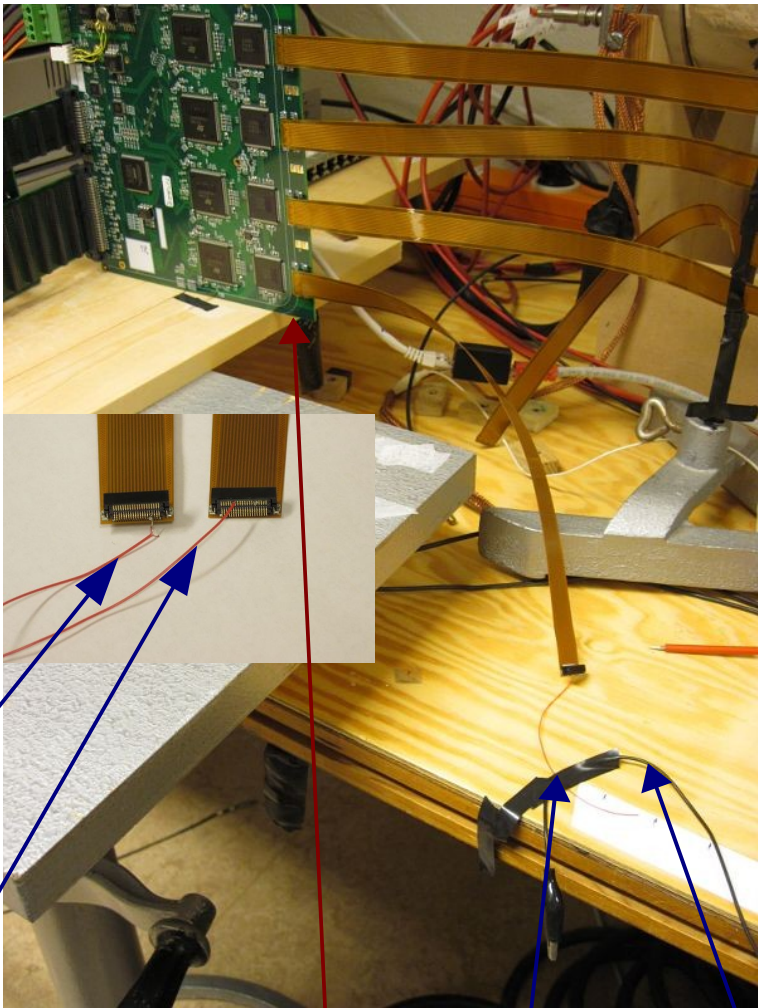


Study of crosstalk in cables by injecting a signal on one or two signal paths in a kapton cable

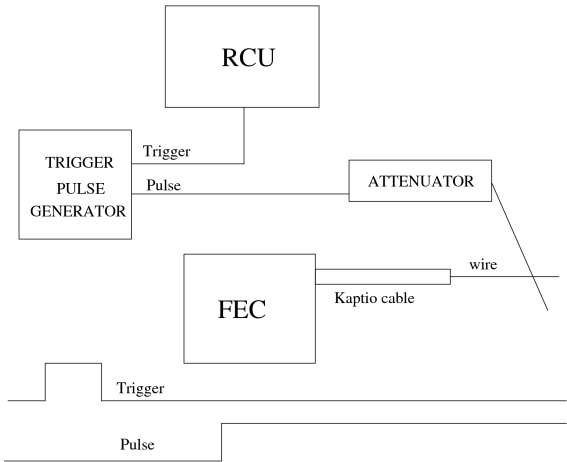


Two lines
one line
male signal side injection connector

FEC 78
"Signal injection"

From pulser

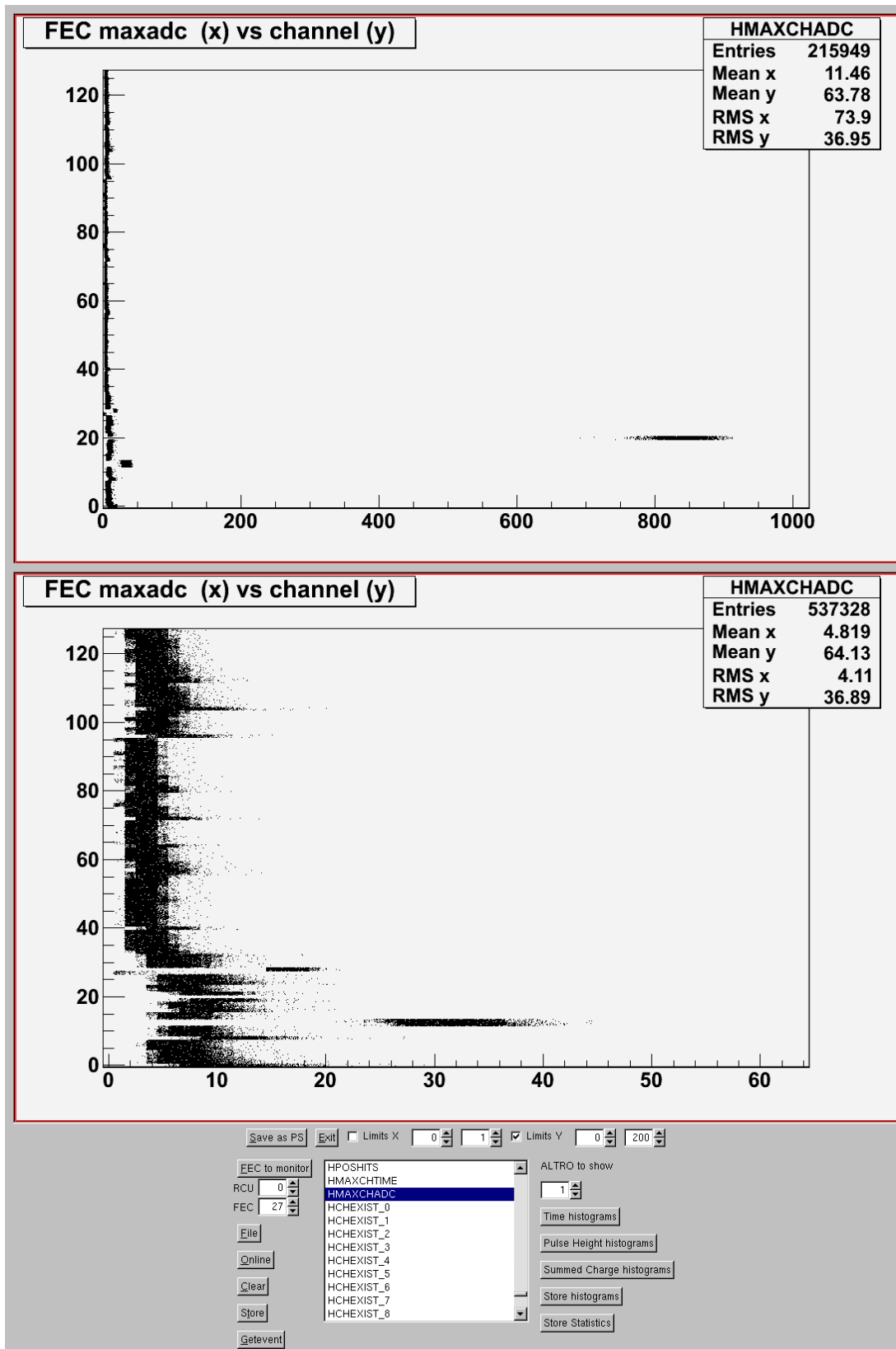
trigger & pulse generation:



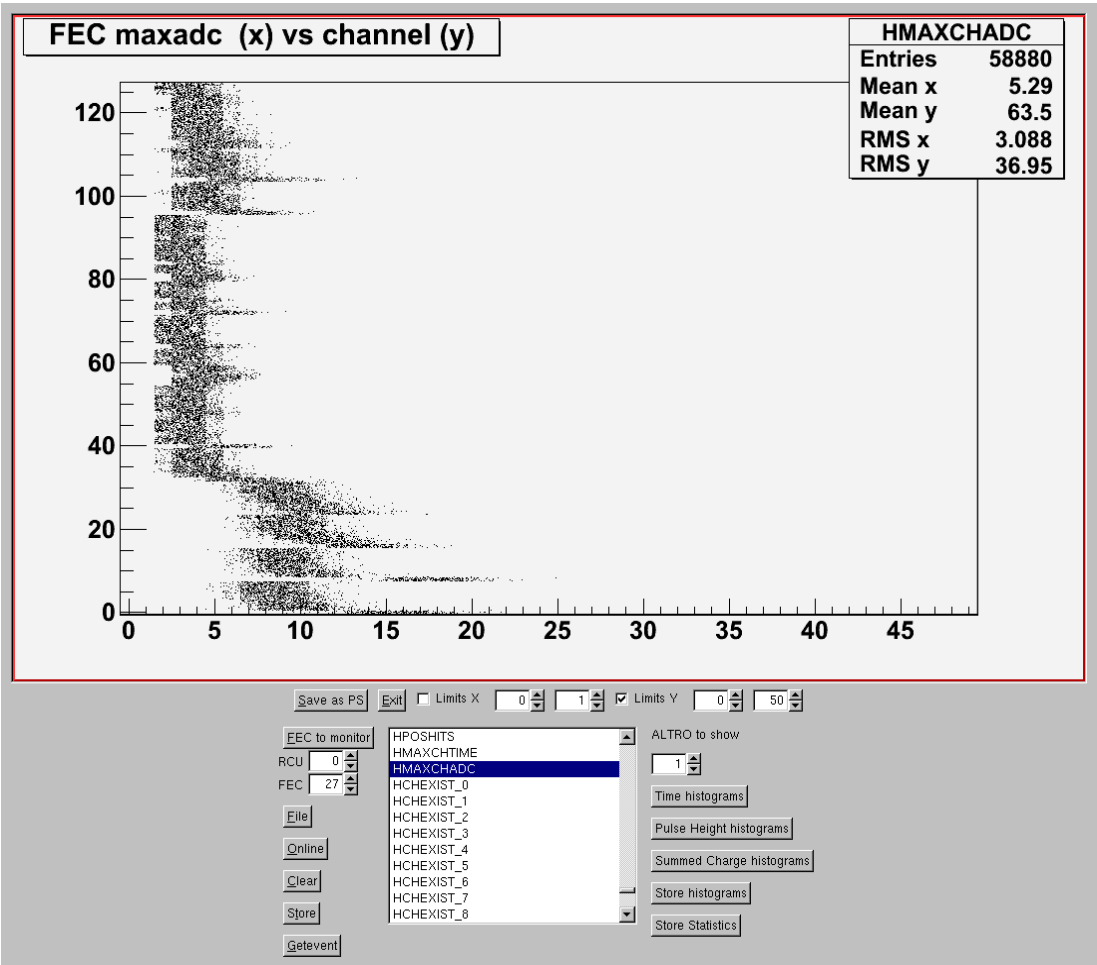
All ADC/time plots are with pedestal subtraction, unless otherwise stated.

Single signal input case (x axis = max ADC values, y axis = FEC channel)

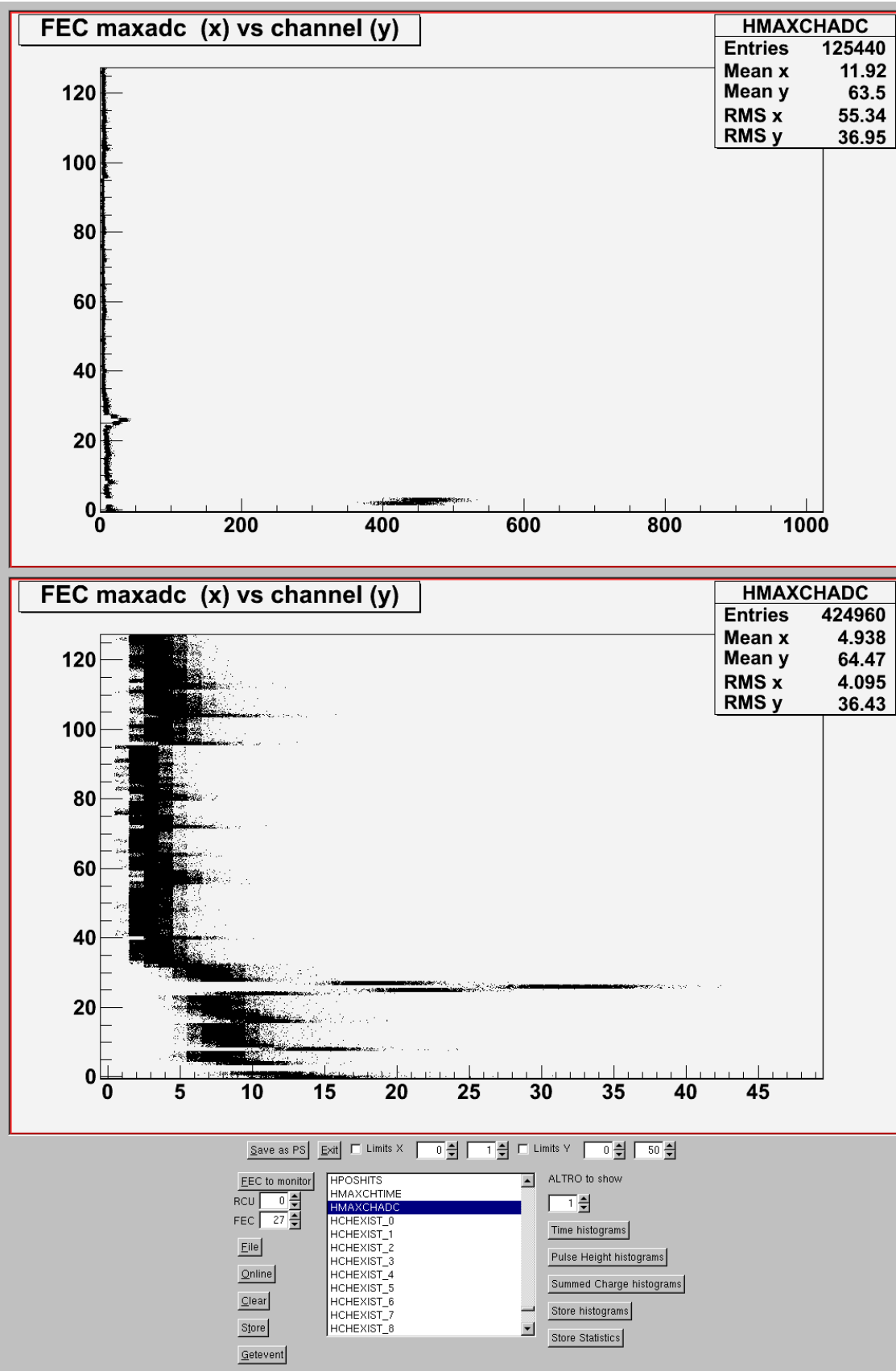
lower plot shows expanded scale for low ADC values. The signal is in channel 20, cross talk seen in channels 12 and 13.



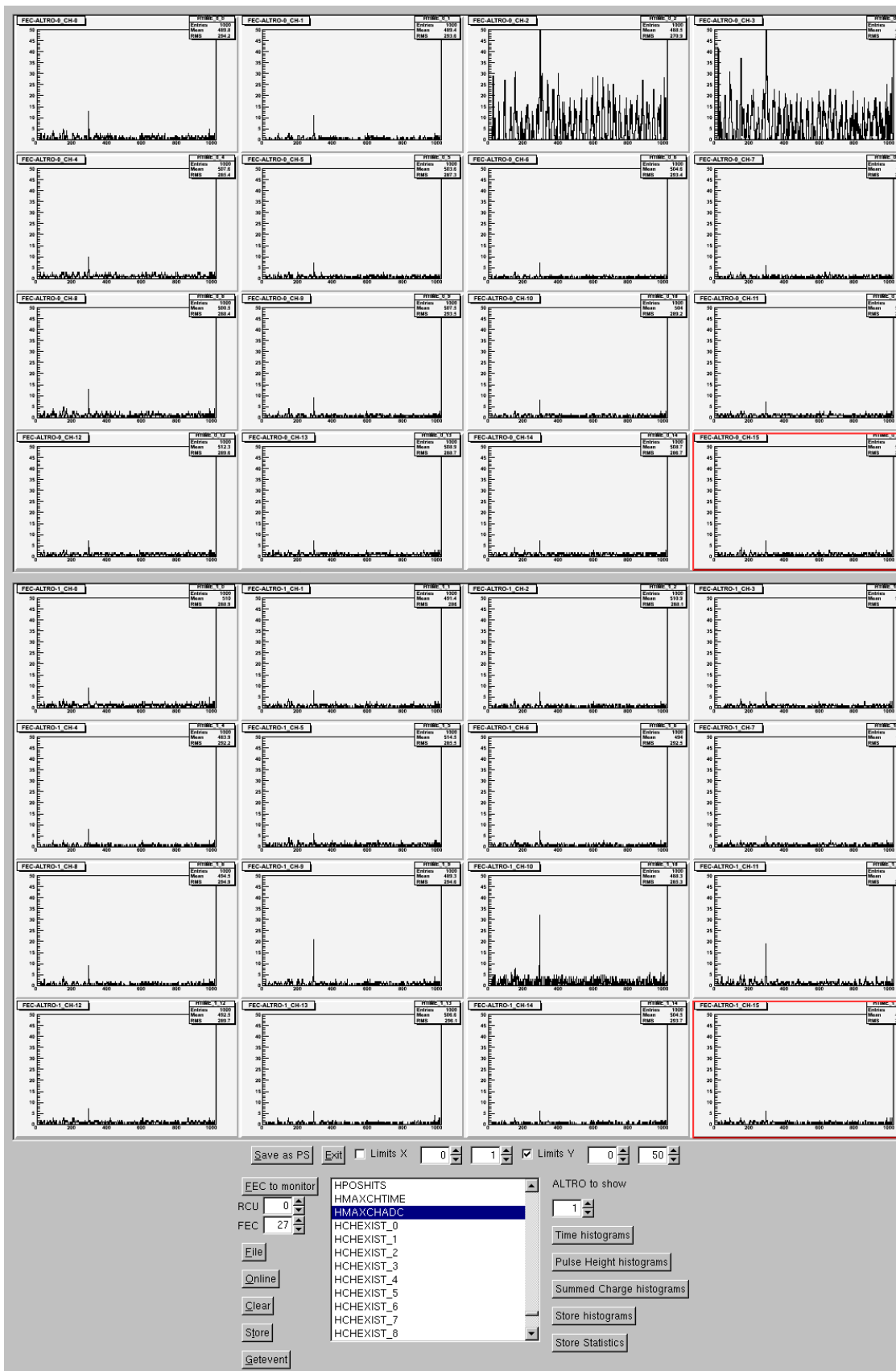
The on the average larger ADC values for channels 0-31, compared to the other channels, is due to pickup in the cable on all channels. Next plot show response when signal adapter connector was disconnected from the kapton cable but is still close to the cable.



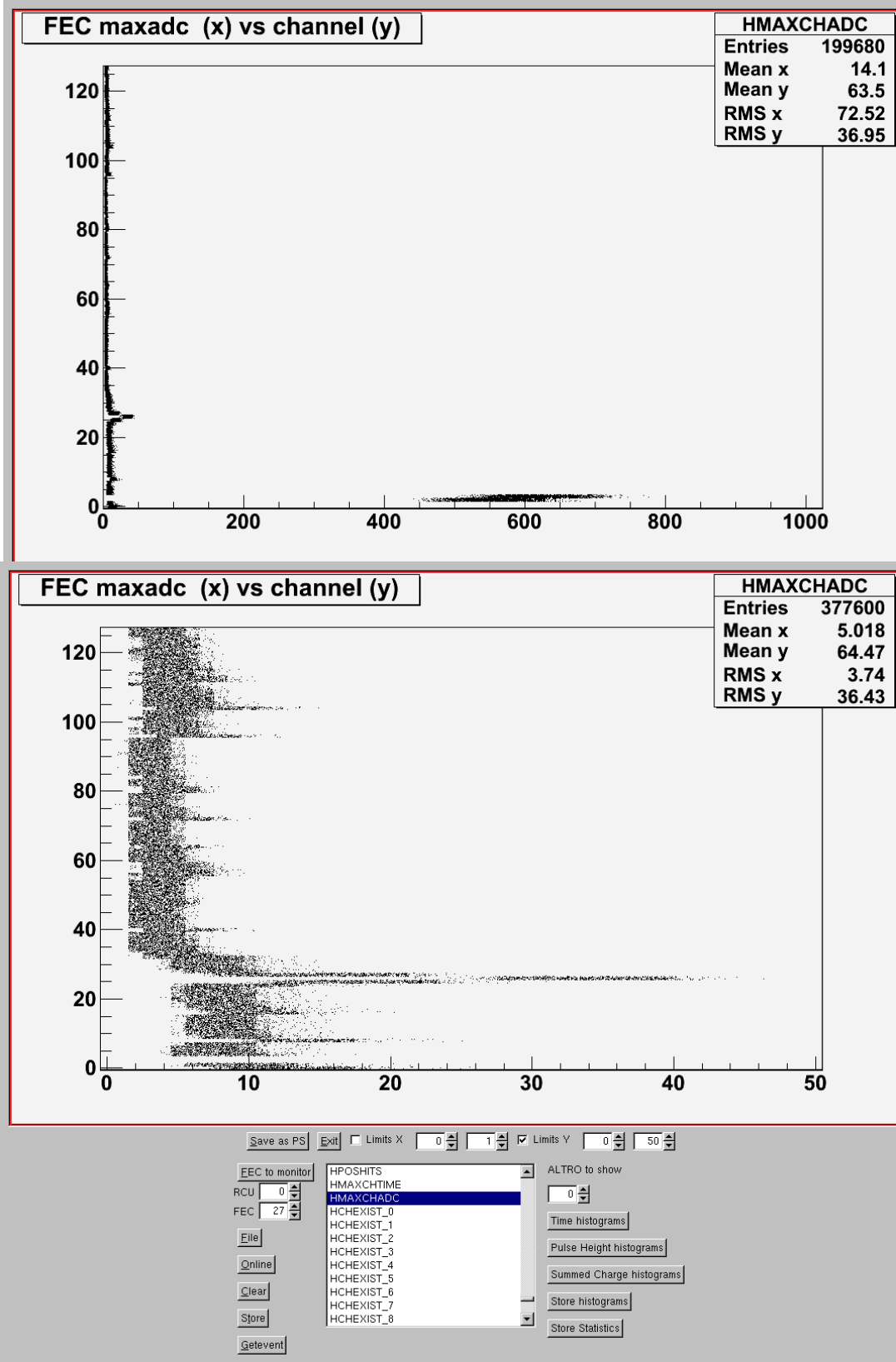
Two signal input case, i.e. input on two neighboring lines. Input on channel 2 and 3, cross talk seen in channels 25,26, and 27.



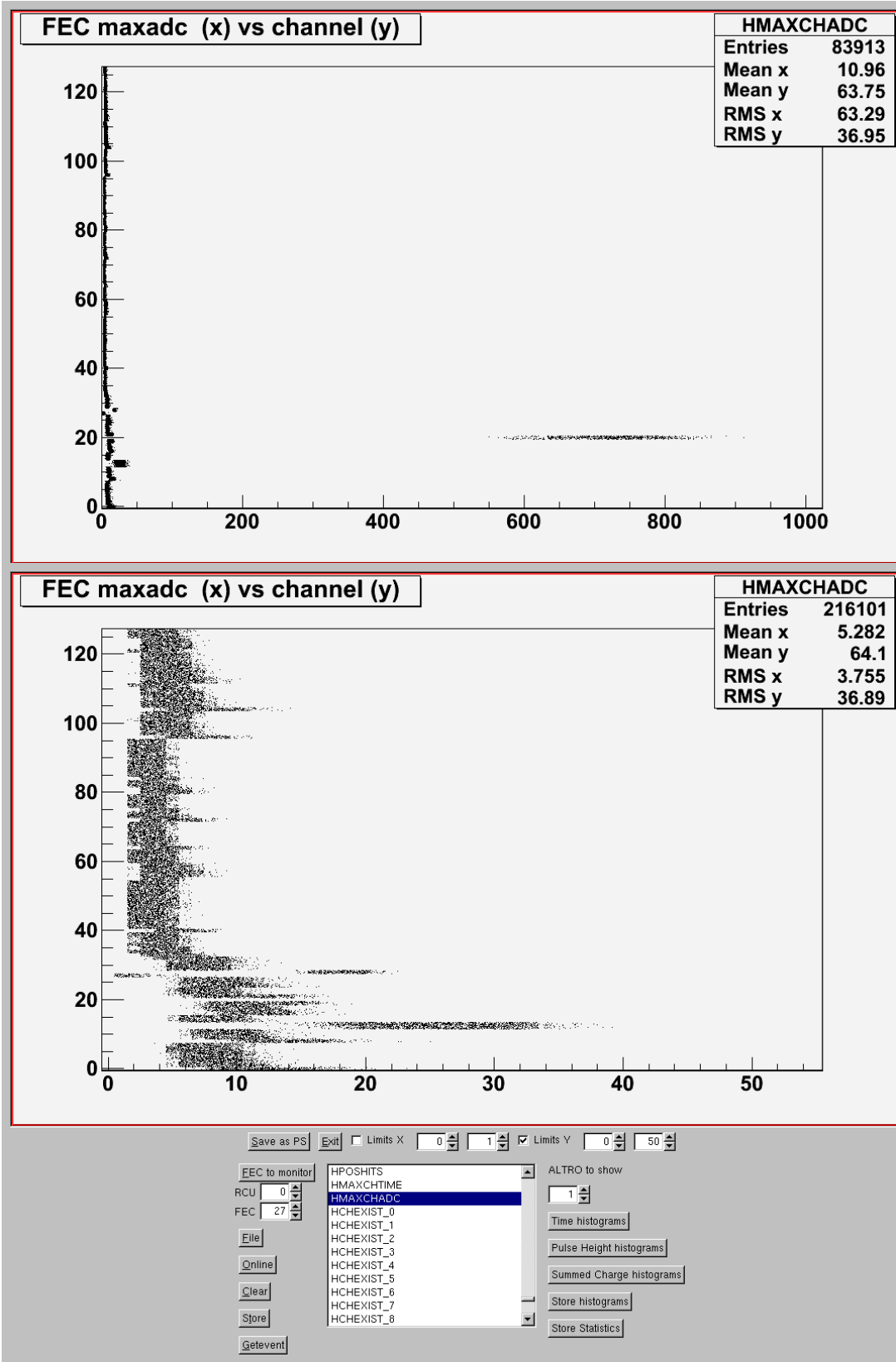
Example time plots (a single event) chip 0 upper, chip 1 lower



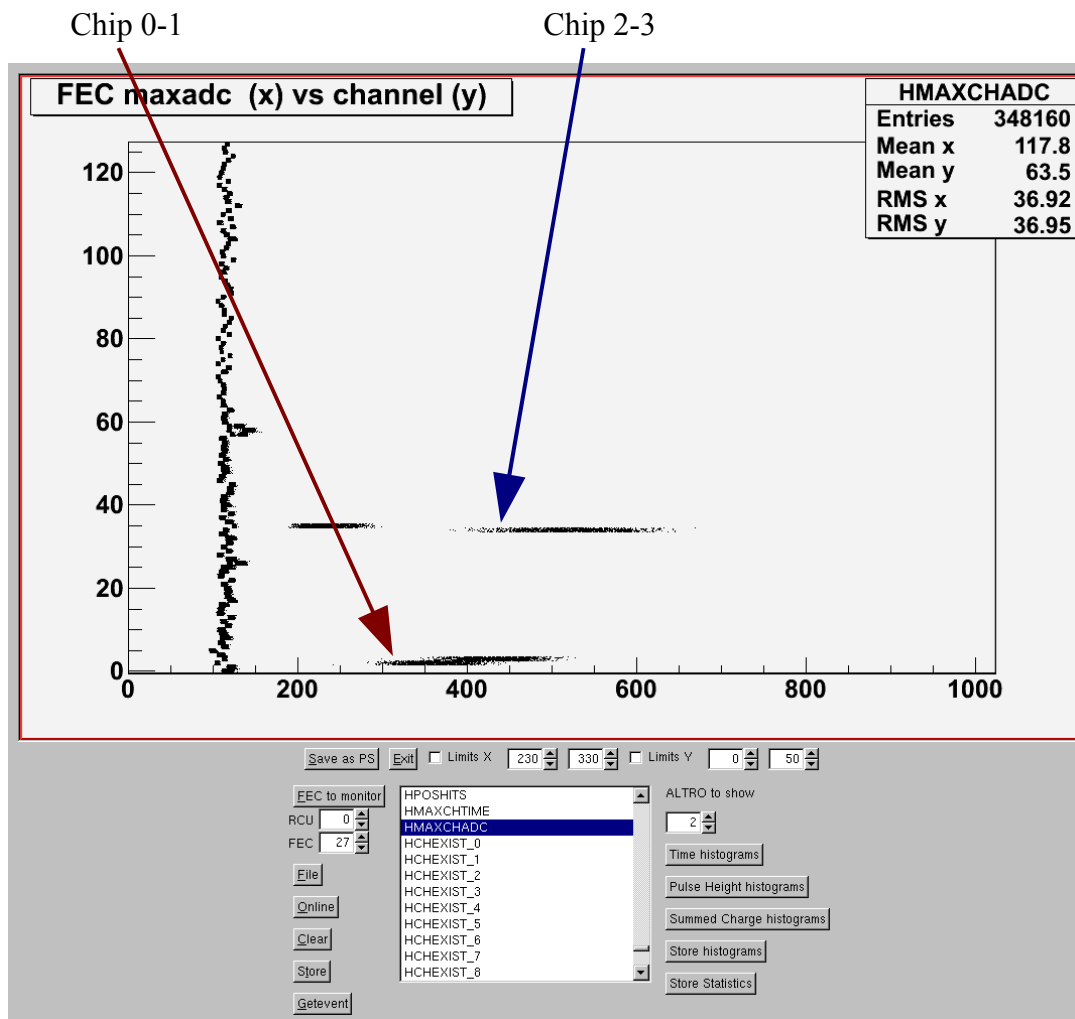
Try to shape the signal generated with a RC-filter to have a rise time of 100ns, to look more like a real signal. Note that the signal has another attenuation here. Two signal input case:



One signal input case:

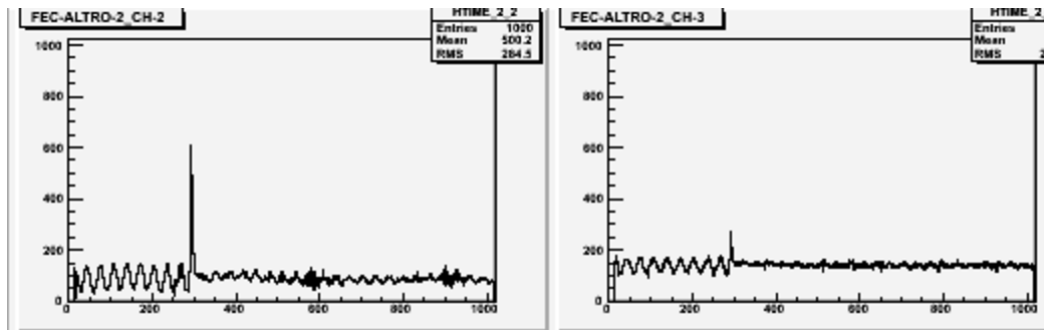


use chip 2 and 3 instead of chip 0-1. Then there is a change in the two signal input, the pulse heights gets very unequal. They only change was to move the cable. Another cable gave the same result. Rotating the male signal side connector, made it to be unequal also on chip 0-1. ADC values are without pedestal subtraction.

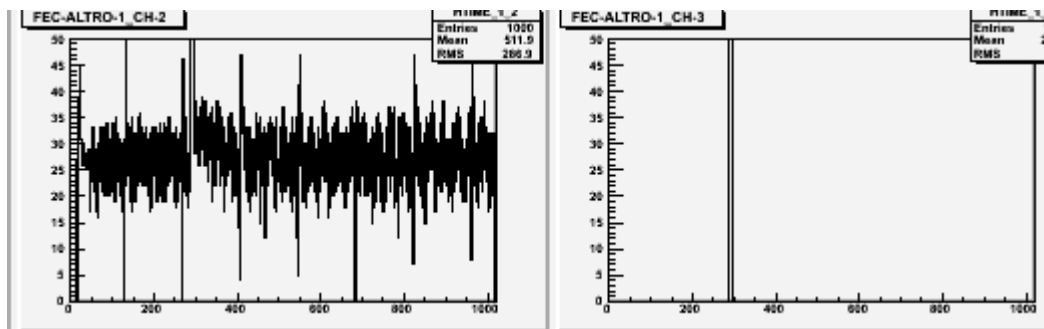


Perhaps a short somewhere?

One can also see that the pedestals on the channels with injected signals seems shifted, one to lower values, the other to higher values:



Rotating the male signal side connector 180 degrees, made it to be unequal also on chip 0-1: and a pedestal subtracted time spectra for single event looks like (note expanded y-scale!):



Conclusion:

The cross talk is 2-3 % for single signal input. For two signal input does the cross talk add up from the two signals.

Data files were taken as:

readout-25377_0.dat one signal into connector
 readout-25380_0.dat no connector on cable, signal generator cable nearby
 readout-25382_0.dat two inputs connected together (unequal response)
 readout-25384_0.dat two inputs, rotate connector 180 degrees (equal responses, the plots shown here)
 readout-25387_0.dat two inputs RC-filter - 100 ns rise time
 readout-25390_0.dat one signal into connector and RC-filter