

```
//Code Written by Phantom Electronics
```

```
#include <LiquidCrystal.h>//LCD library
```

```
LiquidCrystal lcd(2, 3, 4, 5, 6, 7); //This part defines the pins of the LDC 16x2 which will be connected on the Arduion board
```

```
//Vin voltage from the arduino board is 5V
```

```
//Ohm meter variables
```

```
int Vin = 5;//Voltage at 5V pin of arduino
```

```
float Vout = 0;//volage at A0 pin of arduino
```

```
float R1 = 3300;//Value of the known resistor located at the voltage divider
```

```
float R2 = 0;//Value of the unknown resistor. This is where you measure your unknown resistor, which its value will be displayed on the 16x2 LCD
```

```
int a2d_data = 0;//Analog to digital. Analog pins can only read values from 0 - 1023 and not voltage
```

```
float buffer = 0;
```

```
//Voltmeter variables
```

```
float input_volt = 0.0;
```

```
float temp2 = 0.0;
```

```
float r1V = 10000;//R1 value located on the volatge divider circuit
```

```
float r2V = 100000;//R2 value located on the voltage divider circuit
```

```
//Counter to change positions of pages
```

```
int page_counter=1 ; //To move beetwen pages by pressing up button or down button
```

```

//-----Pins-----//

int up = 8;      //Up button connected to pin 8 of arduino

int down = 10;   //Down button connected to pin 10 of arduino

//Storage debounce function (Custom made function which is not part of the void setup function or
void loop function)

boolean current_up = LOW;

boolean last_up=LOW;

boolean last_down = LOW;

boolean current_down = LOW;

void setup() {

  Serial.begin(9600);//Open serial communication of the arduino uno board, 9600 baud rate per
second

  lcd.begin(16,2);//Initializing 16x2 LCD

}

//Custom made function to make programming easier

boolean debounce(boolean last, int pin)

{

boolean current = digitalRead(pin);

if (last != current)

{

delay(5);

current = digitalRead(pin);

}

}

```

```
return current;
}
```

```
void loop() {
```

```
//In this part of coding analog value which ranges from 0-1023 is converted into voltage.
```

```
//We use voltage divider equation in order to calculate R2 which is our unknown resistor
```

```
a2d_data = analogRead(A0);
```

```
buffer = a2d_data*Vin;
```

```
Vout = (buffer)/1024.0;
```

```
buffer = Vout/(Vin-Vout);
```

```
R2 = R1*buffer;
```

```
int analogvalue2 = analogRead(A1);
```

```
//Formula used to convert ACD to volage
```

```
temp2 = (analogvalue2*5.0)/1024.0;
```

```
input_volt = temp2/(r2V/(r1V+r2V));
```

```
current_up = debounce(last_up, up);    //Debounce for Up button
```

```
current_down = debounce(last_down, down); //Debounce for Down button
```

```
//Page counter function to move pages
```

```
//Page Up
```

```
//Obviously you can have more than 3 pages on the LCD but that highly depends on the arduino memory because you can't have 1 million pages on the LCD. That is way over the limit.
```

```
if (last_up== LOW && current_up == HIGH){ //When up button is pressed
```

```
    lcd.clear();          //When page is changed, LCD clear to display new page
```

```

if(page_counter <3){          //Page counter never goes higher than 3 pages

    page_counter= page_counter +1; //Page up when the button up is pressed with the increment
of 1

}

else{//else function is here to unsure, when the user is on page 3 of the LCD and he/she presses
the up button, the LCD will remain on page 3

    page_counter= 3;

}
}

```

```

last_up = current_up;//Last button state is equals to current button state

```

```

//Page Down

```

```

if (last_down== LOW && current_down == HIGH){ //When down button is pressed

    lcd.clear();          //When page is changed, lcd clear to print new page

    if(page_counter >1){          //Page counter never lower than 1 (total of pages)

        page_counter= page_counter -1; //Page down when the down button is pressed with the
decrements of 1

    }

    else{//else function is here to unsure, when the user is on page 1 of the LCD and he/she presses
the down button, the LCD will remain on page 1

        page_counter= 1;

    }

}
}

```

```

last_down = current_down;

```

```
//Switch function to write and show what you want
```

```
switch (page_counter) {
```

```
    case 1:{ //Designing page 1 of the LCD
```

```
        lcd.clear();
```

```
        lcd.setCursor(4,0);
```

```
        lcd.print("Ohm Meter");
```

```
        lcd.setCursor(0,1);
```

```
        lcd.print("R(ohm) = ");
```

```
        if(R2<15000)
```

```
        {
```

```
            lcd.print(R2);
```

```
            delay(1000);
```

```
        }
```

```
        if(R2>20000)
```

```
        {
```

```
            lcd.print("NO RES");
```

```
            delay(1000);
```

```
        }
```

```
    }
```

```
    break;
```

```
    case 2: {
```

```
        lcd.print("DC DIGI VOLTMETER");
```

```
        if(input_volt<0.1)
```

```
{
```

```
    input_volt = 0.0;
```

```
}  
Serial.print("V = ");  
Serial.print(input_volt);  
lcd.setCursor(0,1);  
lcd.print("Voltage= ");  
lcd.print(input_volt);  
delay(300);  
}  
break;  
  
case 3: { //Designing page 3 of LCD  
lcd.setCursor(1,0);  
lcd.print("This is");  
lcd.setCursor(4,1);  
lcd.print("Page 3");  
}  
break;  
  
} //switch end  
  
} //loop end
```