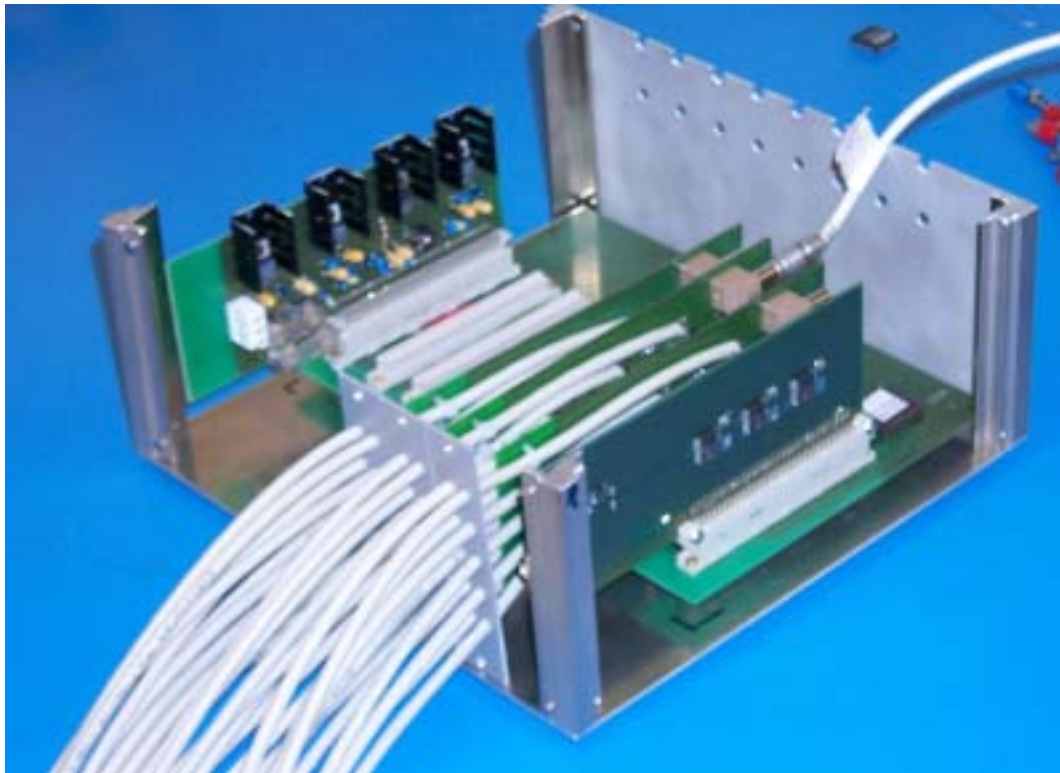


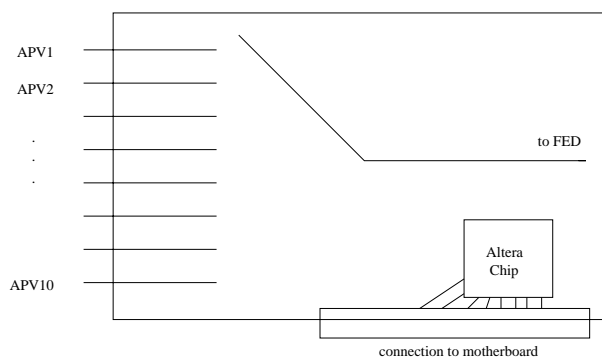
## Multiplexer Status



Thomas Weiler for the Karlsruhe CMS Group

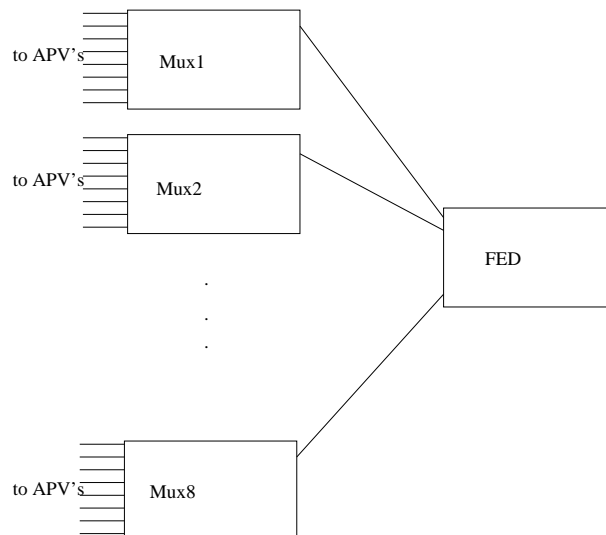
Institut für Experimentelle Kernphysik,  
Universtät Karlsruhe (TH)

## Scheme of Multiplexer



Scheme of multiplexer, the communication is done via the motherboard, which can be controlled by an digital I/O card or  $I^2C$ . One Multiplexer is capable to multiplex 10 APVs to one FED channel.

## Connection Scheme of Multiplexer to FED

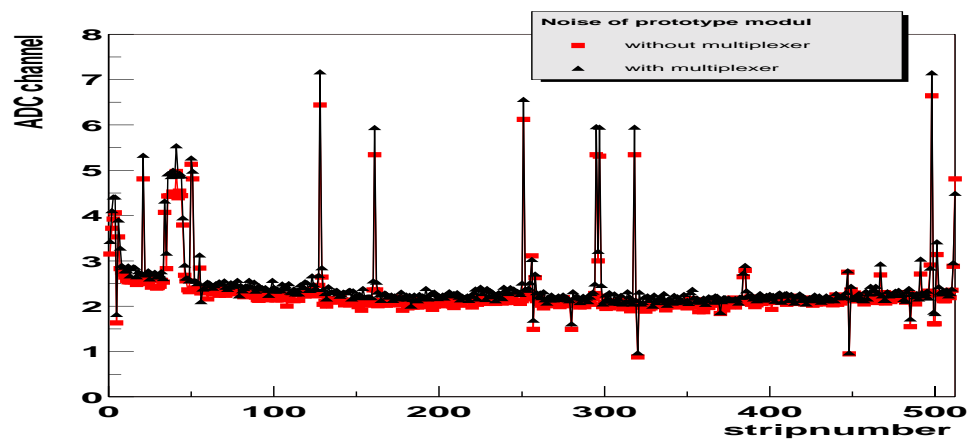


Scheme for connecting eight multiplexer to FED, this makes it possible to read out 80 APVs with one FED.

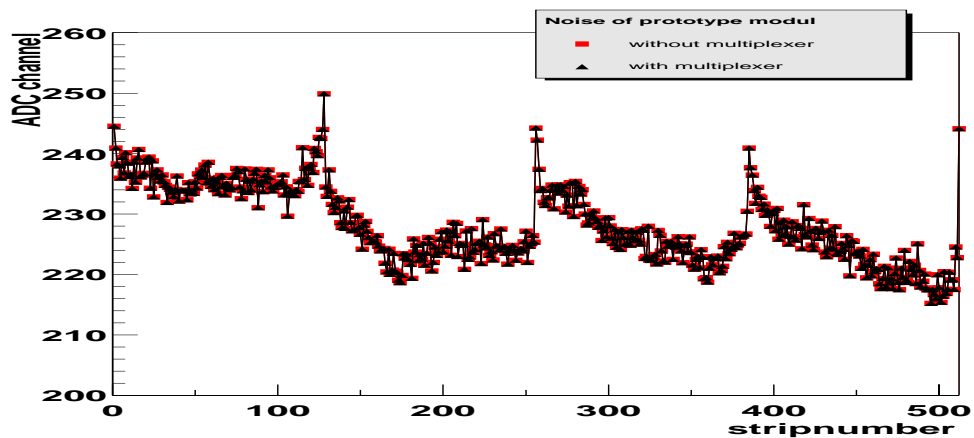
## Comparison of noise and pedestal

$$(V_{Bias} = 50 \text{ V})$$

### Noise for mux device no. 03



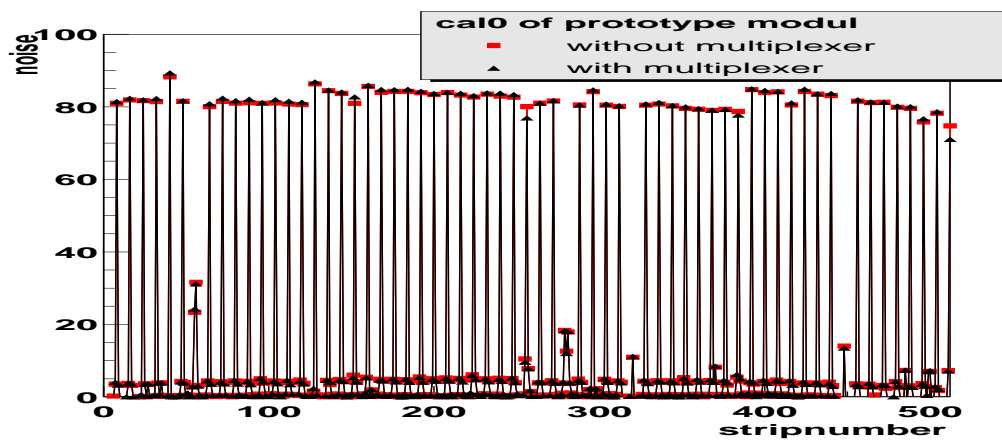
### Pedestals for mux device no. 03



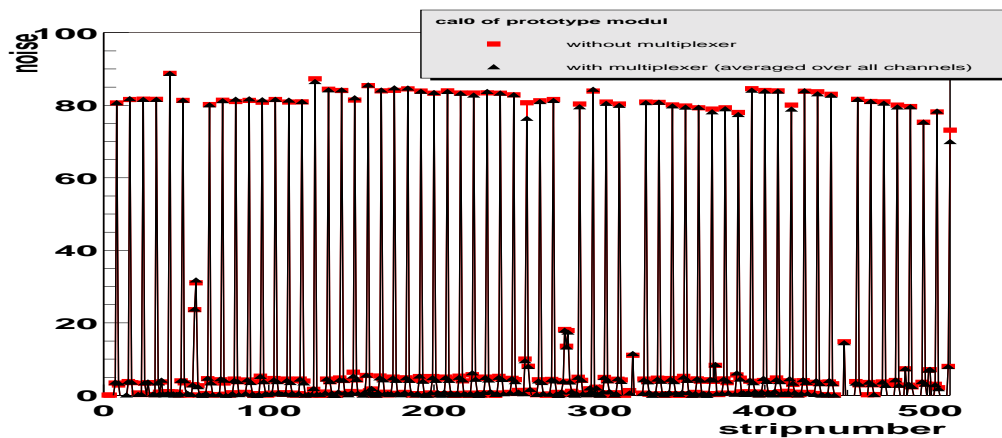
## Comparison of Calibration Pulses

( $V_{Bias} = 50 \text{ V}$ )

Mux device no. 06



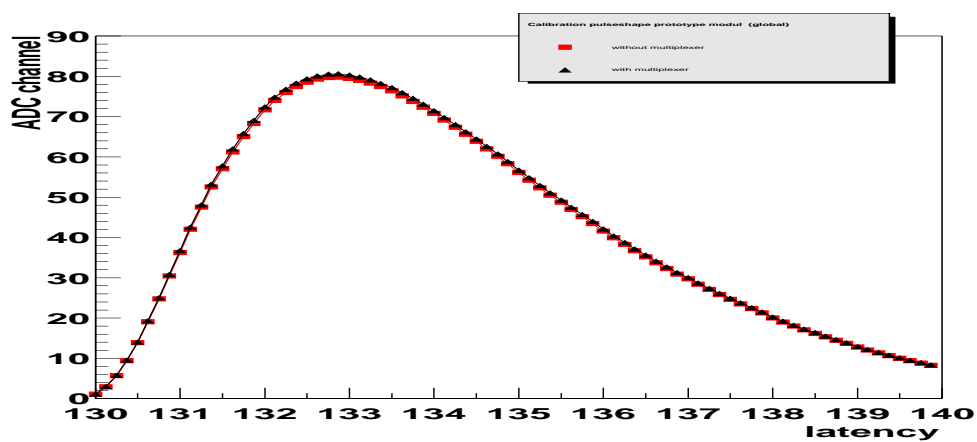
Mux device no. 03



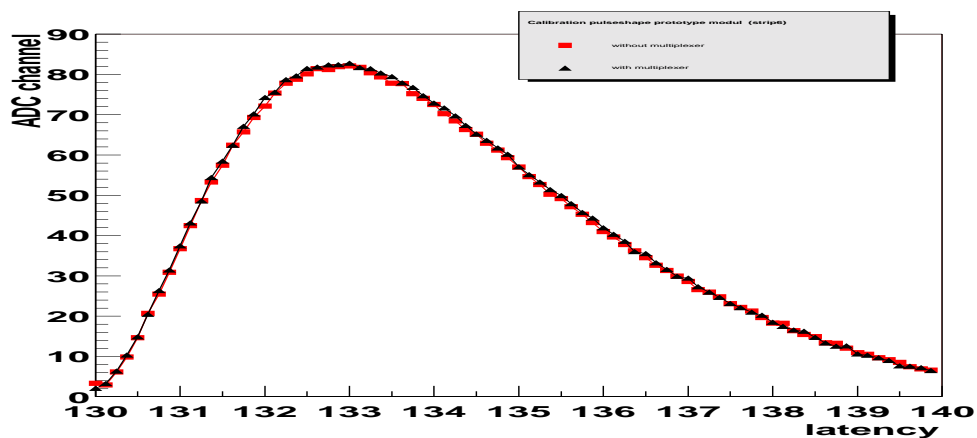
## Comparison of calibration pulseshapes (Mux device 03)

( $V_{Bias} = 50 \text{ V}$ )

### Average pulseshape for all strips



### Pulseshape for a single strip



## Measurements with different cable lengths

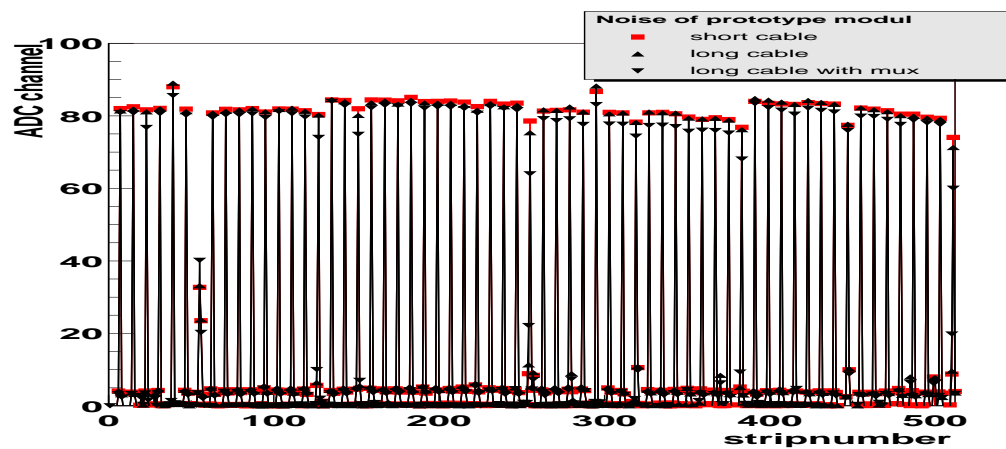


- same APV settings for all measurements
- cable length between APV and multiplexer 1.1 m, directly soldered to multiplexer PCB (see picture)
- in this measurement the cable length between FED and multiplexer was changed
- we used our standard cable (called **short** in the following graphs) with a length about 1.5 **m** and the second (called **long** in the following graphs) we used a 2.5 **m** long cable.

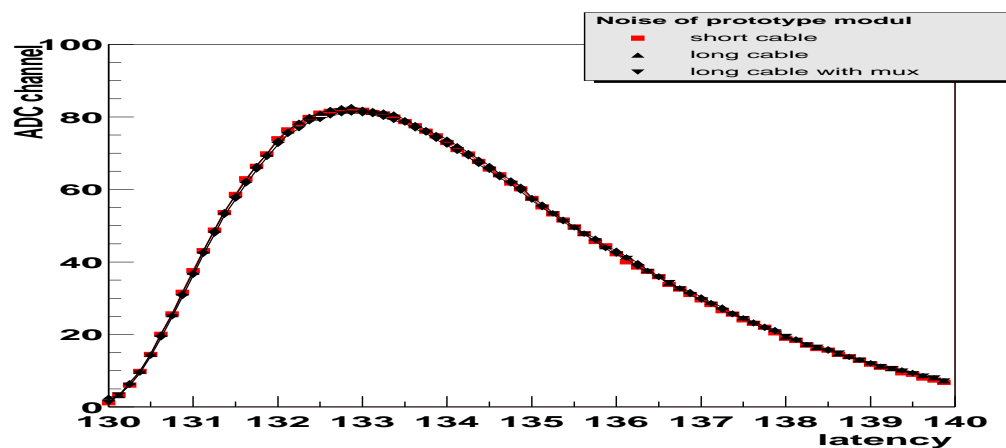
## Measurements with different cable lengths

$$(V_{Bias} = 50 \text{ V})$$

### Calibration pulses for cell 1



### Pulse shape for strip no. 14



## Summary

All tests done with the Aachen repeater card, APV25, FED and our prototype module. There was no fine tuning for the latency or any other parameter, the settings stayed the same for all measurements.

- Noise baseline at  $\langle 2.5 \rangle \dots \langle 2.6 \rangle$  for both configurations, noise for multiplexer slightly increased, but no additional noisy channels have been seen.
- Calibration pulses identical
- Pulseshapes are identical
- 7 Mux devices tested the last one will follow soon

## ToDo List

- Calibration with a source to determine the signal to noise ratio
- testing crosstalk of multiplexer channels
- Mux devices still have to be tested with V-Utri card and to be integrated in long term software
- Prototype PCB for multiplexing the output for the optical receiver arrived last week, tests have to be done
- 40 channels (4 multiplexer cards ) can be equipped for the needs of the optical receiver