Skill Demo 2

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α1=1, α2=5, β1=2, β2=1

Gain=2+ α1=2+1=3 db

Fc=10+5* β1=10+(5*2)=20Hz

For inverting low pass filter

Assume

C=470nF

R1=RG

$$fc = \frac{1}{2 * \pi * R1 * C} = \frac{1}{2 * \pi * R1 * (470nF)} = 20Hz$$

$$R1 = \frac{1}{2 * \pi * 20Hz * (470nF)} = 16931\Omega(approx. 20k\Omega)$$

$$Gain = 1 + \frac{RF}{RG}$$

$$3 = 1 + \frac{RF}{20000}$$

$$RF = 2 * 20000 = 40000\Omega(approx\ 50k\Omega)$$

Because there was not any 16000–17000-ohm resistors, R1 and RG was made to be 20000 ohms which was in the lab in the box. Also, there was not any 40000 ohms resistor, it was substituted by 47000ohms-50000ohms resistor.

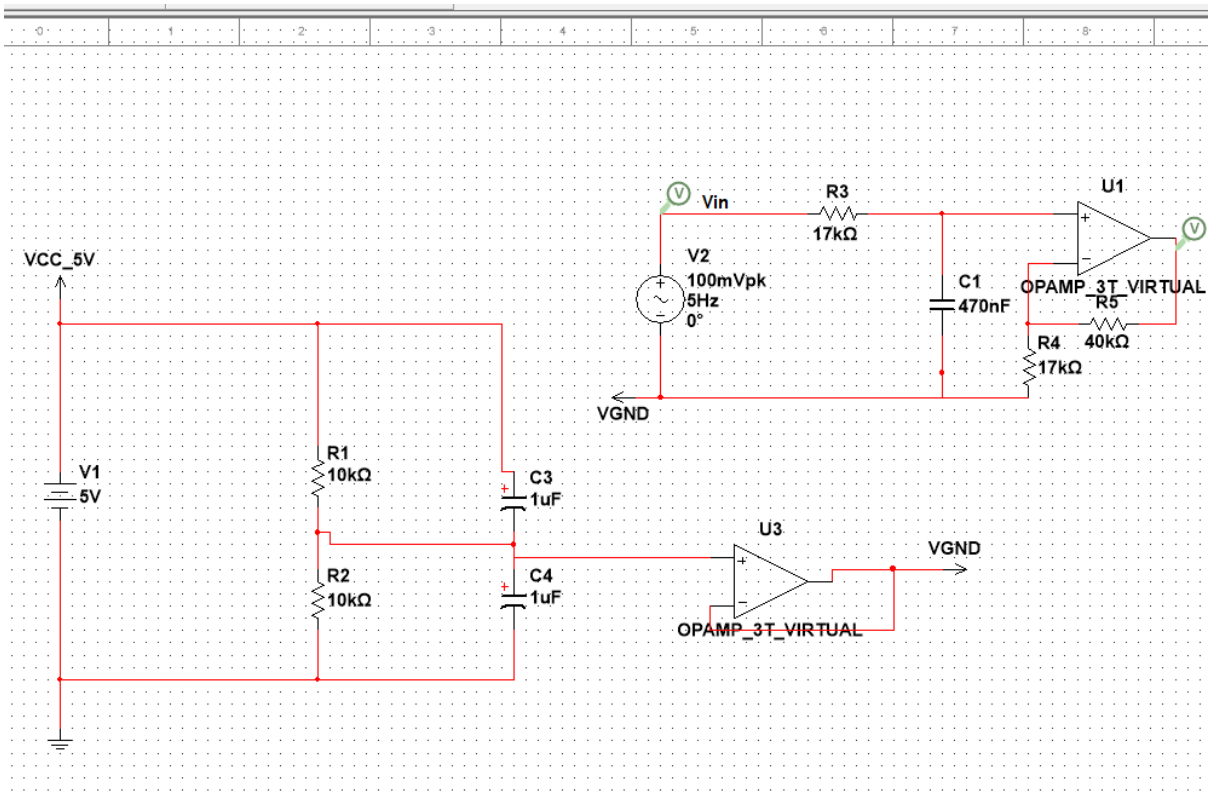

Figure 1. Shows the circuit in Multisim, 17k ohms and 40kohms was used in this simulation.

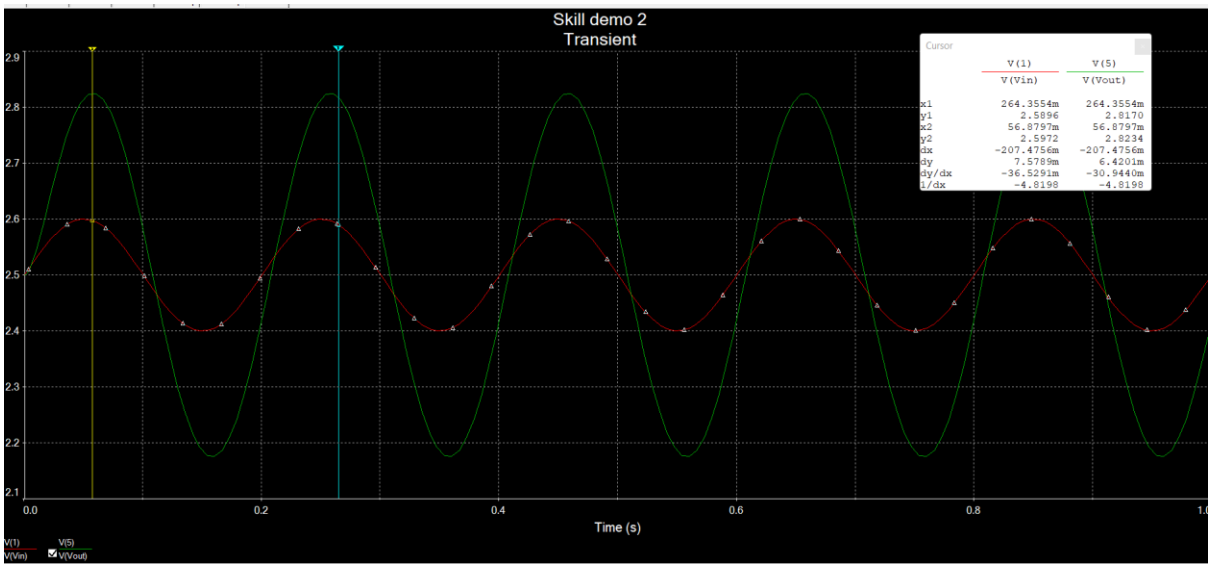

Figure 2-Multisim transient response

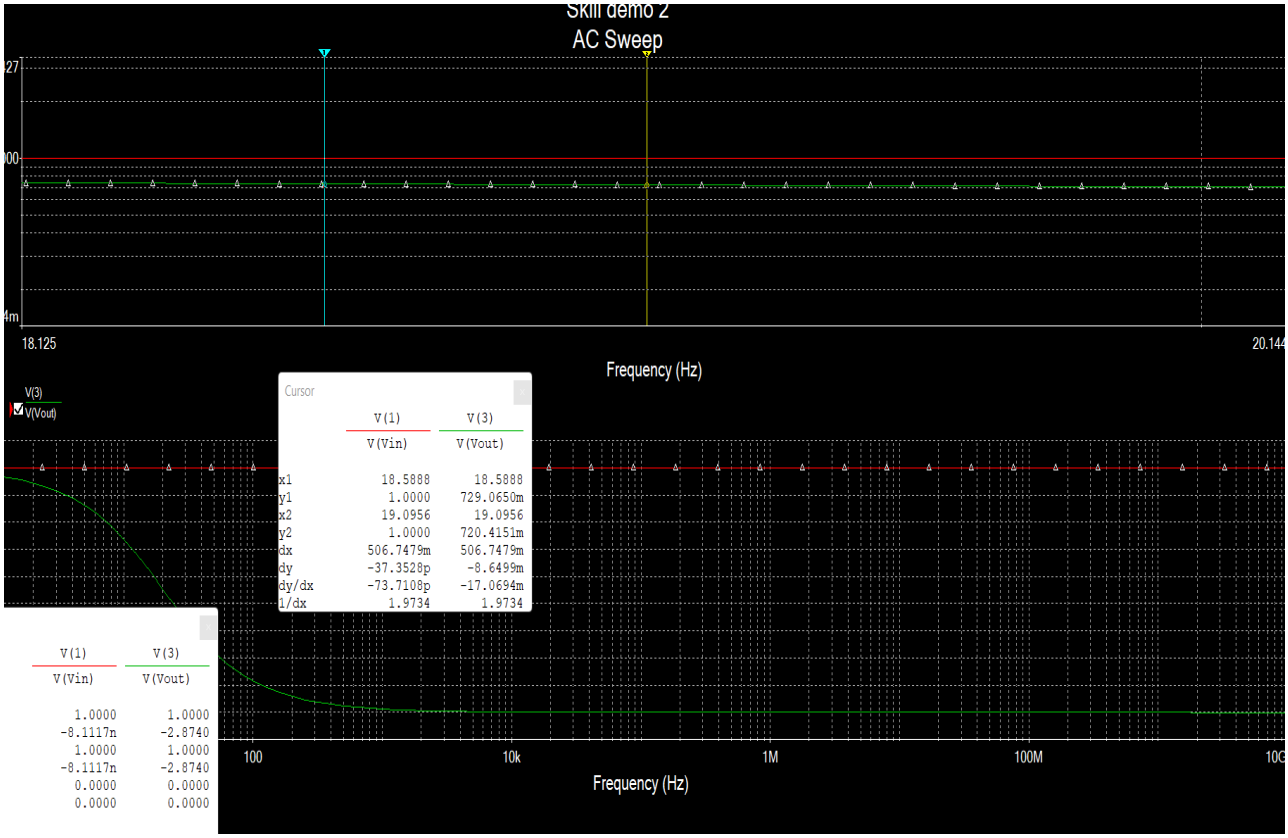

Figure 3. Multisim AC sweep to show the cut0frequecy(fc)

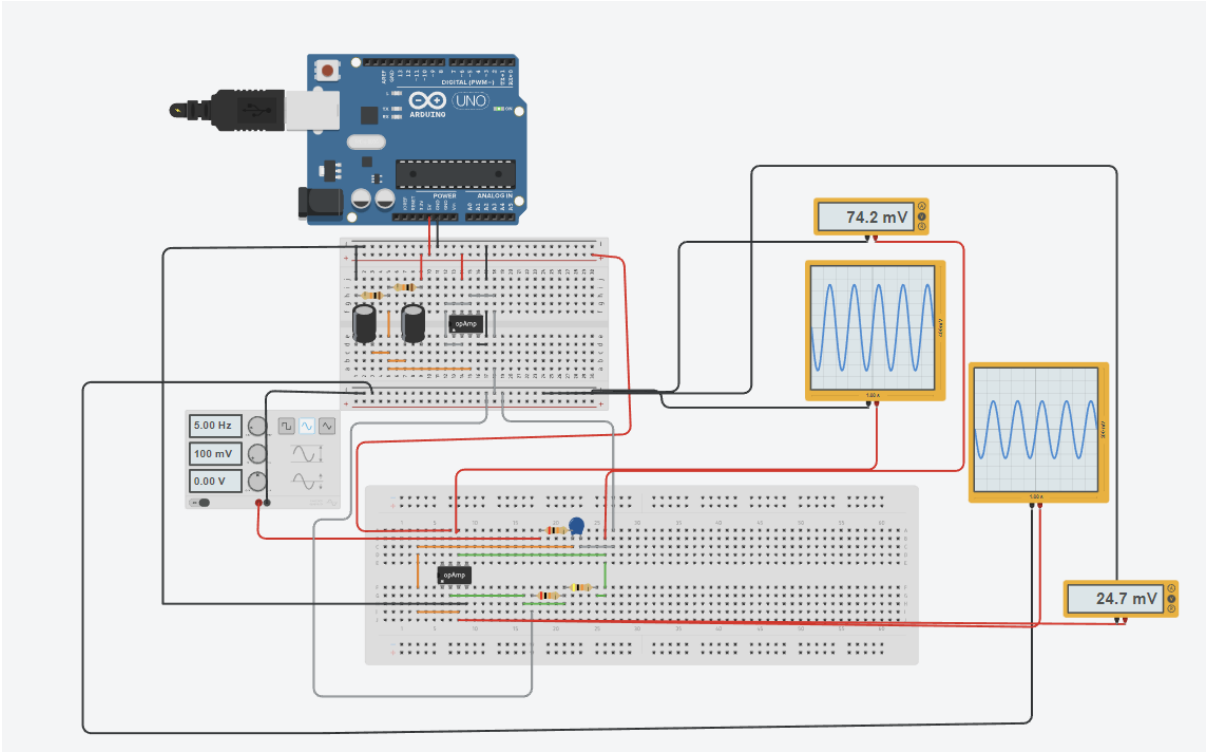

Figure 4. The circuit in Tinker CAD

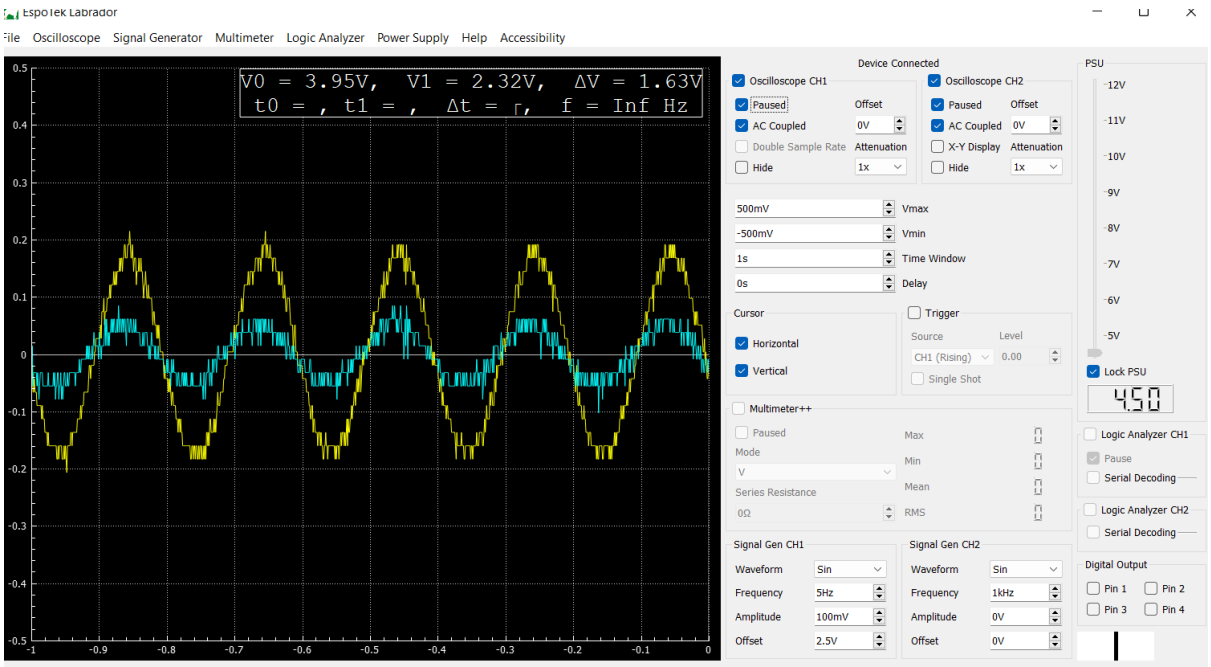

Figure 5. The output and input shown in the EspoTek Labrador.

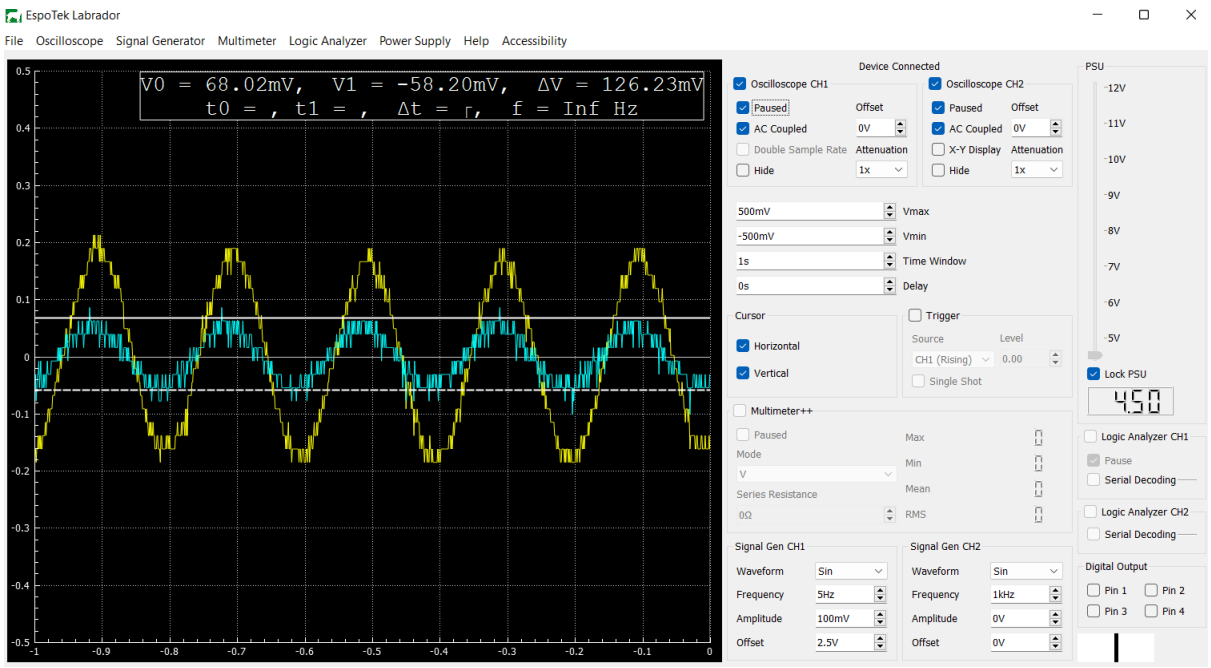

Figure 6. Shows the input peak to peak voltage measurement which is 126mV approx.

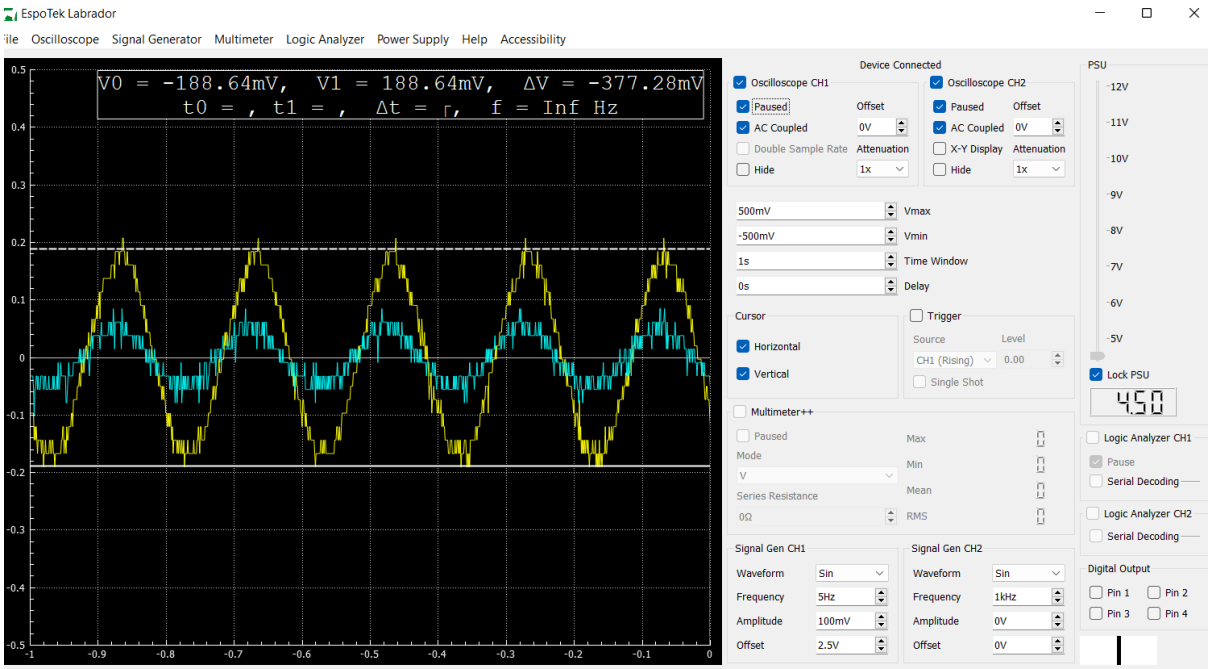

Figure 7. The change in V shows the output peak to peak voltage which is 3 times the input. 377mV approx.

VinPP(mV)	f(hz)	VoutPP(mV)
127	5	359
119.7	10	325
120	15	313
128	20	296
138	25	243
138	30	225
136	35	195
135	40	190

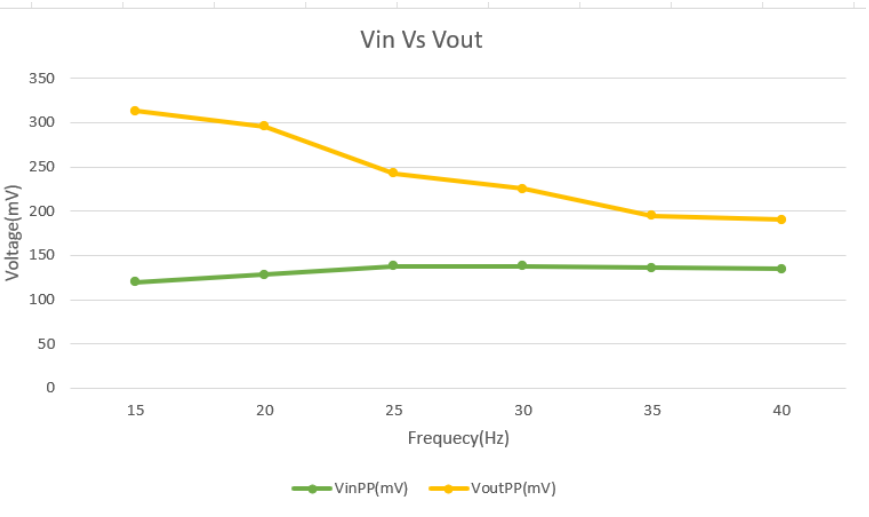

Figure 8. The graph and table show where the cut-off frequency is which is 20Hz. Measured using EspoTek Labrador board. The output and input voltage were recorded for different frequency from 5hz to 40hz.

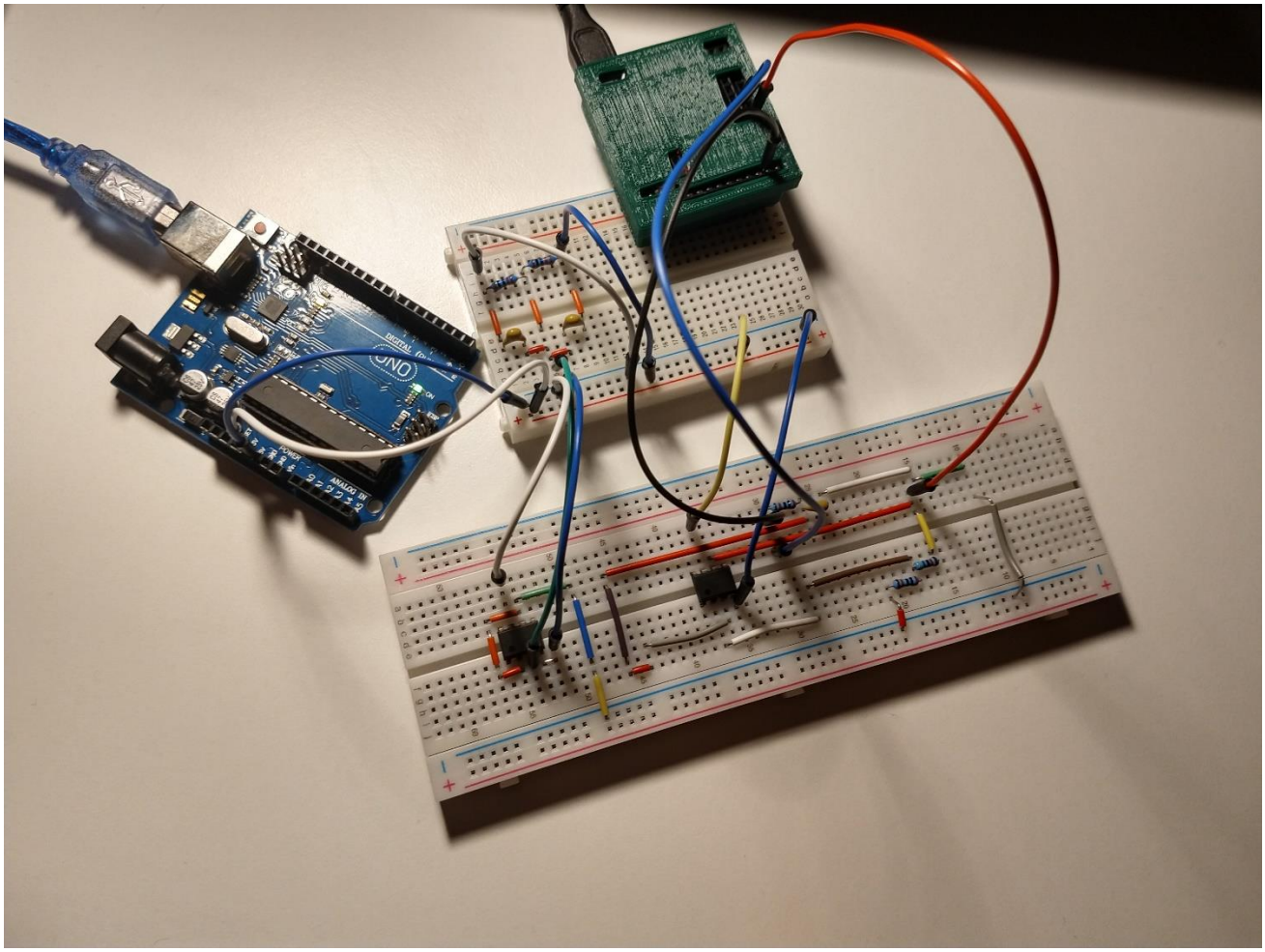

Figure 9. The circuit on a physical breadboard.