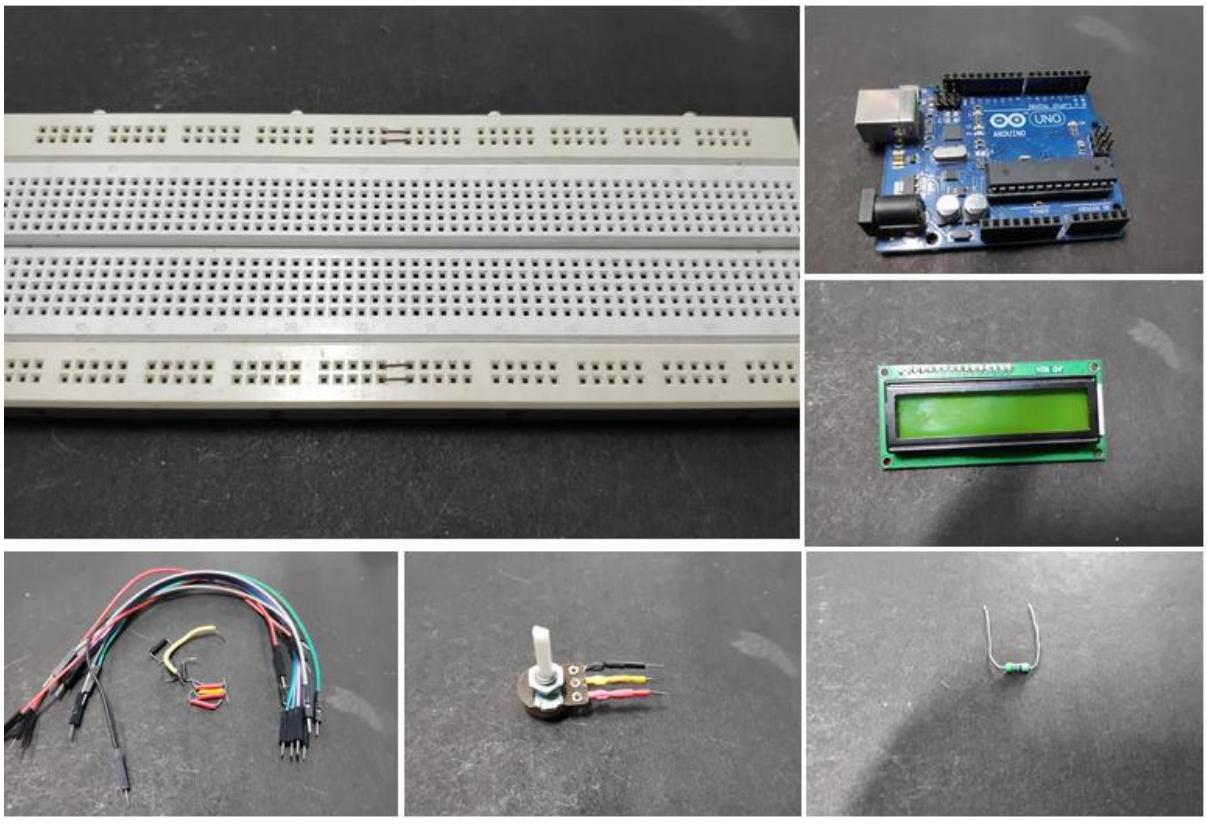
How to make Arduino-based Digital Ohmmeter

Introduction: How to Make an Arduino Ohm Mete

We find it difficult to read color codes on resistors to find its resistance. In order to overcome the difficulty of finding the resistance value, we are going to build a simple Ohm Meter using Arduino. The basic principle behind this project is a Voltage Divider Network. The value of the unknown resistance is displayed on **16*2 LCD display**.

Step 1: Components Required: -

1. Breadboard
2. Arduino UNO
3. 16x2 LCD display
4. Jumper wires
5. 10k potentiometer
6. 470ohm resistor



Step 2: Circuit and Connections: -

- LCD PIN 1----------GND
- LCD PIN 2----------VCC
- LCD PIN 3----------Middle pin of the pot
- LCD PIN 4----------D12 of arduino
- LCD PIN 5----------GND
- LCD PIN 6----------D11 of arduino
- LCD PIN 7----------NC
- LCD PIN 8----------NC
- LCD PIN 9----------NC
- LCD PIN 10----------NC
- LCD PIN 11----------D5 of arduino
- LCD PIN 12----------D4 of arduino
- LCD PIN 13----------D3 of arduino
- LCD PIN 14----------D2 of arduino
- LCD PIN 15----------VCC
- LCD PIN 16----------GND

Step 3: Calculating Resistance Using Arduino Ohm Meter: -

The working of this Resistance Meter is very simple and can be explained using a simple voltage divider network shown below.

From the voltage divider network of resistors R1 and R2,

Vout = Vin * R2 / (R1 + R2)

From the above equation, we can reduce the value of R2 as

R2 = Vout * R1 / (Vin – Vout)

Where,

R1 = known resistance

R2 = Unknown resistance

Vin = voltage produced at the 5V pin of Arduino

Vout = voltage at R2 with respect to ground.

Note: the value of known resistance (R1) chosen is 470Ω, but the users should replace it with the resistance value of resistor they have chosen.

Step 4: The Code:

```
#include <LiquidCrystal.h>
//LiquidCrystal(rs, sc, d4, d5, d6, d7)
LiquidCrystal lcd(12, 11, 5, 4, 3, 2);
const int analogPin = 0;
int analogval = 0;
int vin = 5;
float buff = 0;
float vout = 0;
float R1 = 0;
float R2 = 470;
void setup() {
 lcd.begin(16, 2);
}
void loop() {
 analogval = analogRead(analogPin);
 if (analogval) {
   buff = analogval * vin;
   vout = (buff) / 1024.0;
   if (vout > 0.9) {
     buff = (vin / vout) - 1;
     R1 = R2 * buff;
     lcd.setCursor(0, 0);
     lcd.print("  -Resistance-");
```

```
    lcd.setCursor(0, 1);
    if ((R1) > 999) {
      lcd.print("    ");
      lcd.print(R1 / 1000);
      lcd.print("K ohm");
    }
    else {
      lcd.print("     ");
      lcd.print(round(R1));
      lcd.print(" ohm");
    }
    delay(1000);
    lcd.clear();
  }
  else {
    lcd.setCursor(0, 0);
    lcd.print(" ! Put Resistor");
    lcd.setCursor(0, 1);
  }
 }
}
```

Step 5: Conclusion:

This circuit with the R1 being 470 ohm will work fine between 100Ohm to 2k ohm of resistances. You can change the value of the known resistance for higher values of unknown resistances

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