BUILDING AN OHMMETER WITH ARDUINO MICROCONTROLLER

Project work

FOR VEHICLE ENGINEER STUDENTS

Version: 1.1

1. Introduction, preparation

One of the first projects of our studies is the construction of an ohmmeter (resistance meter). The task is somewhat simplified, in other words, to determine the value of an unknown resistance. There are several ways to determine an unknown resistance, here we will implement one of the simplest using an Arduino Uno type microcontroller.

1.1 Measurement principle

The value of an unknown resistance can be determined using several methods:
- flowing a current through the resistor and measuring the voltage across it (e.g. multimeter);
- using a Wheastone-bridge;
- using a voltage divider.

In this project work we will use the voltage divider method. Its wiring diagram is shown in the first figure.

Fig.1. Voltage divider
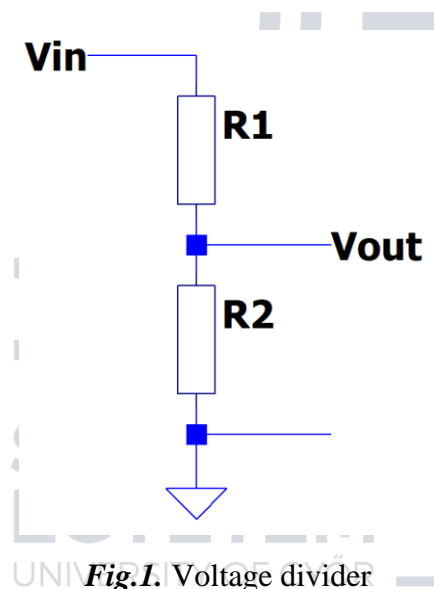
Based on the learning obtained during the semester, the following can be identified: R1 and R2 are connected in series, i.e., their currents are common, but the voltage (Vin) applied to the circuit is divided in the ratio of the resistors.

The aim is to express R2 in terms of Vin, R1 and Vout, because these are known or measurable data. The student is responsible for defining the formula!

Use the following values in the measurement/design:
- R1 = 1kΩ;
- Vin = 5V.

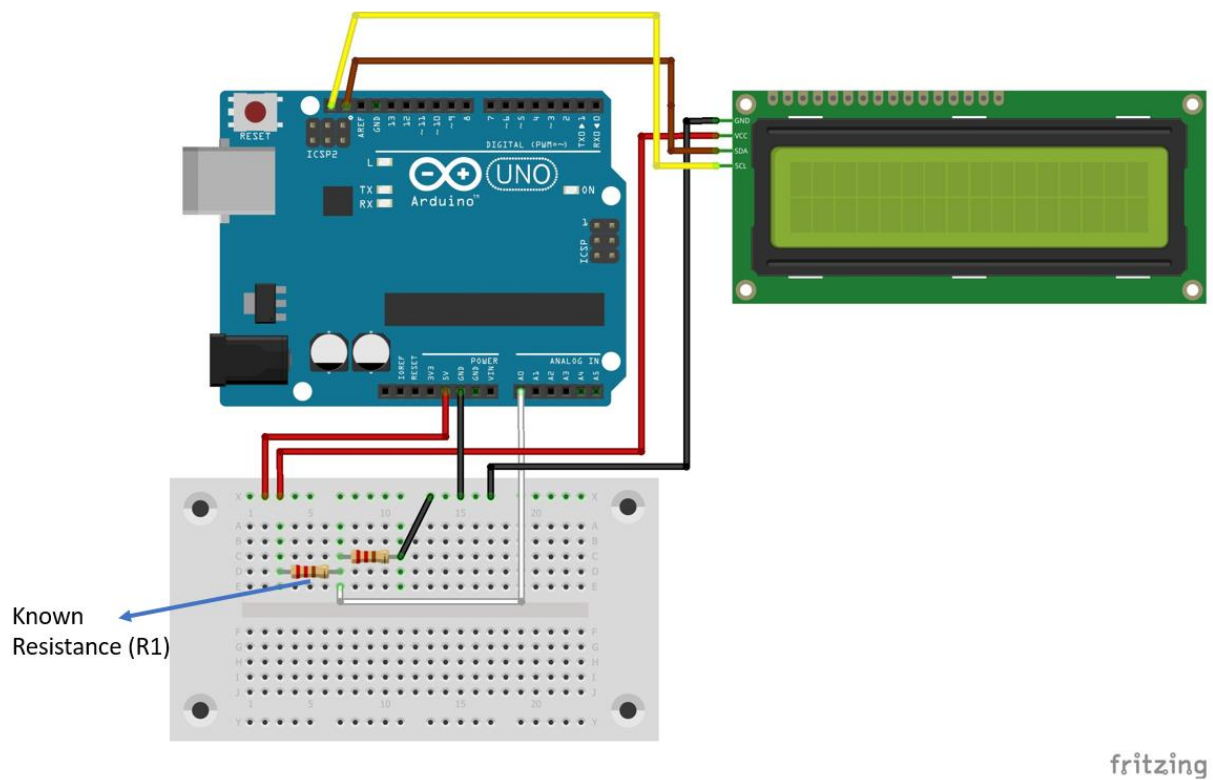A possible layout is shown in the second and the real demo the third figure.
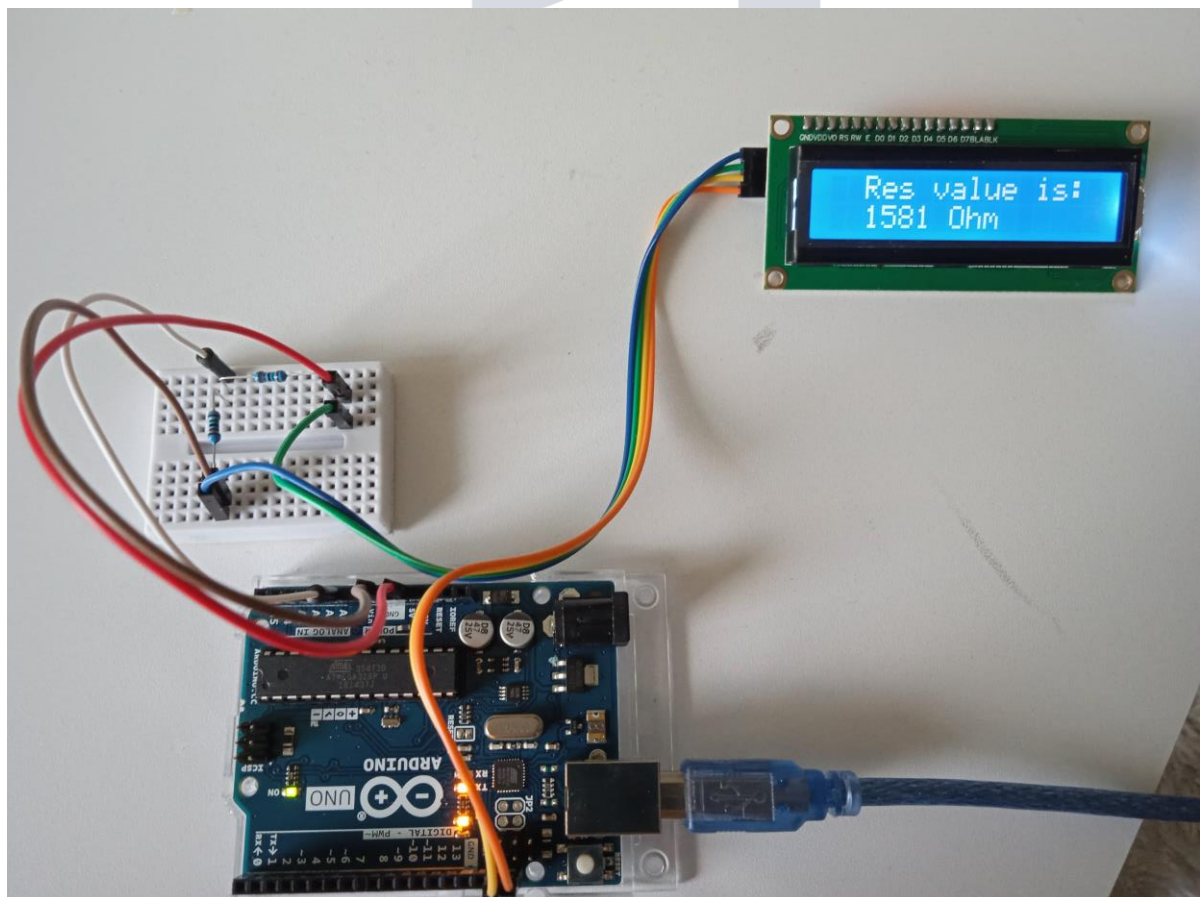
Fig.2. Ohmmeter with Arduino - possible layout

Fig.3. Ohmmeter with Arduino – real measurement