Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832
Email & Skype: info@chipsmall.com Web: www.chipsmall.com
Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China

M-BUS RF click

From MikroElektonika Documentation

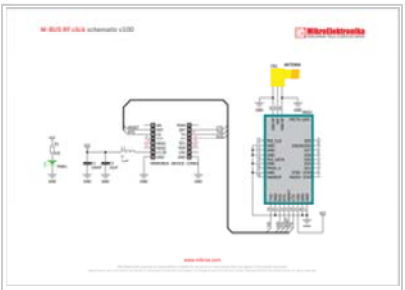
M-BUS RF click is a mikroBUS™ add-on board with a Telit ME70-169 RF wireless module. The radio operates at the unlicensed ISM frequency band between 169.400 and 169.475 MHz. The device is compliant with EN13757 part 4 2013.

M-BUS RF click

M-BUS RF click

IC/Module	ME 70-169 (http://www.lte.com.tr/uploads/pdf/410.pdf)
Interface	CTS, TX, RX, RESET, RTS
Power supply	3.3V
Website	www.mikroe.com/click/m-bus-rf (http://www.mikroe.com/click/m-bus-rf)

Features and usage notes



Schematic also available in PDF (http://cdn-docs.mikroe.com/images/9/93/M-BUS_RF_click_sch

The module has specified serial data rates of up to 115.2 Kbps and radio data rates of 2.4, 4.8 and 19.2 kbps. For security, the wireless signal has AES and NRZ encryption. Output power is from 125 mW to 631 mV (28dBm). According to the vendor's data sheet, the module has wireless range of up to 20 km (an external antenna is required).

Short for Meter-Bus, this protocol was designed for remote reading of gas or electricity meters in Europe, but it's also suitable for alarm systems, illumination installations, heating control and more.

Devices that communicate with wireless M-Bus modules are classified as either meters or 'other' devices. There is a total of six different M-Bus modes:

- Mode S 'Stationary
- Mode T 'frequent Transmit
- Mode R2 'frequent Receive
- Mode C 'Compact
- Mode N 'Narrowband VHF
- Mode F 'Frequent receive and transmit

The working of all six modes is explained in detail in the learn.mikroe.com article on M-Bus.

Telit also provides a M-Bus (http://www.telit.com/fileadmin/user_upload/products/Downloads/sr-rf/me70-169/Telit_Wireless_M-bus_2013_Part4_User_Guide_r13.pdf) guide which provides an Learn article explaining the MikroElektronika M-BUS library overview of the standard (http://learn.mikroe.com/wireless-m-bus/).

M-BUS RF click communicates with the target MCU through the mikroBUS™ UART interface, with additional functionality provided by RESET, RTS, and CTS pins. The board is designed to use a 3.3 power supply only.

Programming

This example sets the M-Bus up for transmitting some data with a length field activated.

```
#include <stdint.h>
#include <stdbool.h>
#include <stddef.h>
#include "mbus_hw.h"

sbit MBUS_RST    at GPIOC_ODR.B2;
sbit MBUS_RTS    at GPIOD_ODR.B13;
sbit MBUS_CTS    at GPIOD_ODR.B10;

bool my_receive_flag = false;     //Extern for knowing when packet is received from another M-Bus RF click

void system_setup( void );

void main()
{
    //Local Declarations
    transmit_frame_t *transmit_frame;

    // Malloc space for the Transmit Frame
    MM_Init();
    transmit_frame = Malloc( sizeof( transmit_frame_t ) );
    // Setup GPIOs, communication pins, interrupts, e.t.c.
    system_setup();


    //Initialize Conifguration Mode
    UART1_Write_Text( "Entering Config Mode\r\n" );
    mbus_at_init();

    // Set MBUS Mode
    UART1_Write_Text( "Setting MBUS Mode\r\n" );
    check_status( mbus_set_mbus_mode( ROLE_N1_METER ) );

    // Set RX / TX formats
    check_status( mbus_set_serial_tx_format( LENGTH_TX ) );   // TX Format must have Length.. so that sending / receiving works properly

```

```
    //Sending some data...
    UART1_Write_Text( "\r\n\r\n Sending Frame Of Data...\r\n\r\n" );
    // Set OP Mode
    check_status( mbus_op_init() );
    //Send Frame
    sprintf( transmit_frame->data_field, "My Name is Engineer and I am %d Years Old.", 22 );
    transmit_frame->length_field = strlen( transmit_frame->data_field );
    mbus_send_frame( transmit_frame, 1 );             /**< Using length field for TX format, so not length needed */

    while ( 1 );
}

void system_setup( void )
{
    GPIO_Digital_Output( &GPIOC_BASE, _GPIO_PINMASK_2  );       /**< Reset pin Output */

    UART1_Init_Advanced( 9600,  _UART_8_BIT_DATA,               /**< UART for Terminal */
                         _UART_NOPARITY,
                         _UART_ONE_STOPBIT,
                         &_GPIO_MODULE_USART1_PA9_10 );
    Delay_ms(300);

    UART3_Init_Advanced( 19200, _UART_8_BIT_DATA,               /**< UART for MBus */
                         _UART_NOPARITY,
                         _UART_ONE_STOPBIT,
                         &_GPIO_MODULE_USART3_PD89);
    Delay_ms(300);

    mbus_init();                                                /**< Initialize MBus HAL Layer */
    Delay_ms(300);

    RXNEIE_USART3_CR1_bit = 1;
    NVIC_IntEnable( IVT_INT_USART3 );
    EnableInterrupts();
}

void LO_RX_ISR() iv IVT_INT_USART3 ics ICS_AUTO
{
    mbus_rx_isr( USART3_DR );
}
```

Code examples that demonstrate the usage of TK 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/1902/m-bus-click).

Resources

- Vendor’s data sheet (http://www.telit.com/fileadmin/user_upload/products/Downloads/sr-rf/me70-169/Telit_ME70-169_Datasheet.pdf)

- Vendor’s User guide (http://www.telit.com/fileadmin/user_upload/products/Downloads/sr-rf/me70-169/Telit_ME70_169_RF_module_User_Guide_r4.pdf)

- M-BUS library hosted on Libstock (http://libstock.mikroe.com/projects/view/1902/m-bus-click)

- Learn article explaining the MikroElektronika M-BUS library (http://learn.mikroe.com/wireless-m-bus/)

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