TOE 9261
Suppression of disturbances on signal line switches

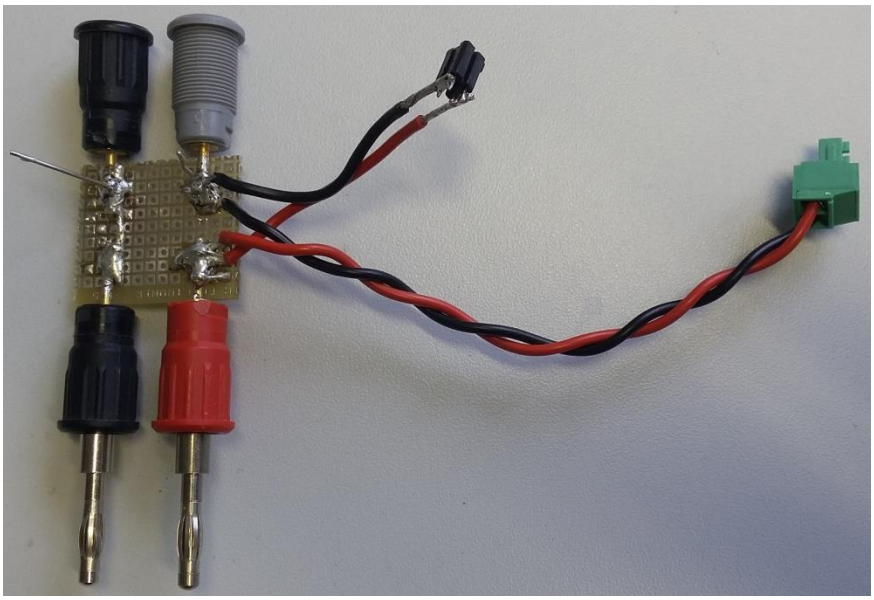
10.12.2018
EW – DG

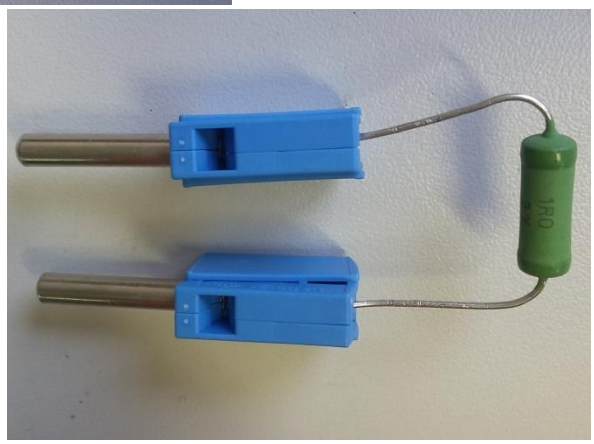
The ascertained disturbances are common mode disturbances. They can be kept low by:

- Short cables
- Closely spaced wires, twisted if possible

Next pages show test setups and related voltages across the 1 Ω resistor
The settings are:

- Power supply 2 V
- Switching frequency 1 kHz
- Oscilloscope, acquire mode “Peak Detect”, 1 M points





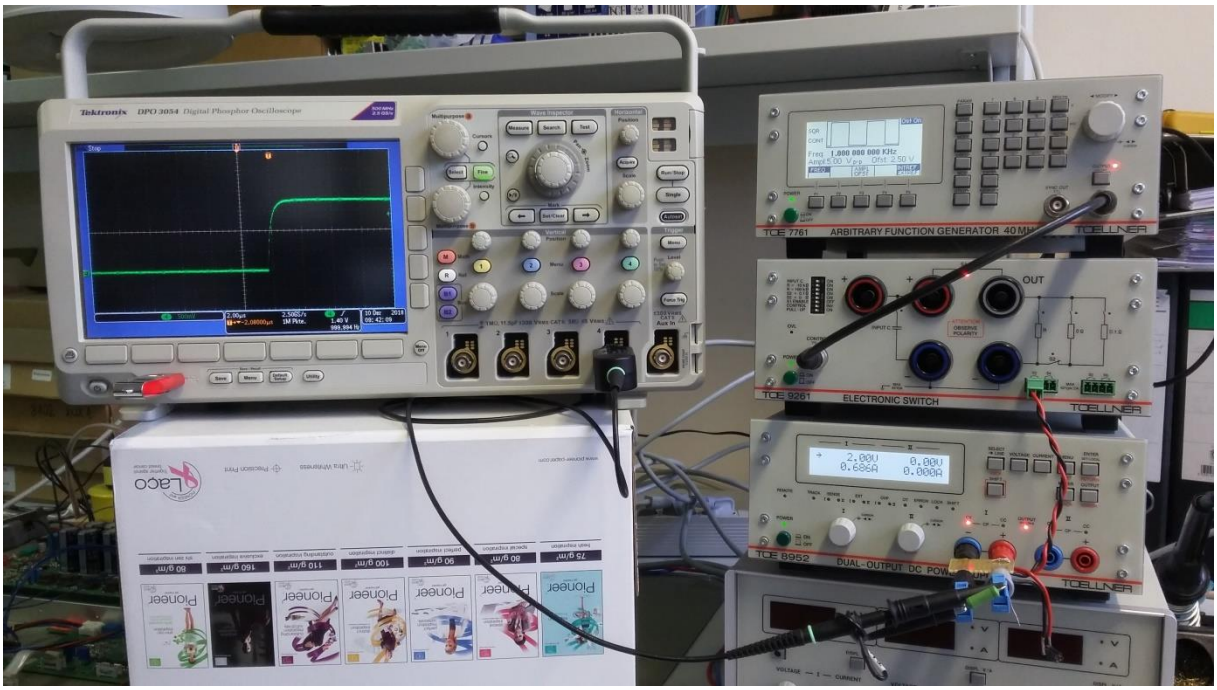


Fig. 1: Test setup

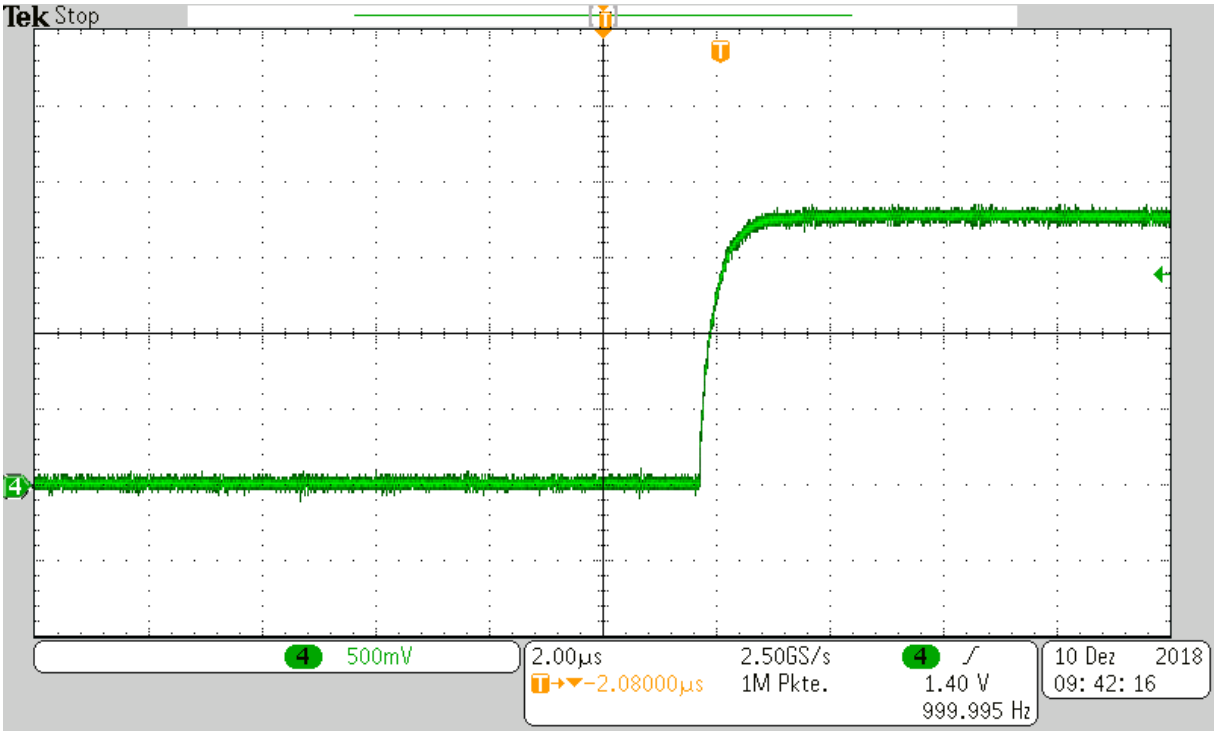


Fig. 2: Related voltage across 1 Ω resistor

We did not observe the disturbances you have ascertained. As cause for the disturbances you observed, we assume couplings of cables, oscilloscope, or power supply to earth, which result in common mode disturbances coupled into the oscilloscope input.
So we established a capacitive coupling of the oscilloscope probe cable to earth by guiding it along the upper side of the housing of the TOE 9261, pressed on the housing by the case feet of the function generator.

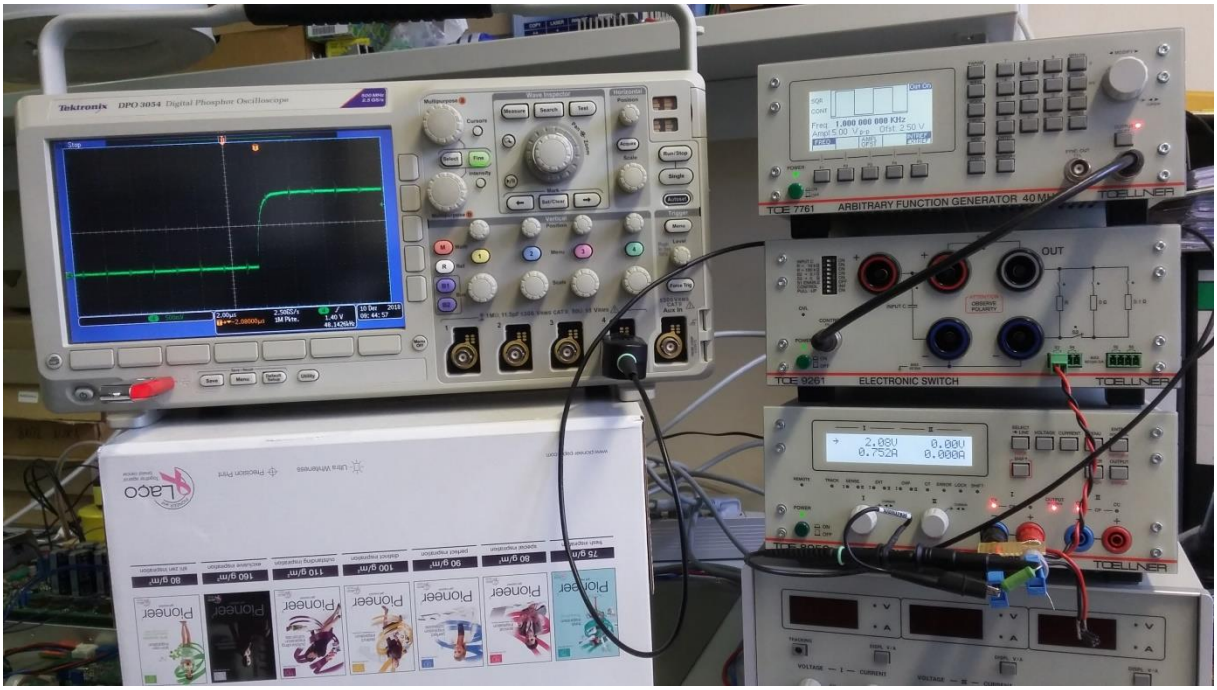


Fig. 3: Test setup with increased disturbances by capacitive coupling of probe cable to housing of TOE 9261

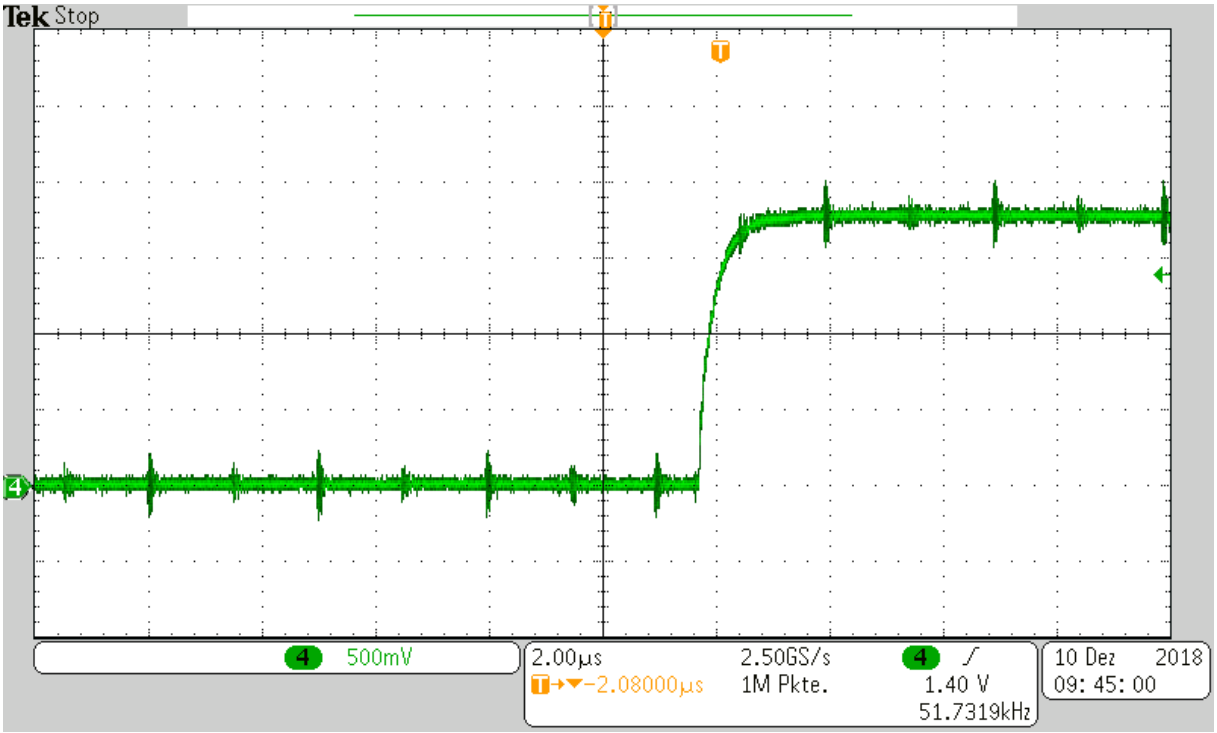


Fig. 4: Related voltage across 1 Ω resistor, superposed by common mode disturbances

A first method of disturbance suppression is the loop-in of a common mode choke, in this case realized by a core CS 270125 of manufacturer Chang Sung with N = 4 windings, into the twisted cable to switch S3 of the TOE 9261.
The disadvantage of this method is a slight slowing down of the switching speed by the necessary additional cable length of the choke and the small leakage inductance of the choke.

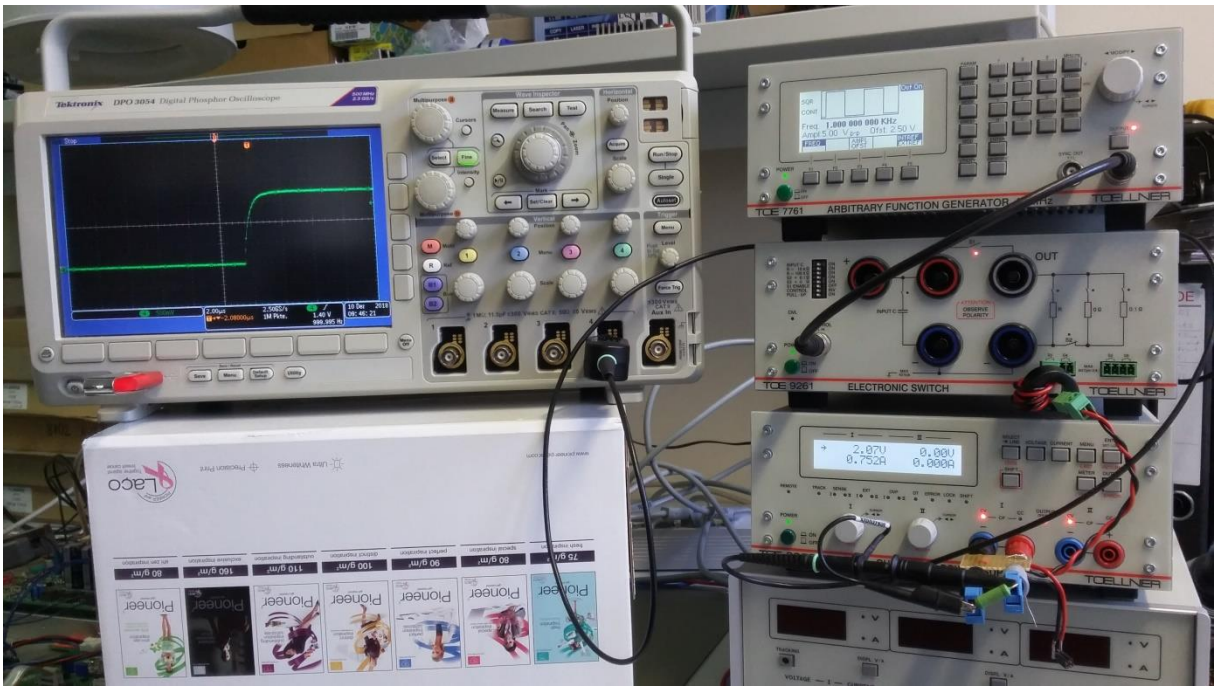


Fig. 5: Loop-in of a common mode choke (4 windings on core CS 270125) into the cable to signal line switch S3 of the TOE 9261

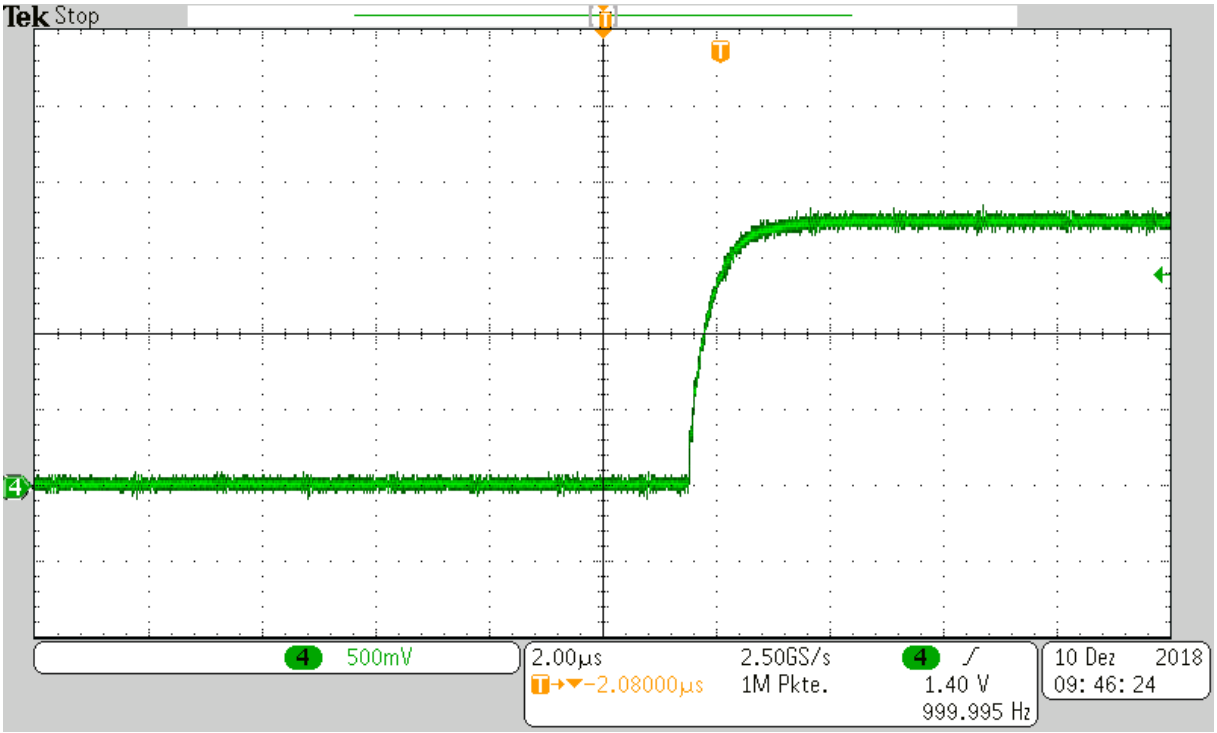


Fig. 6: Related voltage across 1 Ω resistor. Common mode disturbances are reduced significantly

Another method to keep the common mode disturbances away from the oscilloscope input is to use a differential probe for the measurements.

Fig. 7: Use of a differential probe (Testec TT – SI 9002, 25 MHz),setting 20:1

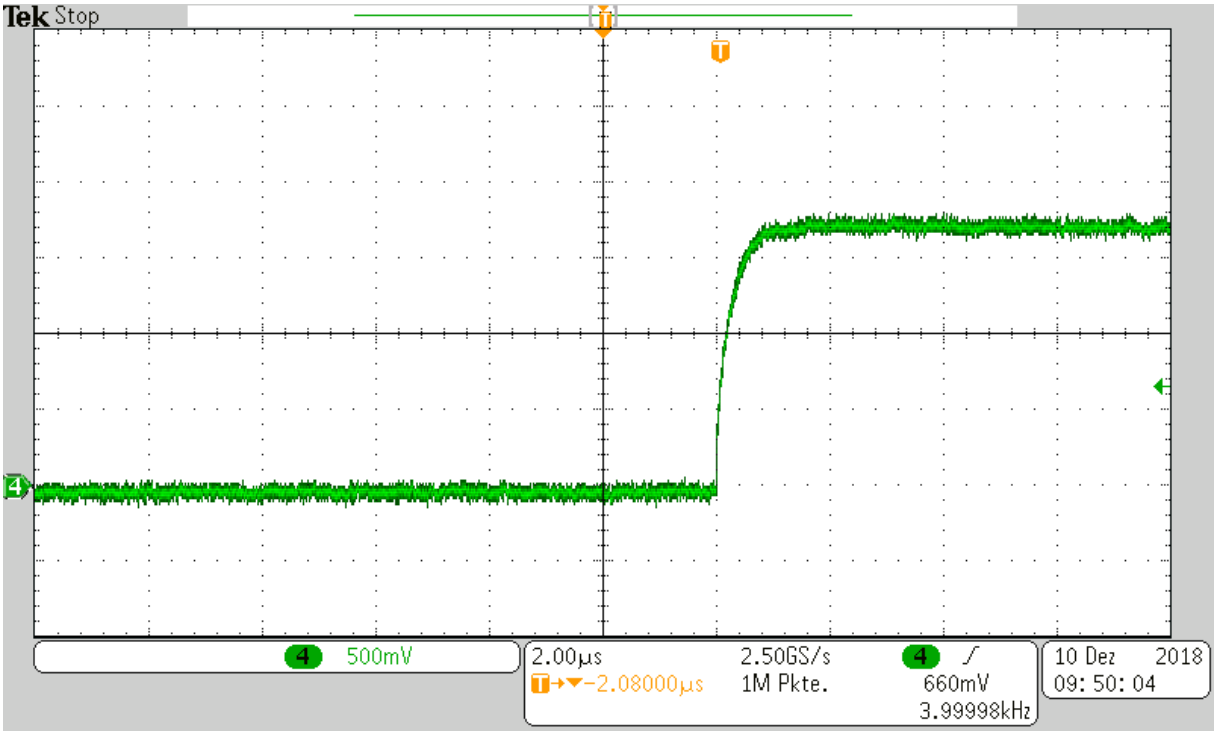


Fig. 8: Related voltage across 1 Ω resistor. Common mode disturbances are not visible anymore