

Electronics hands on training



JOINT INSTITUTE
FOR NUCLEAR RESEARCH

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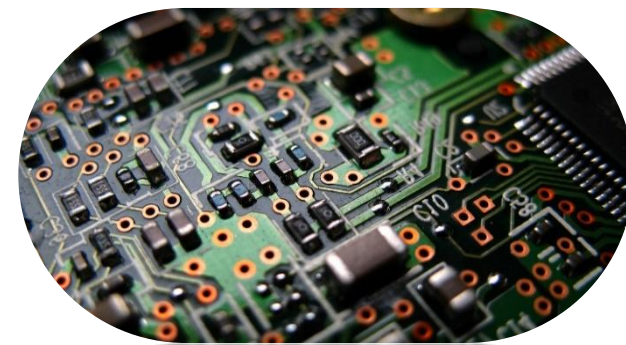
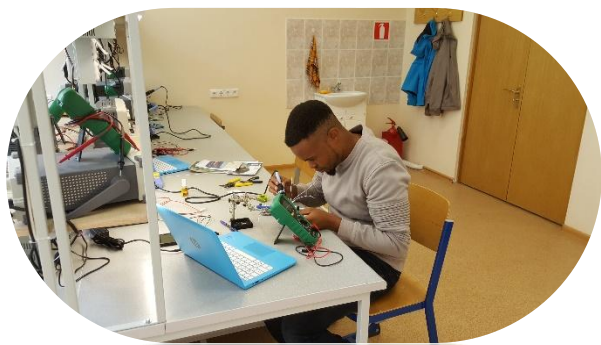
Outline

Introduction

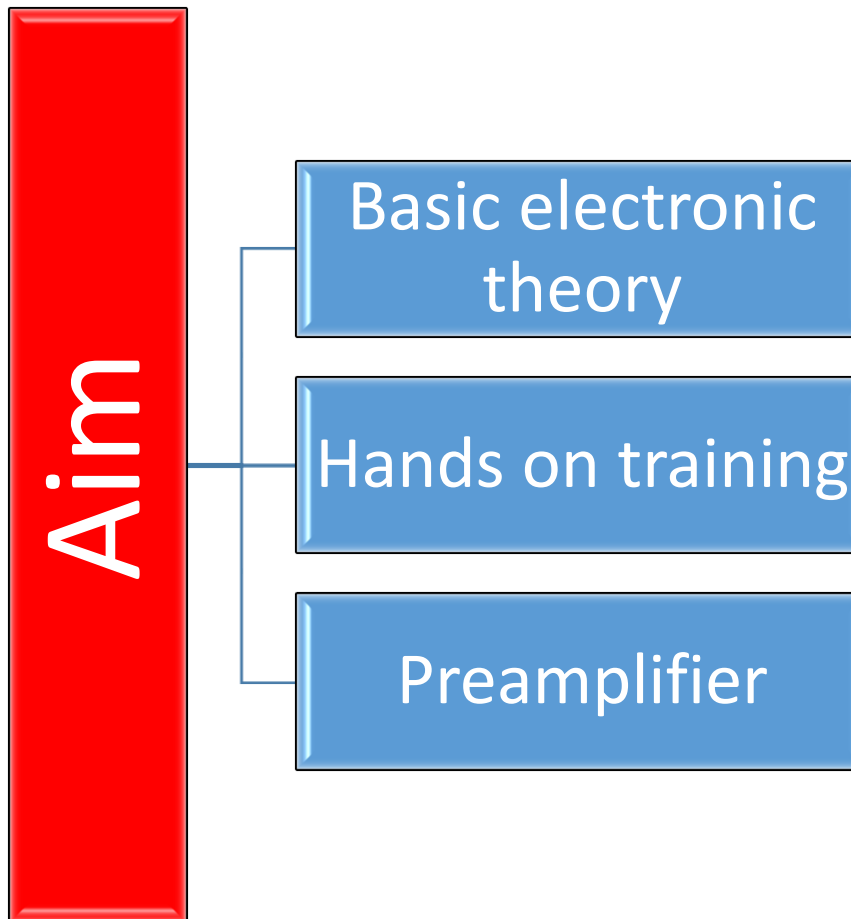
Experimental
methods

Results obtained
and conclusion

Introduction



Introduction



Experimental methods

Equipment

Procedure

Equipment



Soldering iron



Multimeter

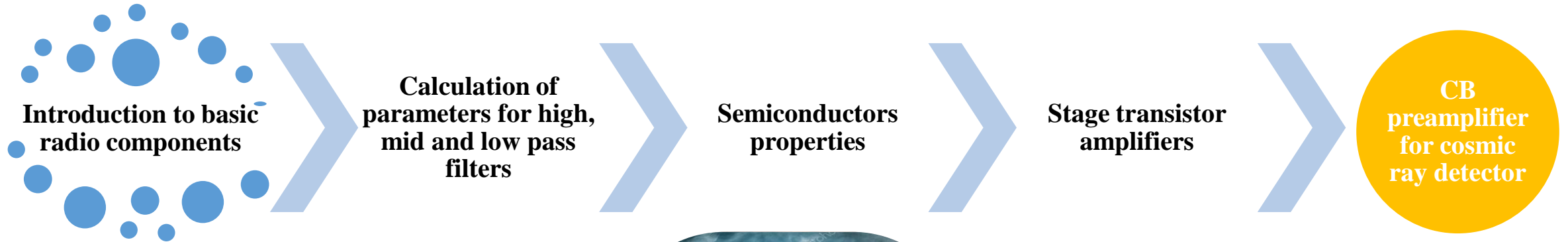


Signal generator



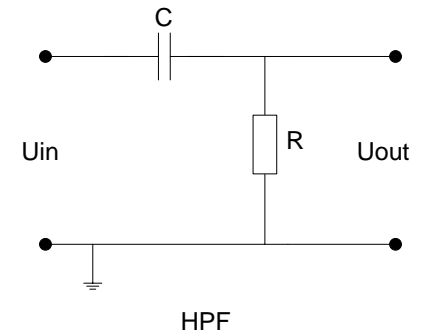
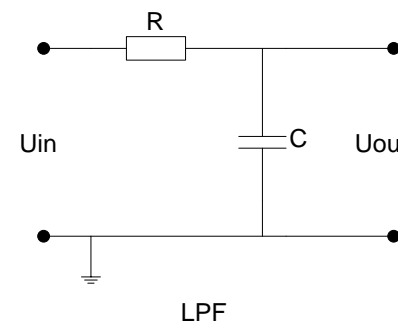
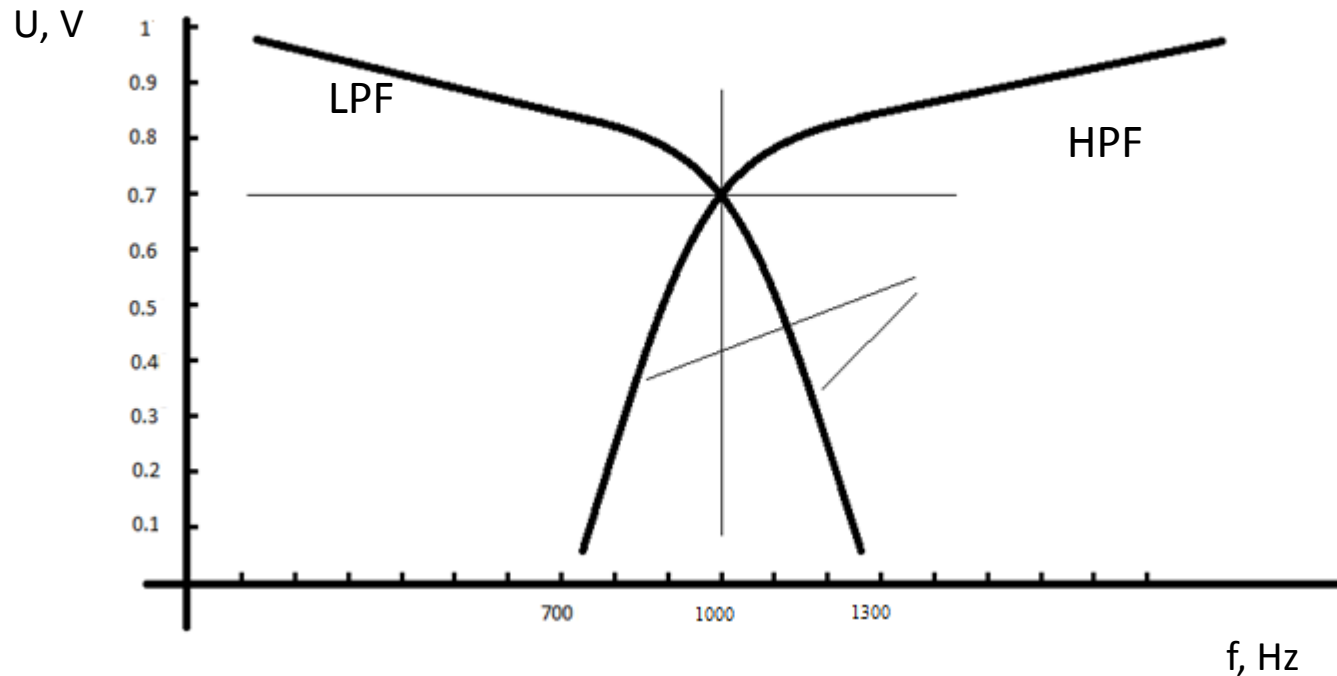
Oscilloscope

Procedure



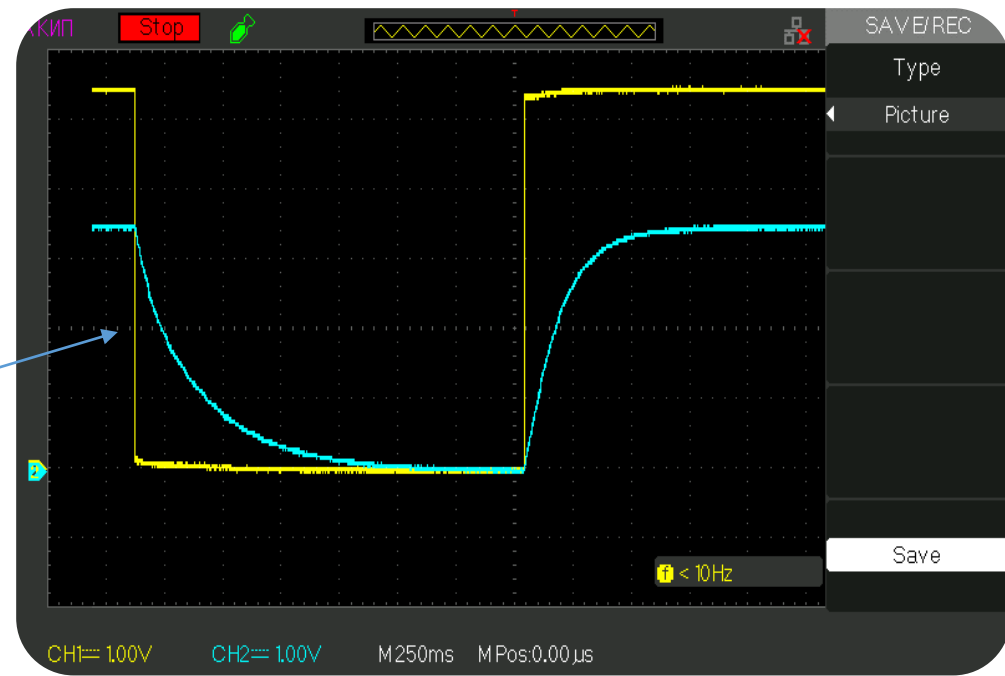
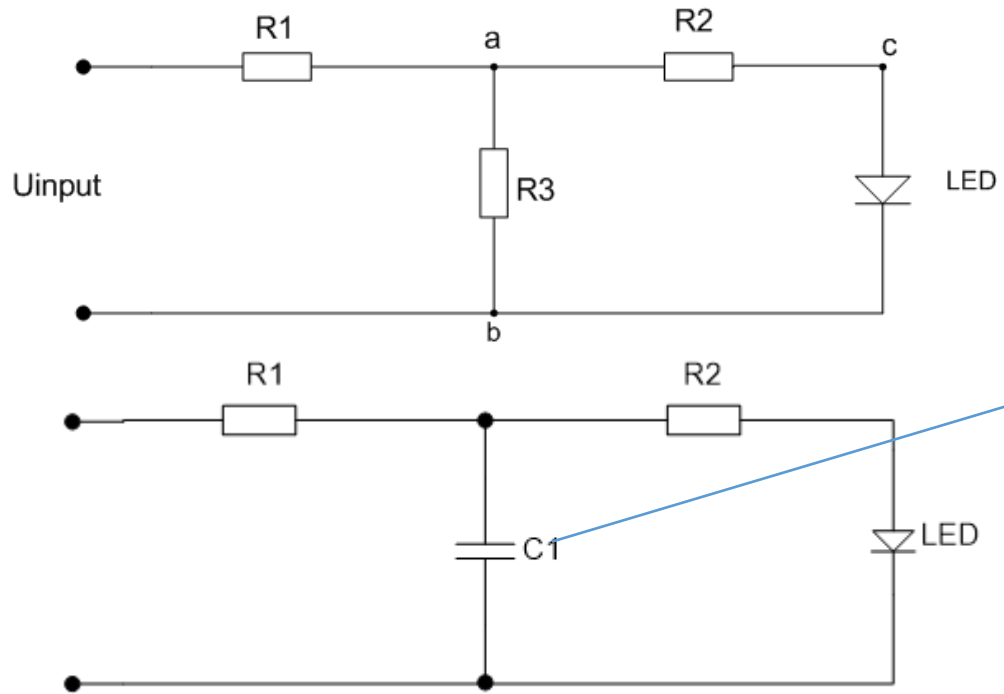
Parameters for high, mid and low pass filters

Frequency-response function (FRF)

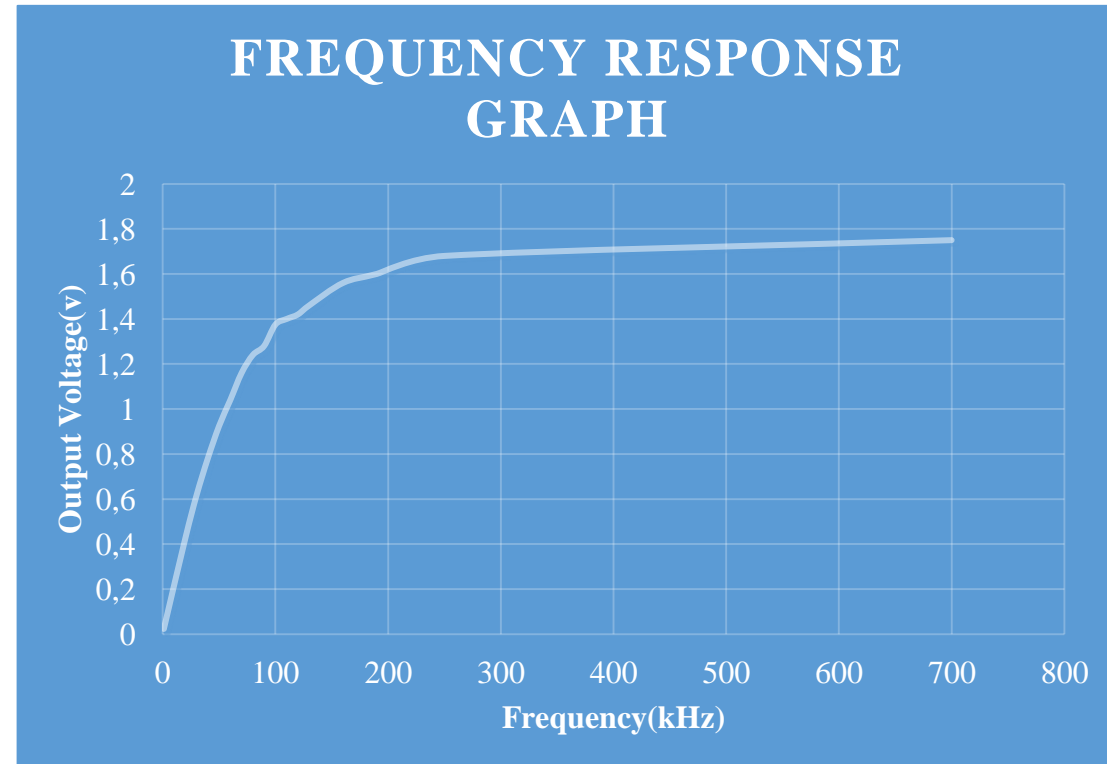
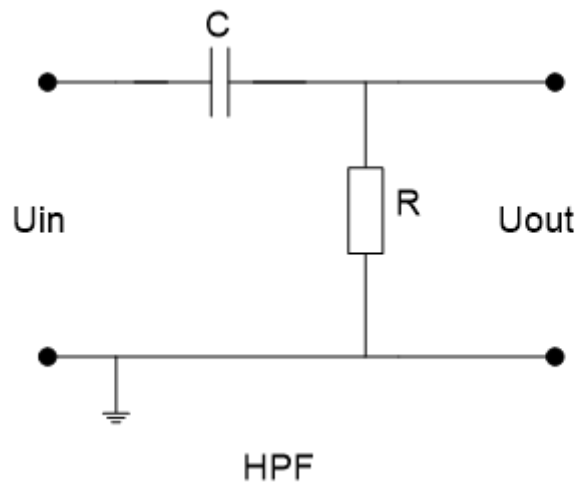


Capacitor acts as dielectric for DC, but for AC it acts like a resistor which resistance depends on frequency.

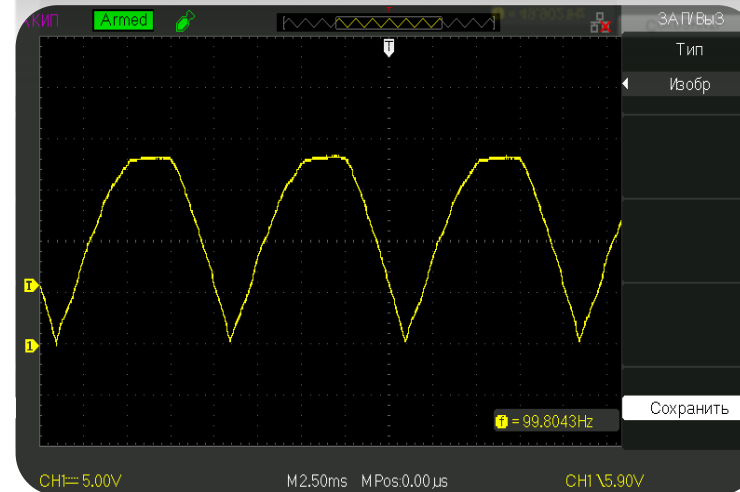
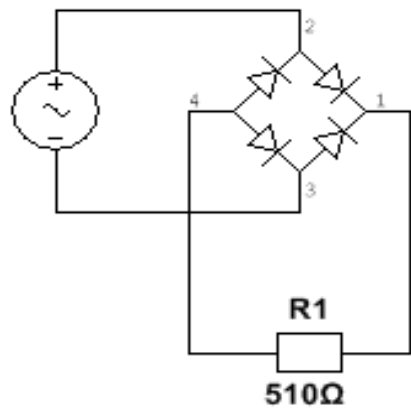
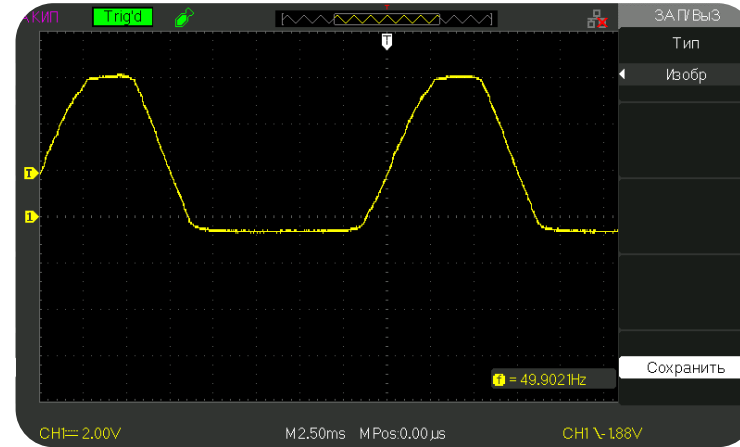
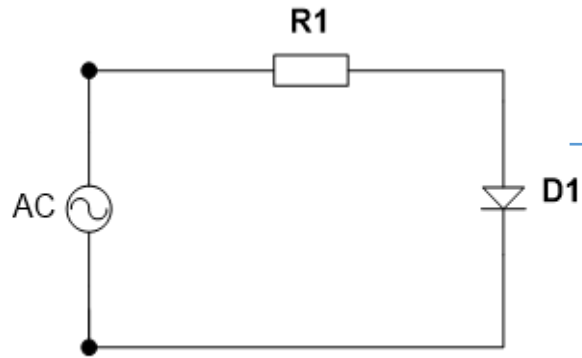
Results and discussion



Results and discussion

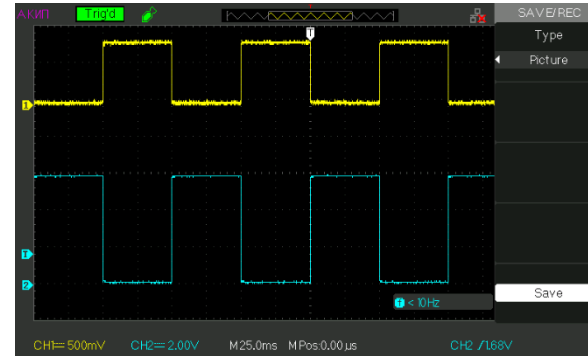
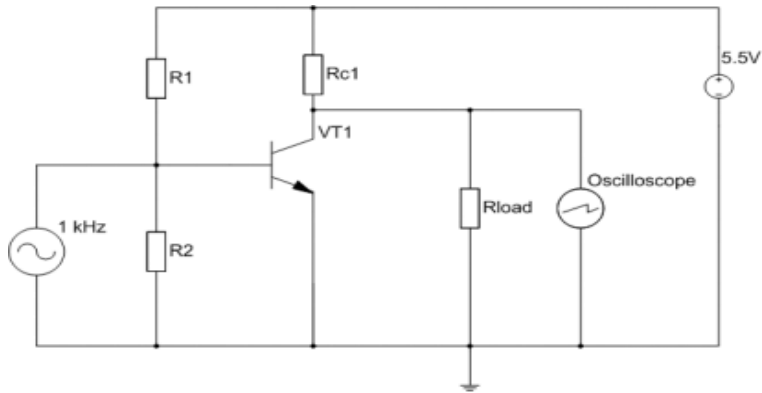


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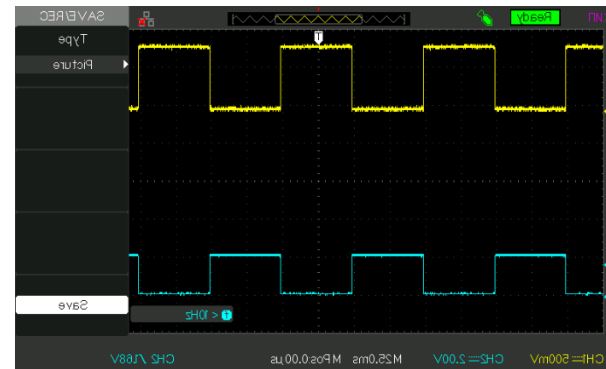


Results and discussion

Common-emitter circuit

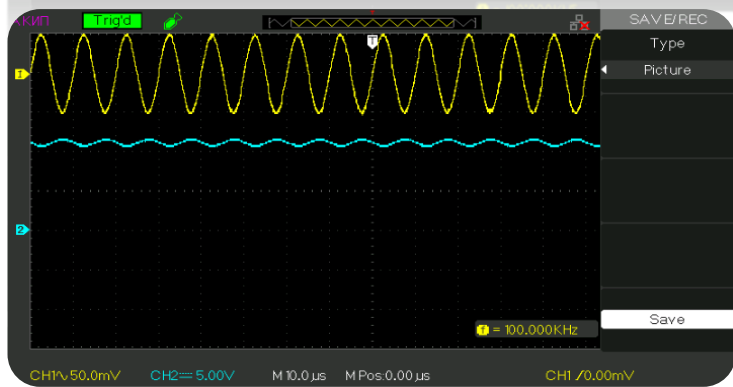
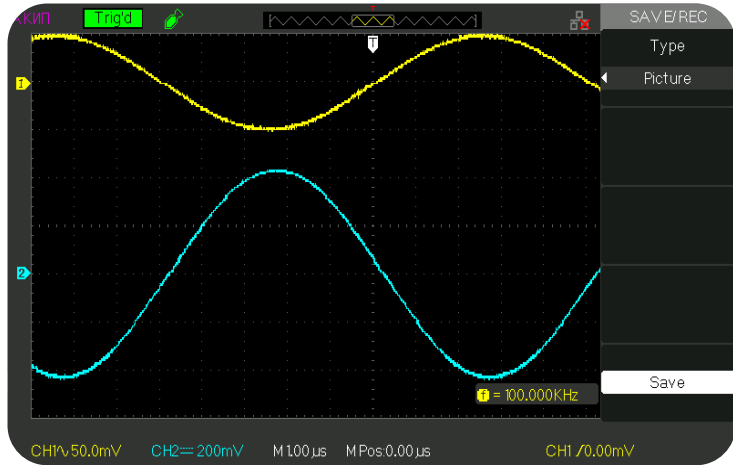


Without load



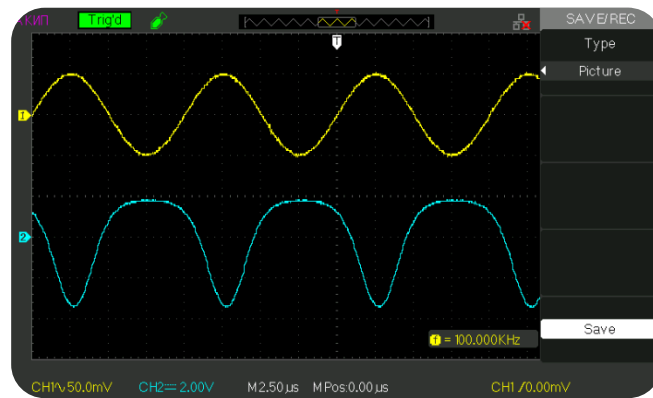
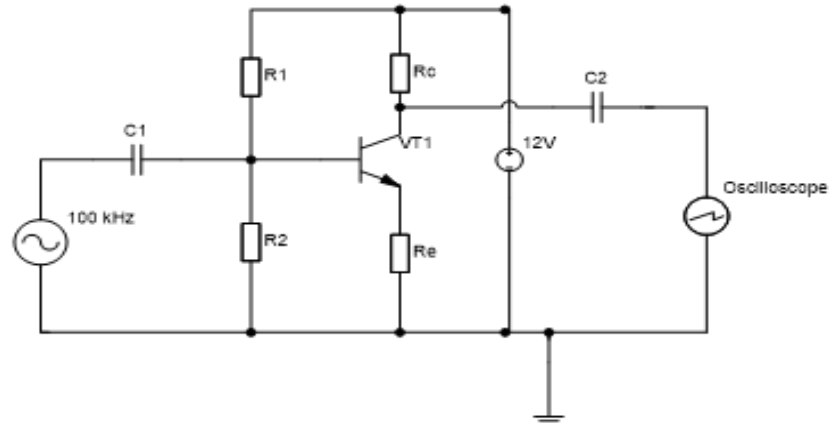
With load

Results and discussion

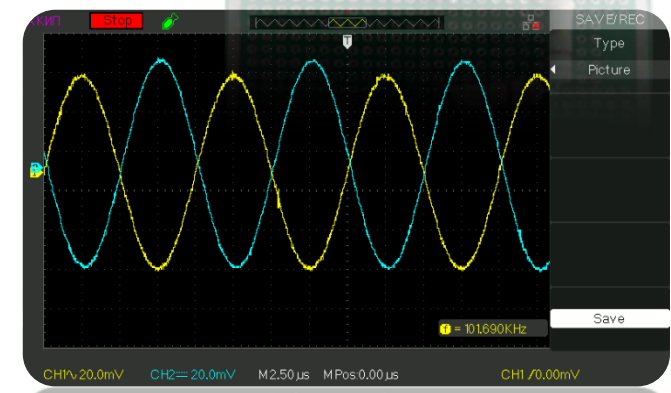
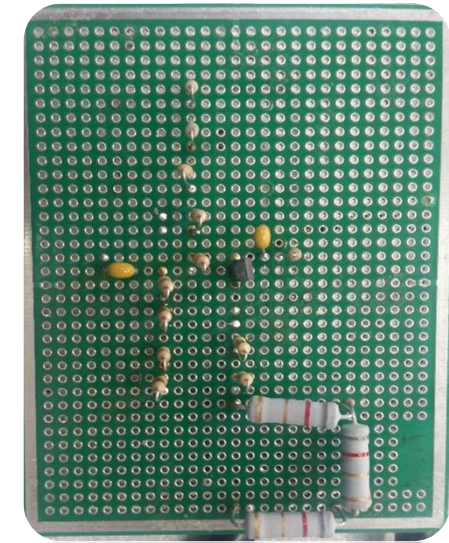


Without C2

Common-emitter circuit



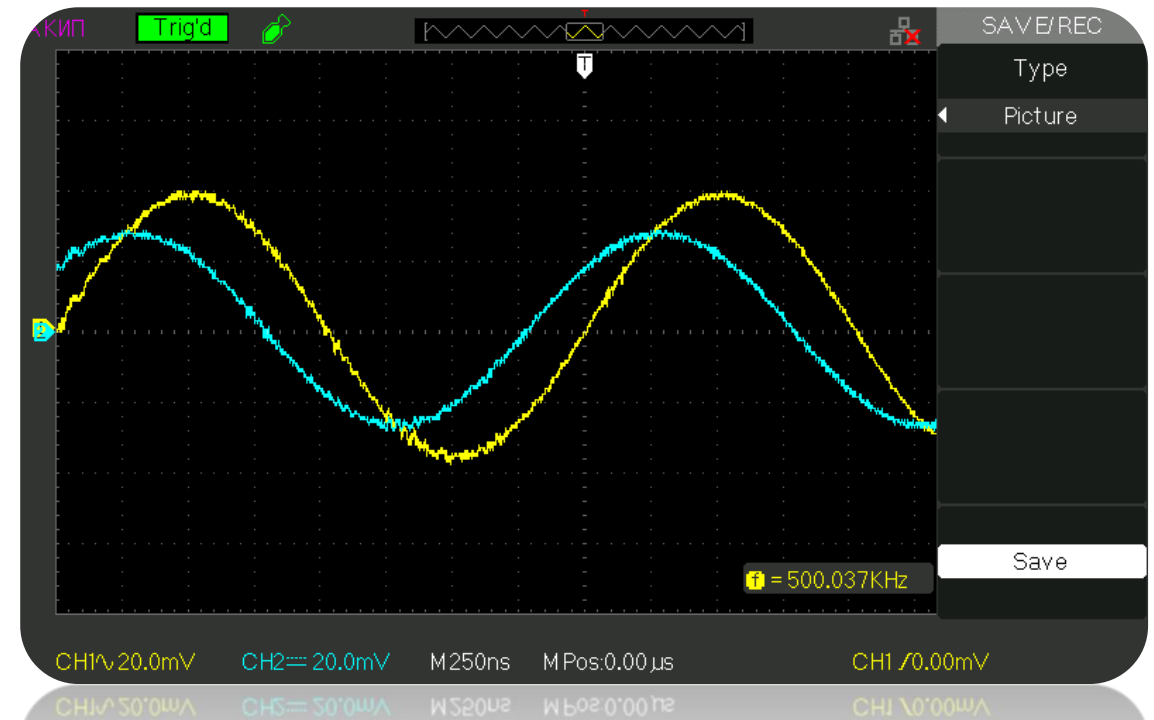
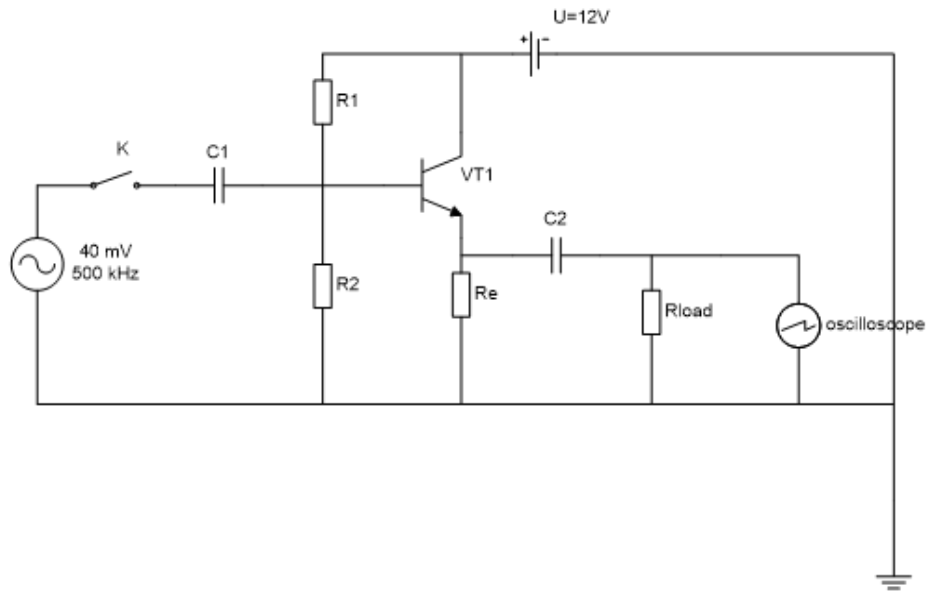
Without Re



With high Re

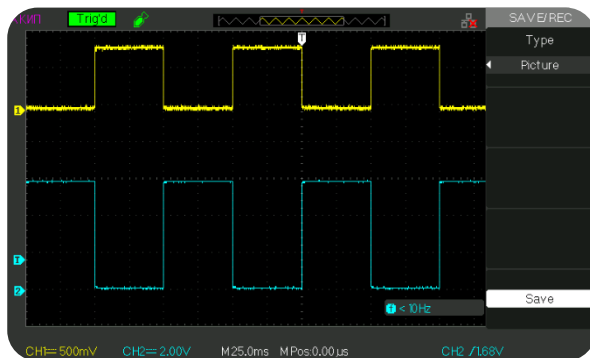
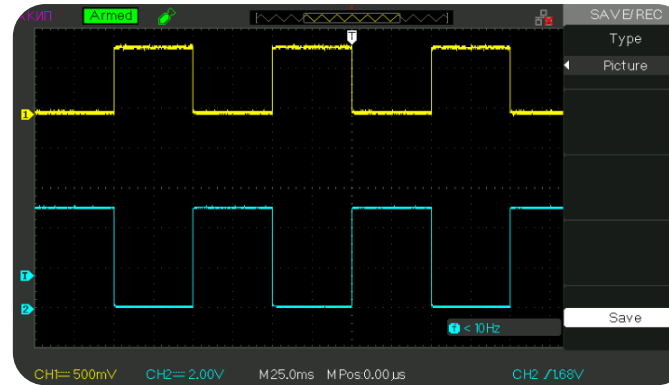
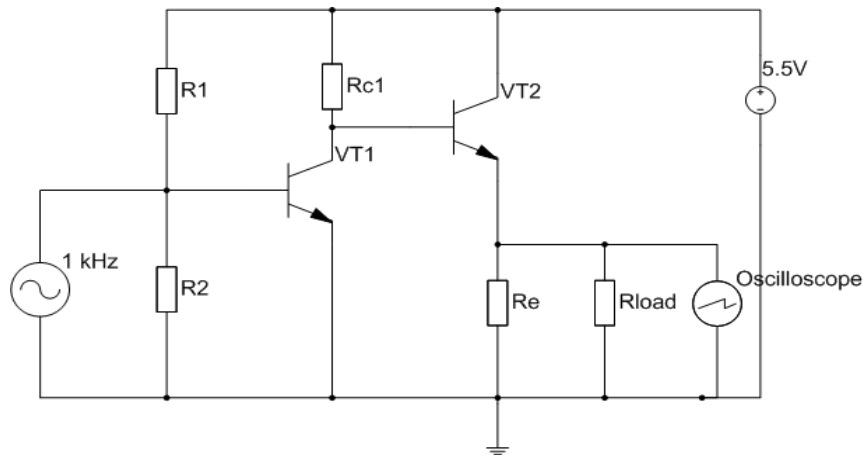
Results and discussion

Common-collector circuit

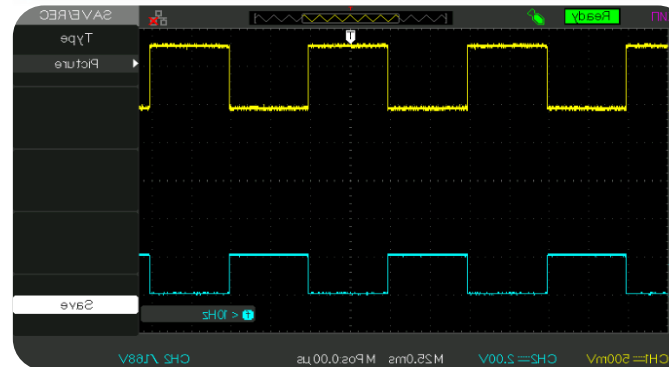


Results and discussion

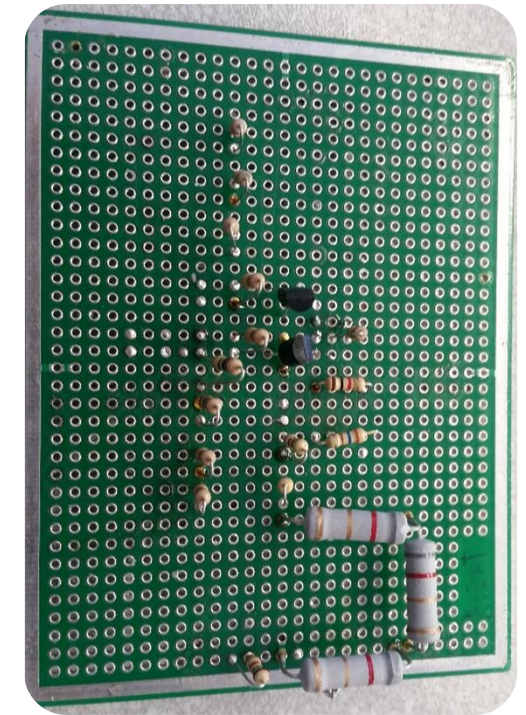
CEC+CCC circuit



Without load

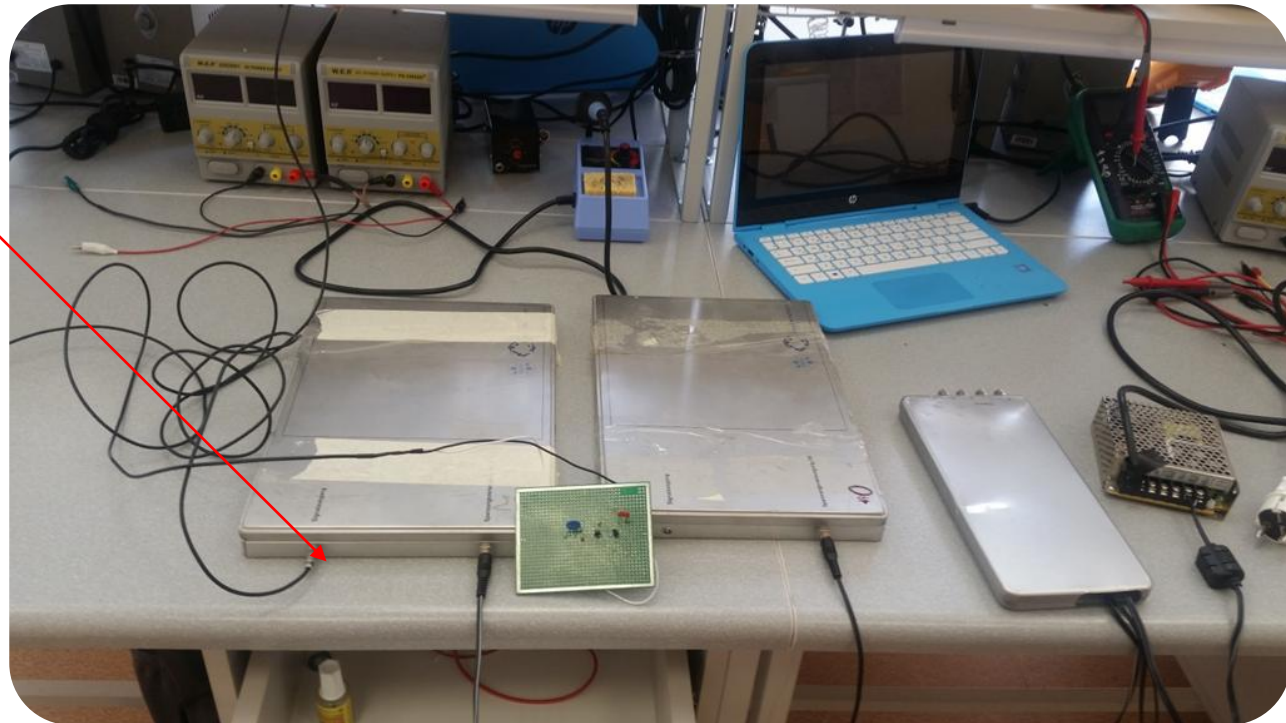
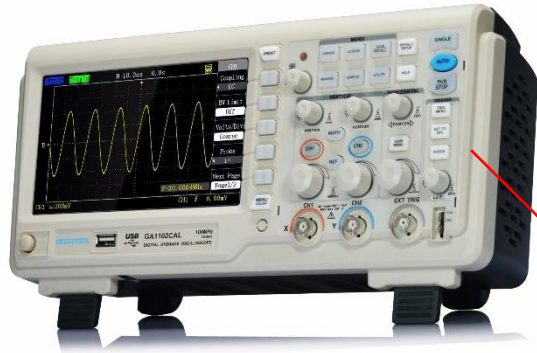


With load



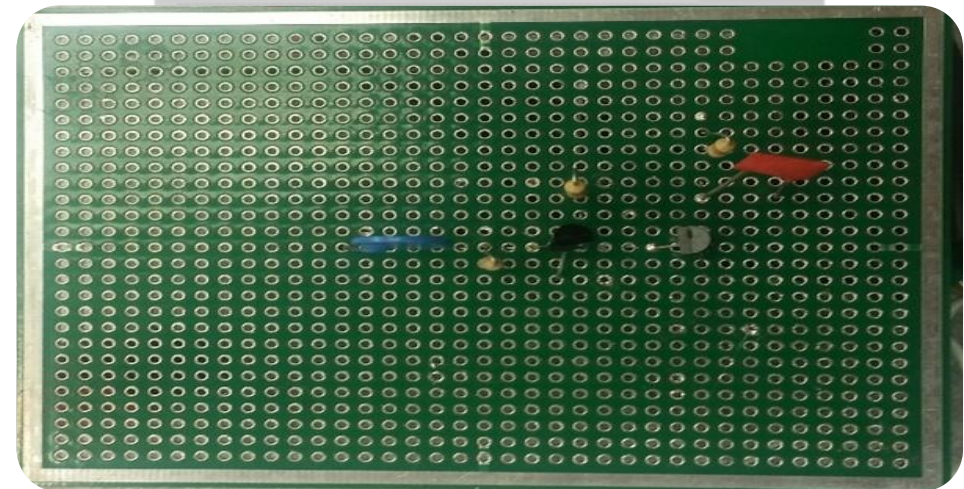
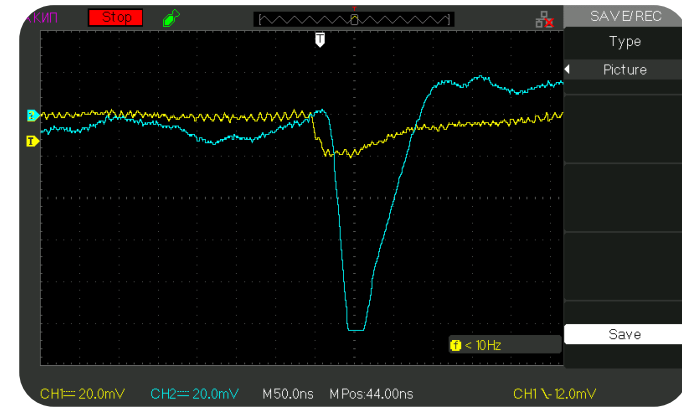
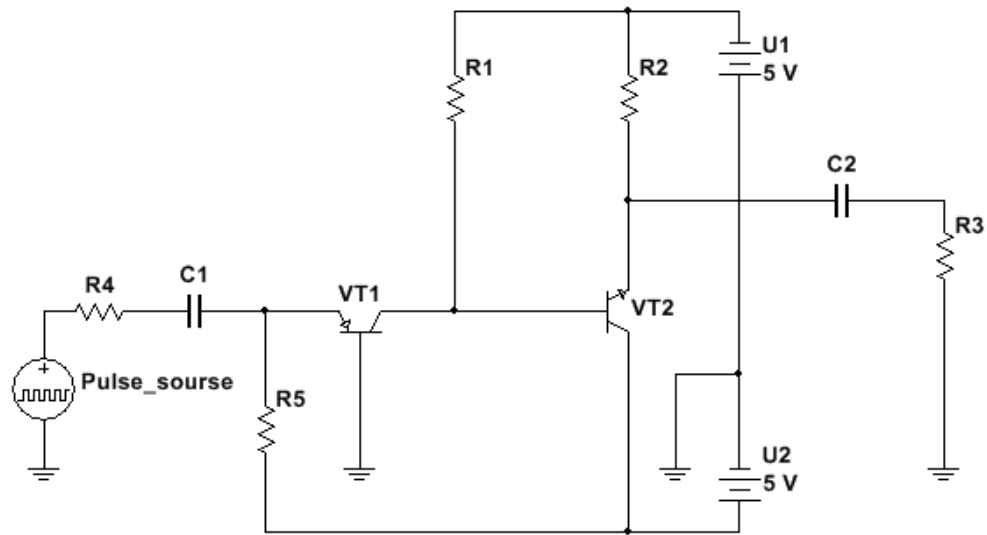
Results and discussion

Preamplifier CBC+CCC setup with cosmic ray detector



Results and discussion

Preamplifier CBC+CCC



Conclusion

- At the electronic practice I learned how to work with soldering iron, generator, oscilloscope and tester. I am now able to assemble circuits working with different electronic elements (diodes, transistors, capacitors etc.)
- Now I can read different schematic circuit diagrams
- The pre-amplifier has good sensitivity and amplifies the reference signal 5times
- The output signal has some distortions
- It is useful for the next step of amplifying the signal to the necessary level to convert to digital signal
- We did not have enough time, we need two amplifiers because we have two detectors
- We can measure cosmic rays with high energies and determine direction of the particles when using two amplifiers and detectors

