



“Status of the hybrid testing”
or

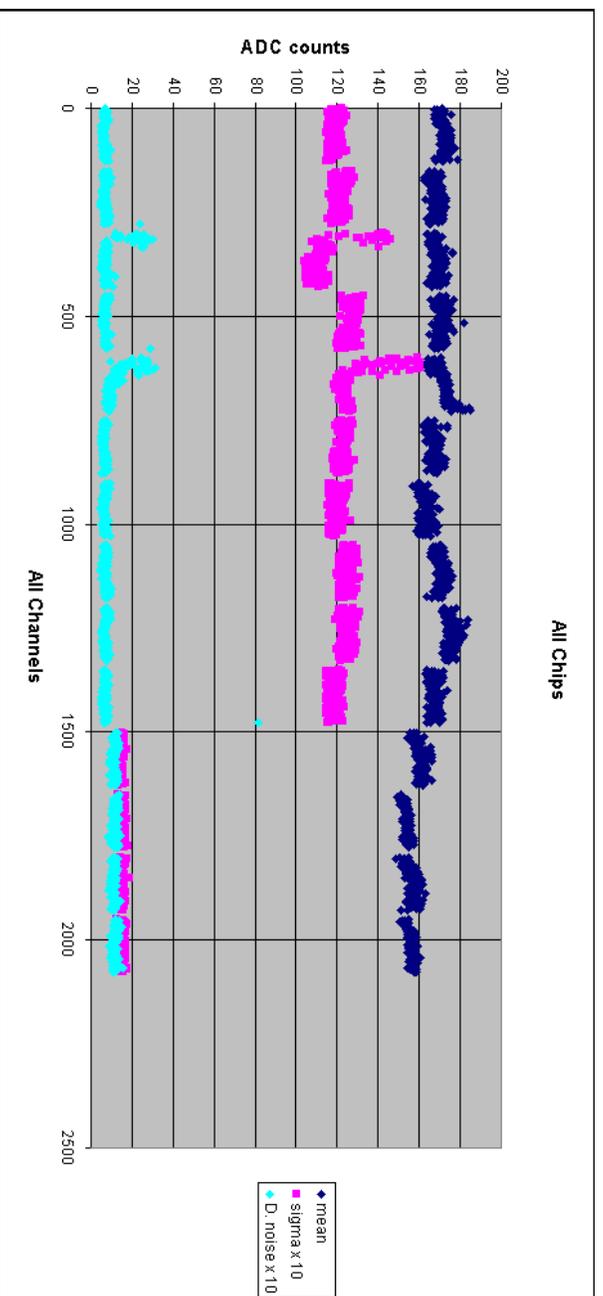
“Where does the noise come from?”

With much help from Mike, Andrei and Sergey



The mysterious noise

→ We see a huge noise close to Preamp Reset!



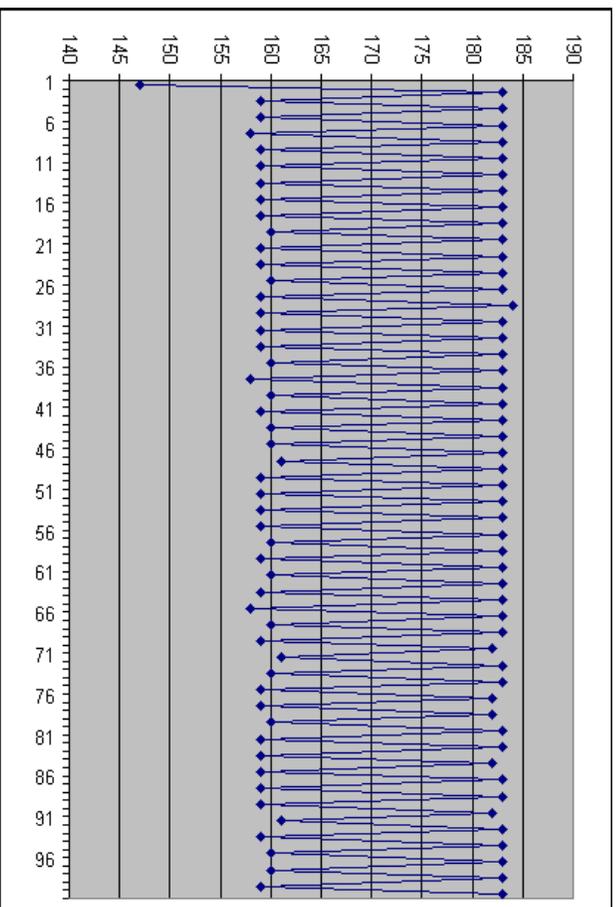
→ Worse for 10-chip hybrids than for 4-chip hybrids.

→ Worse (or different) when using a Rev.1 Purple Card.

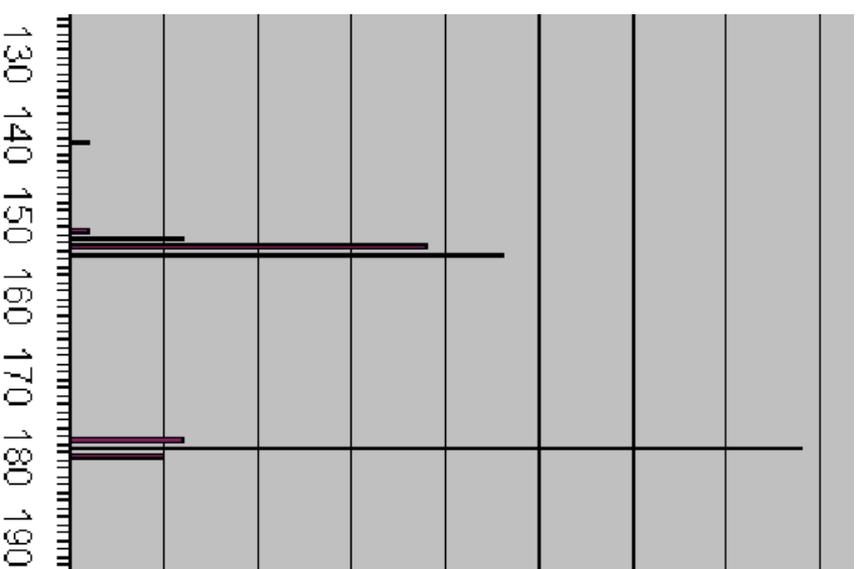


→ The noise is due to a double peak in the pedestal distribution.

→ The pedestal oscillates as a function of time.



→ The first event is always lower than the rest.

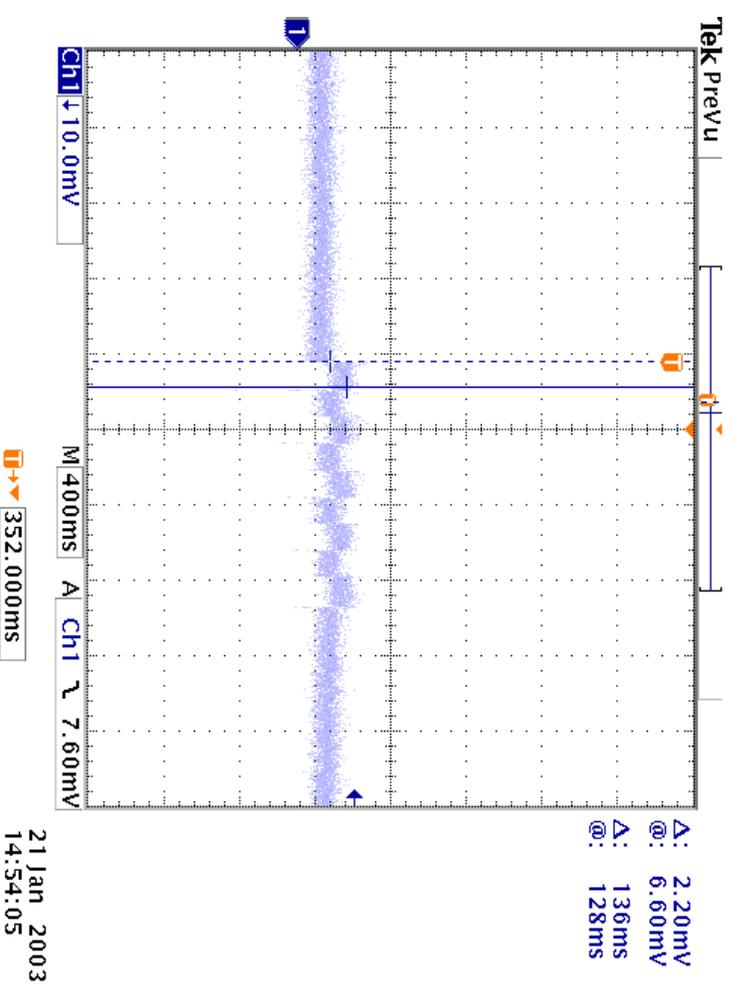




New findings

- If one puts a sleep command in the spreadsheet code after every readout the noise goes away.
- All the events get the same pedestals as the first one!
- The sleep has to be greater than 2s to fully remove the noise.
- This behavior got Mike to think about currents. - **Good guess!**

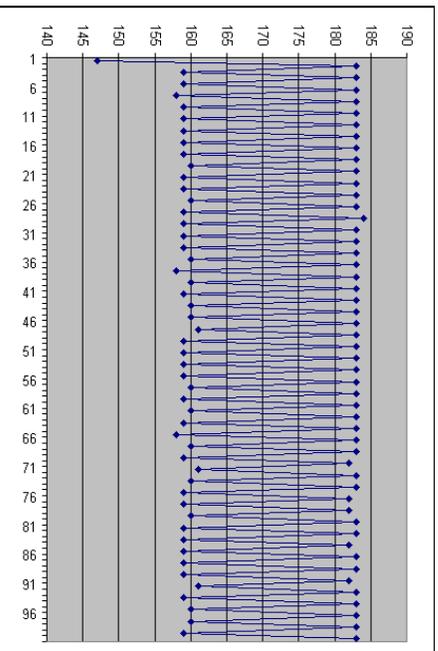
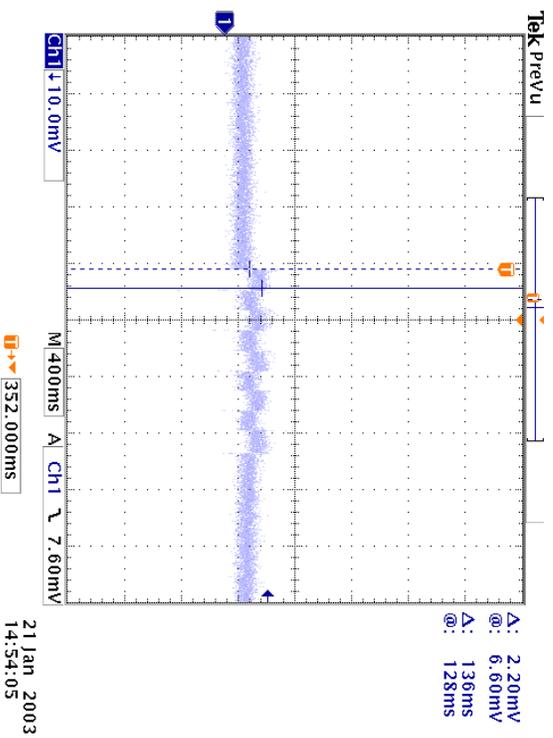
AVDD current during a 10 event readout with a 10-chip hybrid and a Rev.1 Purple Card.



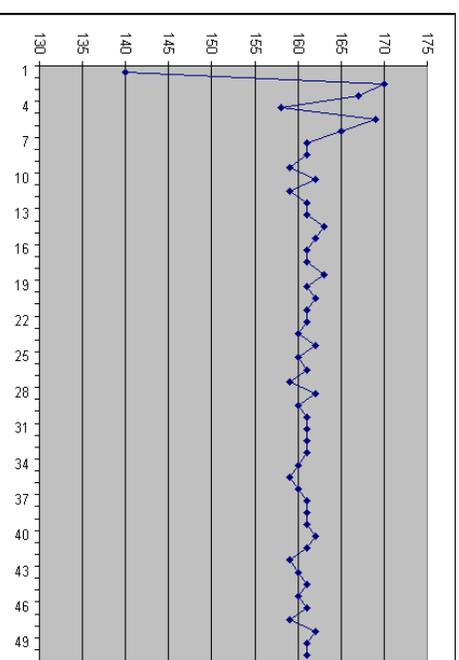
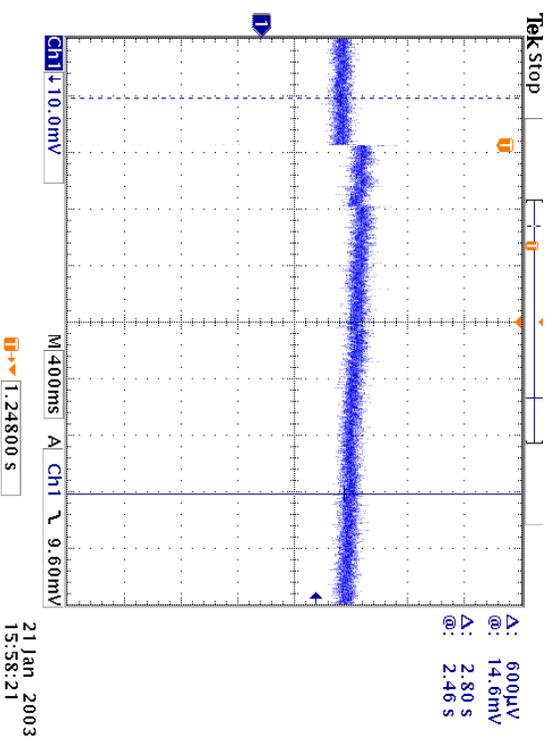


Rev.1 vs Rev.2 Purple Card

Rev.1



Rev.2



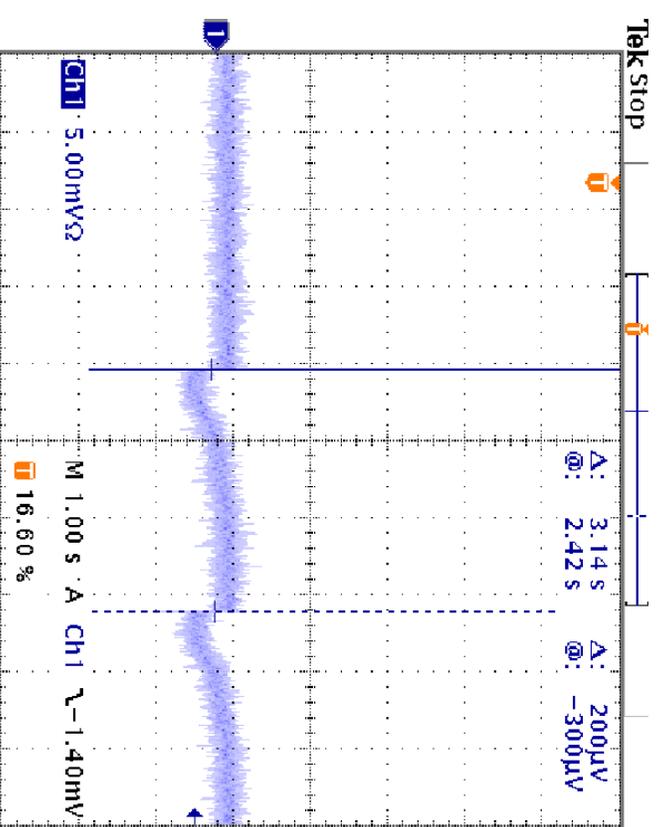


The time constant of the DVDD current

The current rises when the chip is being read out (inversed in plot).

It takes seconds for the current to go back to its original value!

If you read out a new event before the currents and voltages are restored you will read out a higher pedestal.

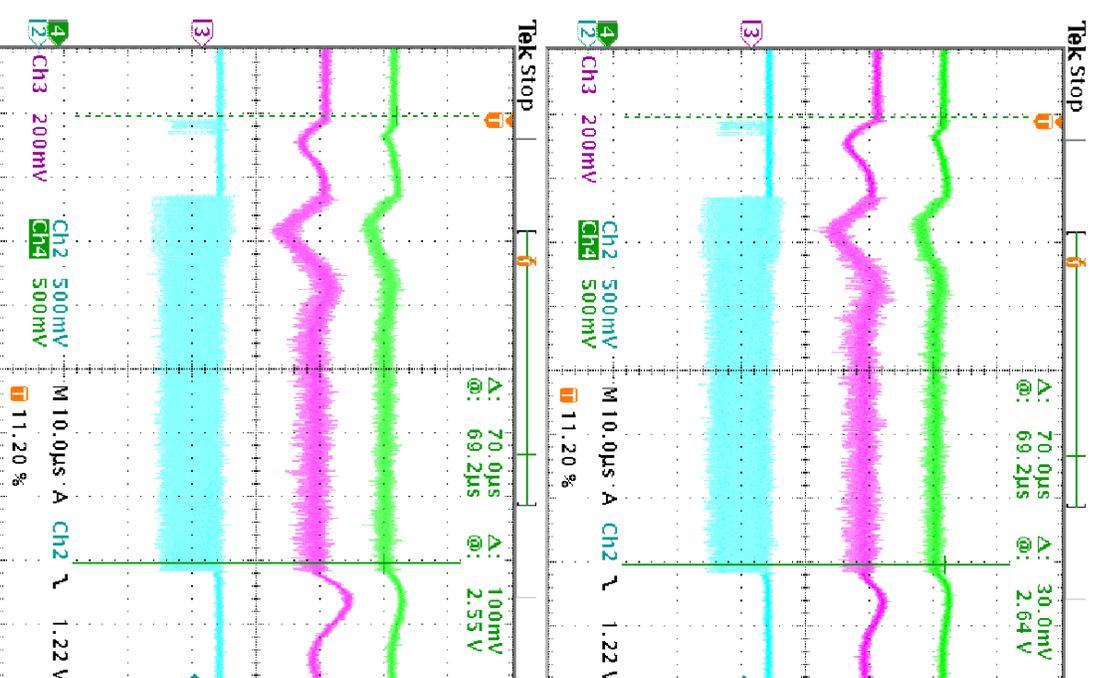




AVDD and DVDD at the hybrid

DVDD, AVDD and CLK
of a full readout cycle.

Same measurement
for the next event.





Shortcuts to noise reduction

There are many odd ways to get rid of the noise:

- Do a SASeq reset in between every event.
- Fake a SASeq reset with the firmware by putting the chips into initialize - acquire - initialize in between every event.
- The noise gets better, but does not go away, by biasing the chips directly on the hybrid instead of going through the Purple Card and Digital Cable.
- Put a 3s sleep after every readout in the spreadsheet code.
- The noise level decreases with increased number of clocks between PA_reset and calInject.
- A change to a Rev.2 Purple Card gives a different noise.



Conclusions

- It is pretty clear that the noise and the oscillations in the voltage and current are correlated.
- We still do not know why the voltage is oscillating.
- The long time constant of the current might have something to do with it. Why the time constant is so big is still unknown.
- What makes the Purple Cards behave differently is a mystery.