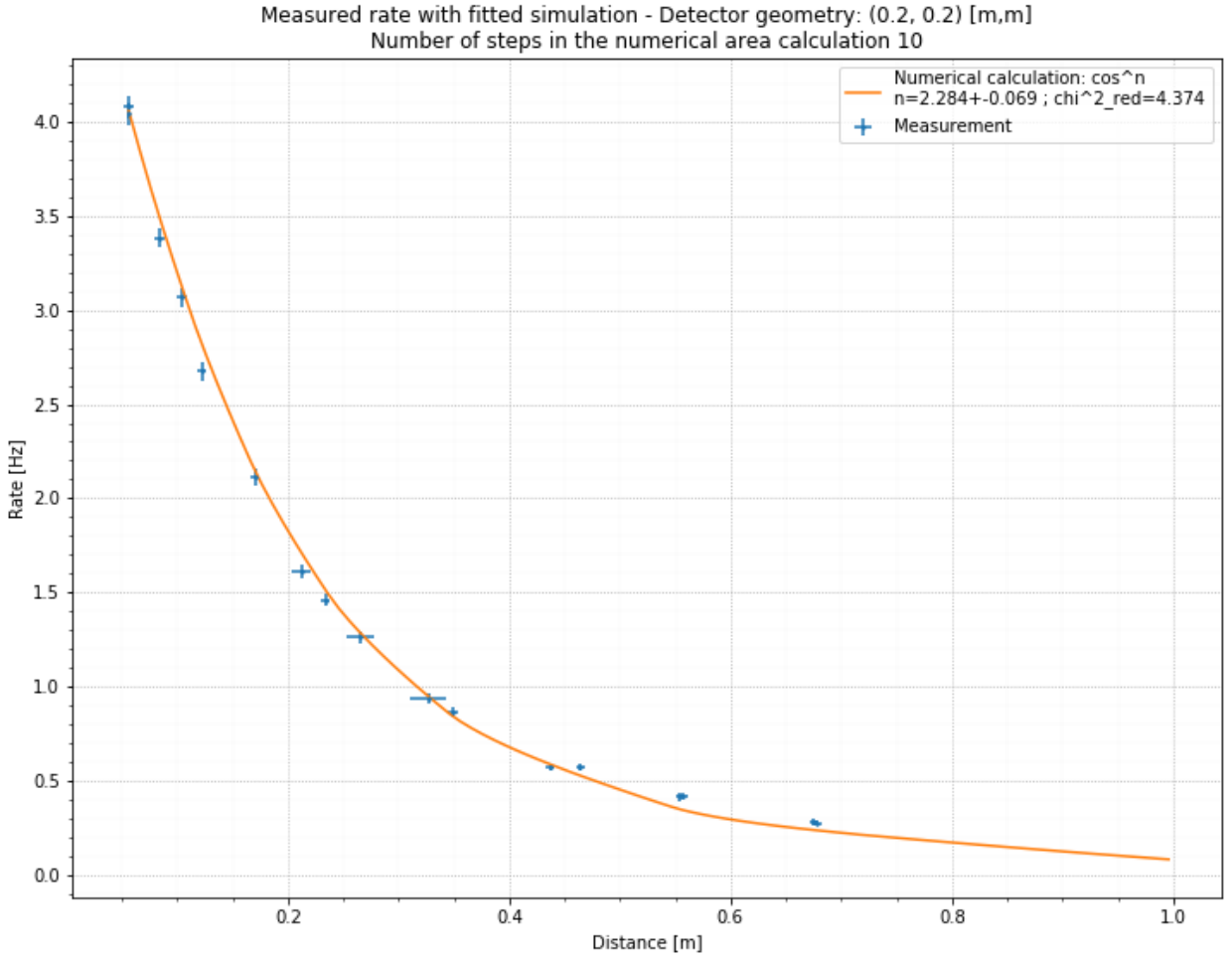
FURTHER SIMULATION OF DETECTOR ACCEPTANCE AND FIRST STEPS IN HARDWARE DEBUGGING

Hendrik Borras

Supervisor: Michael Schmelling

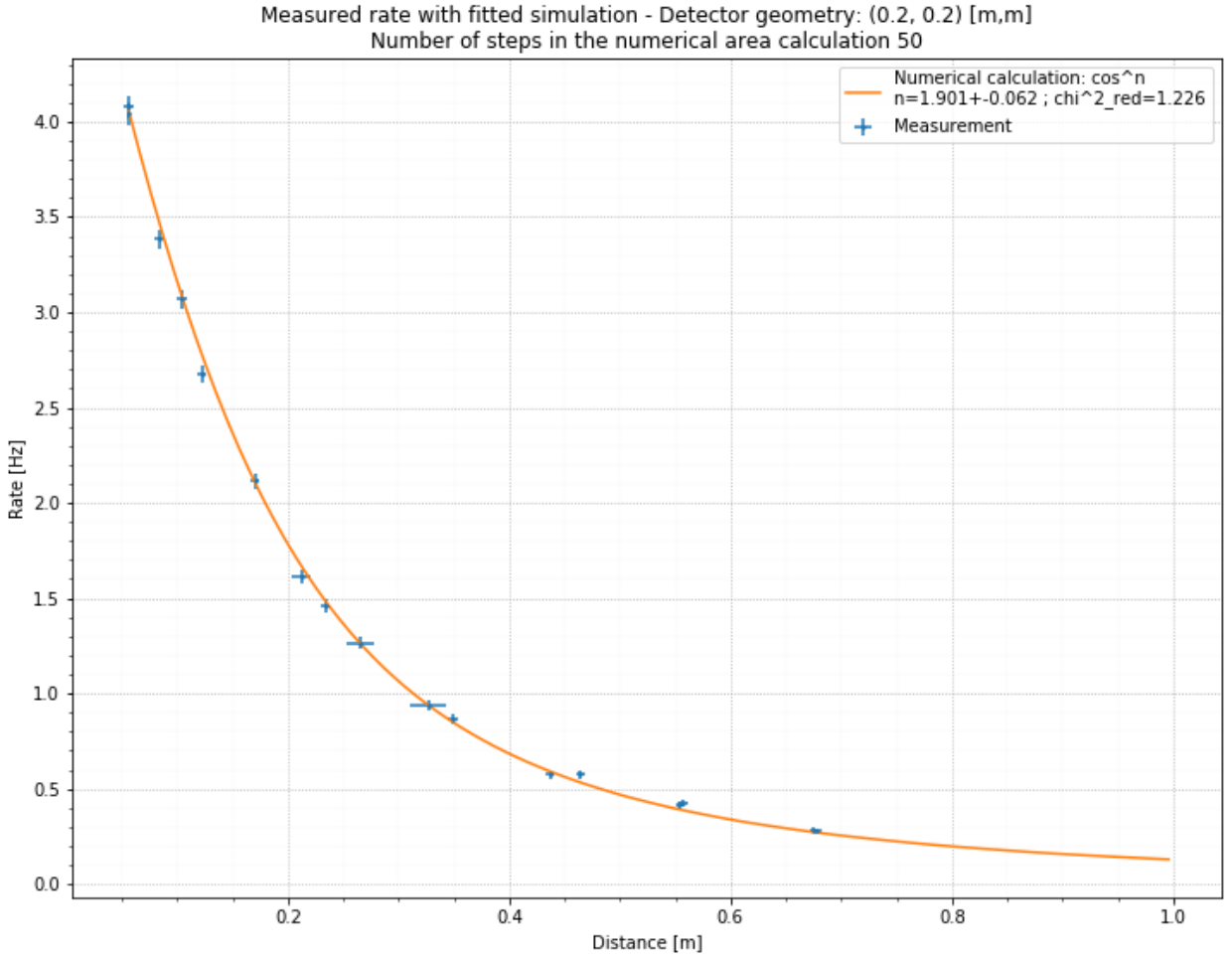
NUMERICAL SIMULATION

- Fitting with minuit now possible
- Fit converges towards cos^n with n = 1.88 +- 0.06
- On the right:
  - Overlapping detector area was calculated for 10 different angles



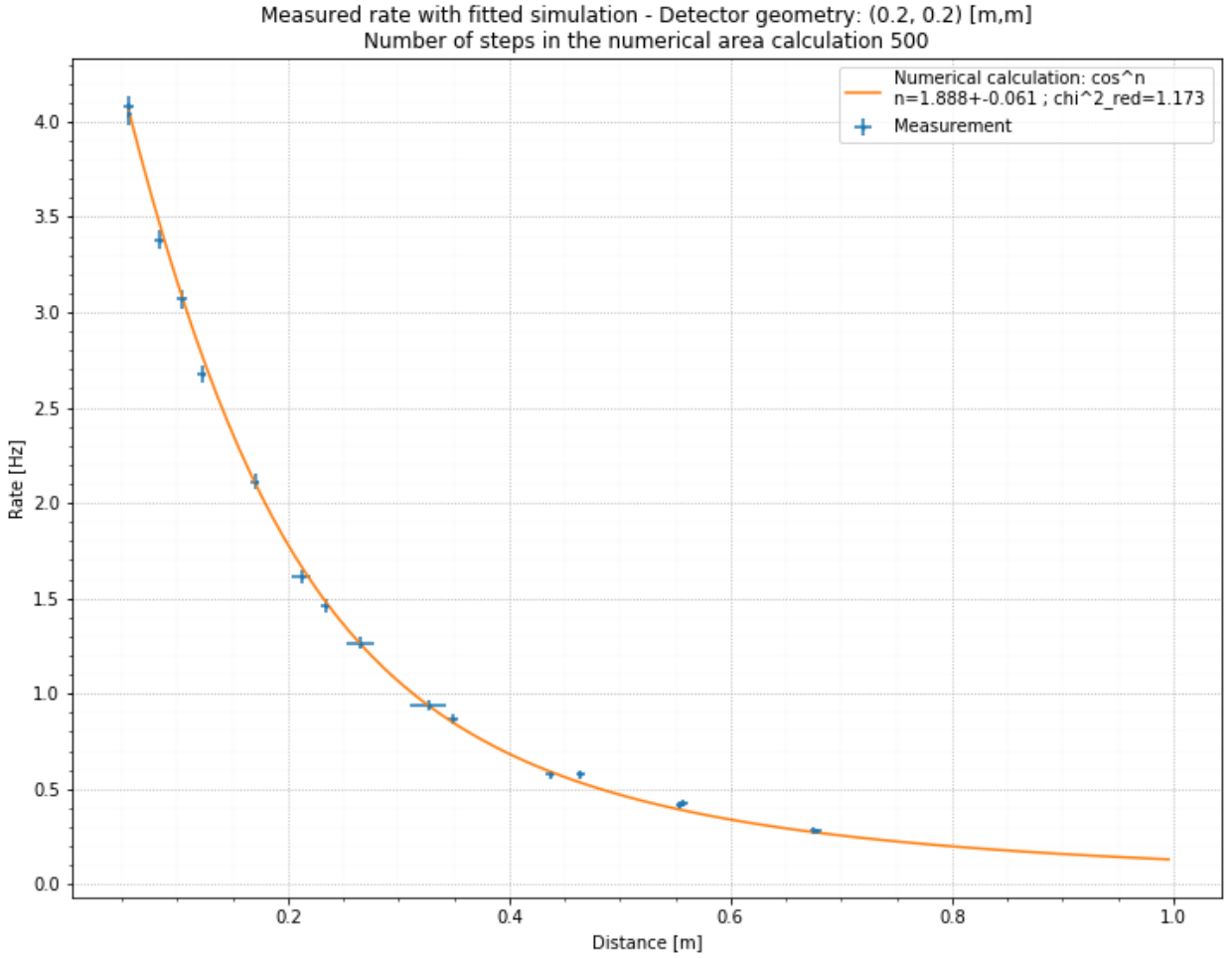
NUMERICAL SIMULATION

- Fitting with minuit now possible
- Fit converges towards cos^n with n = 1.88 +- 0.06
- On the right:
  - Overlapping detector area was calculated for 50 different angles



NUMERICAL SIMULATION

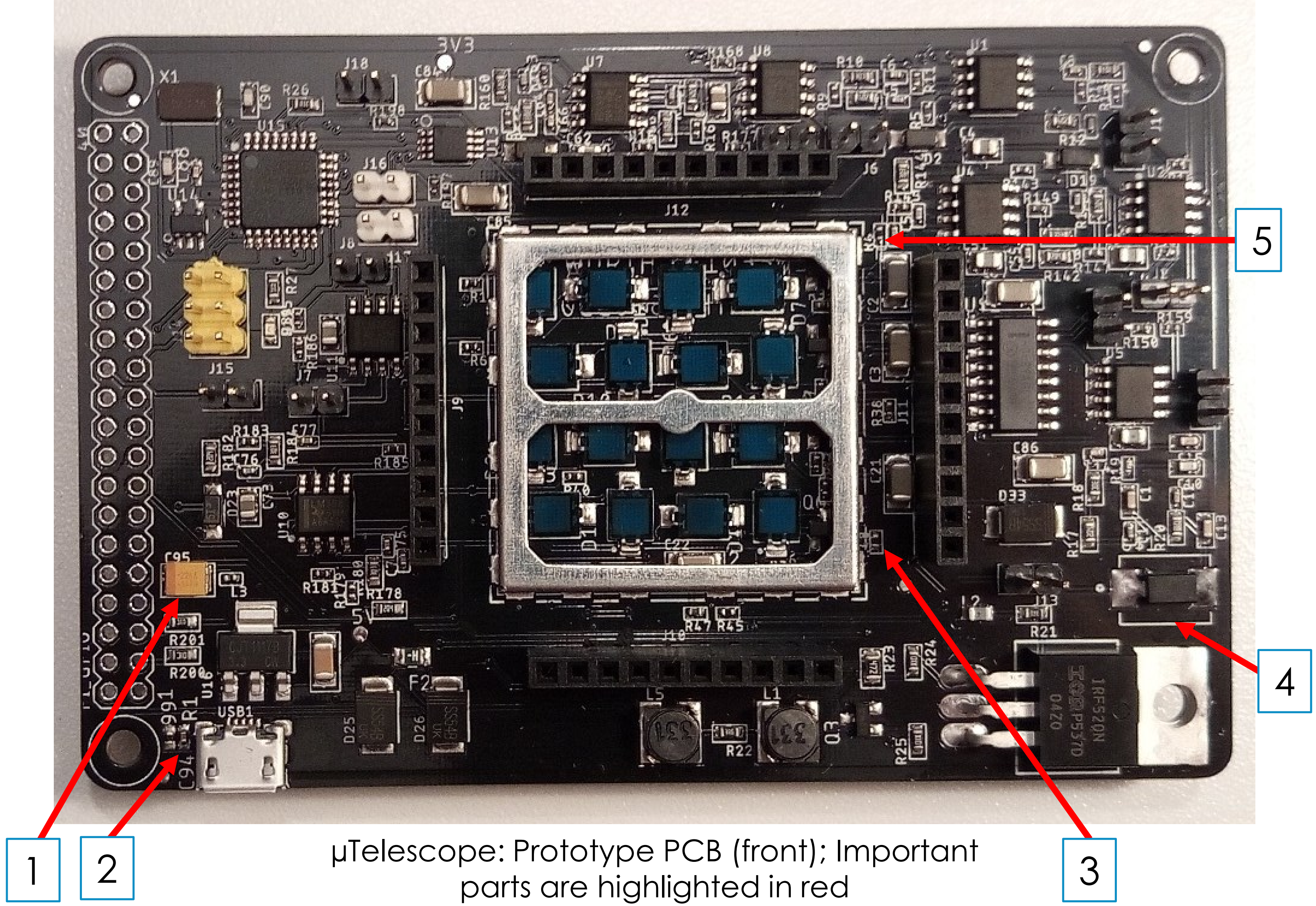
- Fitting with minuit now possible
- Fit converges towards cos^n with n = 1.88 +- 0.06
- On the right:
  - Overlapping detector area was calculated for 500 different angles



HARDWARE DEBUGGING: CURRENT STATE

- Visually confirmed component placing
- On board measurement of resistor values
- Off board measurement for critical components
- Smoke test
  - Slowly powering up the board
  - Continuous checking for heat development
  - Investigation of hot parts

HARDWARE DEBUGGING: COMPONETS

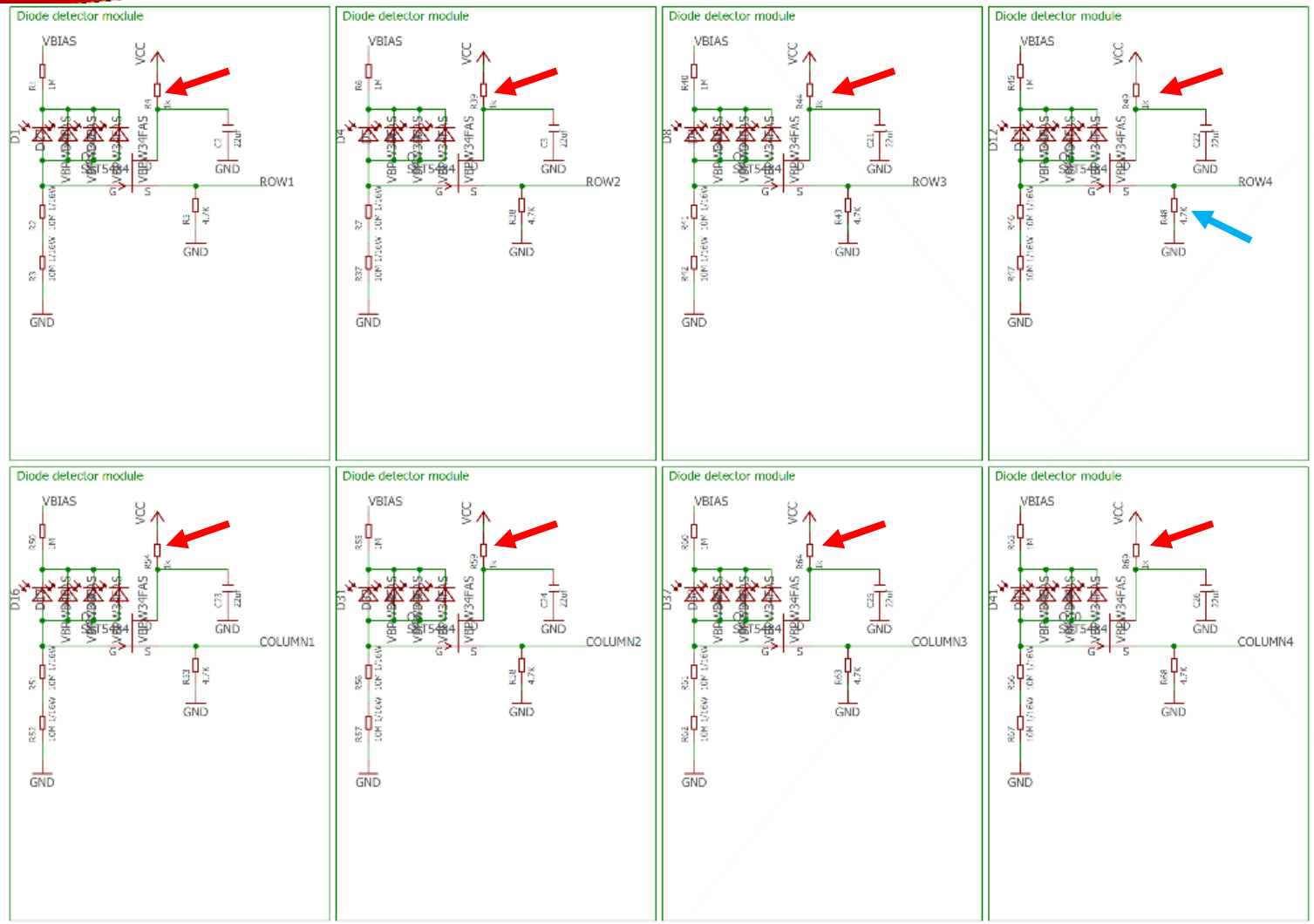


µTelescope: Prototype PCB (front); Important parts are highlighted in red

1. Capacitor flipped in wrong polarization direction
2. C94&R199 swapped
3. Short on PCB
4. Wrong pad size
5. Wrong resistor value (more on the next slide)

Non significant value change for all pull-up resistors

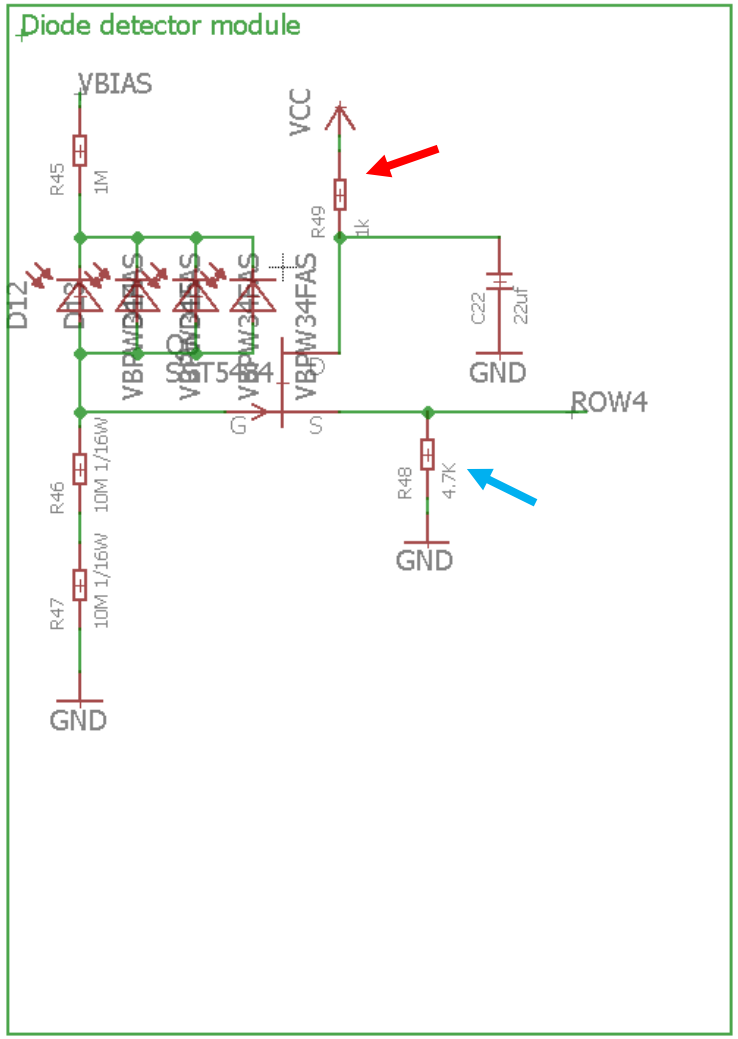
HARDWARE DEBUGGING: COMPONETS



µTelescope: Schematics for pin-diodes; Important parts are highlighted in red

- Red arrows
  - 1k Ohm resistors on Schematics
  - 4,7k Ohm resistors on PCB
  - Basically disables the circuit
  - Solvable via replacing of components
- Blue arrow
  - Short on PCB
  - “S” Pin of the jfet is directly connected to ground
  - Solvable via a flying circuit

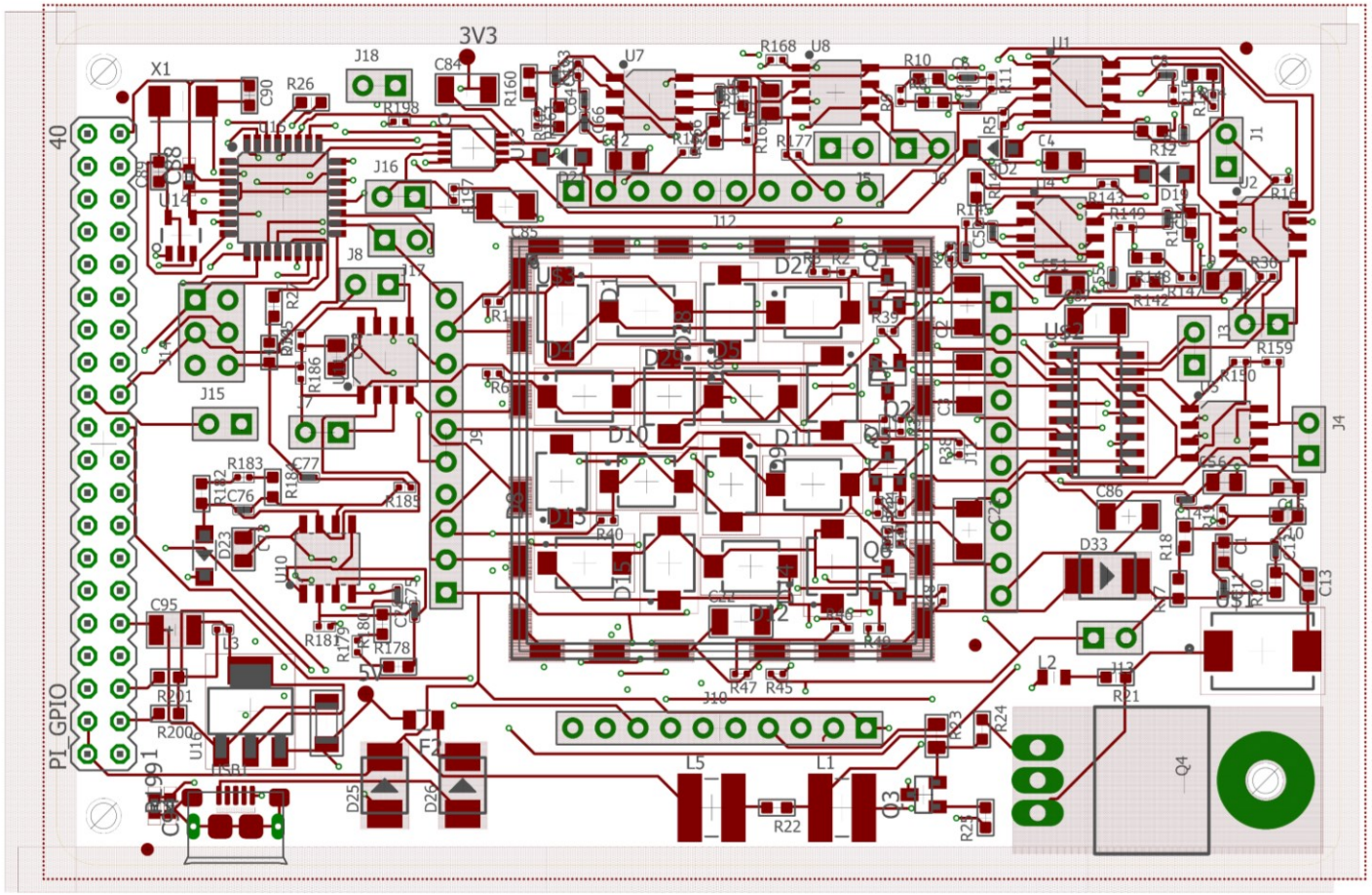
HARDWARE DEBUGGING: COMPONETS



µTelescope: Schematics for one pin-diodes module; Important parts are highlighted in red

- Red arrows
  - 1k Ohm resistors on Schematics
  - 4,7k Ohm resistors on PCB
  - Basically disables the circuit
  - Solvable via replacing of components
- Blue arrow
  - Short on PCB
  - “S” Pin of the jfet is directly connected to ground
  - Solvable via a flying circuit

HARDWARE DEBUGGING: COMPONETS



µTelescope: Prototype PCB (front); Important parts are highlighted in red

- Resistor replacement:
  - Electronics workshop has the needed parts available
  - Some of the resistors are below the noise shield, e.g. hard to reach
- Flying circuit
  - Further evaluation of where the short exactly is, will be needed