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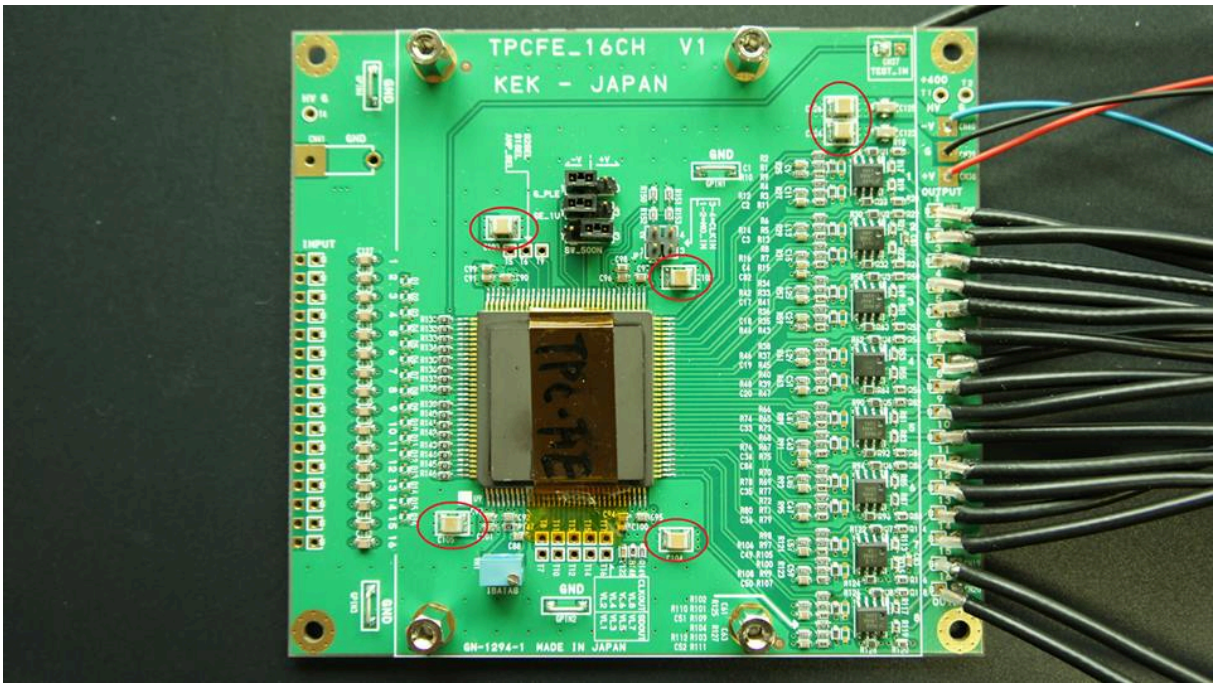
Reporting : 26/09/2013
Overshoot on the ASIC

Abstract :

After the test of the new ASIC board we noticed an overshoot of the output response of pulses. These overshoots appears after having connected the output channels to some resistors (50 Ω).

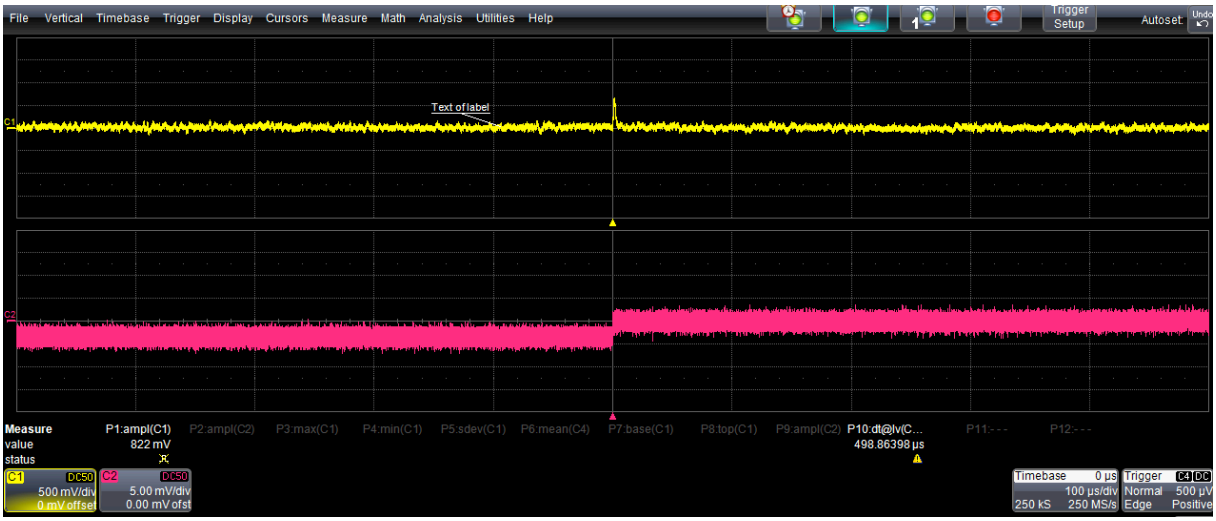
The subatech team proposed then to increase the capacitance of some capacitances responsible of decoupling the current, but the problem remains. (in red the 6 capacitance has been changed into 6.6 micro-fahrad)



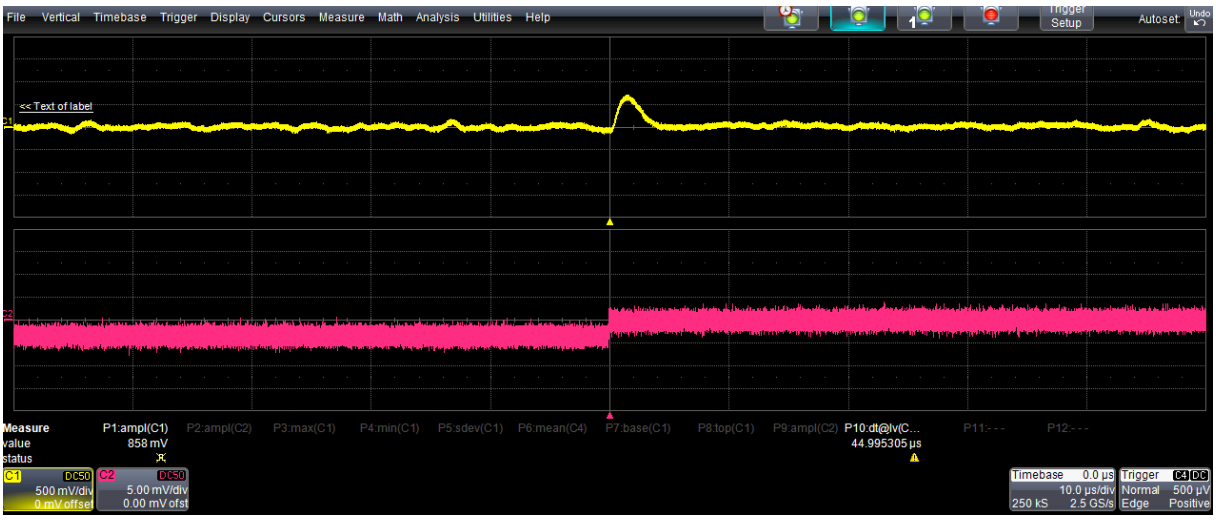
Following are the screenshot of what we can see on the oscilloscope. Channel 1 is the response of the ASIC for a pulse input of a 3.3mV pulse (3.3 fC).
The time base is 100 micro-second/div for the first screen and 10 micro-second/div for the second screen.

- 1 channel connected (1*50 Ω) :

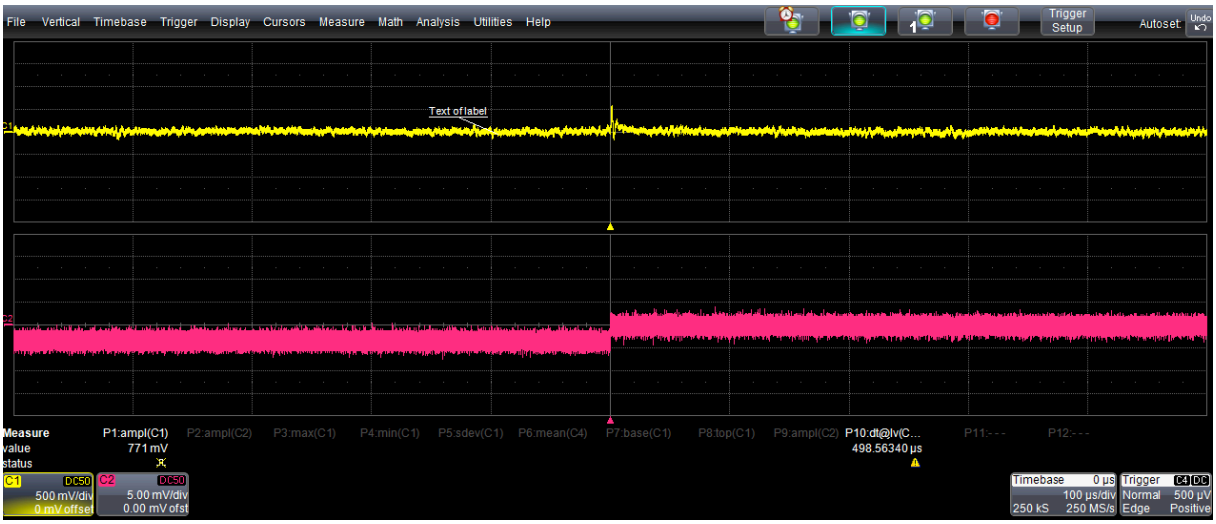
100 micro-second/div

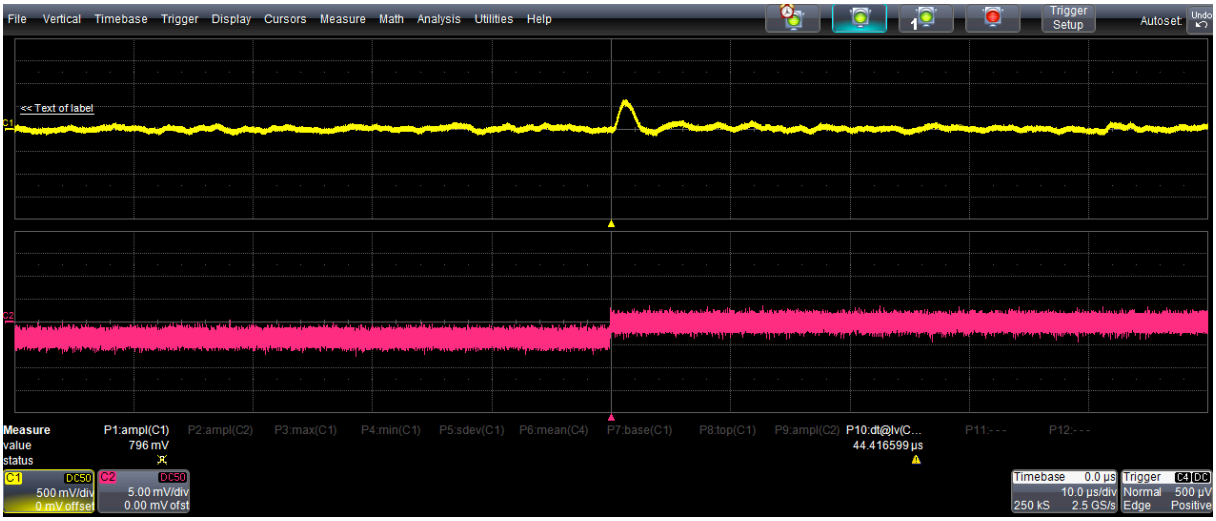


10 micro-second/div

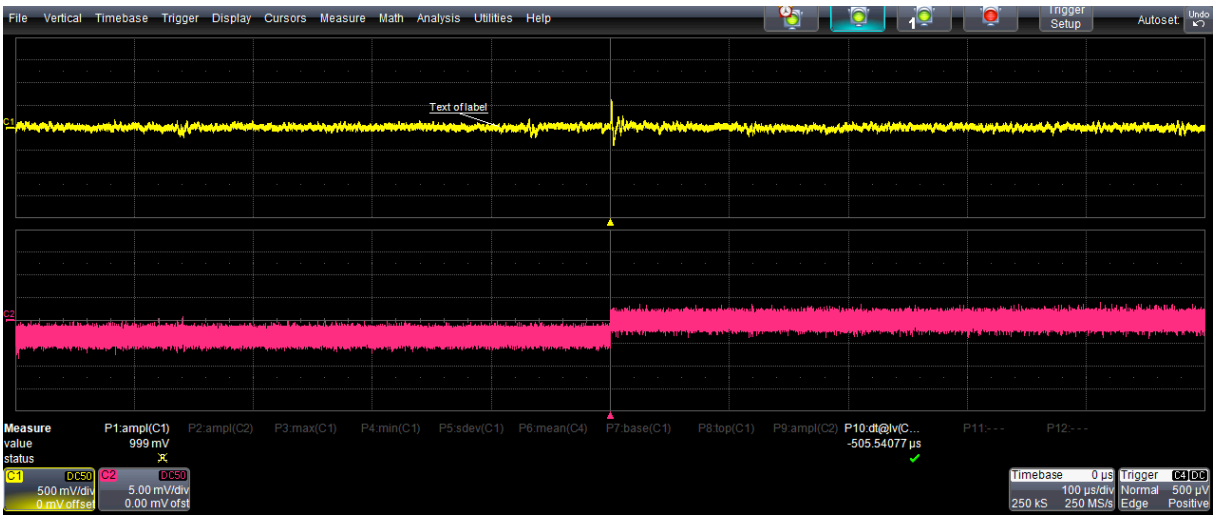


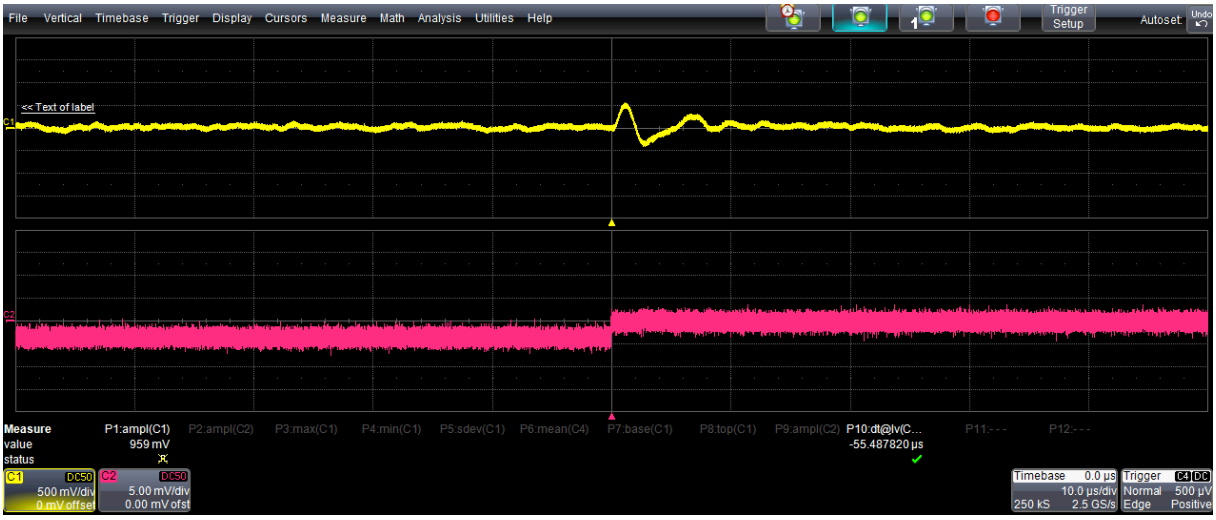
- 4 channel connected (4*50 Ω) :



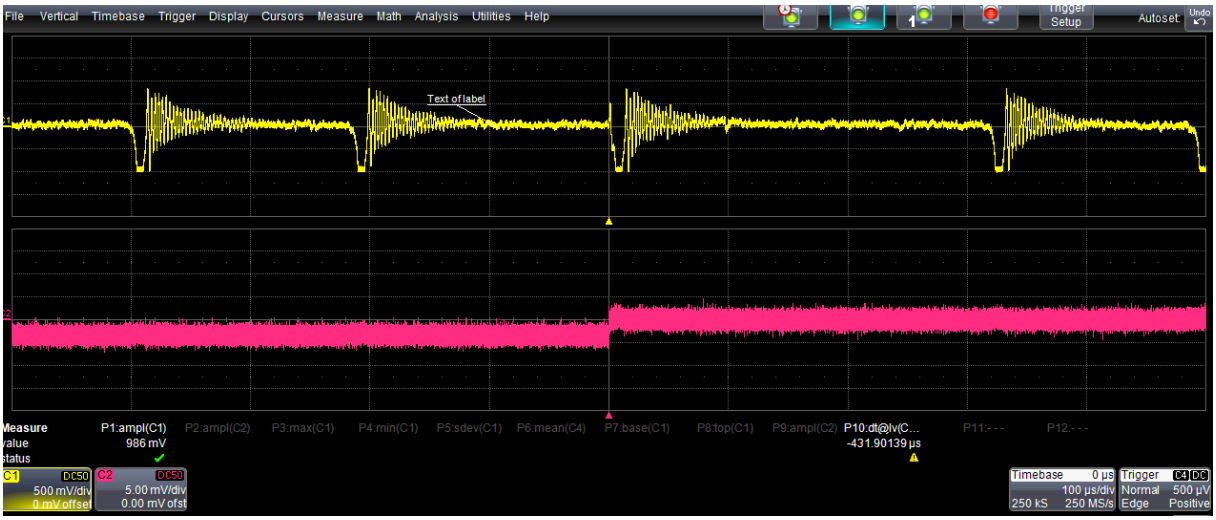


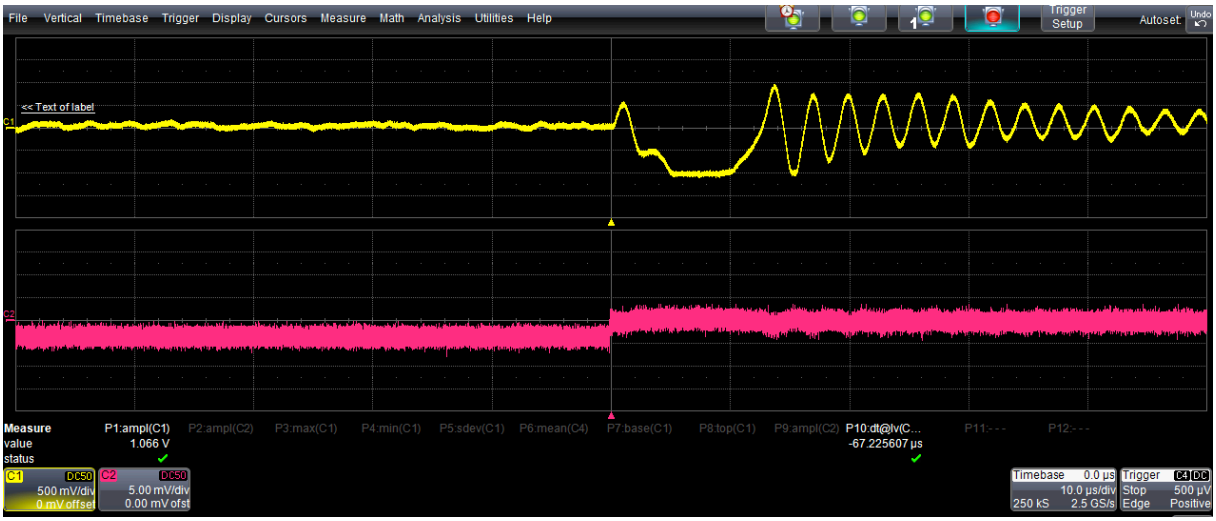
- 8 channel connected (8*50 Ω) :



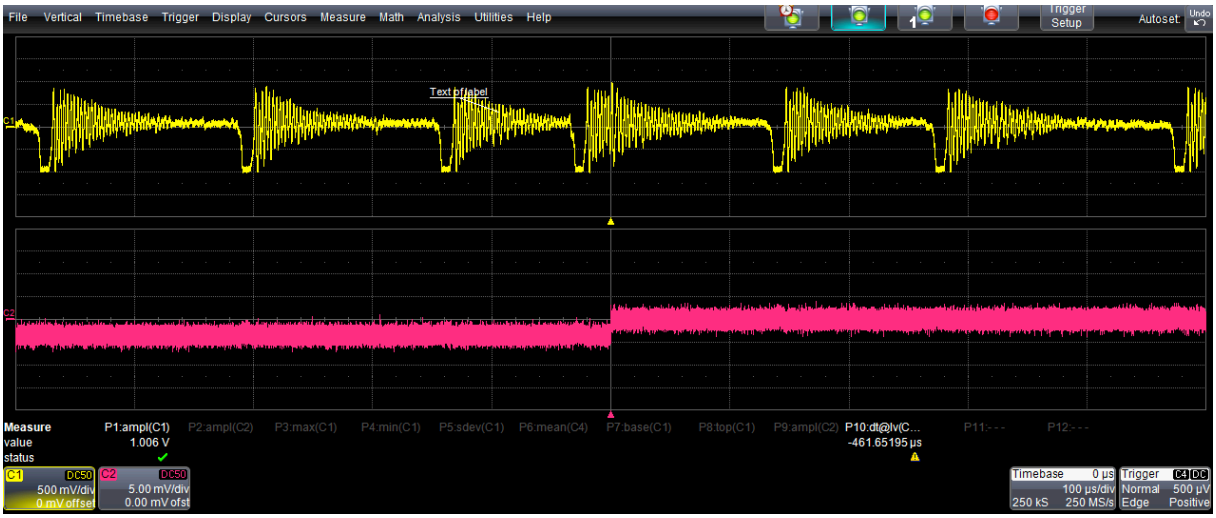


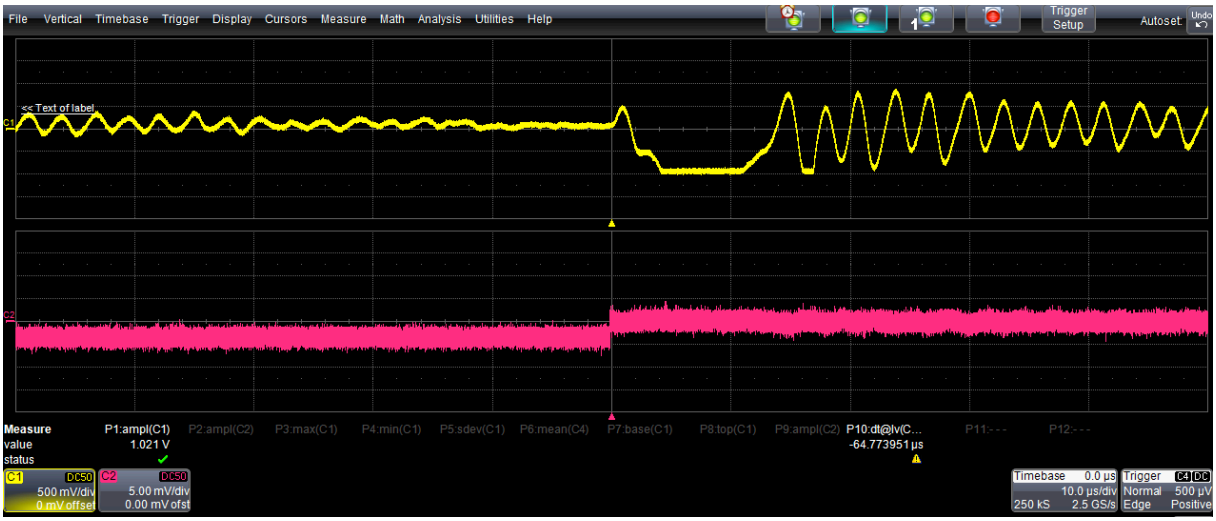
- <u>12 channel connected (12*50 Ω) :</u>





- 16 channel connected (16*50 Ω) :





We can easily have the frequency of the oscillation next the overshoot with the last screenshot:

$$T_{oscill} = \frac{1,3}{5} \times 10\mu s$$

$$T_{oscill} = 2,6\mu s$$

$$f_{oscill} = 385kHz$$

* The apply voltage is between -1.25V and +1.25V. Even when it is pushed between -1.35V and +1.35V the problem remains so it seems that the cause is not related by the limit of apply of the LMH6646MA which is 2.5V (the operational amplifier)…