

DCD-B sampling

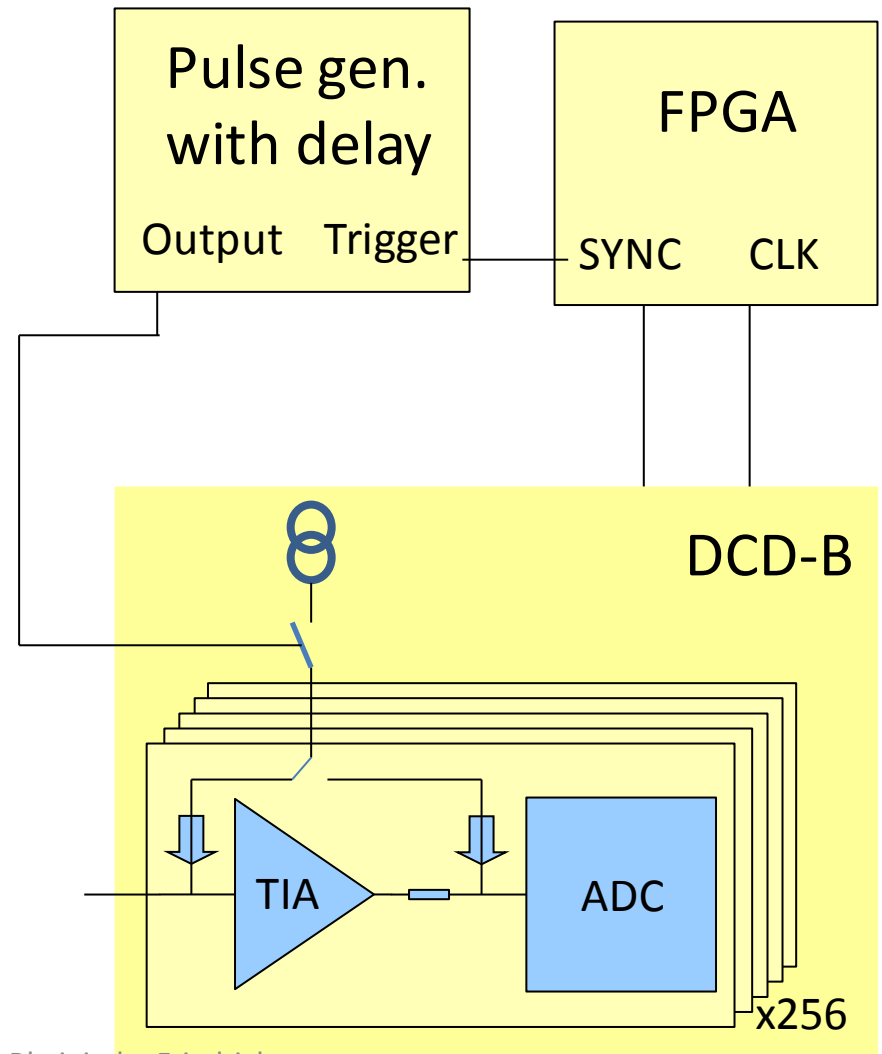
Florian Lütticke, Rheinische Friedrich-Wilhelms-Universität Bonn

First considerations:

- Estimation of readout speed useful
- Measurement of pulse response for the TIA
- settling time of the TIA limits readout speed

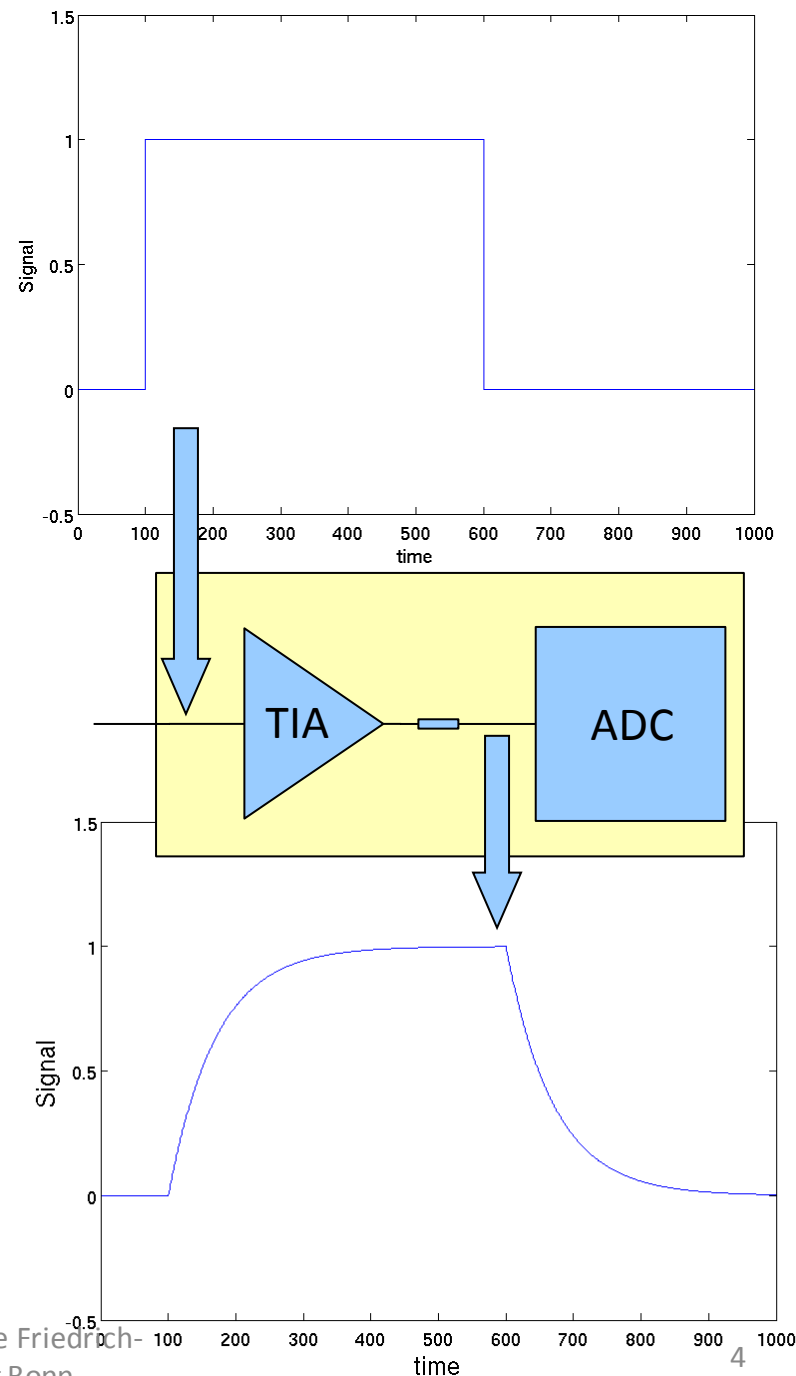
Measurement setup

- Delay between injection and measurement can be set
- Varying delay allows to measure response curve.
- Delay set in pulse generator



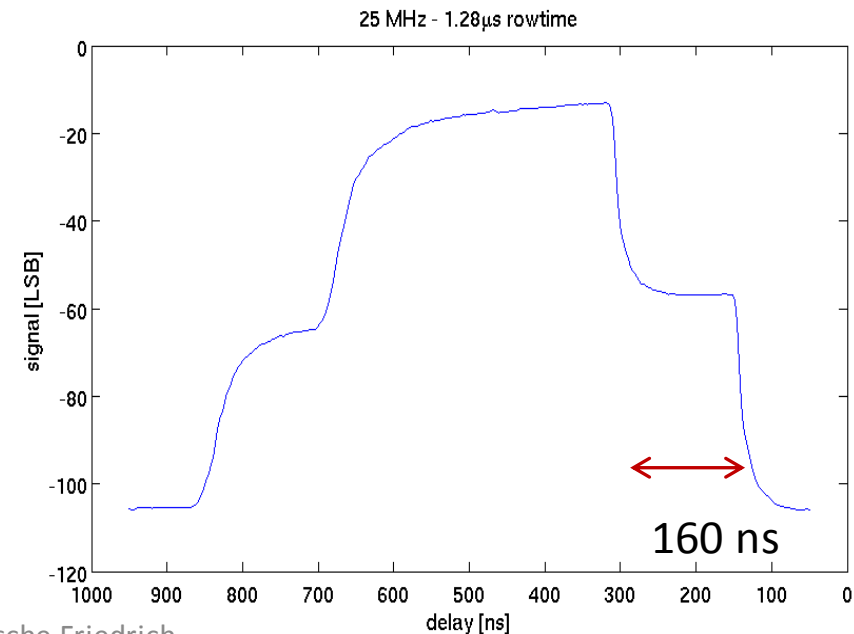
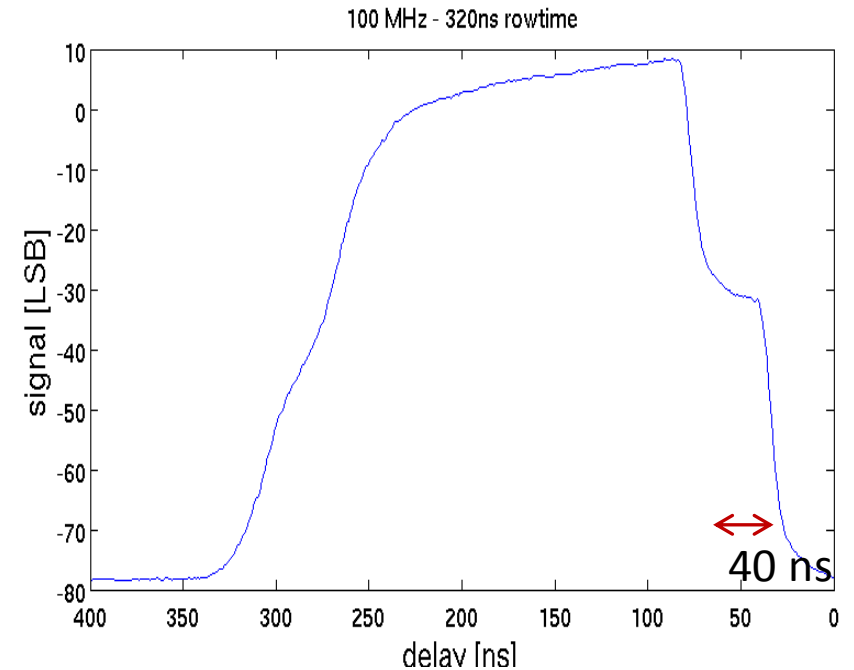
Expected result

- Input signal is assumed to be step function
- Output of TIA shows “slow” rise and fall
- Shape depends on capacity at input
- Expect similar results DCD-2 Measurement done by Manuel



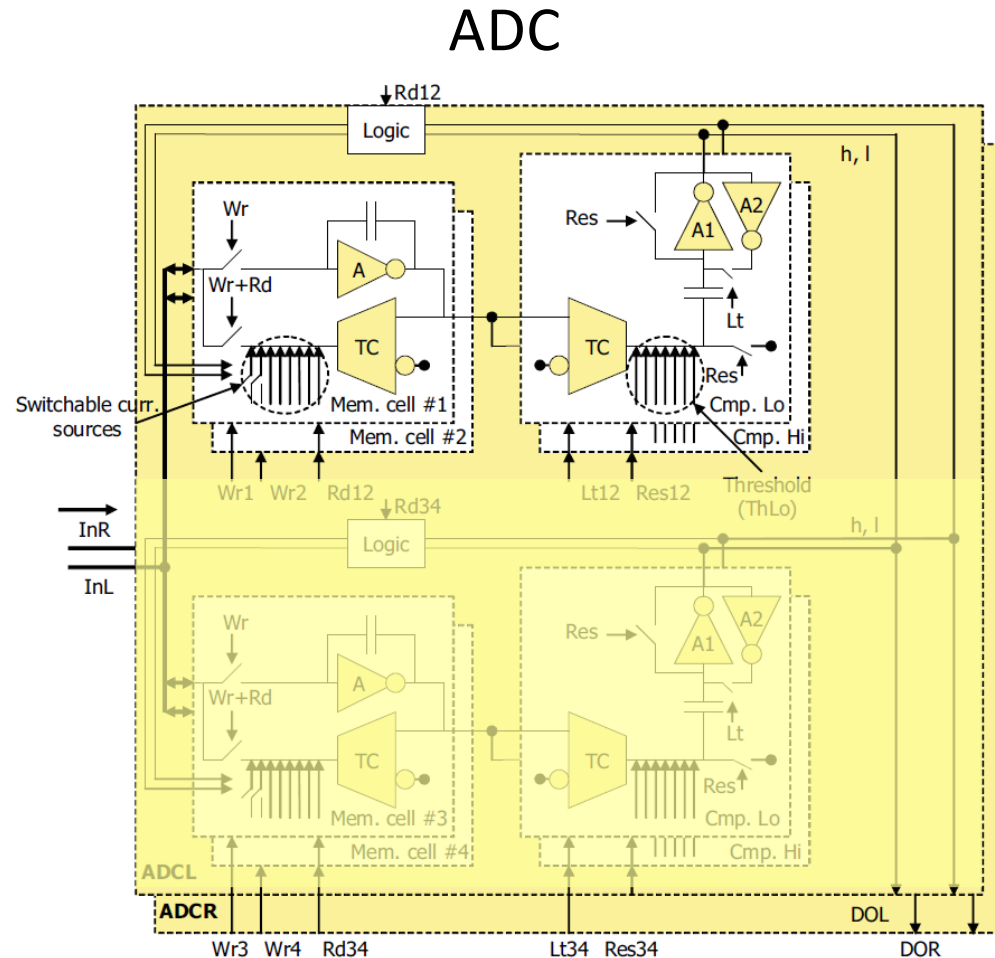
Measured results

- Measured result shows two steps
- Left and right intermediate value is not the same
- Width of step is 1/8 th of row time.



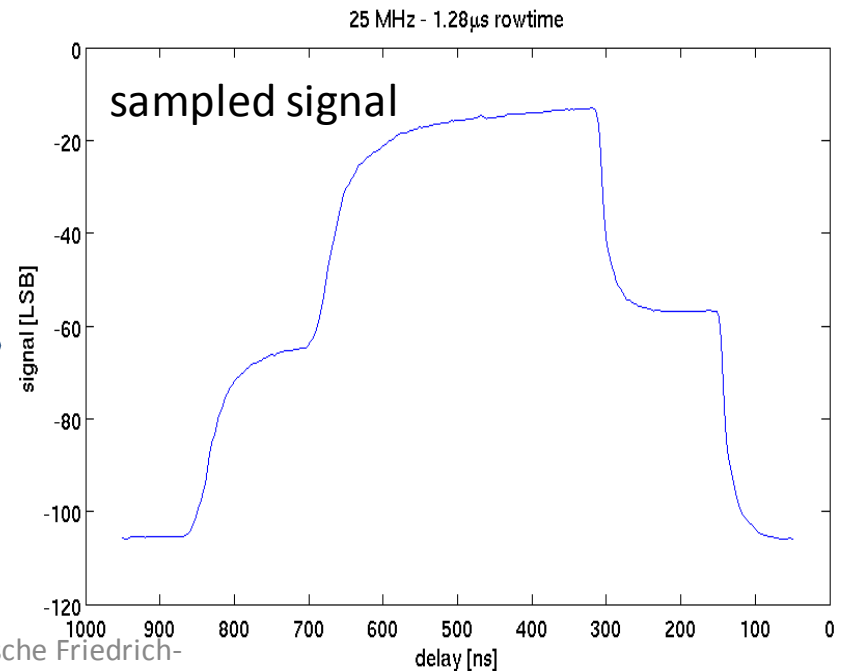
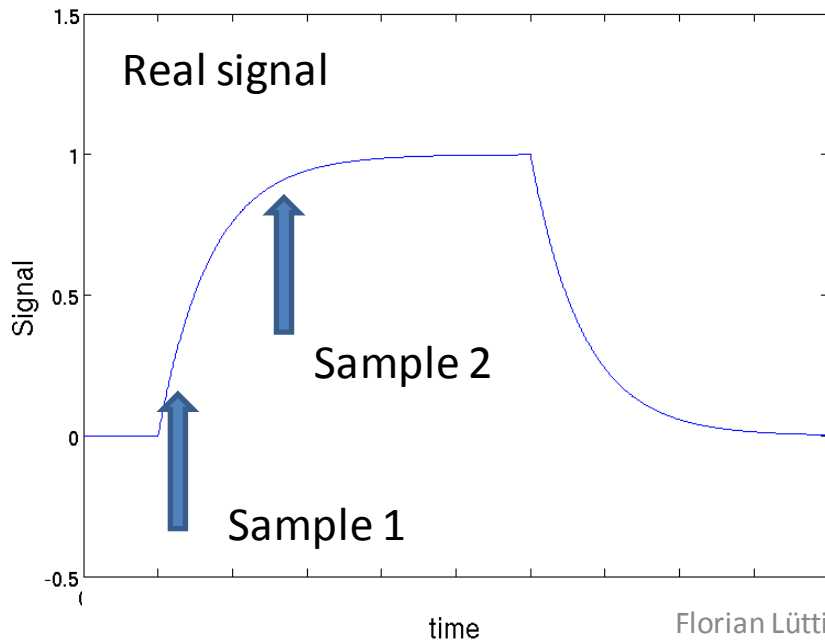
Explanation

- Current is needed in two Cells
 - Current is sampled two times
 - Delay between sampling points is 1 ADC clock cycle
- One cells connected to comparator
- Different current in Cells: Conversion is wrong.



Explanation

- Changing signal:
 - Different current is sampled
 - Conversion goes wrong
- DCD-2 did not show this behavior:
 - Additional current sampling cell as storage



Summary

- After settling of Matrix and DCD, 1/8th of the Rowtime is needed for reading current
- No discrete sampling point
- Changing signal can cause problems
- Characterizing of dynamic DCD-B behavior is difficult