



ELECTRONICS HANDS-ON TRAINING

PARTICIPANTS:

TEYMUR ORUJOV, INSITUTE OF PHYSICS OF AZERBAIJAN

ANDREEA-CRISTIANA GIURA, DEPARTMENT OF PHYSICS,
UNIVERSITY OF CRAIOVA

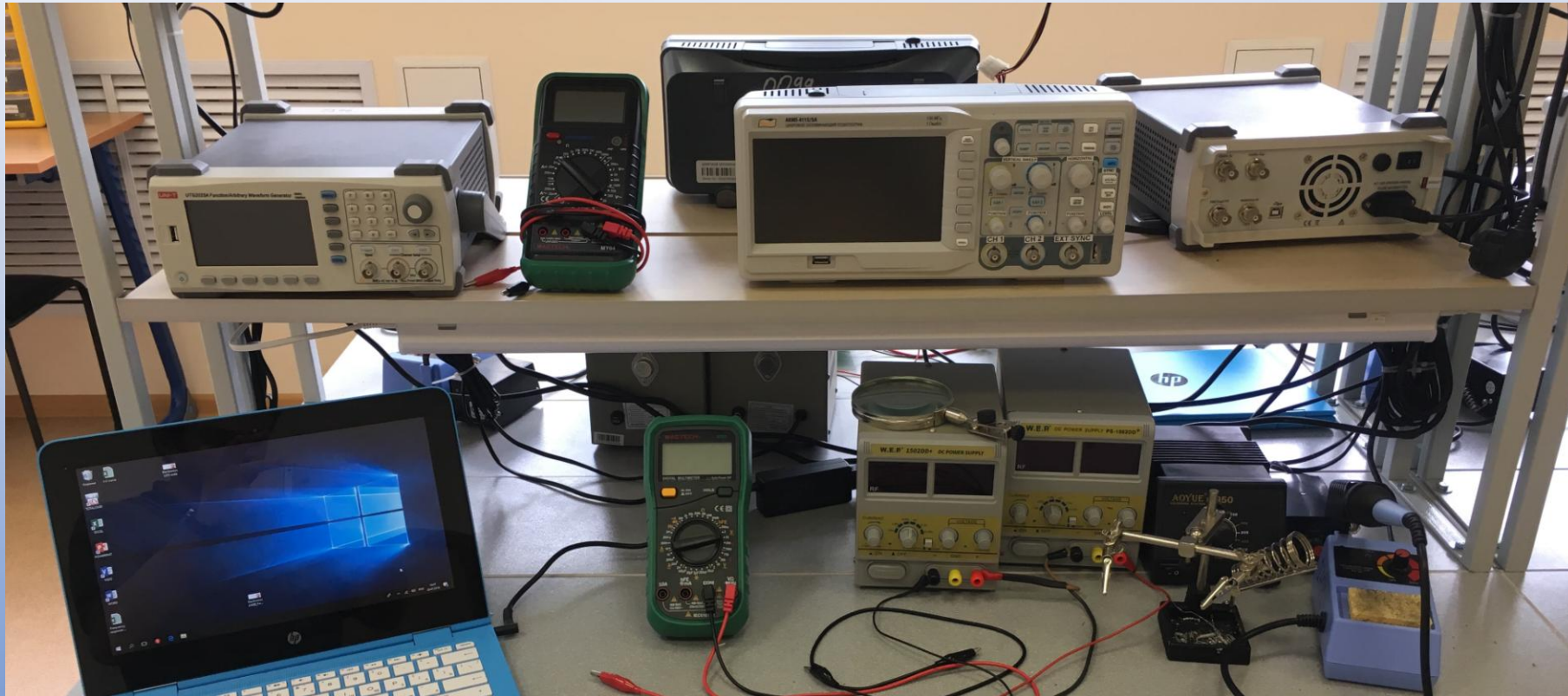
KAMIL STEVANKA, FEEC, BRNO UNIVERSITY OF TECHNOLOGY

LABORYTORY: UNIVERSITY CENTER

Supervisor:
Dmitriy Belozarov

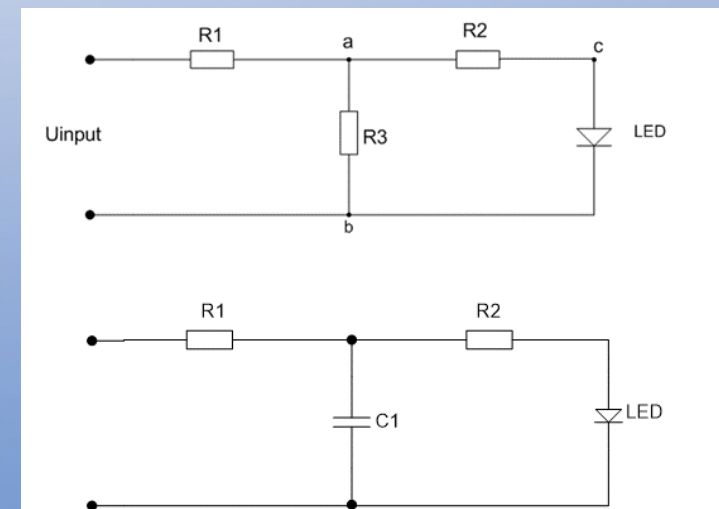
The aim of the project: Studying how to apply the basic radioelectronic components, read electronic circuits and understand the basic principles of electronic devices

Used equipment: signal generator, an oscilloscope, multimeter, soldering iron



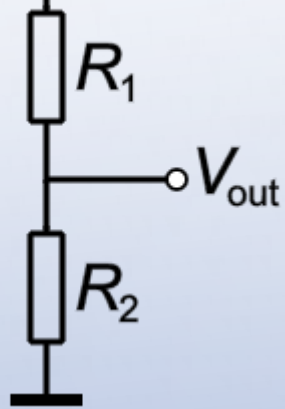
INTRODUCTION TO BASIC RADIOELEMENTS

- Resistors, capacitors, diodes, transistors
- Basic calculations – resistance, capacity
- Basic connection schemes – resistors, capacitors, voltage dividers



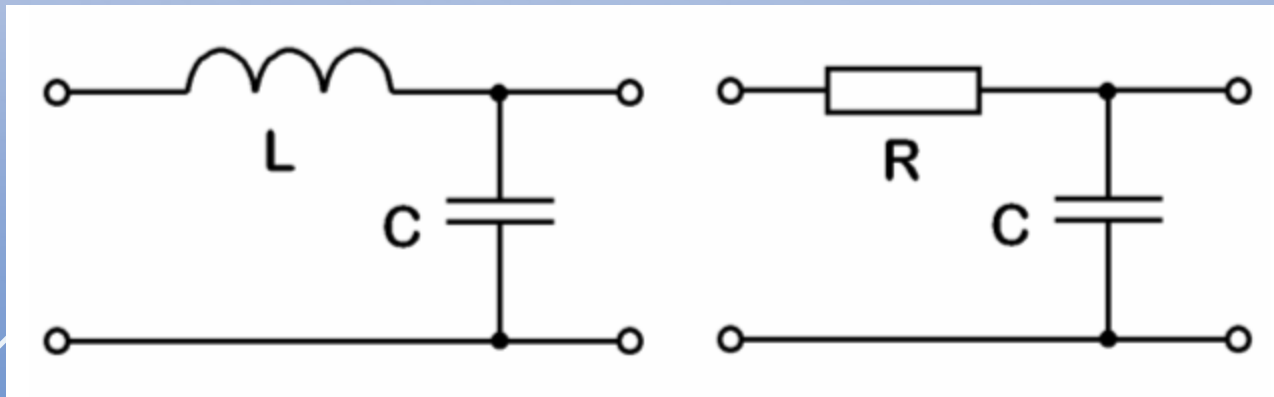
BASIC ELECTRONIC CIRCUITS

Voltage
Divider



$$V_{out} = V_{in} \cdot \frac{R_2}{R_1 + R_2}$$

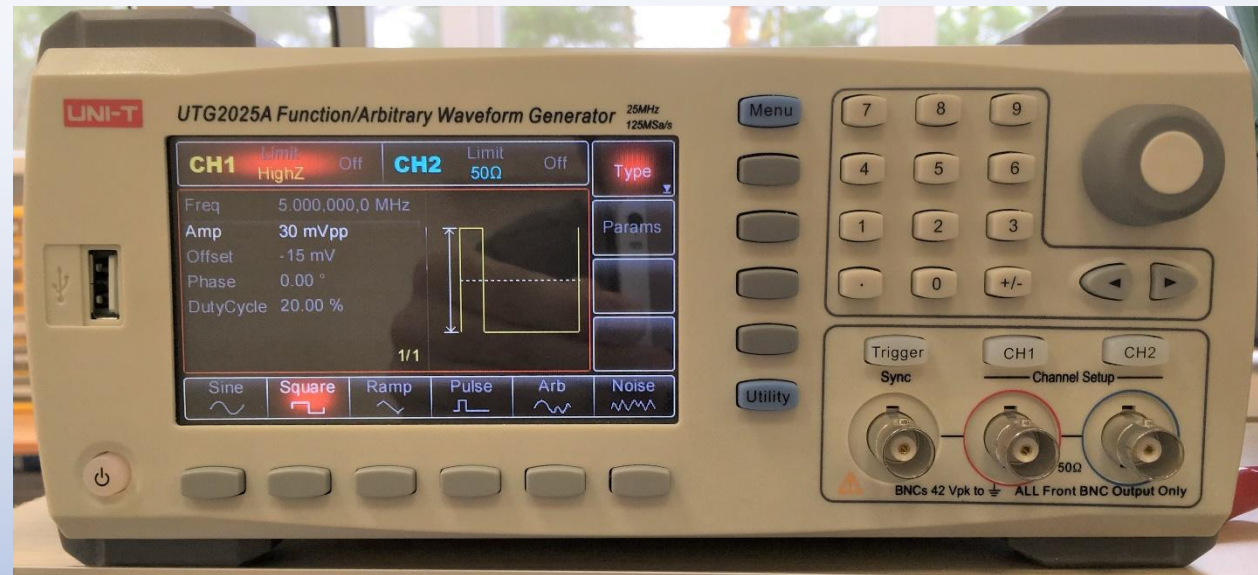
Low and High pass filters



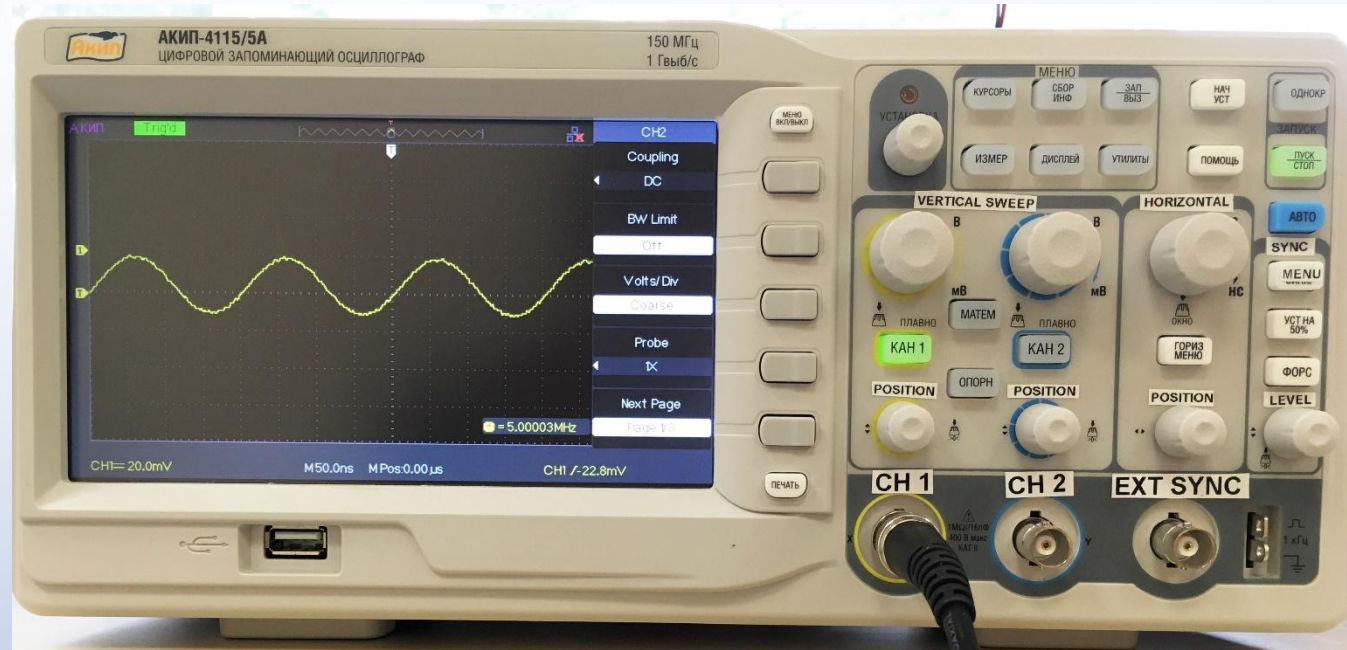
$$X_c = \frac{1}{2\pi f_c C}$$

$$X_L = 2\pi f_L L$$

HOW MEASUREMENTS ARE CARRIED OUT

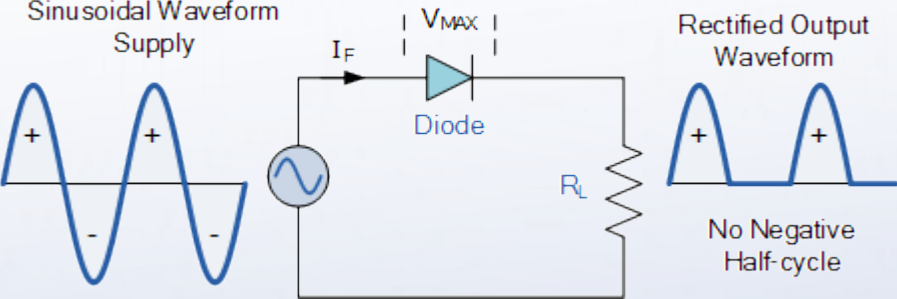


Generators produce electrical signals of various waveforms, frequency, phase and pulse width



Oscilloscopes allow the observation of varying signal voltages as a two-dimensional plot of one or more signals as a function of time

CIRCUIT ACTIVE ELEMENTS

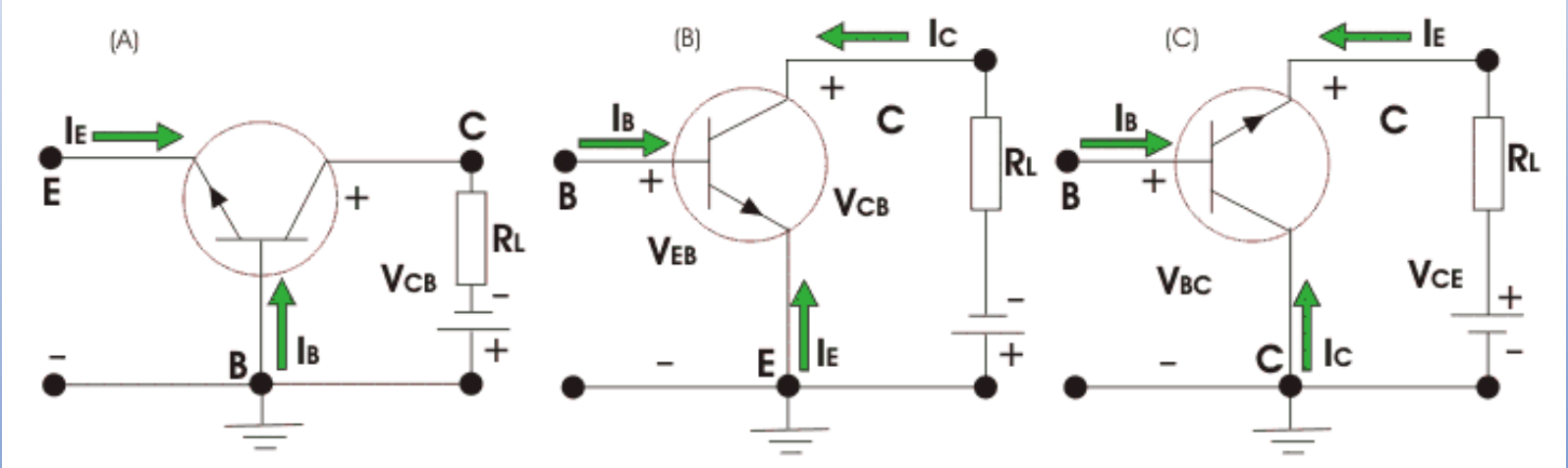


Diode rectifier circuit

CB

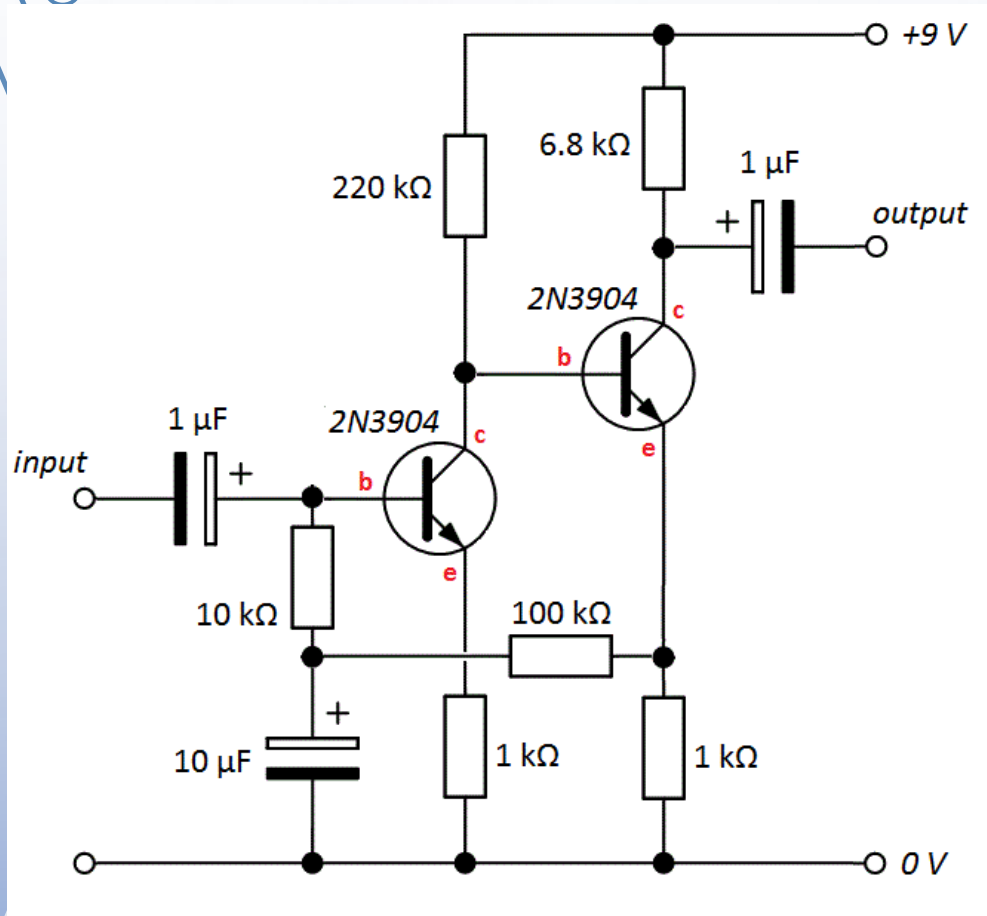
CE

CC



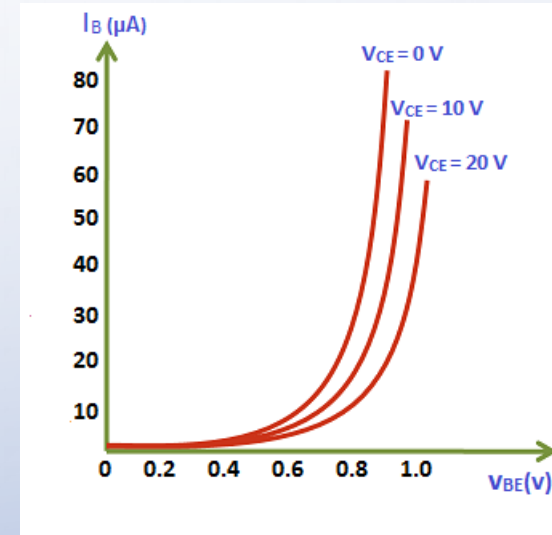
Main transistor circuits

AMPLIFIERS

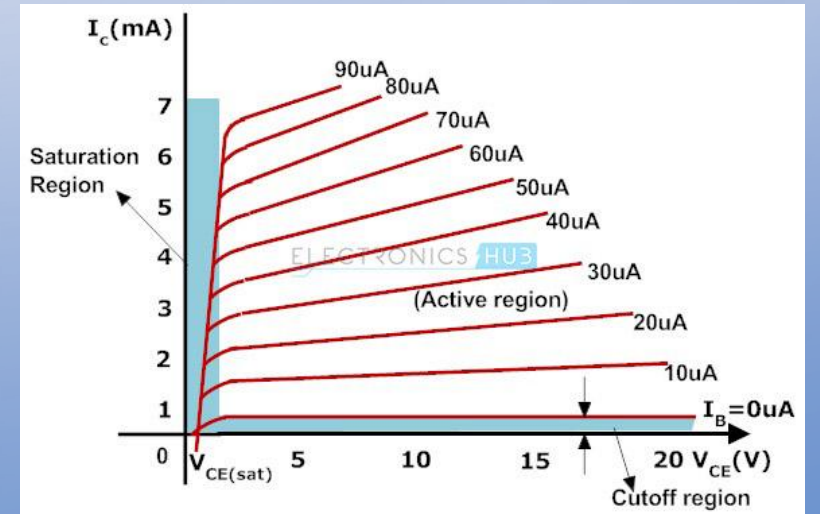


Simple 2-transistor audio amplifier

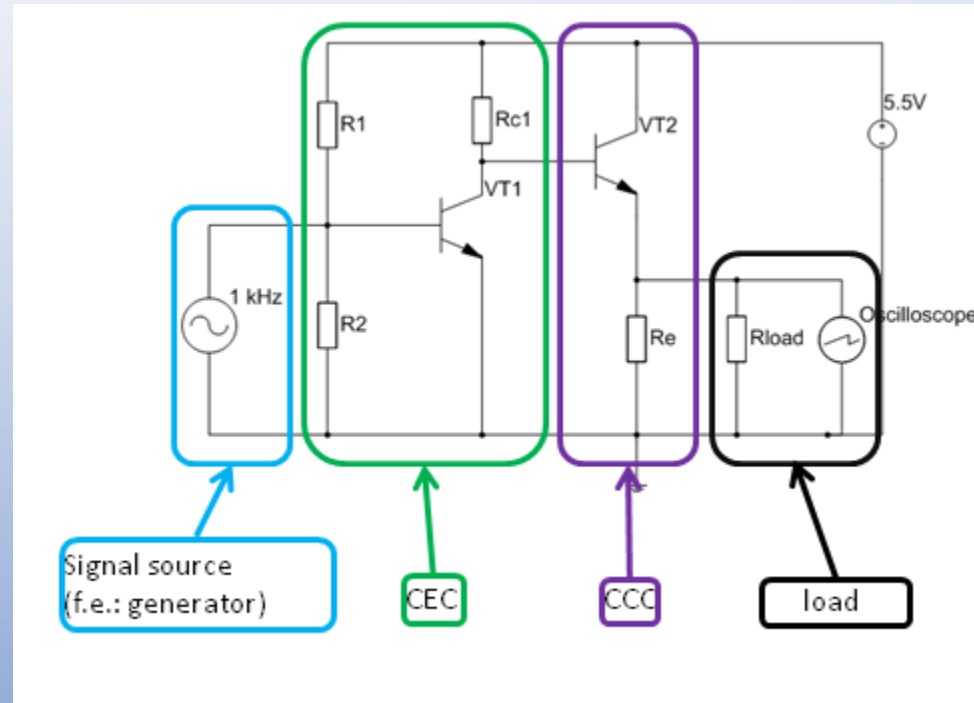
Input characteristics



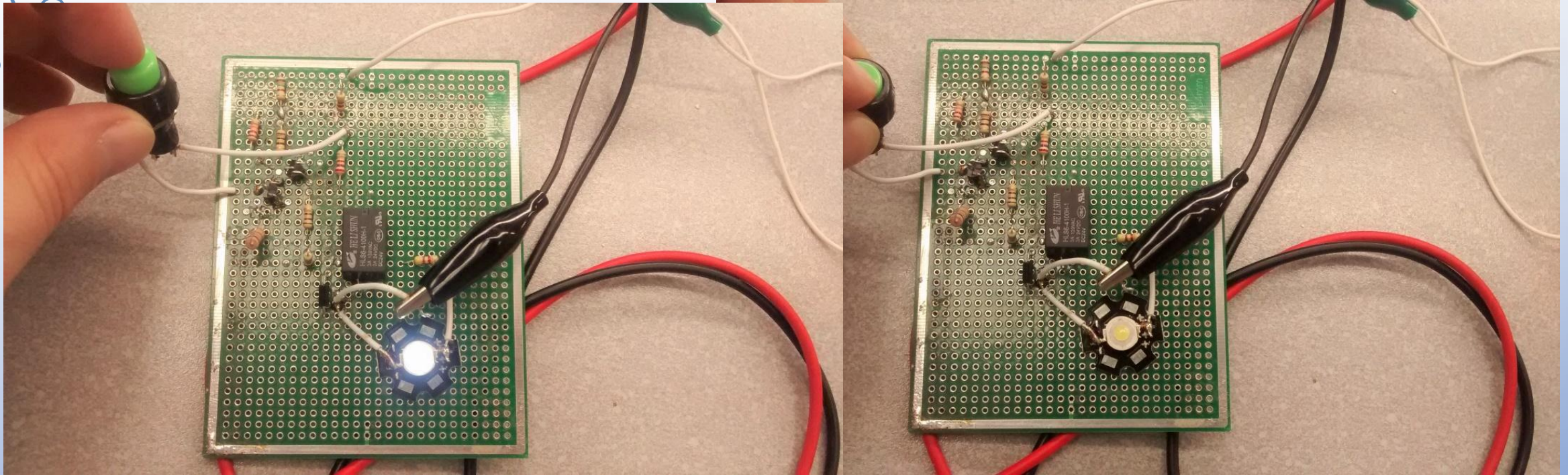
Output characteristics



TASK FIVE – CEC & CCC PREAMPLIFIER



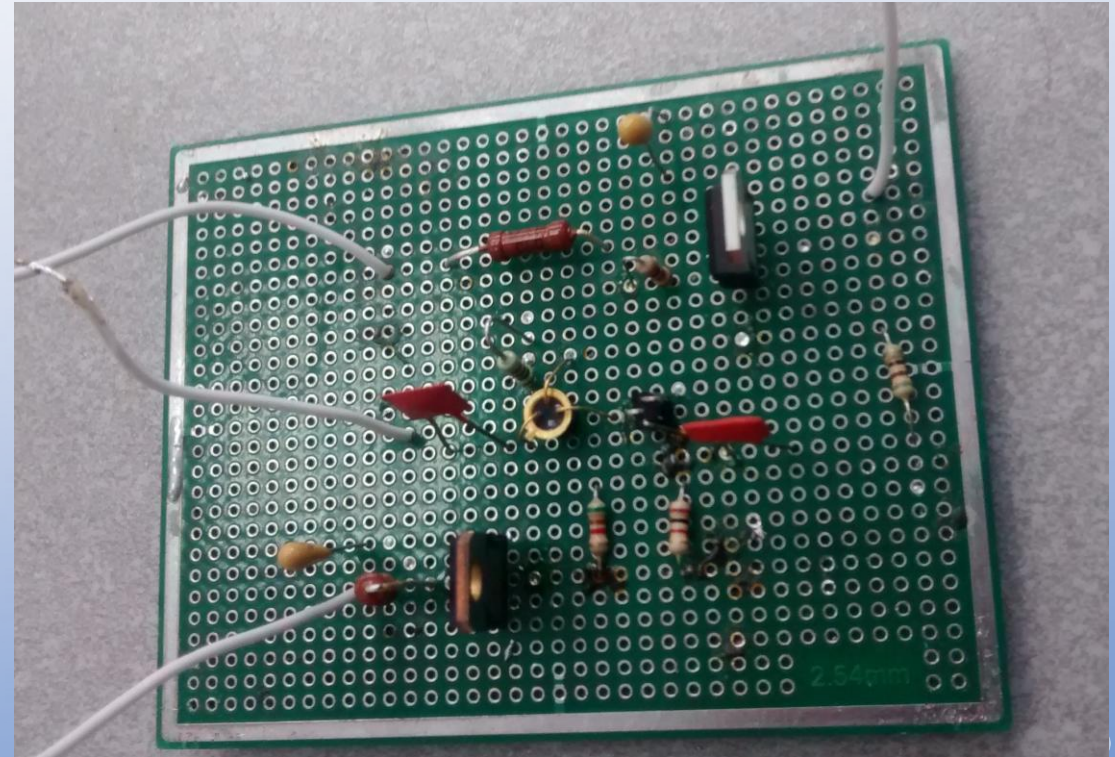
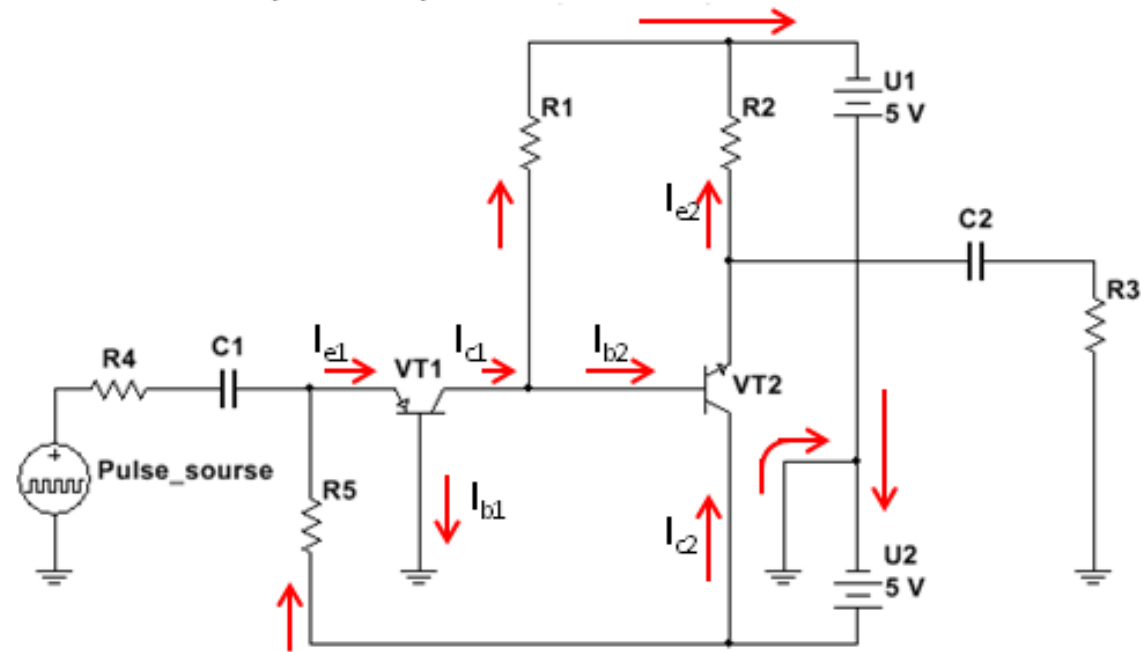
RELAY CIRCUIT



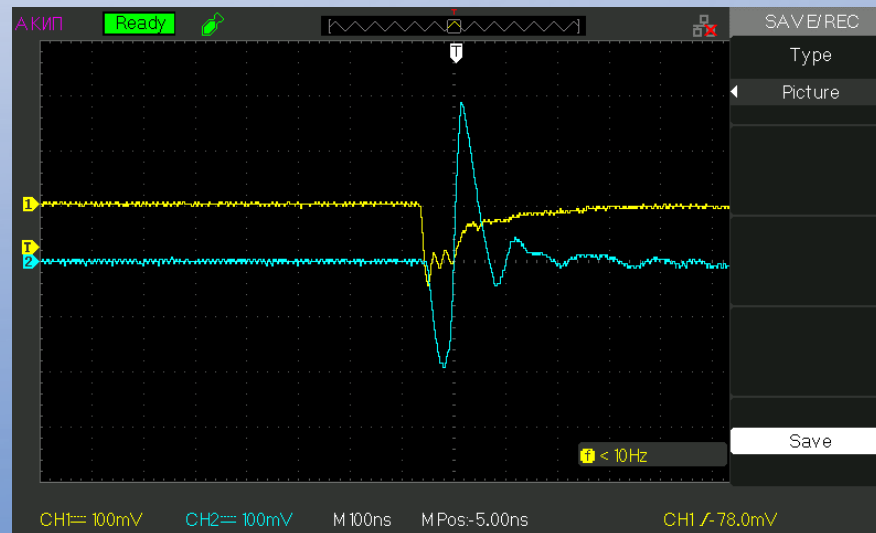
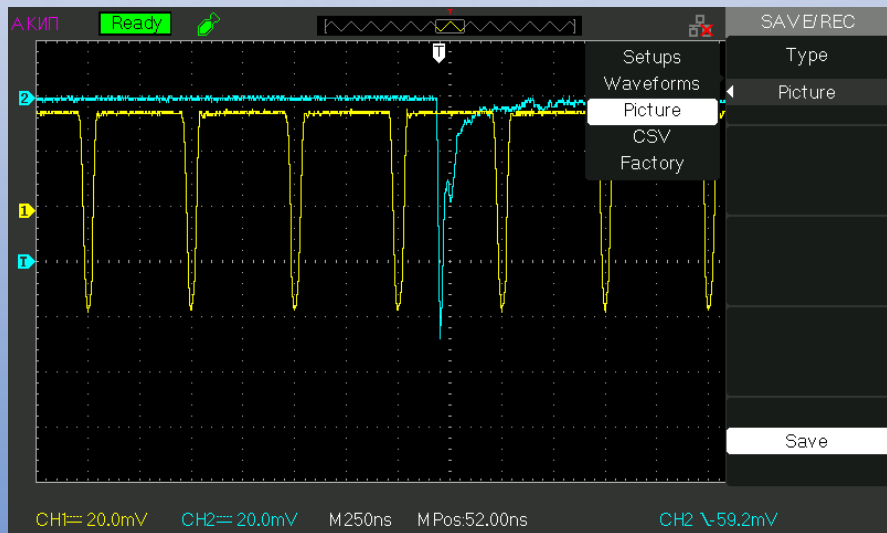
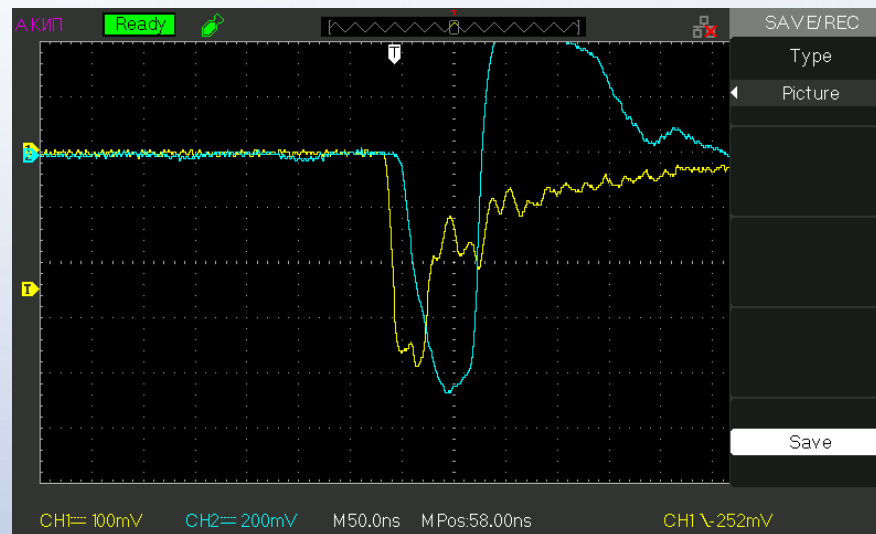
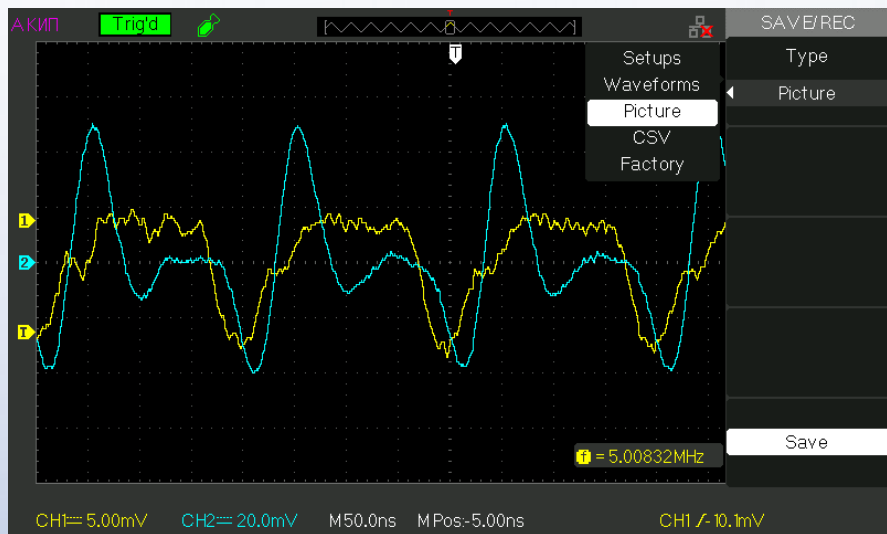
An amp is used to switch the relay on/off, because the input signal can be weak for the relay coil.

TASK SIX - PREAMPLIFIER

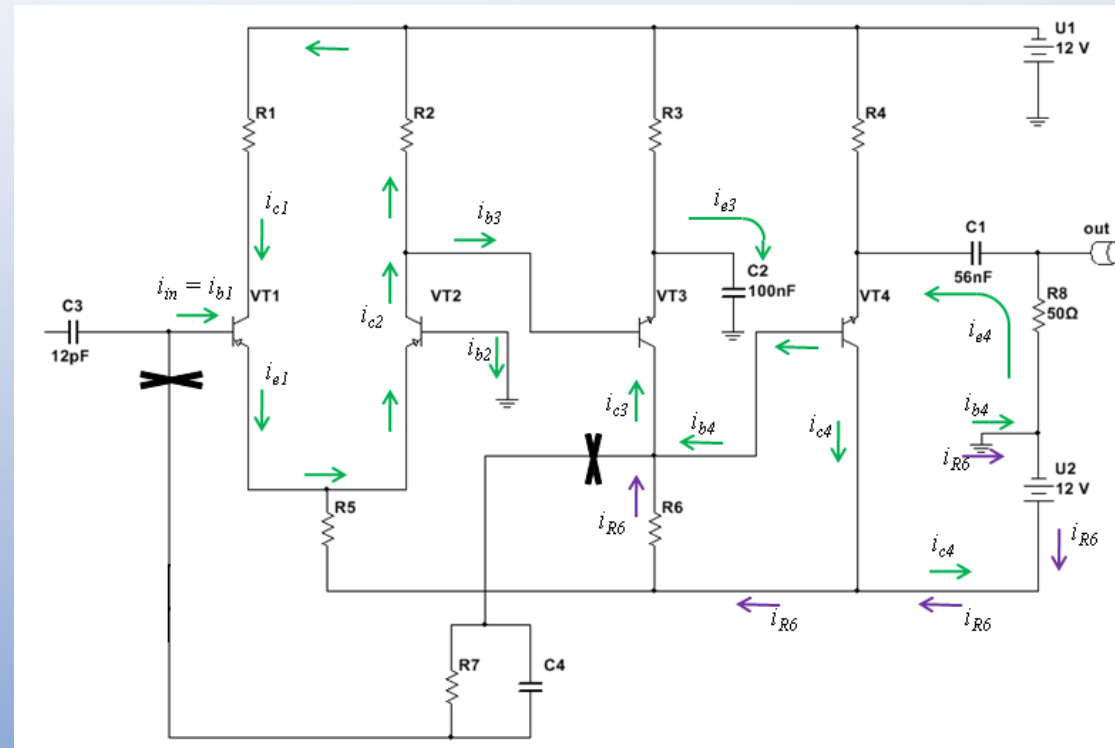
The preamplifier on CBC and CCC.



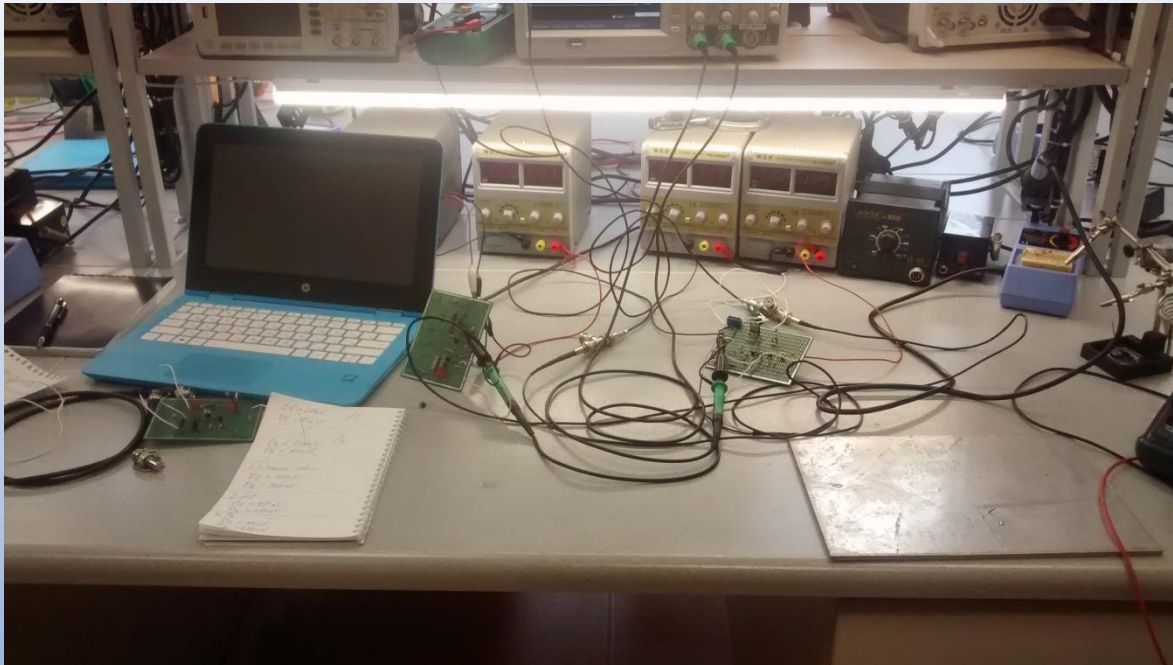
TASK SIX



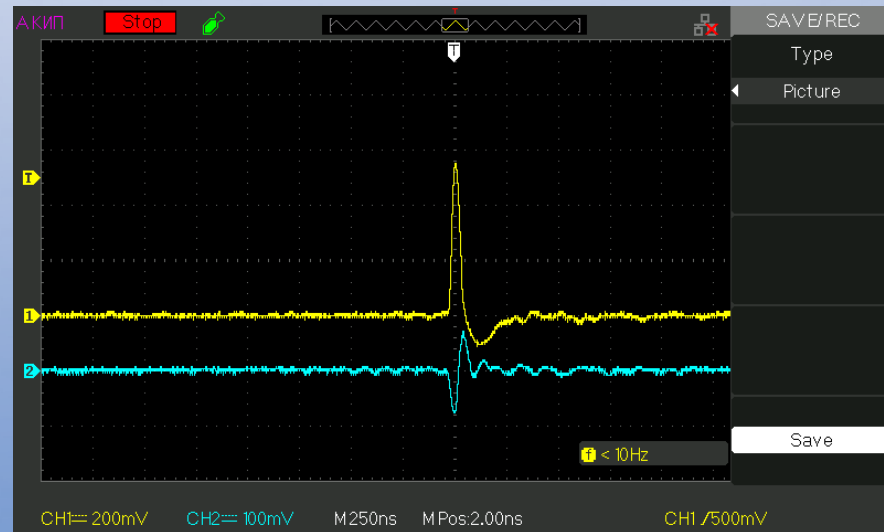
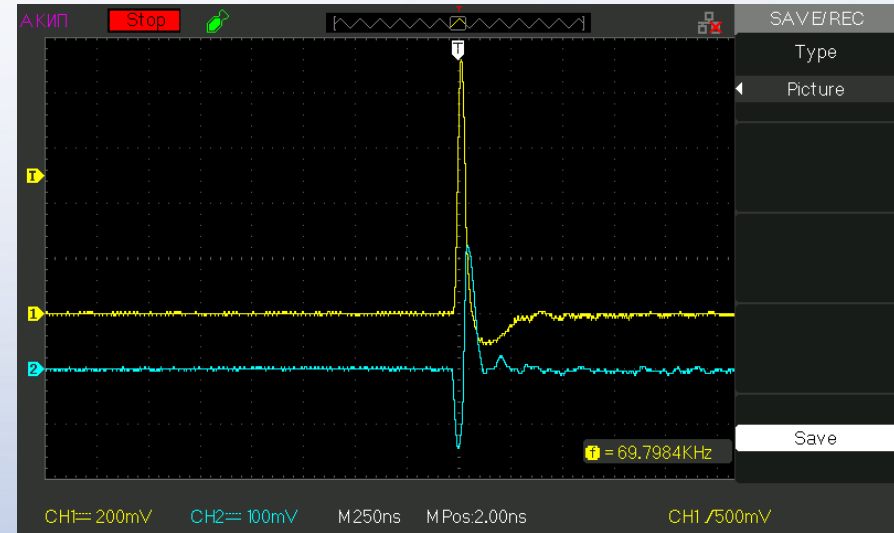
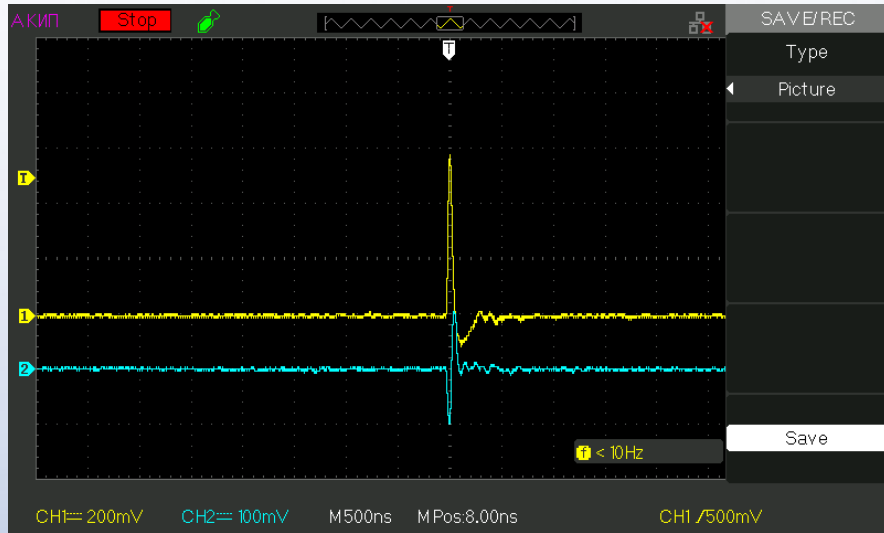
TASK SEVEN – CHARGE SENSITIVE PREAMPLIFIER



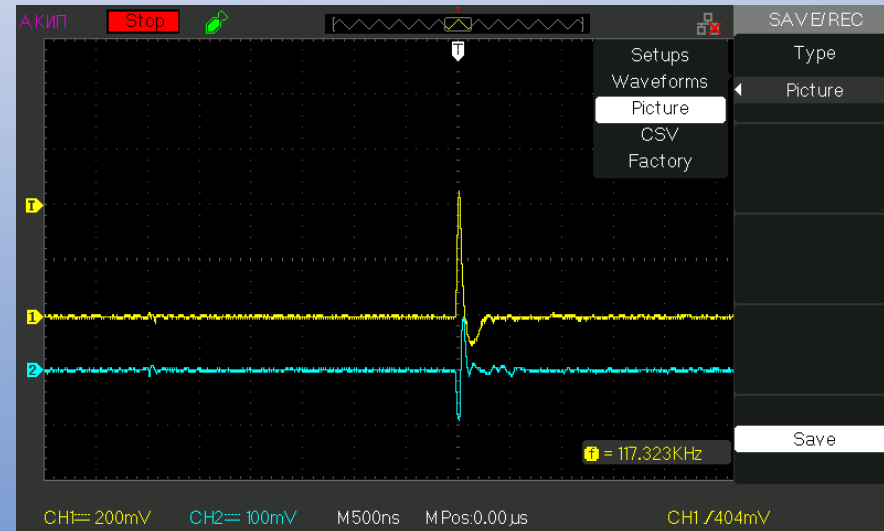
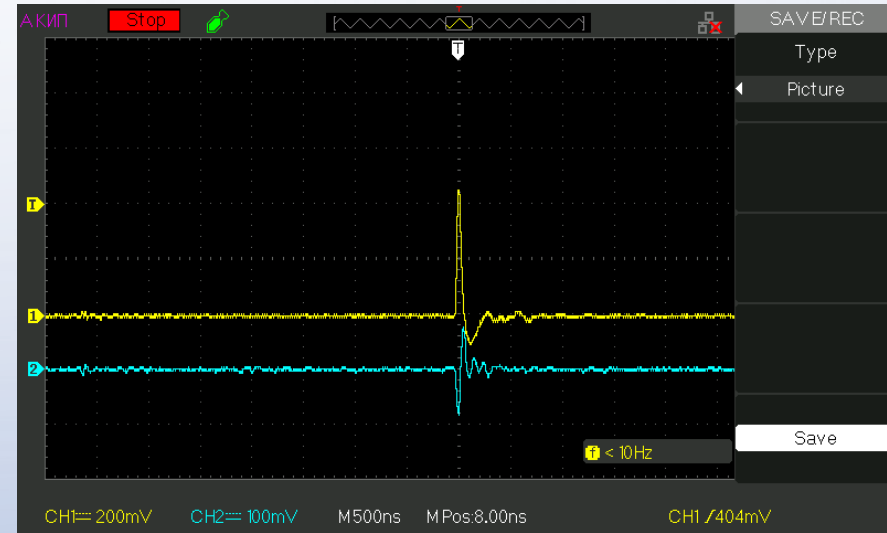
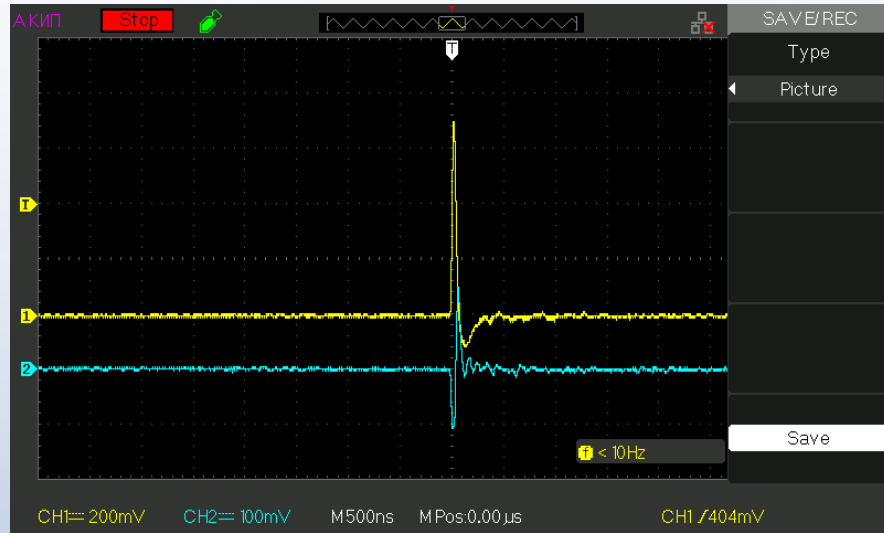
TASK SEVEN – CHARGE SENSITIVE PREAMPLIFIER



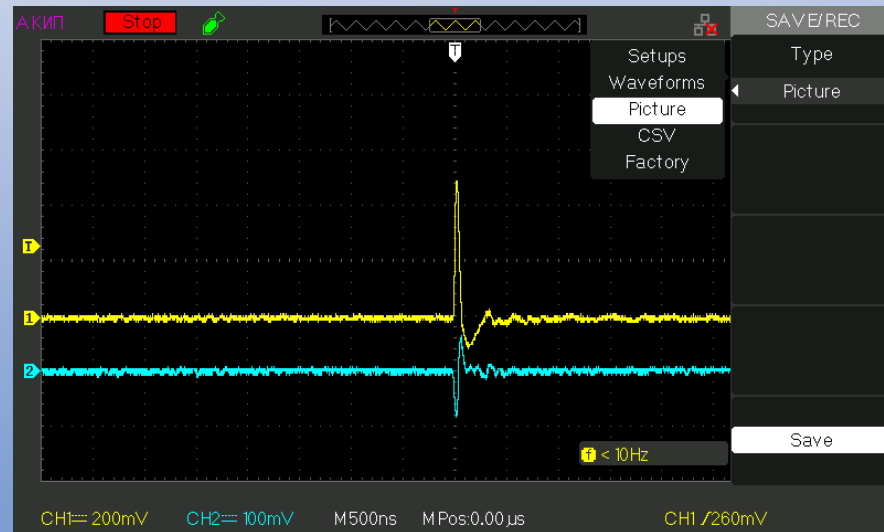
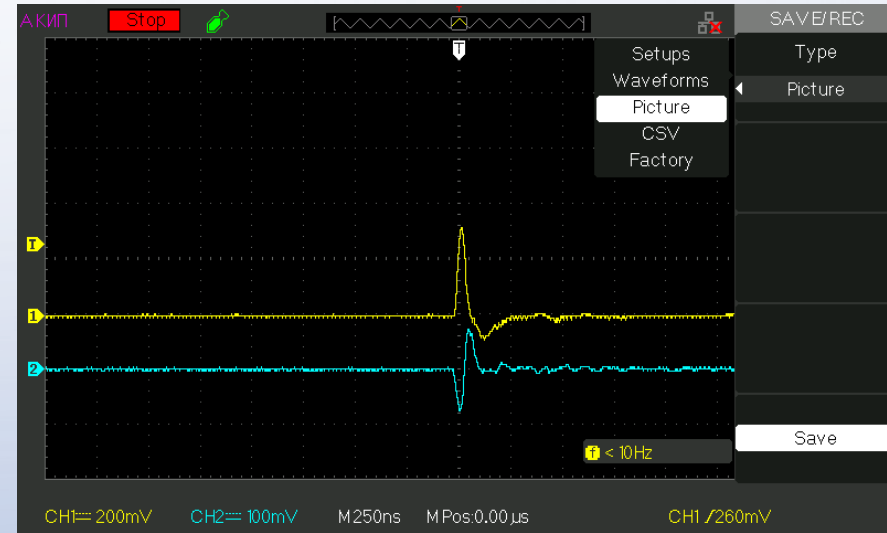
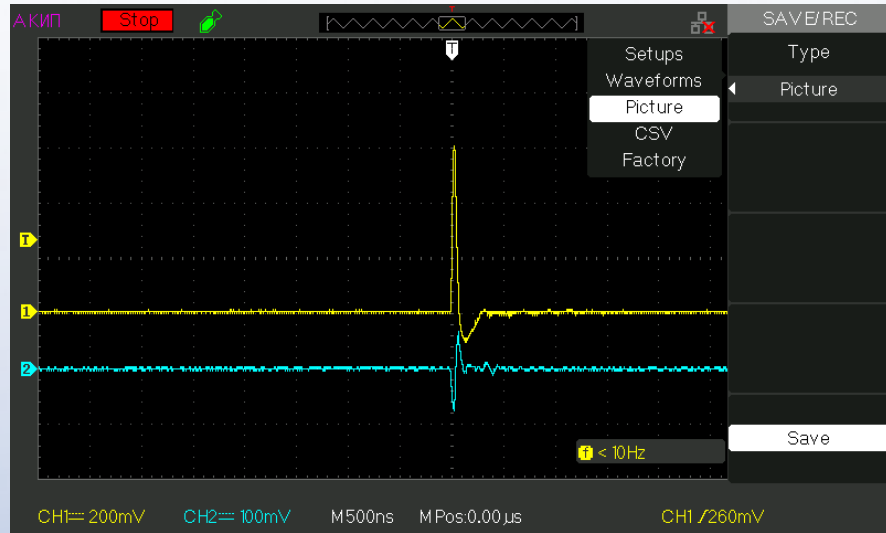
PARTICLE DETECTOR – WITHOUT PLATE



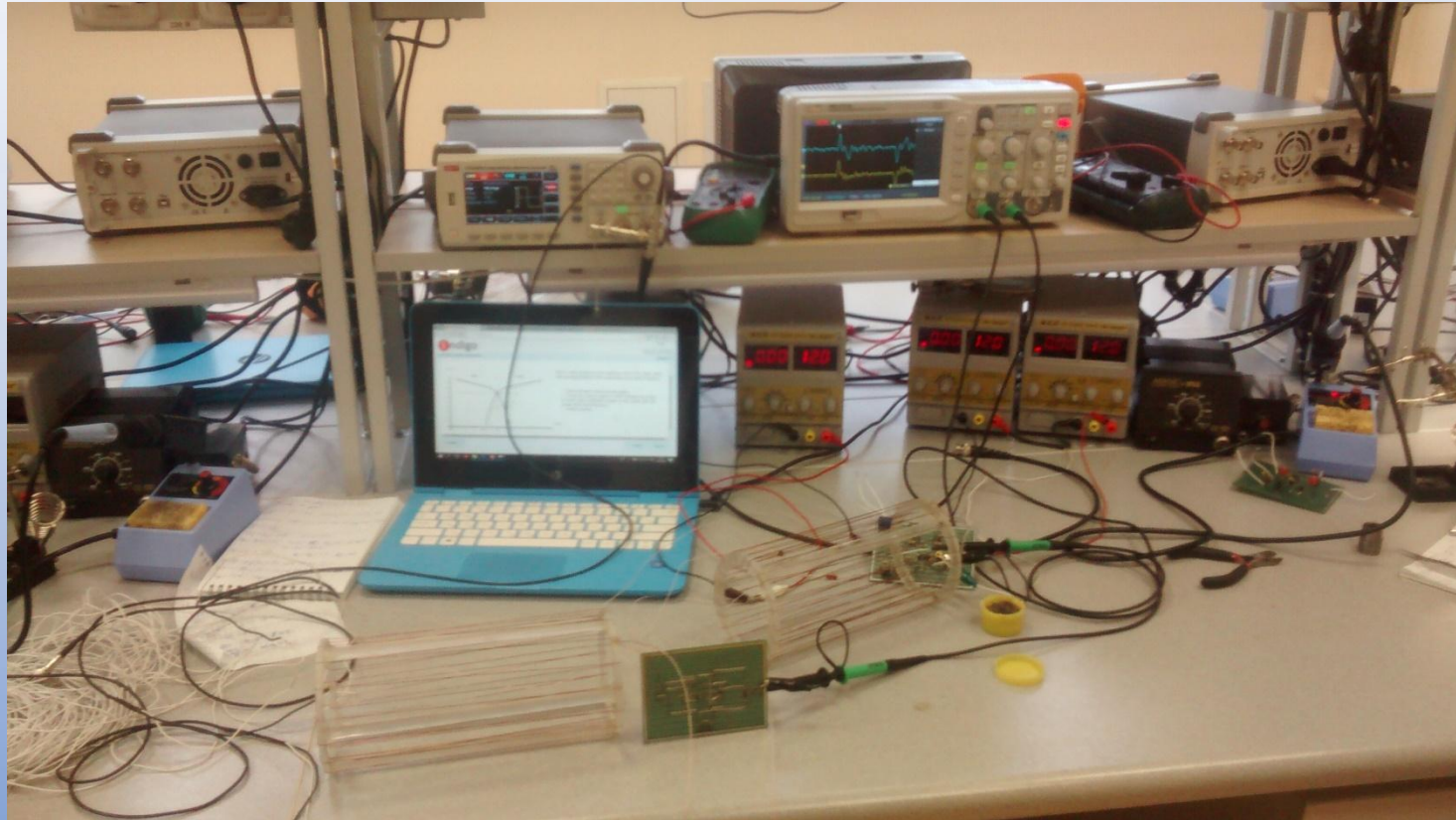
PARTICLE DETECTOR – ALUMINIUM PLATE



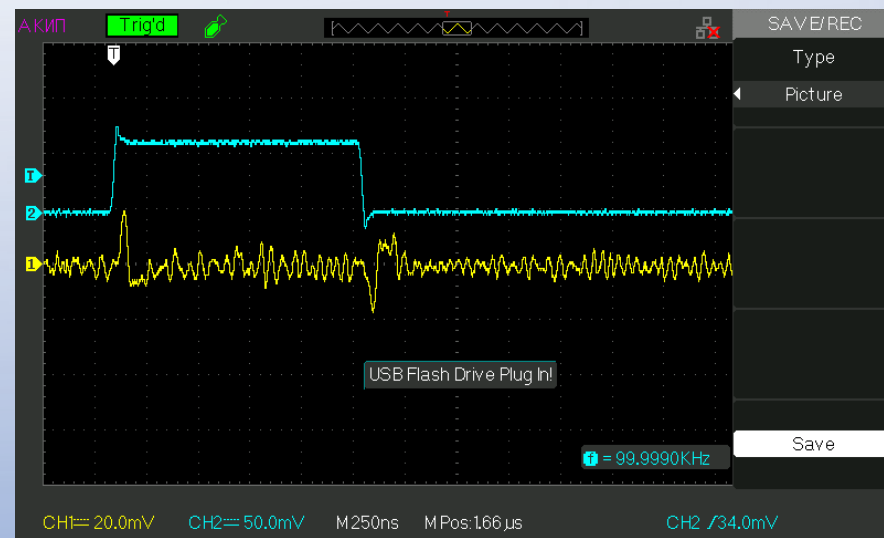
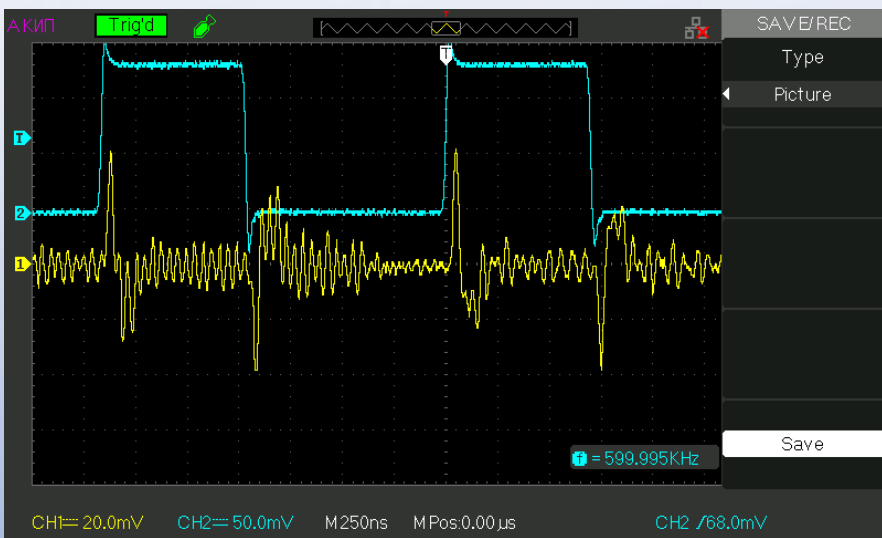
PARTICLE DETECTOR – LEAD PLATE



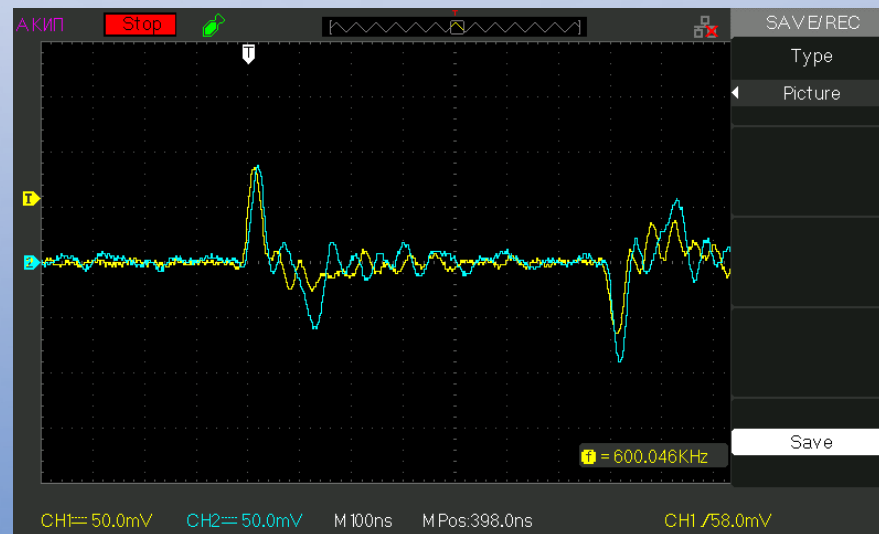
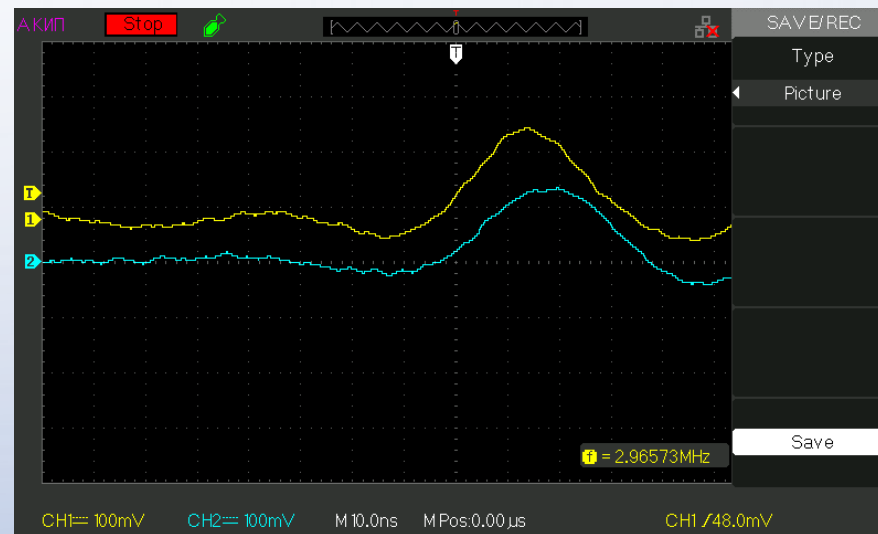
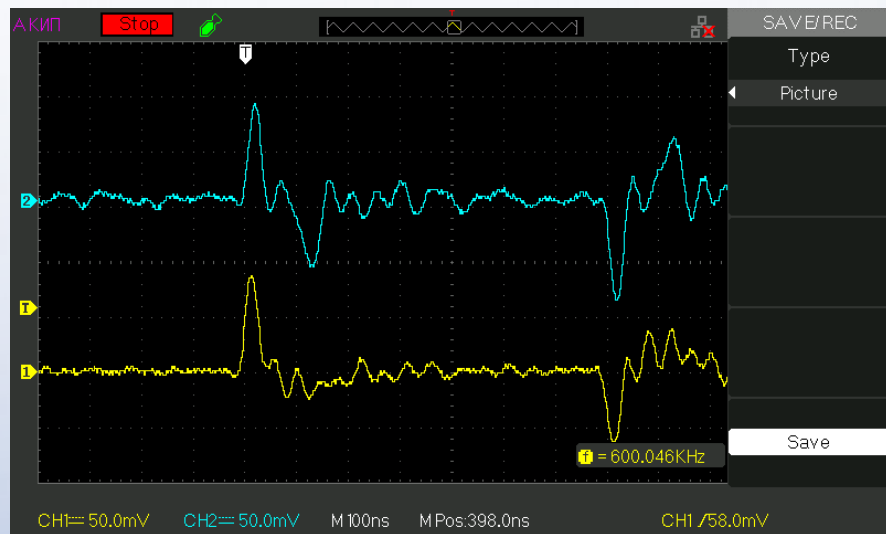
CURRENT DETECTORS



CURRENT DETECTORS



CURRENT DETECTORS



THANK YOU

