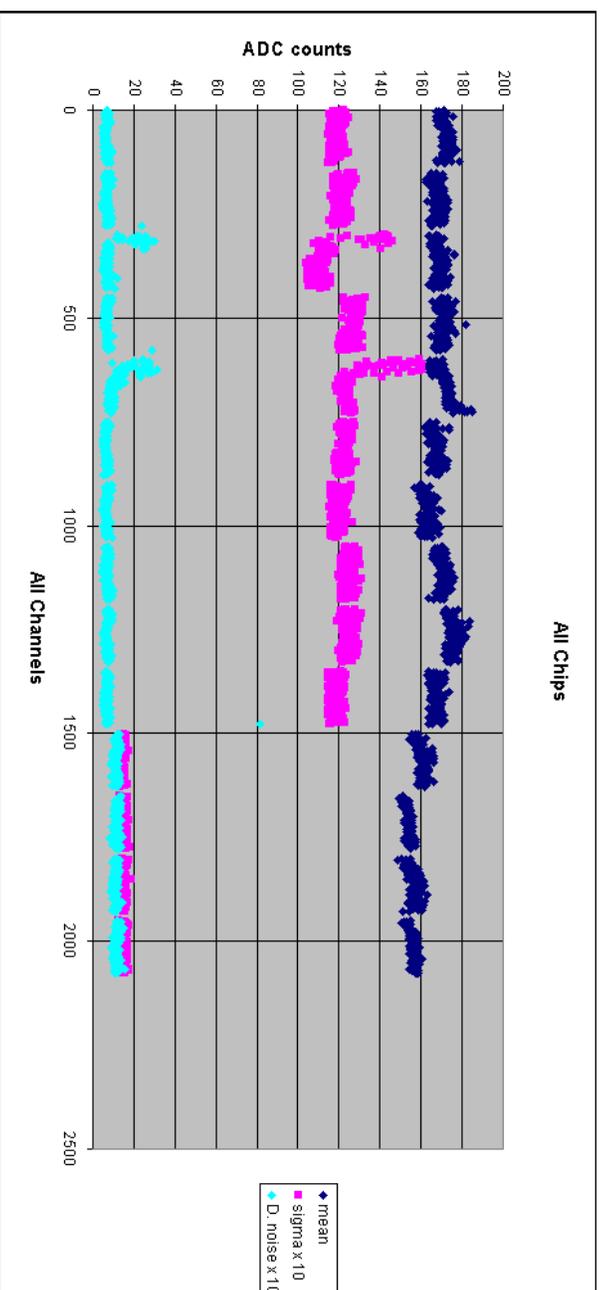




# The Mystery

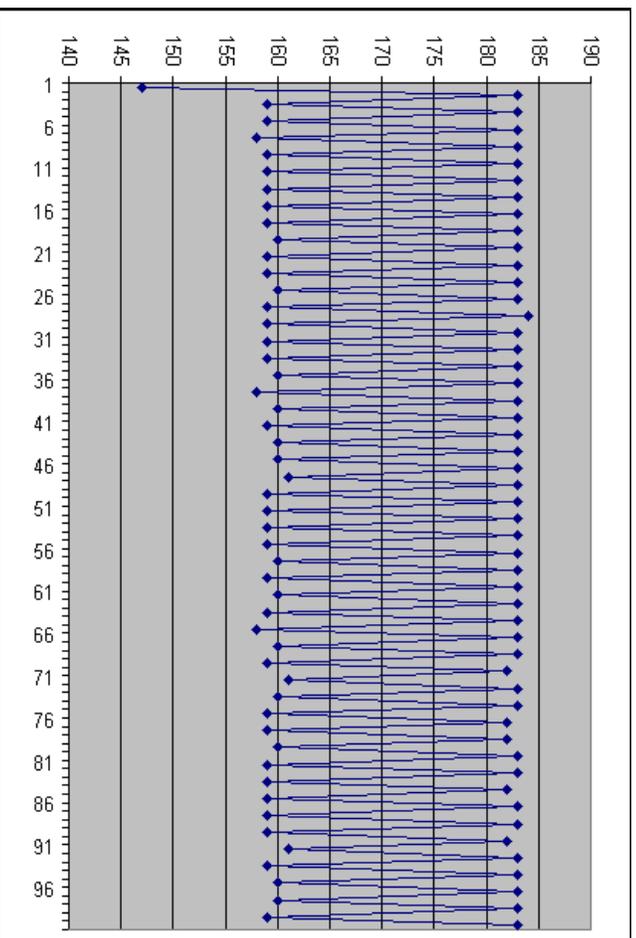
- Huge noise close to Preamp Reset!



- Worse for 10-chip hybrids.
- Worse at DAB than at SiDet.

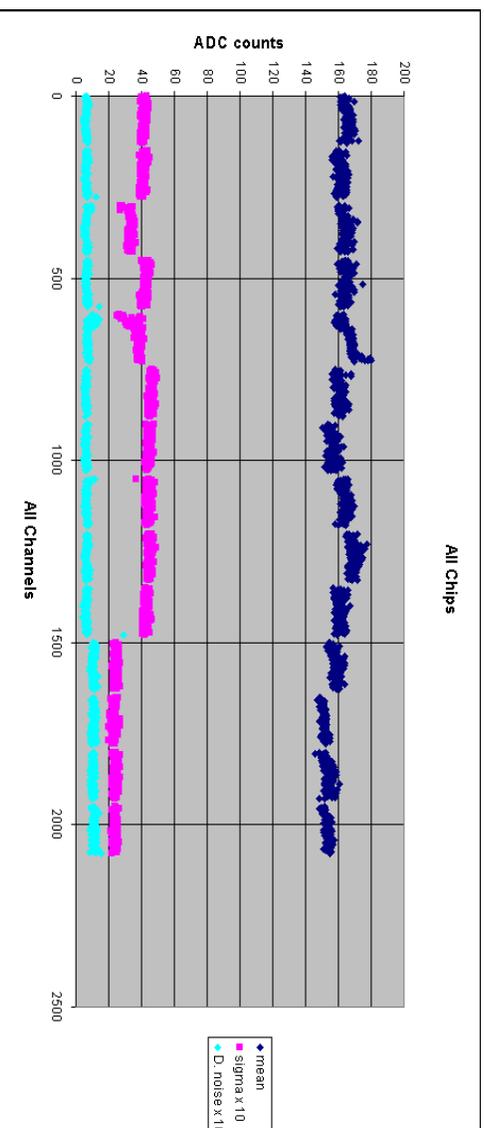


- The noise is due to a double peak in the pedestal distribution.
- The pedestal oscillates as a function of time.

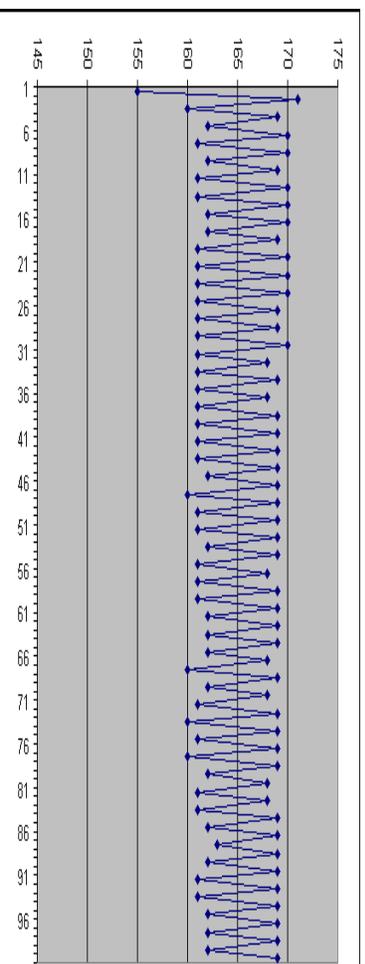




- The noise level decreases if one changes the number of clocks between PA Reset and cal\_inject from 8 to 32.

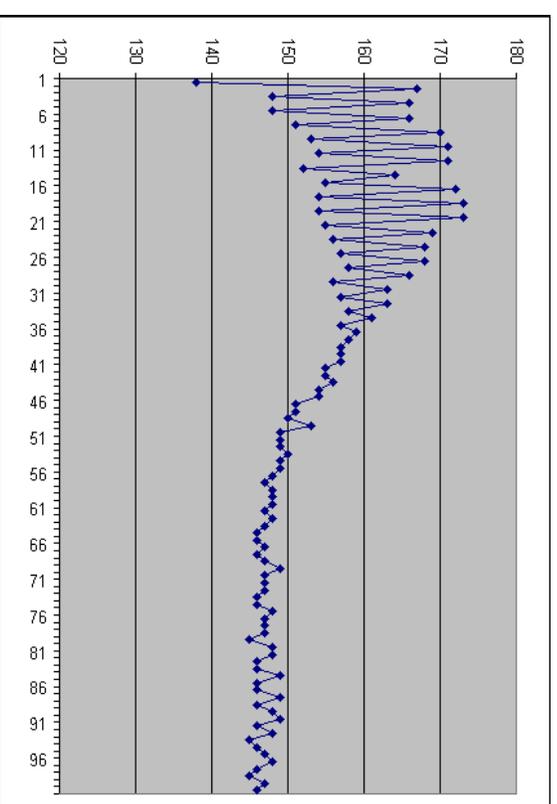
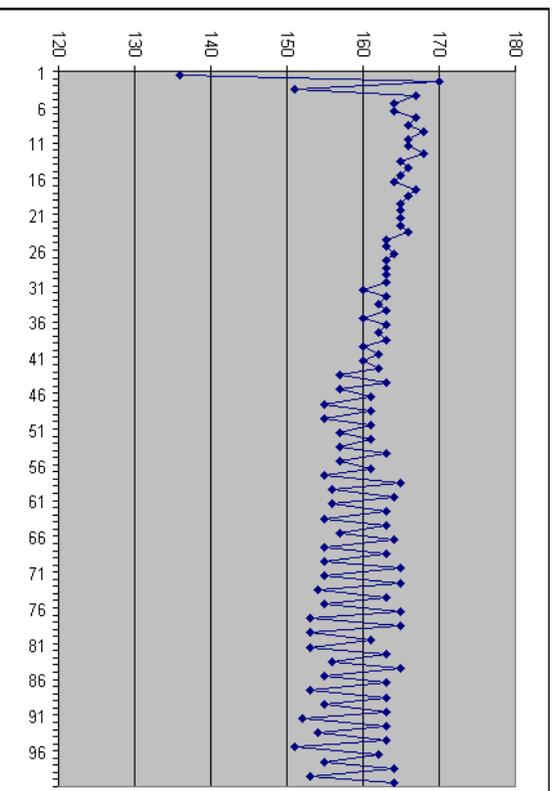


- The source of the noise is still the same, but the amplitude is much smaller.





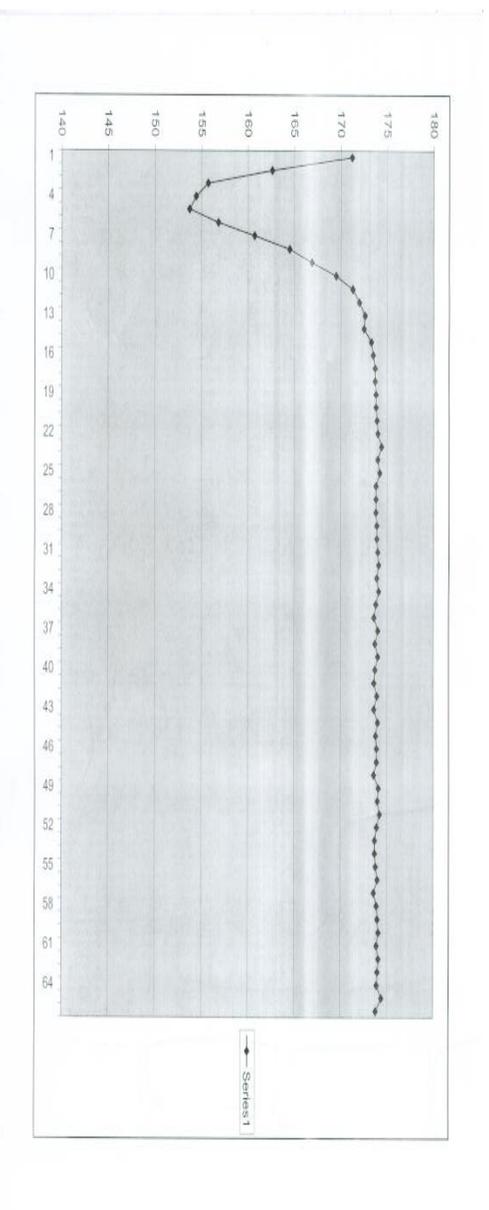
## Difference between hybrids





## First firmware change

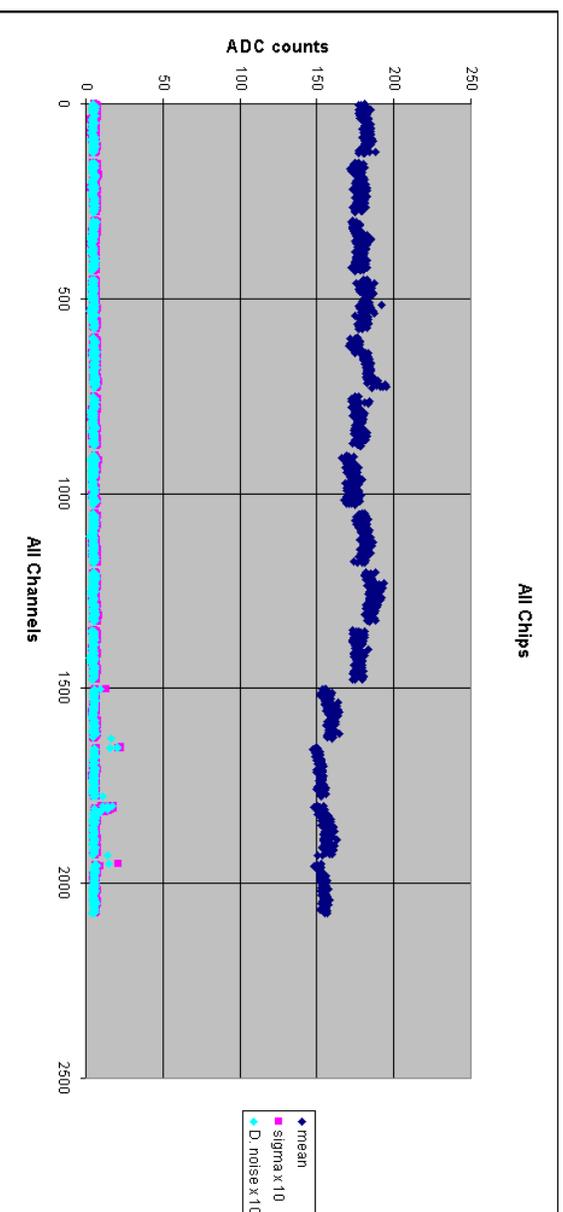
- In the firmware used there was only one clock between cal\_inject and L1 accept.
- Mike changed this to two clocks.



- The “sawtooth” behavior is gone, but we have another problem - there seems to be some “warm up” period...

## The Miracle

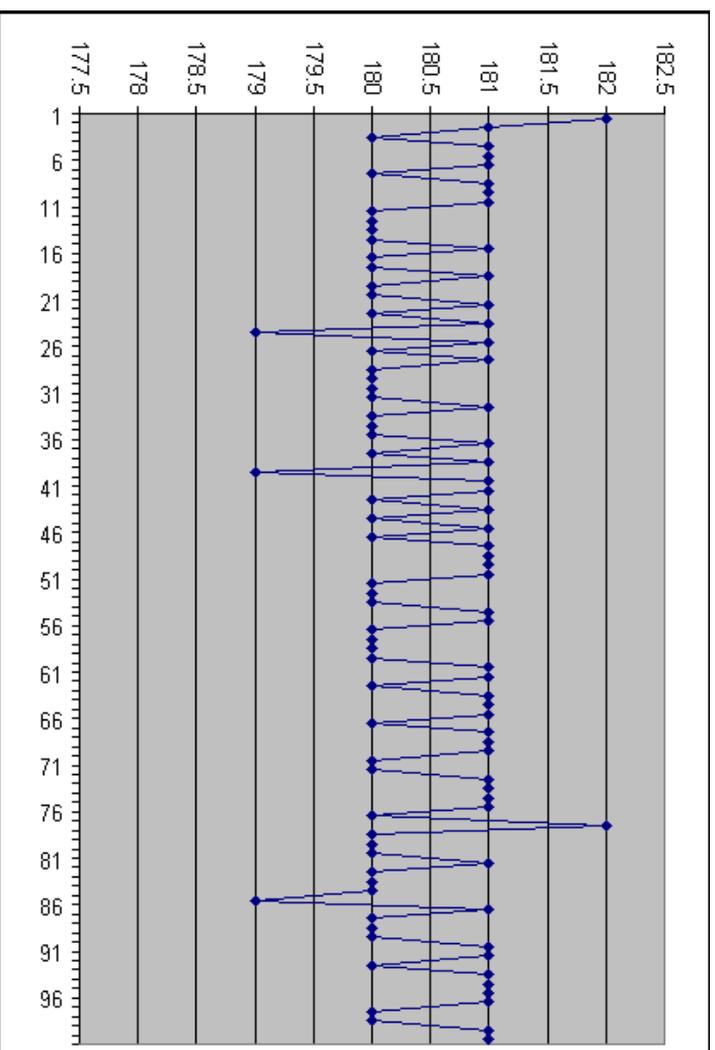
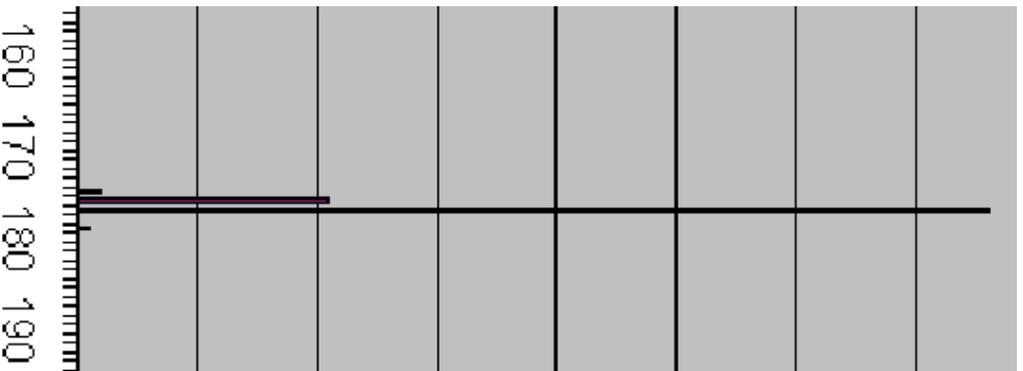
- With Dave's spreadsheet the noise is gone!



- Dave found out that between each event he is writing to the SASEQ control/status register which resets the SASEQ. Gustavo does not do that.



- With the reset implemented in Gustavo's spreadsheet the noise is only about one ADC count!



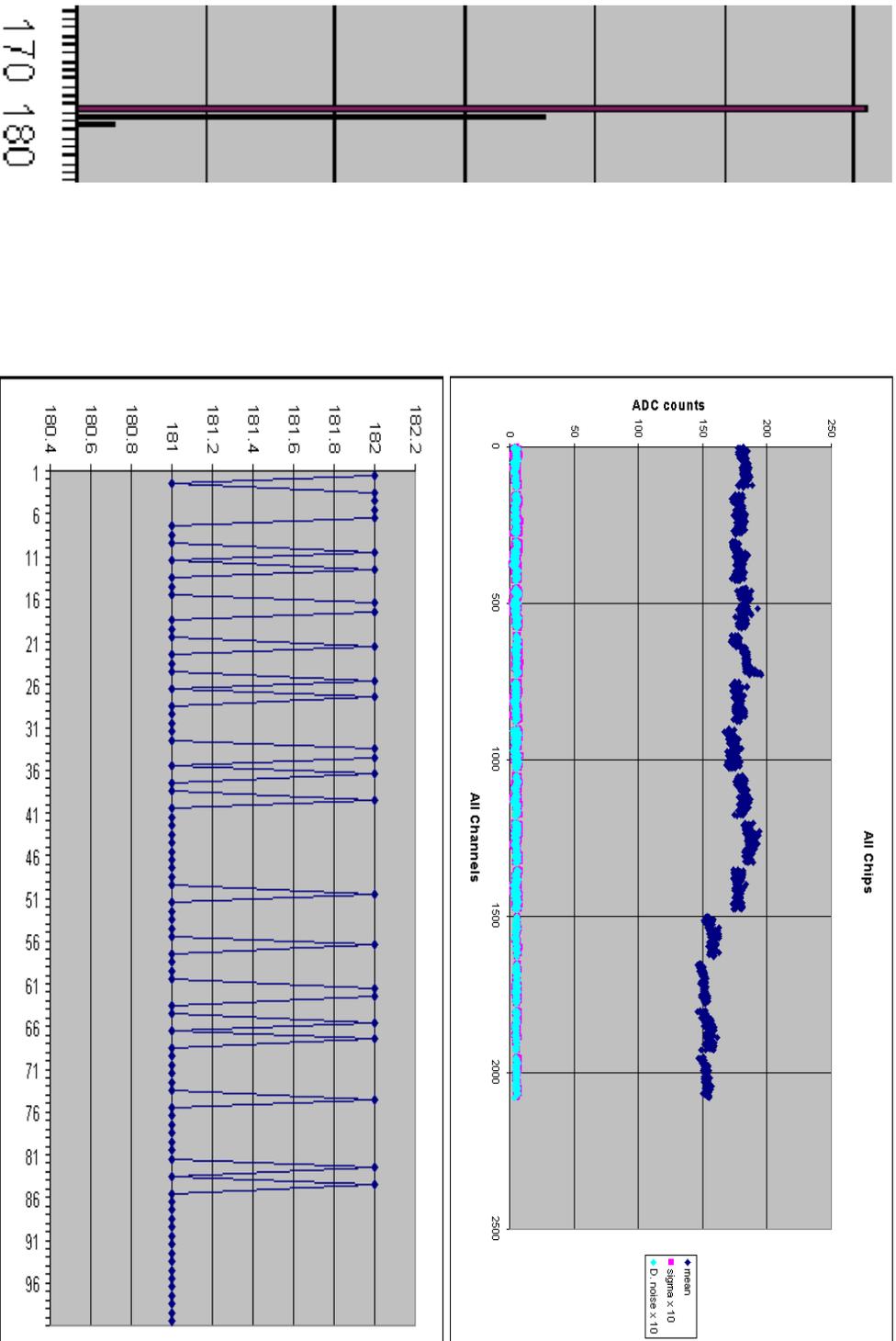


## What is the SASEQ reset doing?

- The reset of the SASEQ sends the SVX4 chips first to initialize mode, then to acquire mode for a short while, and finally back to initialize mode.
- The chips are in acquire mode for about 140 ns.
- Without the reset the chips go into initialize mode between events, but they don't go into acquire mode.
- Mike tried to put "the reset" sequence into the SASEQ firmware.
- With this firmware, after readout, the chips go to initialize - acquire - initialize, without having to reset the SASEQ.



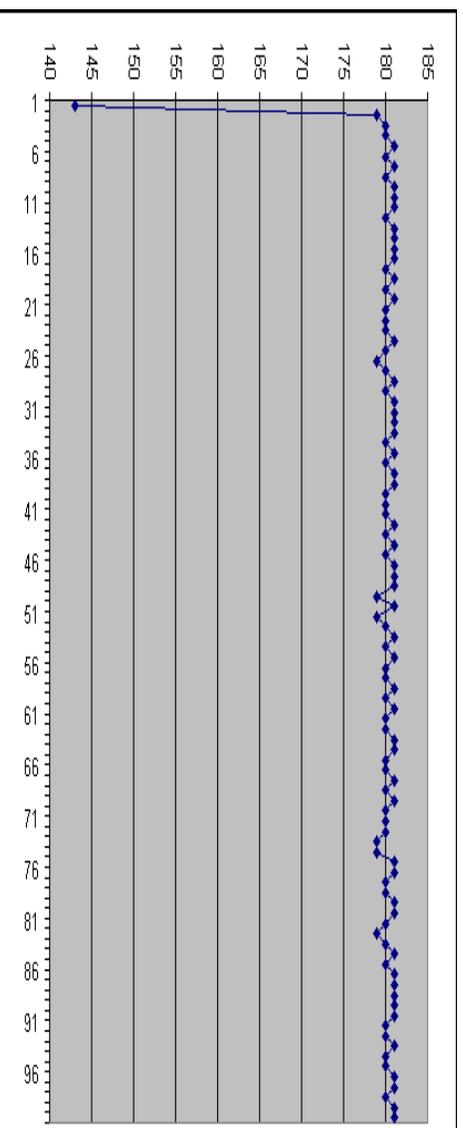
# Mike's new firmware - best case





## Mike's new firmware - problems

- With this firmware the pedestal of the first event sometimes comes out very low.
- We still don't understand why this happens.



- The changes introduce deadtime. Only acquire - initialize is not enough.
- Still need some tuning. Right now cal\_inject does not work properly for example.



## Conclusions

- We see high noise close to PA Reset at DAB.
- We don't see this as clearly at SIDet.
- The 4-chip and 10-chip hybrids behave differently.
- There are also differences in between different 10-chip hybrids.
- Changing the # of clocks between cal\_inject and L1A from 1 to 2 changes the noise behavior.
- Resetting the SASSEQ in between every event kills the noise.
- Changing the SASSEQ firmware to make the chips go through initialize - acquire - initialize between events almost kills the noise.