Original Input Stage – Frequency Response (Part 4)

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Measurement equipment:
Signal Generator Rhode & Schwarz · 100 kHz … 1000 MHz · SMG, Oscilloscope TDS5104B

As known, the frequency response of the original stage shows some kind of peaking with maximum at about 140MHz. The x axis shows the frequency and y axis is normalized to 0 dB.
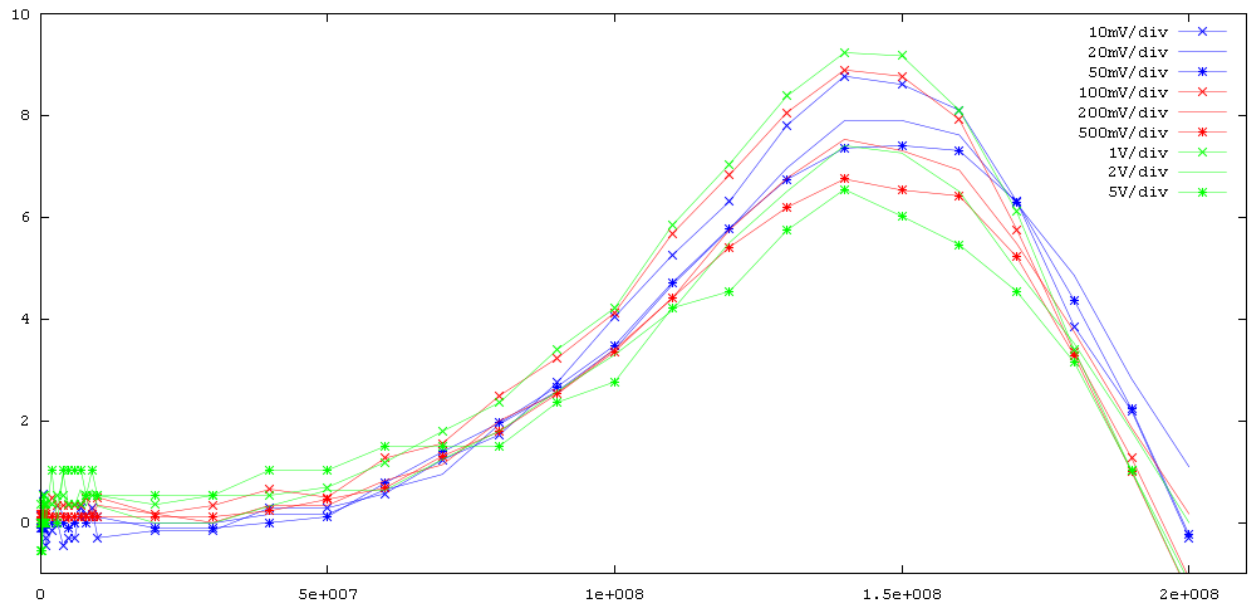

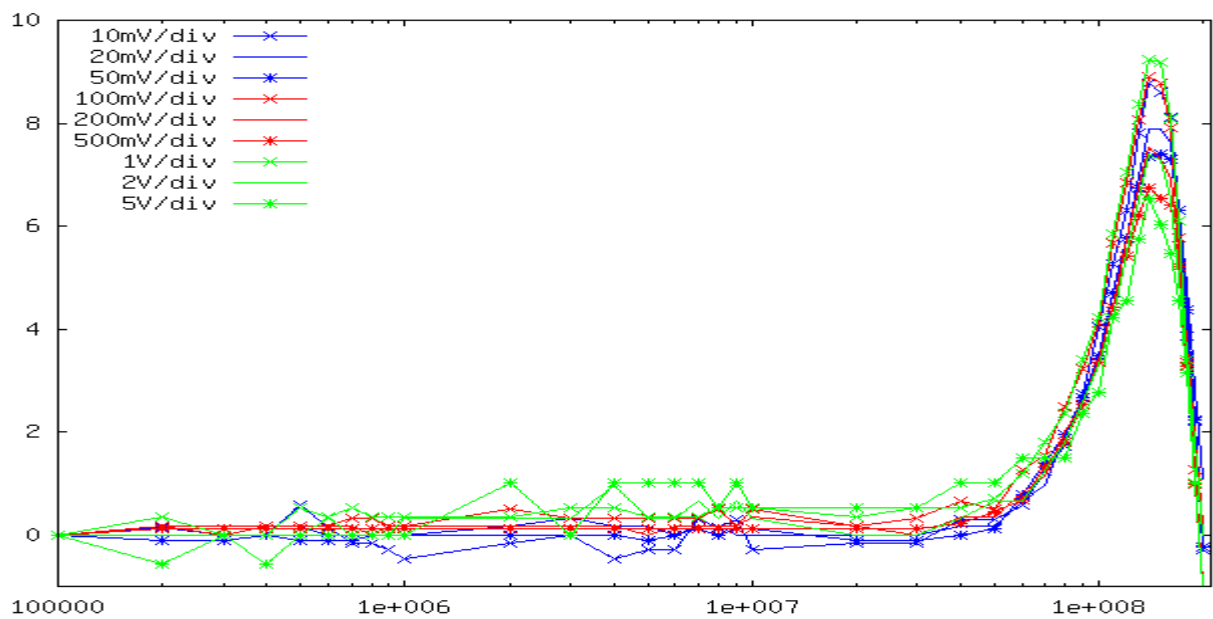*Abbildung 1: Frequency Response of original stage in linear plot*

Abbildung 2: Frequency Response of original stage in log plot

It's also known, that there are 0 Ω resistors between the last opamp (AD8131) and the ADC's (4x MAX1121).

In the following measurements this both resistors were replaced by 24.9 Ω and frequency response was detected again.
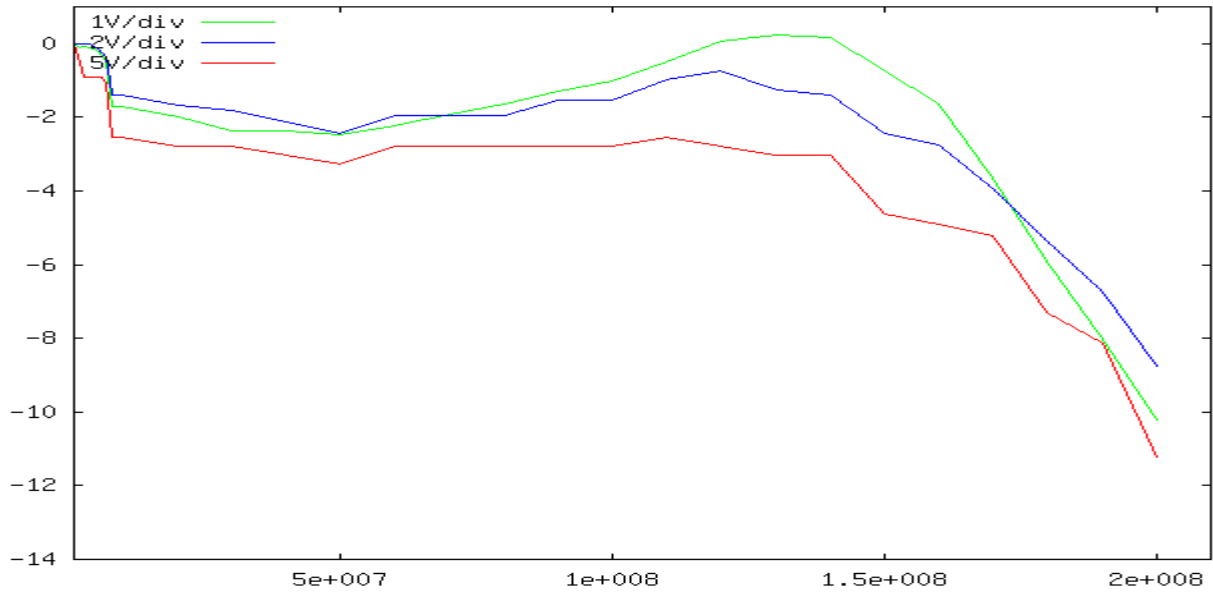

Abbildung 3: Frequency Response of the modified stage in linear plot
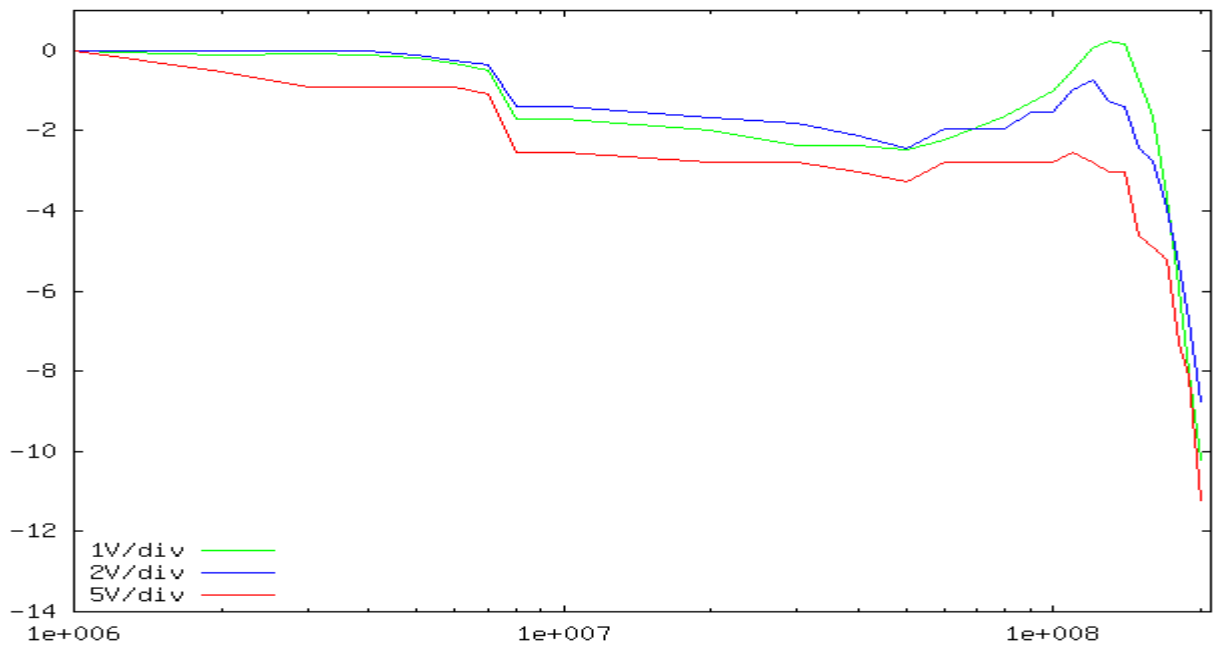

Abbildung 4: Frequency Response of modifiedl stage in log plot

It can be seen, that peaking has decreased, but there is a break-in of nearly -2 dB between 7 MHz and 8 MHz. The value and the function of the resistors is not perfect, influencing the amplitude in the whole frequency range.

A better approach is to set U12 to a fixed output impedance i.e. 50 Ω in each path and connect a LC filter circuit with 100 Ω input impedance and about 4th order. A resistor in parallel to the ADCs reduces the resulting resistor (1.1 kΩ || R). The filter needs to transform the input impedance to the output impedance.

It could also be possible, to use the parasitic capacitance of the ADCs as a part of the filter. Therefore the filter structur could be a Butterworth filter in low pass T configuration.

This action could steady frequency behaviour and reduce noise, which needs to be proved.

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