



Going towards the next version

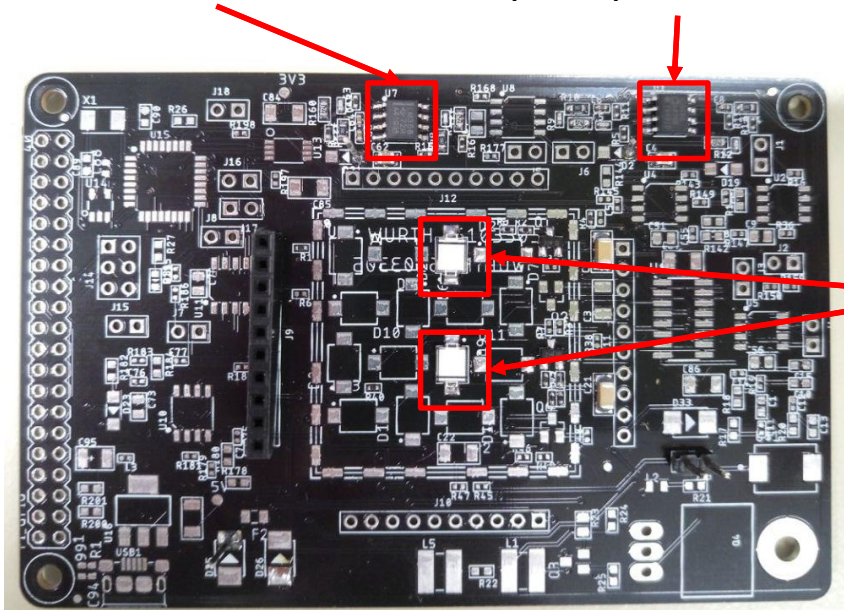
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Results with the partially assembled uTelescope

Op-amp: LM358

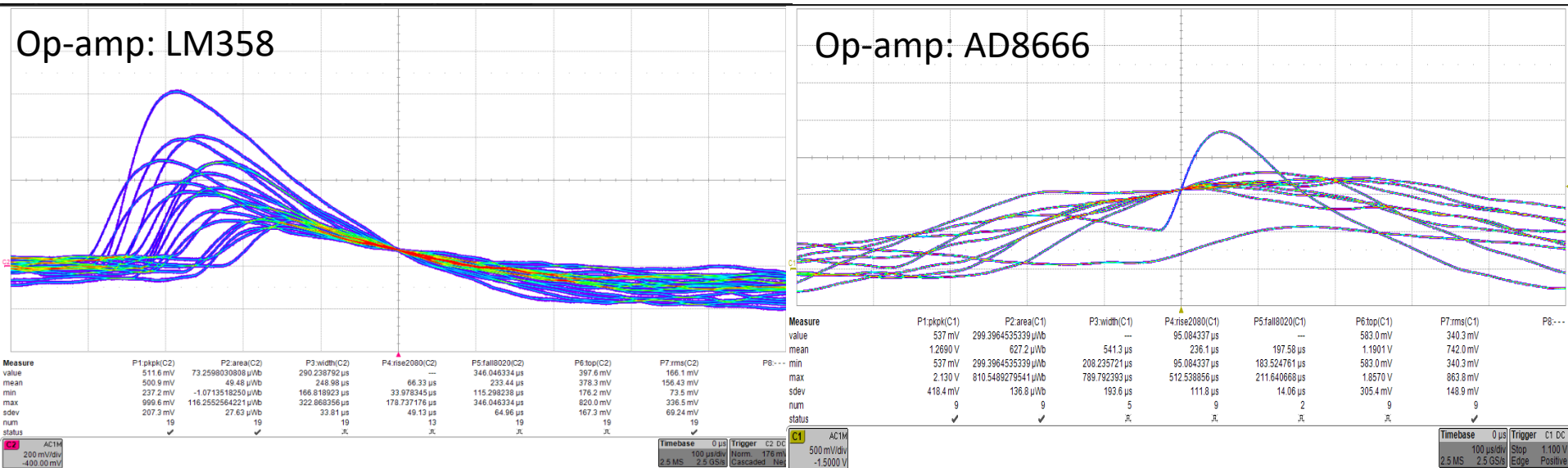
Op-amp: AD8666



uTelescope with two channels assembled

- Two channels assembled
 - Different op-amps in each
- Usage of original op-amp dimensioning
- Diodes from Osram
- Circuit oscillates with light applied
- Very noisy at low frequencies

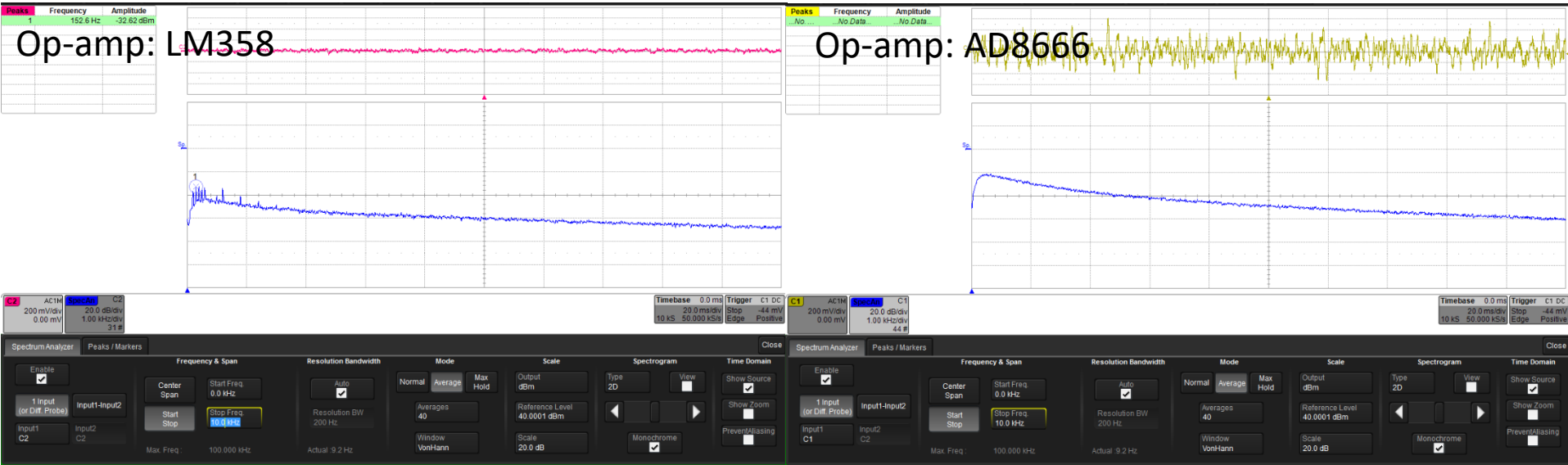
Results with the partially assembled uTelescope



- Very strong signals: 200mV ~ 400 mV
- Notably more low frequency noise than on the breadboard

- Similar signals as with the LM358
- Very strong low frequency noise
- Signals vanish in the background

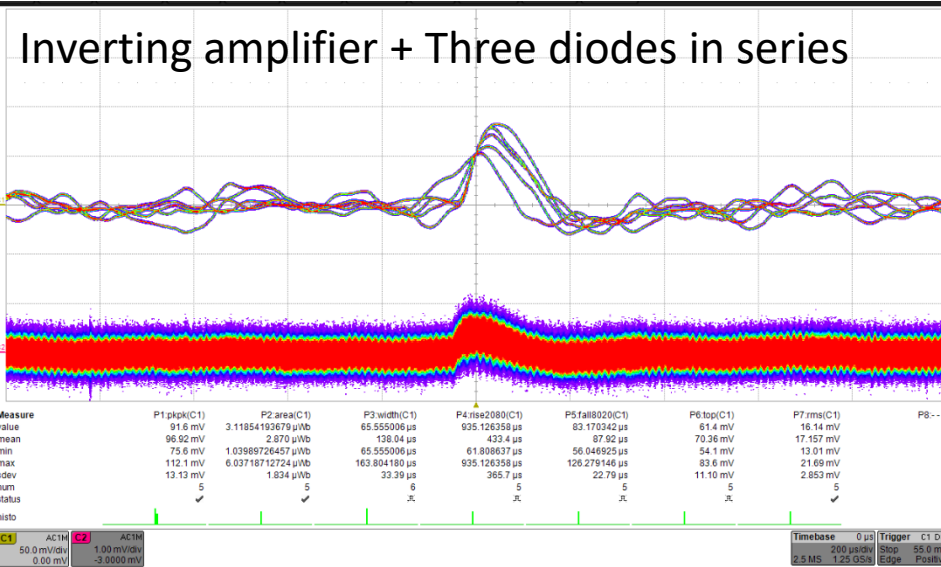
Results with the partially assembled uTelescope



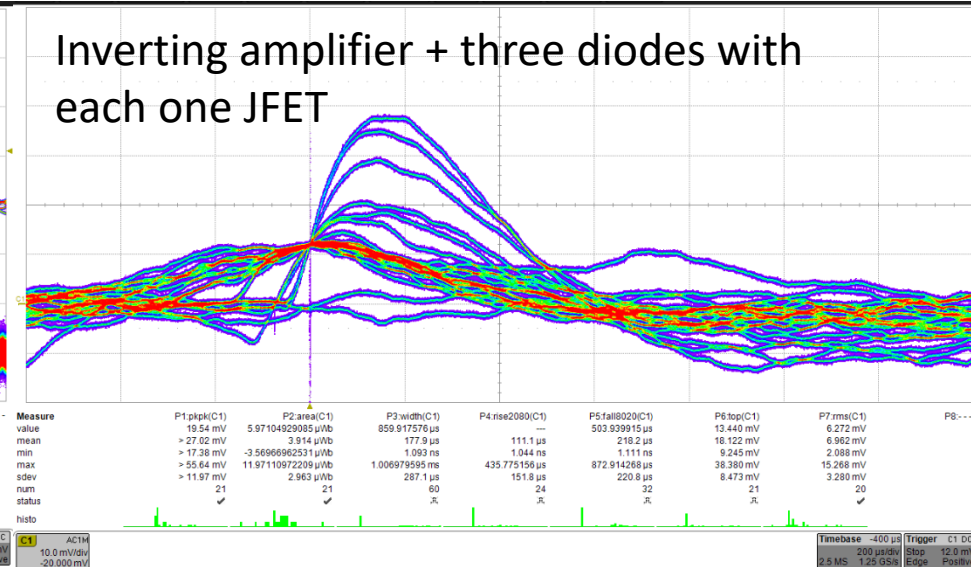
- Spectrum analysis of noise 0Hz to 10kHz
- Significantly less noise
- Distinctive peaks at around 150 Hz visible
- Signal expected be at: ~ 5kHz to 10kHz

- Spectrum analysis of noise 0Hz to 10kHz
- Comparably high noise
- No singular noise sources visible

Testing more ways to increase the detector area

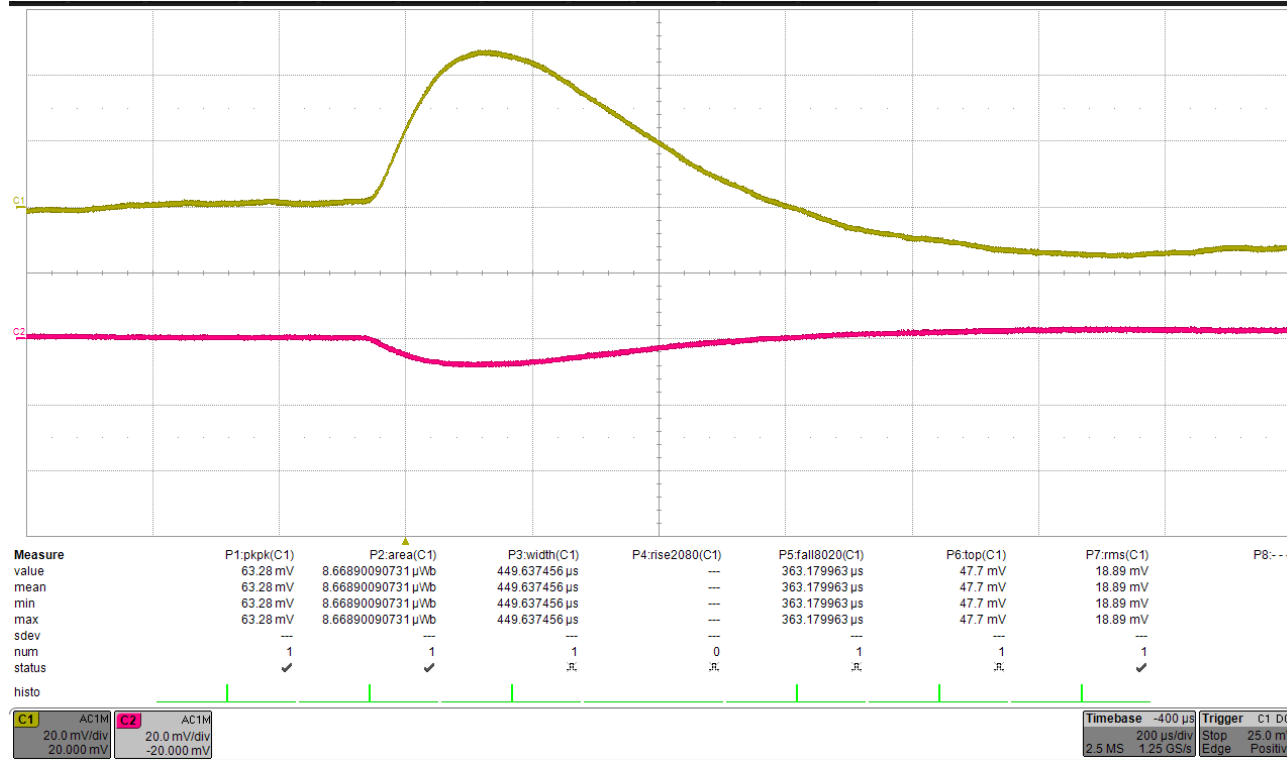


- Peaks do not degrade
- Strong increase in background noise
- Noise is likely to be dark current from the diodes
- Higher operating voltage required



- Rate increases by a factor of ~1.75 as compared to one diode
- Noise increases notably
- Circuit becomes very sensitive to movement

Testing more ways to increase the detector area



- Would using only one op-amp per diode work?
 - Signals
 - C1: Second op-amp
 - C2: First op-amp
 - Very low signal at the first stage
 - Signal gain in the second stage is significant
- One JFET and two op-amps per diode are required

Design decisions for the uTelescope V2

- Diodes
 - Number: 16
 - Orientation: Two rows next to each other
 - Signal amplification per diode: 1 Jfet + 2 inverting op-amps
- Readout and Triggering
 - Output from all diodes is summed into one signal
 - Discriminator from CosmicPi V1.5
 - Fast ADC on the micro Controller
- Micro Controller will be on an evaluation board or similar to reduce development time

Next steps

- Finalize dimensioning of the op-amps
 - Simulate op-amp characteristics analytically
 - Test summing junction with an additional op-amp
- Test summing junction with two breadboard circuits
- Test available Arduino DUE
- Starting to layout the schematics for the uTelescope V2
- Starting to do component placing on the PCB