

## **Device&Tools:**

### **ETH oscilloscope**

**Introduce:** software and hardware complex for visualizing data received from an analog-to-digital voltage converter via an Ethernet cable

#### **Components:**

1. Analog-to-digital voltage converter (converter)
2. PC software (visualizer)

#### **Hardware:**

1. Ethernet module
2. Hardware platform with a 32-bit ARM(R) Cortex(R)-M3 microcontroller (ARM platform)
3. Buffer stage on the operational amplifier with a voltage divider
4. Voltage switch

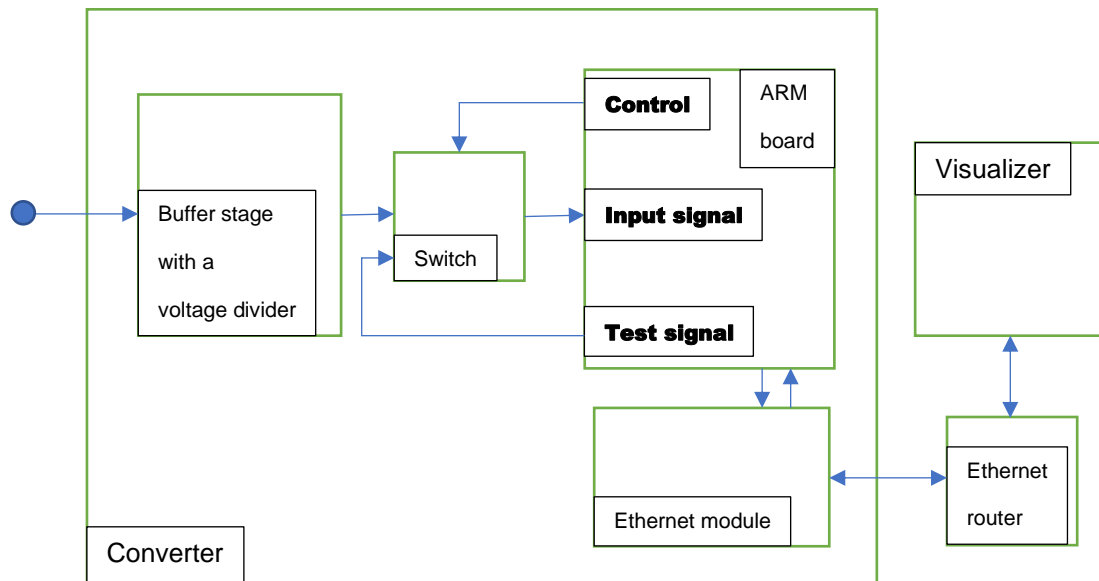
#### **Features of the converter firmware:**

1. Language – C only
2. The standard libraries of the microcontroller manufacturer are used (CMSIS)
3. The standard library of the Ethernet module manufacturer is used

#### **Features of the visualizer software:**

Java 8 SE only

## Hardware flowchart:



## Technical characteristics of the oscilloscope:

1. Sampling interval: 6, microsecond
2. Input voltage range: 0 ÷ 30, V
3. Supply voltage of the converter: 5, V
4. Generating test signals (sinus wave, triangle wave, meander wave) with variable amplitude and frequency

## Features of the visualizer:

1. Periodic display of accumulated signal samples in the oscilloscope window
2. Scaling along the horizontal and vertical axes
3. The ability to record signal samples in memory and view them in the oscilloscope window
4. Control of the test signal generator
5. Synchronization on the leading or trailing edges of the observed signal
6. Measurement of the amplitude characteristics and frequency of the observed signal

Figure 1. Voltage from the power supply unit (fallen edge)

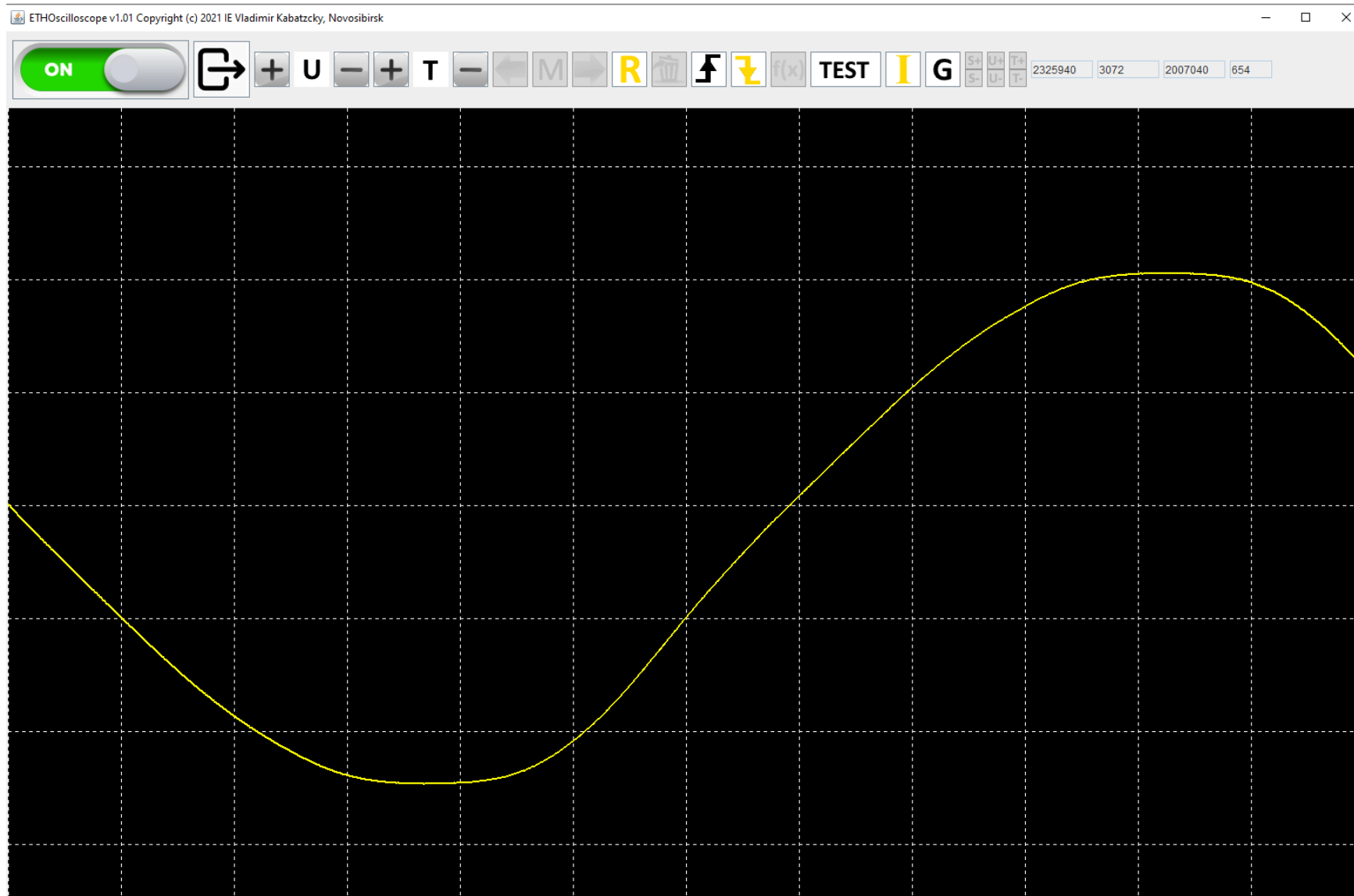


Figure 2. Test signal (sinus wave, fallen edge)

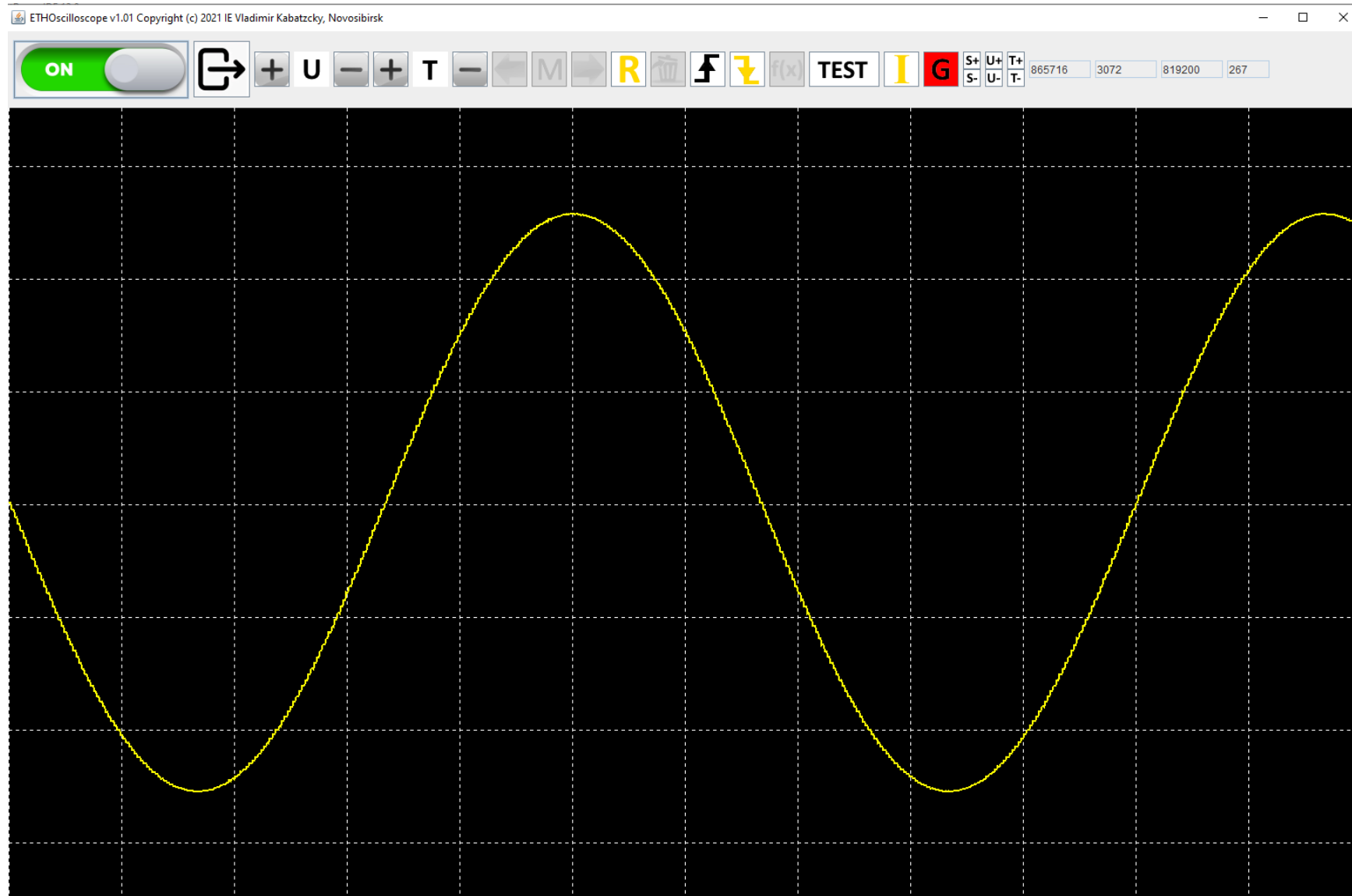


Figure 3. Test signal (triangle wave, fallen edge)

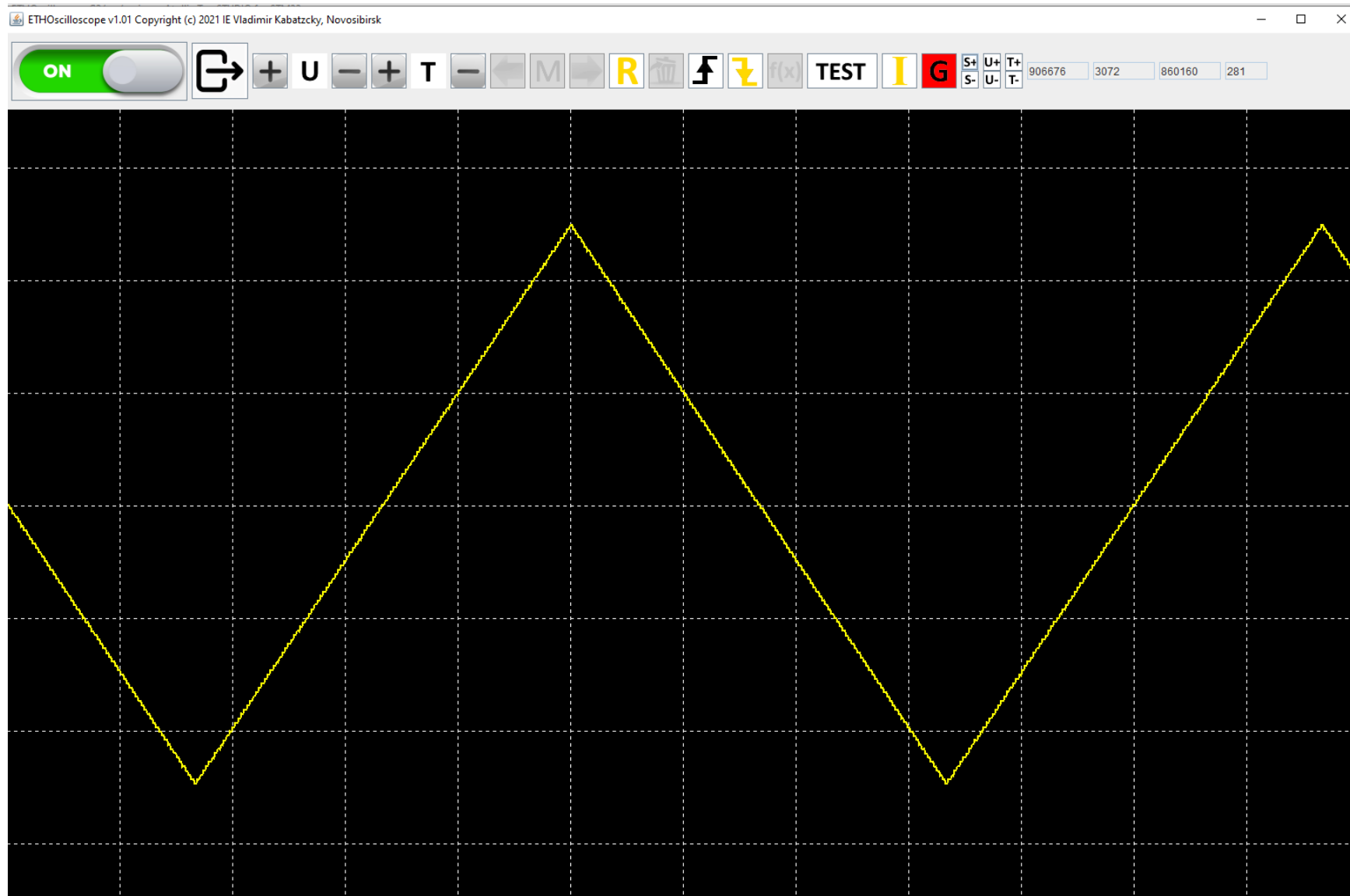


Figure 4. Test signal (meander wave, fallen edge)

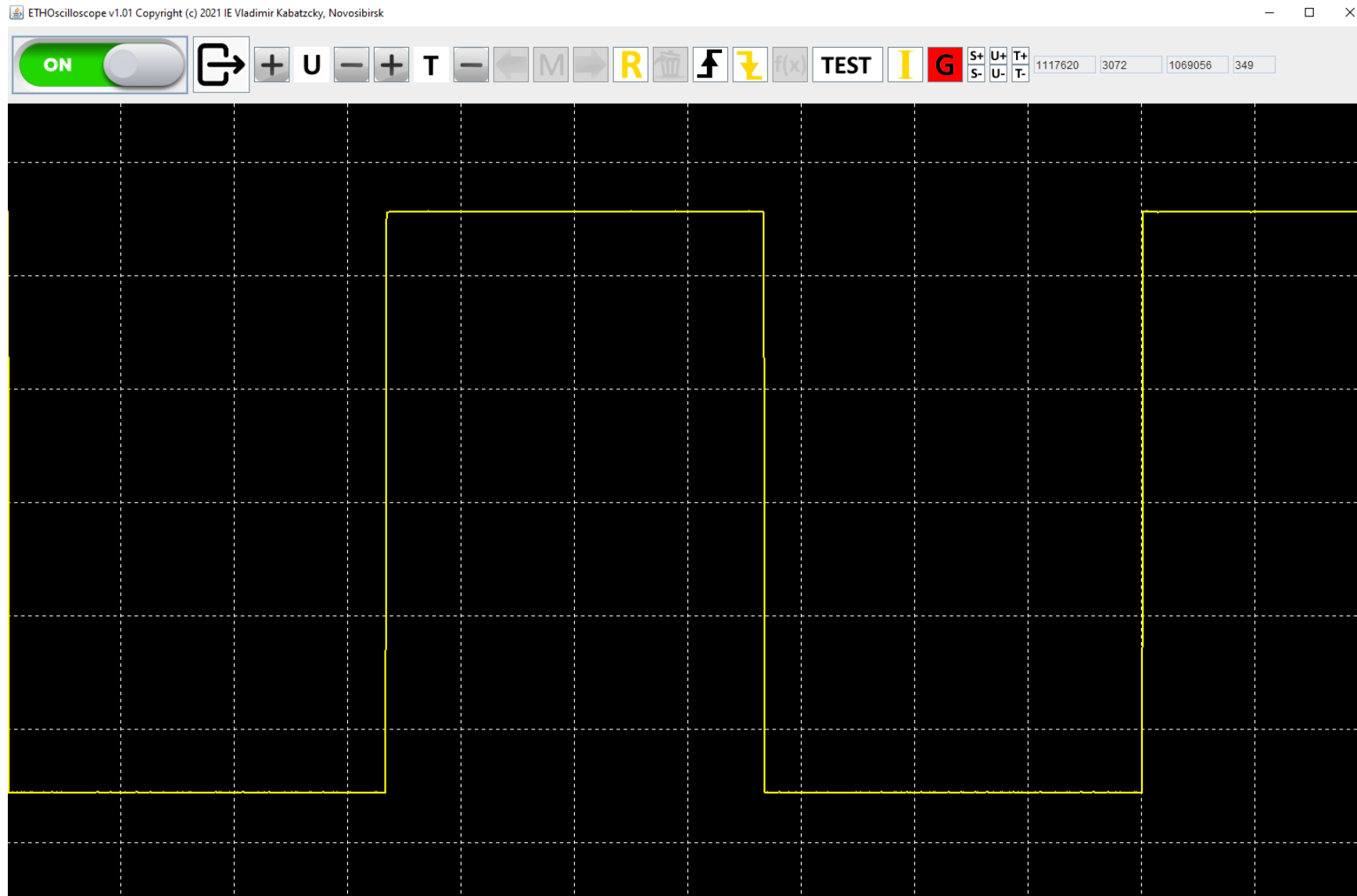


Figure 5. Viewing the recorded signal - the moment when the amplitude of the observed signal changes

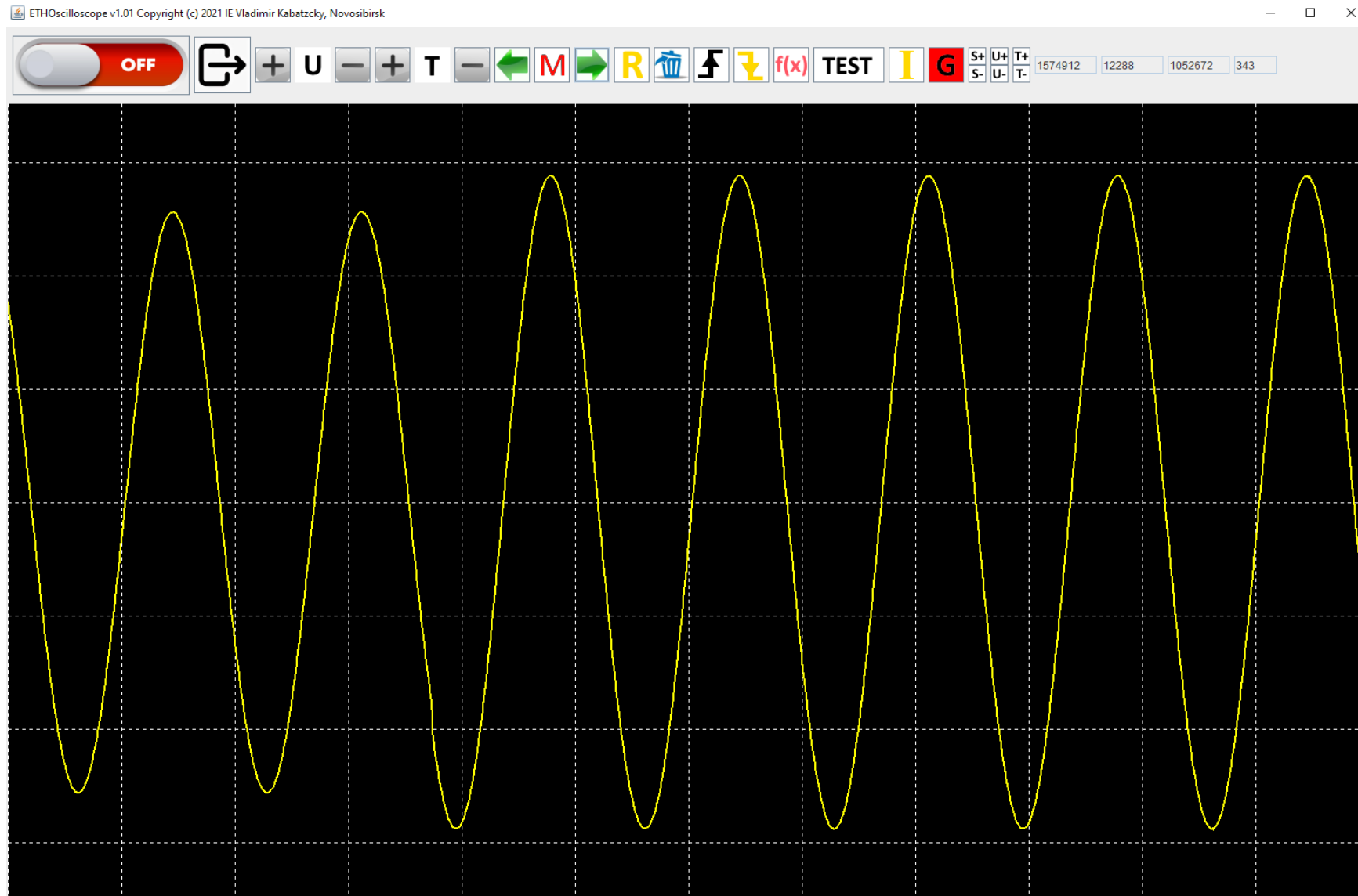
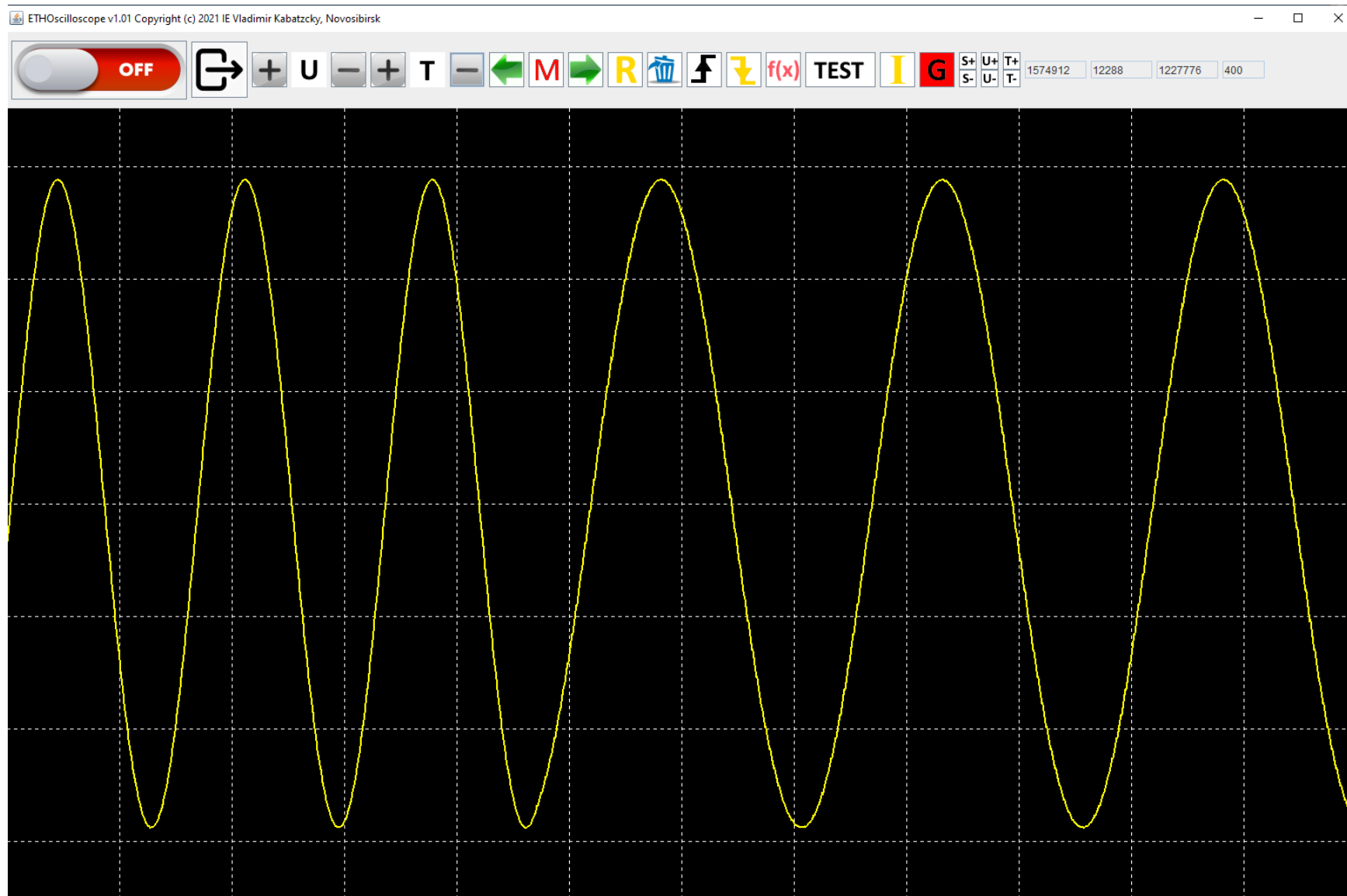


Figure 6. Viewing the recorded signal - the moment when the frequency of the observed signal changes





**Thanks for attention!**