

# Exercise nr 41

## RS 232 – TIME CONSTANT MEASUREMENTS

### GOALS:

The goal of his exercise is to learn the RS-232 standard. An additional goal is to learn and measure the RC time constants.

### 1 Experiment

- 1.1 Build up the measuring circuit according to the scheme given in Fig. 1 part A.
- 2.2 Use multimeter and values of the resistance R and capacitance C.
- 2.3 Calculate the time constant RC.
- 2.4 Turn on the computer.
- 2.5 Find the catalogue "Graphic" and start the program: "Metex" according to the attached instruction.
- 2.6 Turn on the multimeter and chose proper function.
- 2.7 Observe the evolution of the current charging the capacitor. Short a capacitor for a moment with the aid of switch W2 (two wires), after the discharge the capacitor is slowly charge through the resistor R.
- 2.8 Determine the time constant from the observed current evolutions for three different voltages of the Power supply: 0,3 V, 3 V and 15 V. (Remember about the correct polarization).
- 2.9 Compare the time constant determined from the graph of the charging current evolution with the measured RC value. Discus the difference taking into account the internal resistance of the multimeter and the leakage of the capacitor.

### 3 An additional experiment

- 3.1 Build the circuit given schematically in Fig. 2. Investigate what is the highest frequency of the sinusoidal signal that can be measured with the aid of his setup (containing RS-232 interface).

### 4 Background

- 4.1 Multimeters, accuracy of measurements.
- 4.2 Time constant.
- 4.3 The RS 232 interface.

## Literature

- [1] U. Tiede, Shenk, *Układy półprzewodnikowe*.
- [2] P. Horowitz, W. Hill, *The Art of Electronics*.
- [3] T. Stacewicz, A. Kotlicki, *Elektronika w laboratorium naukowym*.
- [4] Internet.

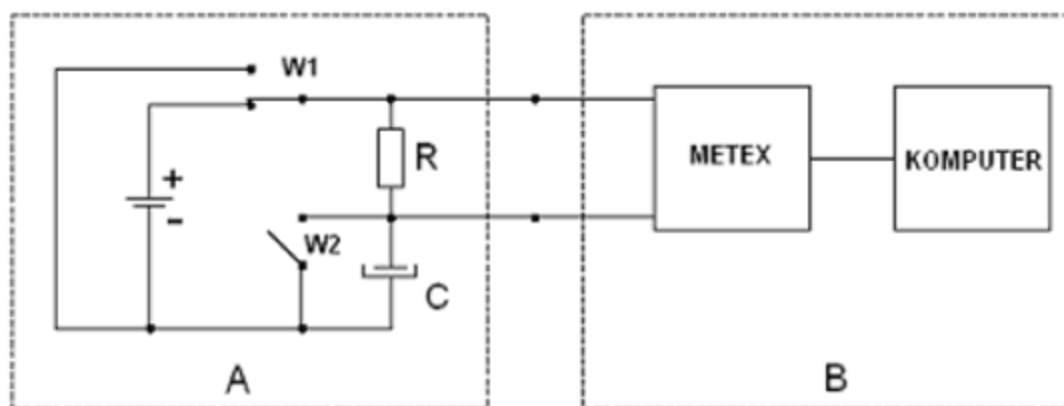


Fig. 1. Scheme nr 1.

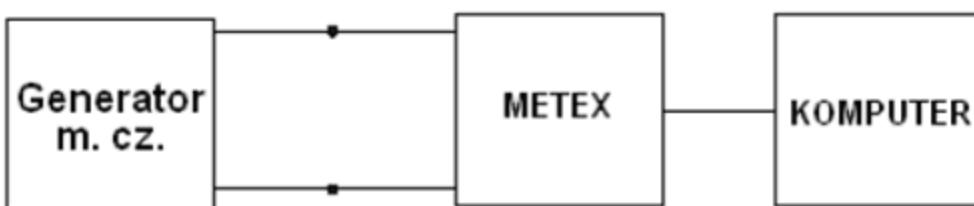


Fig. 2. Scheme nr 2.