Grand Digitizer V2 hardware problems

Version 0.1

Dániel Szálas-Motesiczky

20-04-2021

Radboud Universiteit Nijmegen

I. Power supply problem:

I.1

High level problem description:

- Current consumption of the board is jumping between 0.5A and 0.7A.
- Clicking noise is audible.

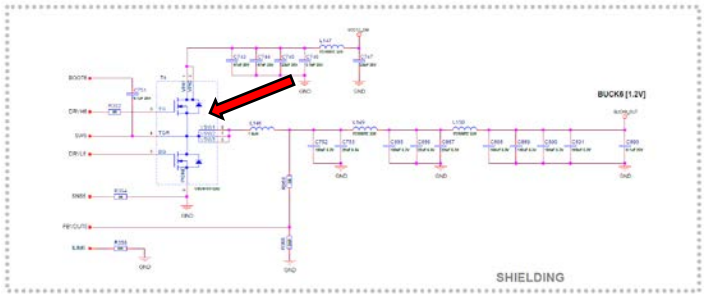
Measurement results:

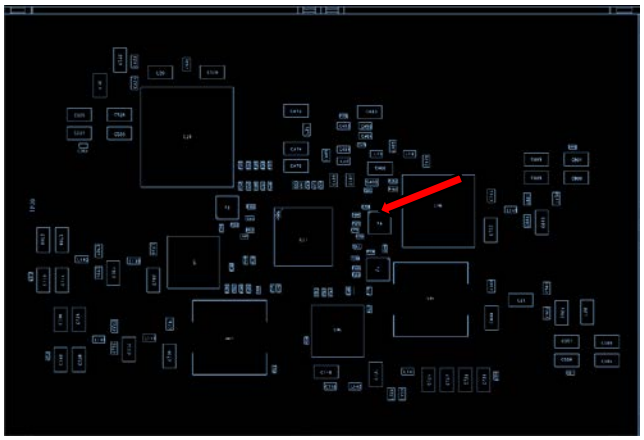
- All power output from the TPS650864 power supply chip is fluctuating; the DC levels are not steady.
- No power present on VCC1V2_PS_DDR and VCC1V2_PL_DDR power lines.
- A short is present between GND and VCC1V2_PS_DDR and VCC1V2_PL_DDR lines.

Conclusion:

After isolating the relevant part of the power circuit (BUCK6) it was measurable that the T4: *(CSD87331Q3D)* FET power block is broken. (TGR and VSW1/2/3 pins were short to GND) Desoldering and measuring the T4 FET power block separately confirmed that it was broken.

Replacing it with a new FET solved the problem.





Possible causes:

- The problem is very unlikely caused by other part of the digitizer because the power FET can withstand much more current than the filter circuit after it. The CSD87331Q3D FET is very vulnerable for ESD, if it is not handled with care in an ESD safe environment it can be damaged. This problem was most probably caused by a faulty FET or mishandling the component.