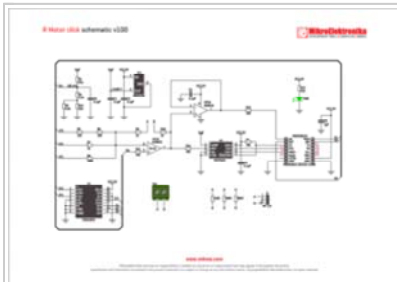# R Meter click

From MikroElektonika Documentation

R Meter click is a mikroBUS™ add-on board with circuitry for measuring the value of resistors. The board can be used to measure a wide range of resistors (from 0 to 1 Mega Ohm). It has three plates for SMD resistors (0603, 0805, 1206) and a header for thru hole resistors.

Features and usage notes

Schematic also available in PDF (http://cdn-docs.mikroe.com/images/3/39/R-meter-click-schematic.pdf)

The design of R Meter click is based on a non-inverting amplifier circuit, with the measured resistor placed in a feedback loop that influences the gain of the amplifier.

The analog output is fed through a 12-bit ADC with the final output going through the mikroBUS™ SPI interface.

Since the ADC has a limited min-max range (0-2043), R Meter click employs a multiplexer that can adjust the input signal to the amplifier and thus allow the same ADC to measure four different scopes of values (0-1k , 1k-100k, 100k-1M)
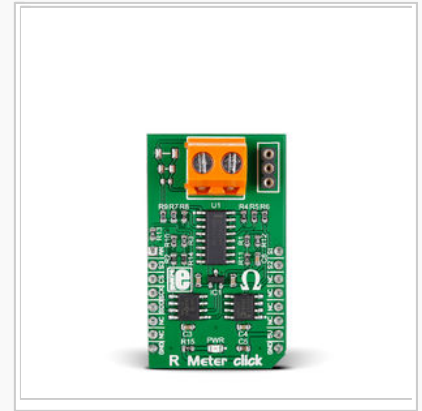
The supplied firmware (available on Libstock) automatically scans the ADC value and switches the multiplexer output based on the resistor in place. The multiplexer interfaces directly with the target board MCU through mikroBUS™ S1, S2, and S3 pins (in place of default mikroBUS™ PWM, INT and RST).

Onboard screw terminals are placed to allow the click to be used with multimeter probes.

R Meter click is a handy tool but it's not to be used as a precision instrument. The linearity of the OpAmp impacts the measurement.

The board is designed to use a 5V power supply.

R Meter click

R Meter click

IC/Module	74HC4053 (http://www.nxp.com/documents/data_sheet/74HC_HCT4053.pdf) REF2925 (http://www.ti.com/general/docs/lit/getliterature.tsp?genericPartNumber=ref2925&fileType=pdf) AD8615 (http://www.analog.com/media/en/technical-documentation/data-sheets/AD8615_8616_8618.pdf)
Interface	SPI, S1, S2, S3
Power supply	5V
Website	www.mikroe.com/click®-meter (http://www.mikroe.com/click/r-meter)

Programming

This example shows how to set up R Meter click, and read out the resistance in ohms (Ω) every 250 ms.

```c
1  #include <stdint.h>
2  #include "r_meter.h"
3
4  //sbits
5  sbit S1  at GPIOA_ODR.B0;
6  sbit S2  at GPIOD_ODR.B10;
7  sbit S3  at GPIOC_ODR.B2;
8  sbit R_METER_CS at GPIOD_ODR.B13;
9
10 //Prototypes
11 void system_setup( void );
12
13 //Main
14 void main()
15 {
16     //Local Declarations
17     char txt[20] = { 0 };
18     float ohms_var = 0;
19
20     //Setup
21     system_setup();
22
23     while (1)
24     {
25         ohms_var = r_meter_get_ohms();
26         if( ohms_var == 0 )
27             UART1_Write_Text( "Over Range\r\n" );
28         else
29         {
30             FloatToStr( ohms_var, txt );
31             UART1_Write_Text( "OHMS: " );
32             UART1_Write_Text( txt );
33             UART1_Write_Text( "\r\n" );
34         }
35         delay_ms(250);
```

```
36      }
37  }
38
39  void system_setup( void )
40  {
41
42      // GPIOs
43      GPIO_Digital_Output( &GPIOD_BASE, _GPIO_PINMASK_10 | _GPIO_PINMASK_13 );
44      GPIO_Digital_Output( &GPIOC_BASE, _GPIO_PINMASK_2 );
45      GPIO_Digital_Output( &GPIOA_BASE, _GPIO_PINMASK_0 );
46      GPIO_Digital_Input( &GPIOA_BASE, _GPIO_PINMASK_4 );
47
48      //UART
49      UART1_Init(9600);                       // Initialize UART module at 9600 bps
50      Delay_ms(100);                          // Wait for UART module to stabilize
51      UART1_Write_Text( "Starting\r\n" );
52
53      //ADC
54      //ADC1_Init();  //For direct analog values
55      Delay_ms(200);
56      UART1_Write_Text( "UART Initialized\r\n" );
57      SPI3_Init_Advanced( _SPI_FPCLK_DIV4,
58                          _SPI_MASTER | _SPI_8_BIT | _SPI_CLK_IDLE_LOW |
59                          _SPI_SECOND_CLK_EDGE_TRANSITION | _SPI_MSB_FIRST |
60                          _SPI_SS_DISABLE | _SPI_SSM_ENABLE |
61                          _SPI_SSI_1,
62                          &_GPIO_MODULE_SPI3_PC10_11_12 );
63
64      Delay_ms( 200 );
65      UART1_Write_Text( "SPI Initialized\r\n" );
66
67      r_meter_init();
68      UART1_Write_Text( "R Meter Initialized\r\n" );
69  }
```

Code examples that demonstrate the usage of R Meter click with MikroElektronika hardware, written for mikroC for ARM, AVR, dsPIC, FT90x, PIC and PIC32 are available on Libstock (http://libstock.mikroe.com/projects/view/1905/r-meter-click).

Resources

- R Meter click Libstock example (http://libstock.mikroe.com/projects/view/1905/r-meter-click)

- mikroBUS™ standard specifications (http://download.mikroe.com/documents/standards/mikrobus/mikrobus-standard-specification-v200.pdf)