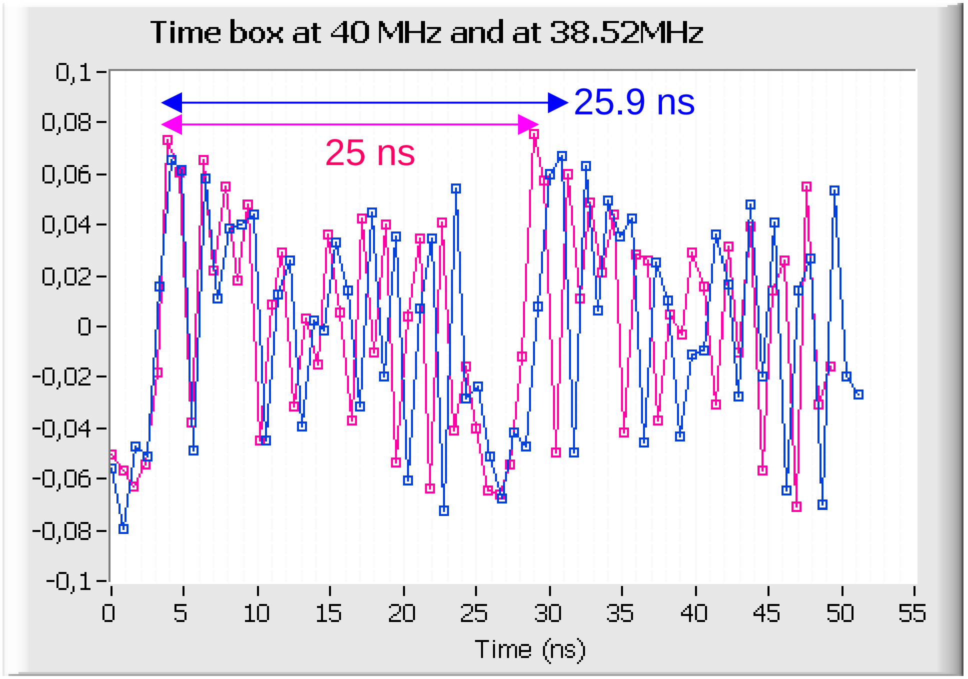


40 MHz patterns

Modulation of the time measurement by the ROB clock.

RO-MC (no TRBs) working at LHC clock, and ROB 1 with an external 38,52MHz clock.

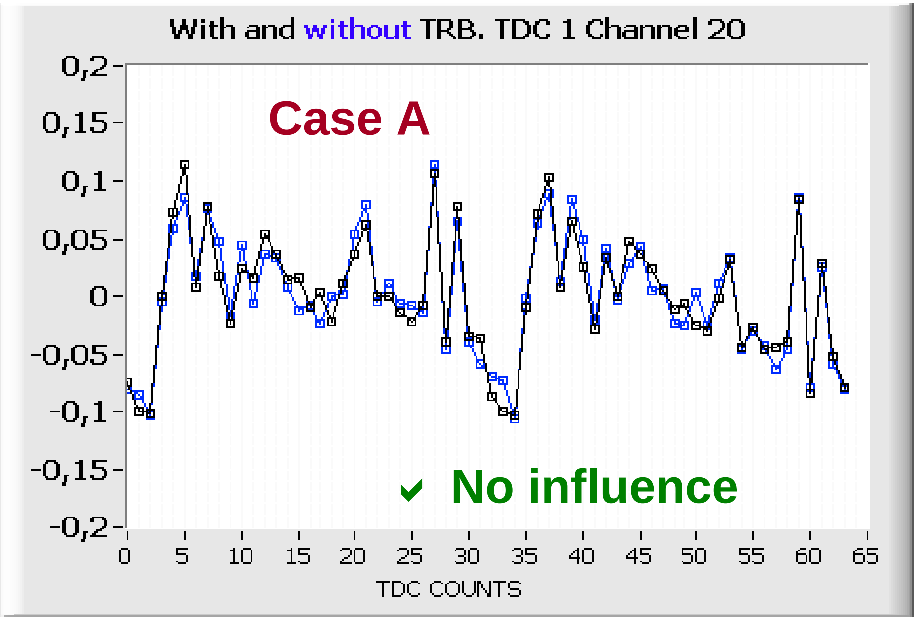


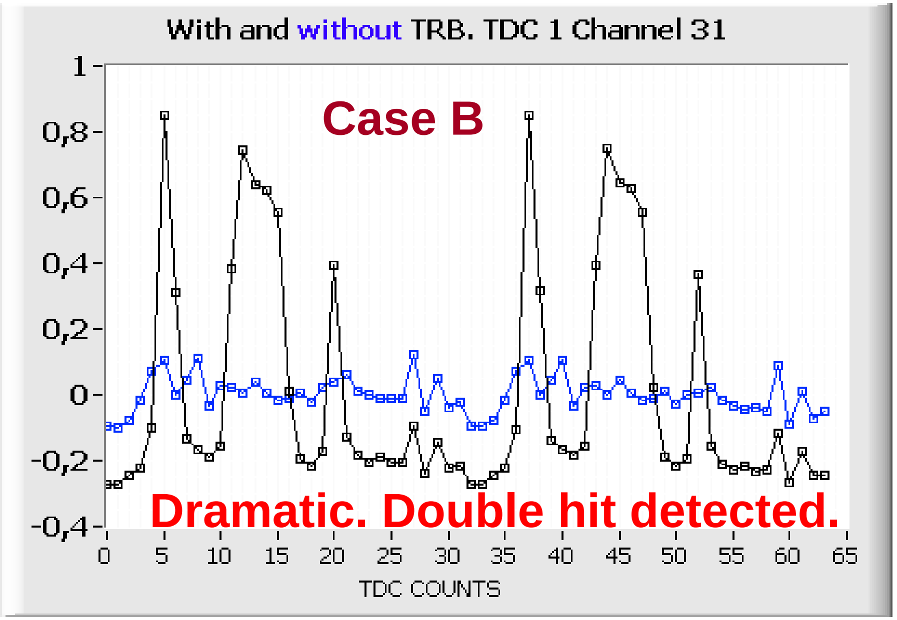


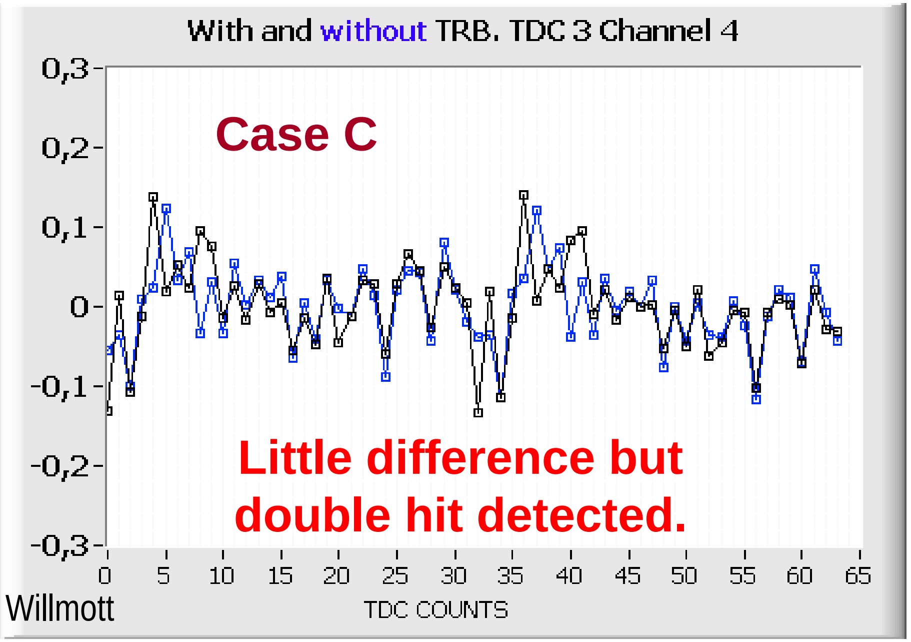
<u>Conclusion</u>:

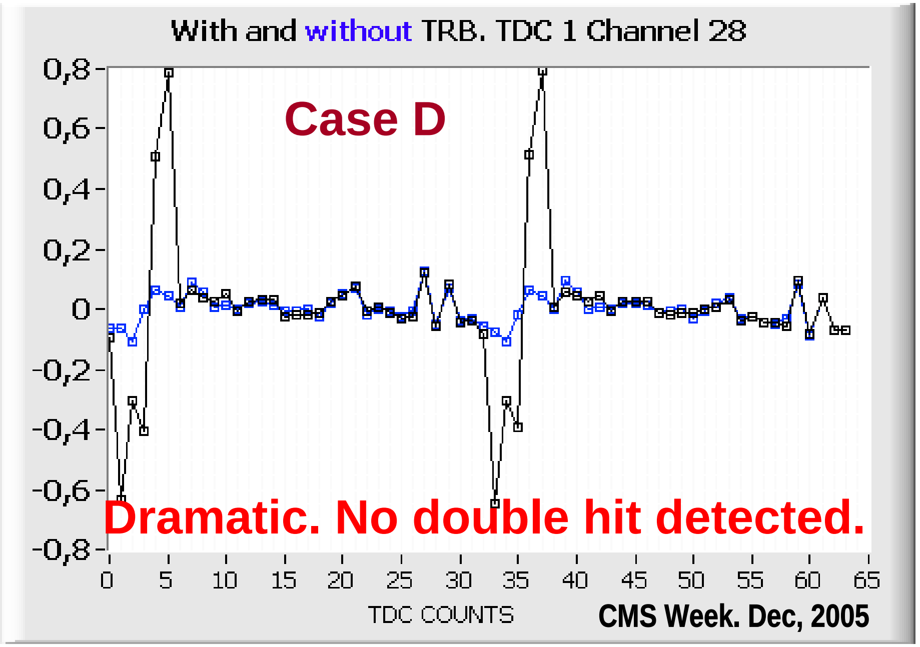
The modulation present at the time measurements (±10%) is due to the clock at each ROB (no influence of the MC clock).

Time boxes of different channels with and without TRB



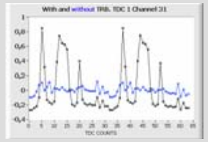


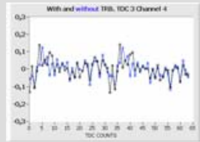




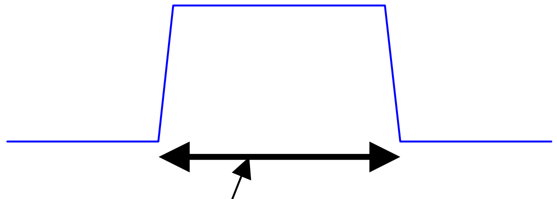
C. Willmott

Cases B and C: Double hit detected.





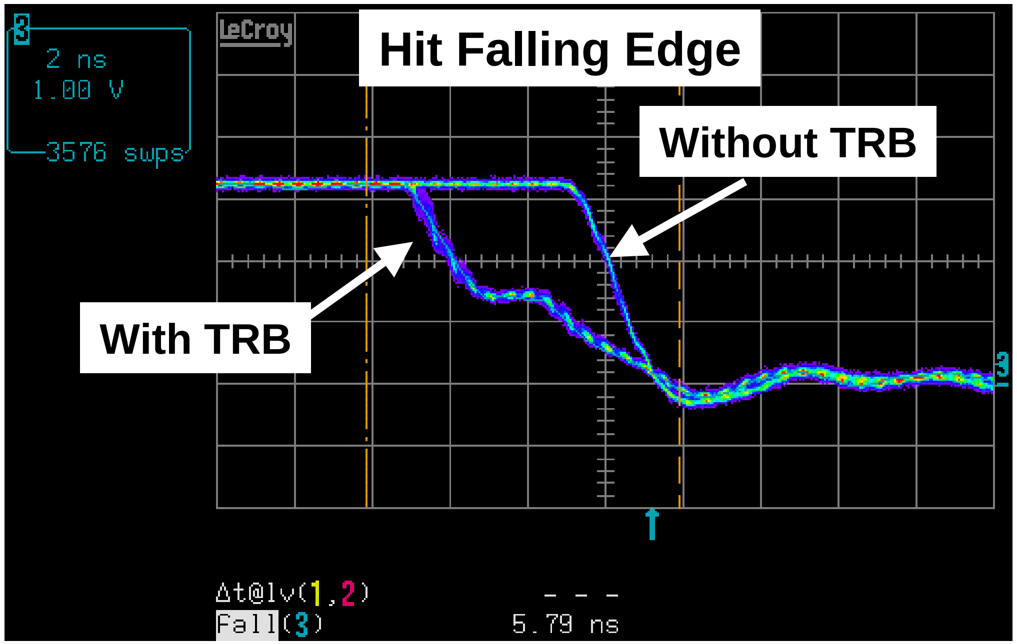
Looking at the data in detail, you can see that sometimes there are two hits that cannot come from the pulse generator.



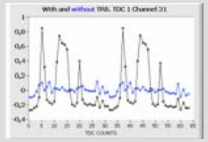
Time difference = width of the pulse (~63 counts, 50 ns)

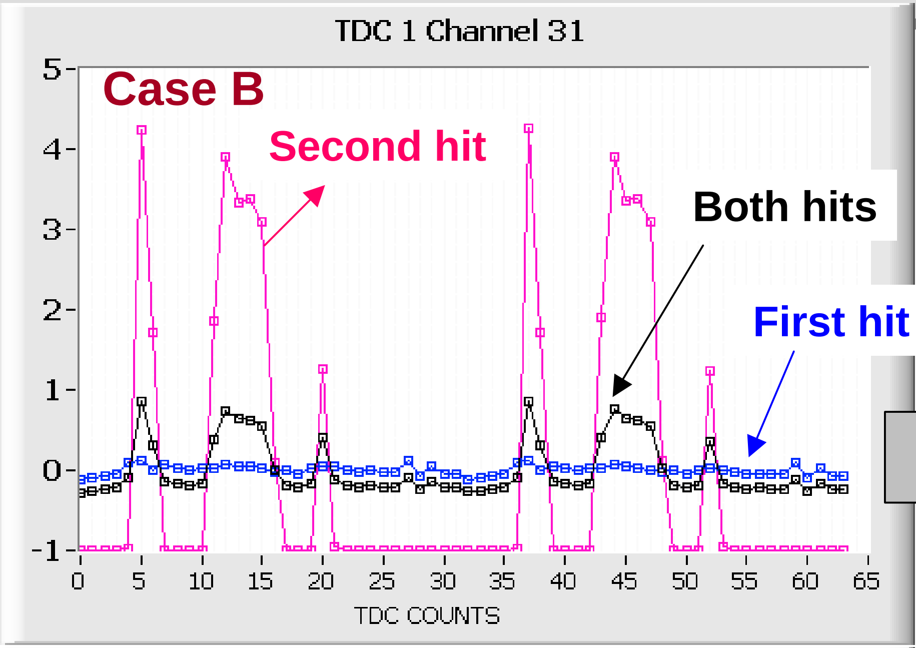
ROB HEADER
TDC 1 Ch 31 Time 788
ROB TRAILER
ROB HEADER
ROB TRAILER
ROB HEADER
TDC 1 Ch 31 Time 941
TDC 1 Ch 31 Time 1004
ROB TRAILER
ROB HEADER
TDC 1 Ch 31 Time 486
TDC 1 Ch 31 Time 549
ROB TRAILER

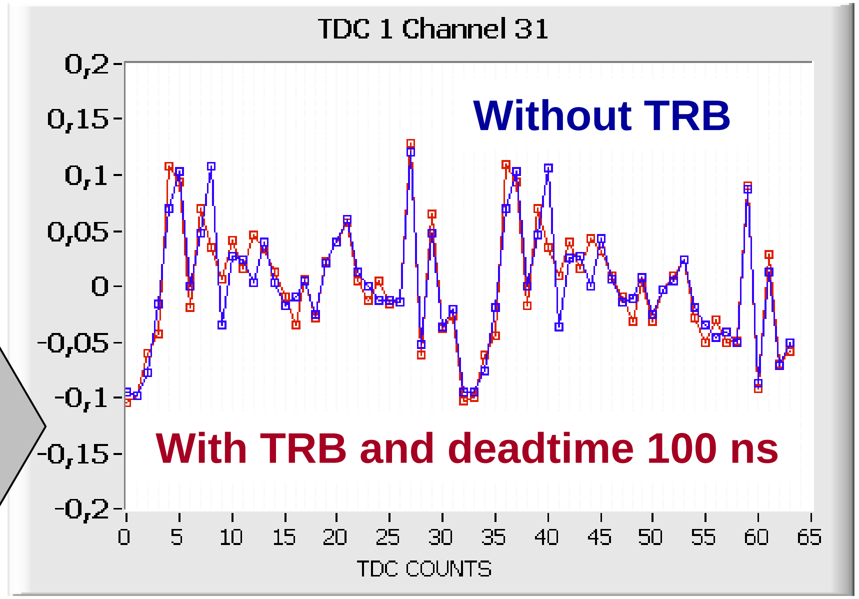
We are detecting the falling edge as rising edge. In some channels it always happens (case C) but in others it only happens depending on the clock phase with respect to the hit (case B).

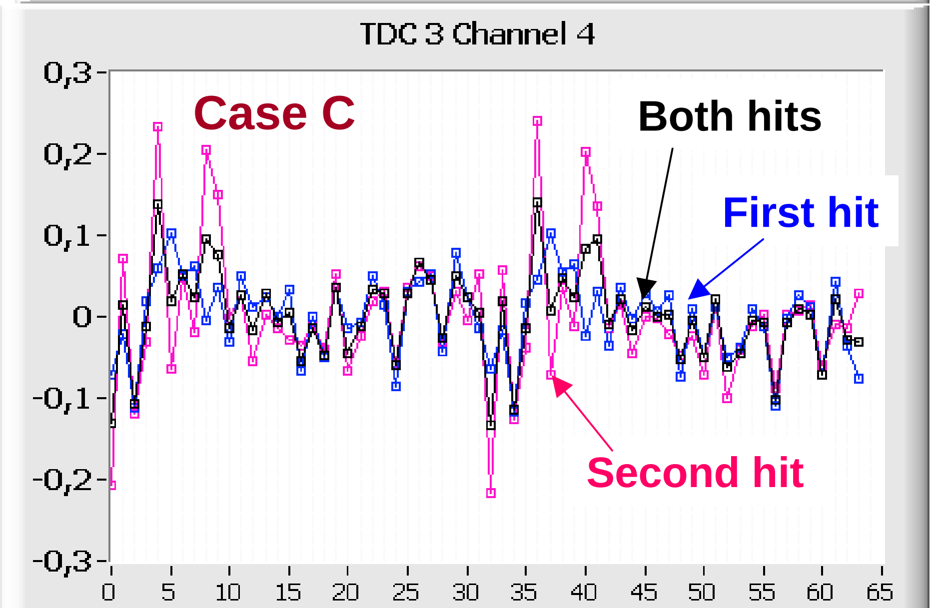


Cases B and C: Double hit detected.









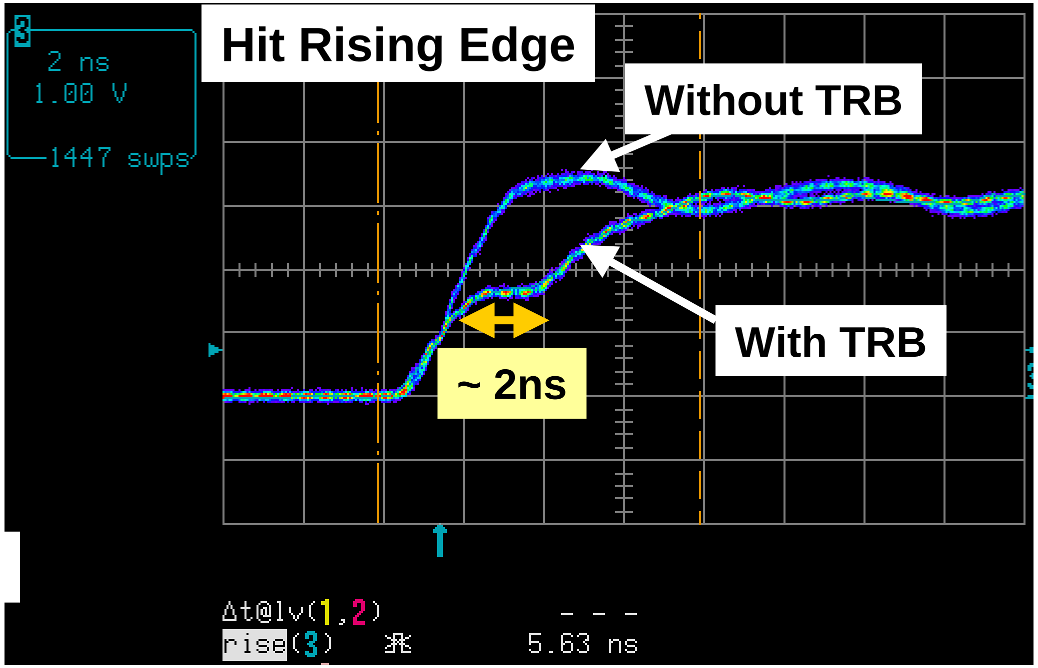
C. Willmott

Each TDC has a programmable deadtime (common to all channels). (Values ~5ns, 10ns, 30ns, 100ns).

With this, the second hit could be eliminated.

Cases D: No double hit detected.

In this case, there is no double hit, the influence is directly on the rising edge of the hit.

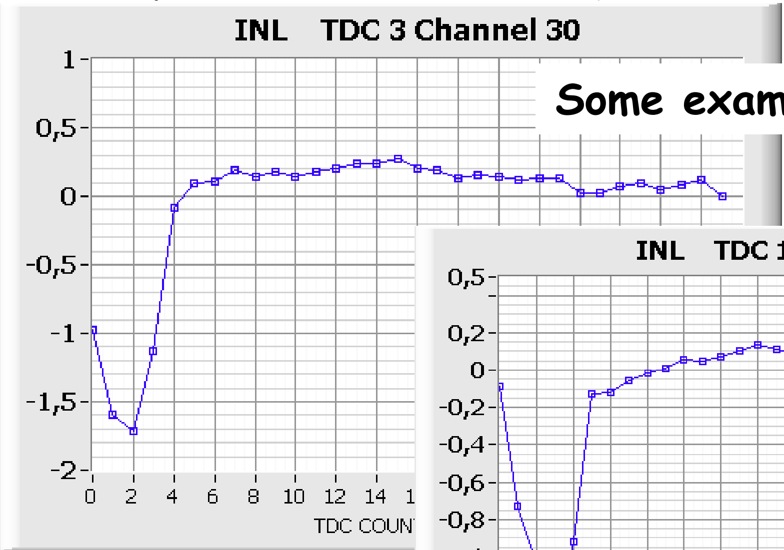


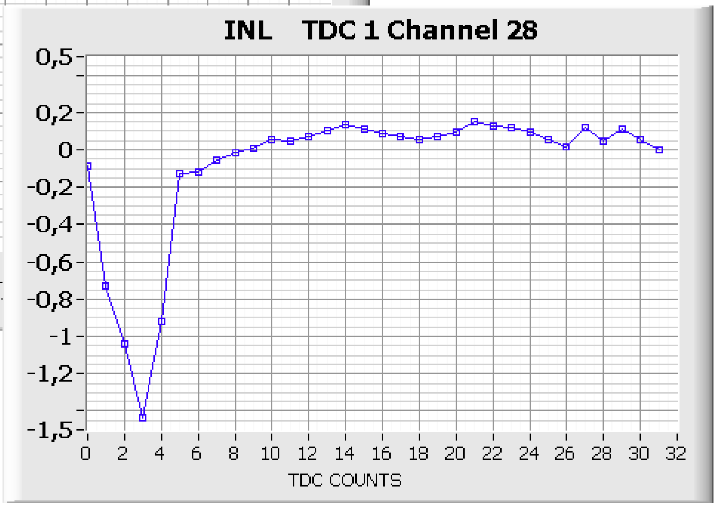
The hit has a window of ~2ns where the TDC can detect it anywhere.

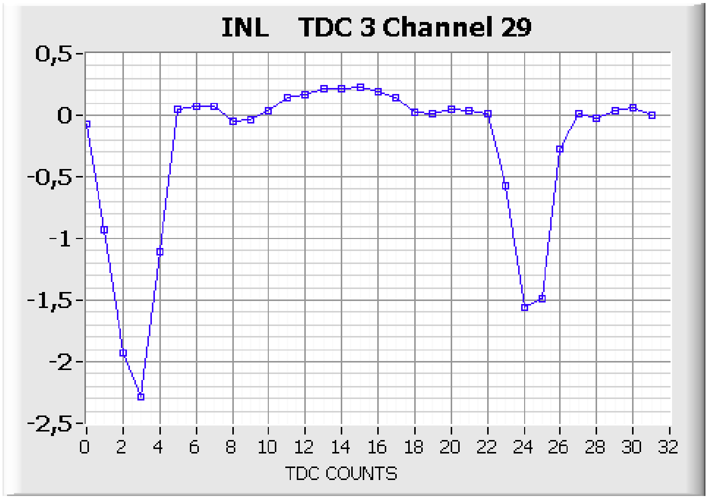
In this region, the signal is much more sensible to any clock influence.

This influence happens in a window of ~2 ns, so the effect should not be much worst than that.

Some examples:

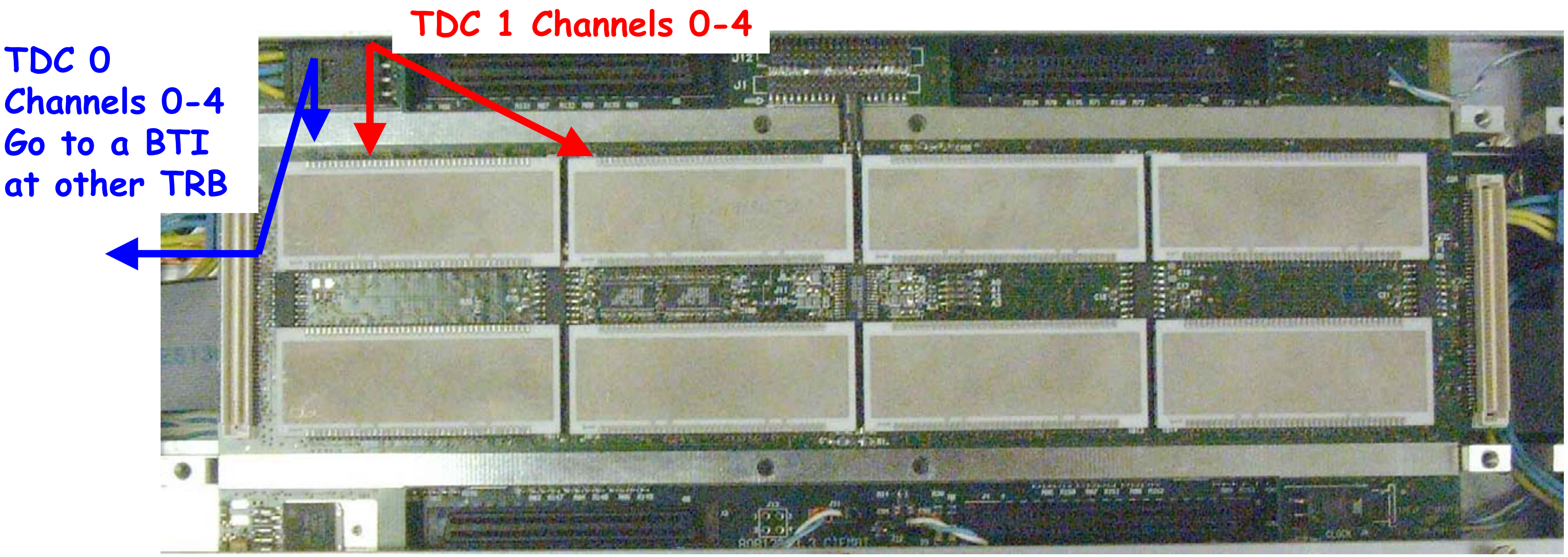






Dependence with channels

- Some ROB channels are more sensible to this kind of effects.
- Actually, all of the channels found with this problem belong to groups of channels going to two different BTIMs.
  - Sensible channels:
    - Channels 0 to 4 of all TDCs.
    - Channels 27 to 31 of all TDCs.
- Specially bad ones are channel 4 and channel 27 of all TDCs.



Conclusions

- In our setup, phase modulation is entirely happening inside ROB, compatible with TDC specs.
- Double pulse detection can be solved by:

  Setting TDC dead time to 100 ns.

  Setting MAD pulse width < 100ns.
- Leading edge interference with TRB (< 2ns) can not be solved.

Next steps

- Evaluate possible phase modulation at LVDS inputs.
- Characterize leading edge problem channel by channel.