MIKROELEKTRONIKA D.O.O, Batajnički drum 23, 11000 Belgrade, Serbia
VAT: SR105917343 Registration No. 20490918
Phone: + 381 11 78 57 600 Fax: + 381 11 63 09 644 E-mail: office@mikroe.com
www.mikroe.com

Bluetooth 2 Click

PID: MIKROE-4087

Bluetooth 2 Click features WT41u, a long range class 1, Bluetooth® 2.1 + EDR module. WT41u is a highly integrated and sophisticated Bluetooth® module, containing all the necessary elements from Bluetooth® radio and a fully implemented protocol stack. Therefore WT41u provides an ideal solution for developers who want to integrate Bluetooth® wireless technology into their design with limited knowledge of Bluetooth® and RF technologies. WT41u optimized for long range applications is available with an integrated chip antenna.

Bluetooth 2 click is supported by a mikroSDK compliant library, which includes functions that simplify software development. This Click board™ comes as a fully tested product, ready to be used on a system equipped with the mikroBUS™ socket.

The Bluetooth 2 Click is the new and updated version of the famous Bluetooth2 Click.

How does it work?

Bluetooth 2 Click uses the WT41u, a fully integrated Bluetooth 2.1 + EDR, class 1 module combining antenna, Bluetooth radio, and an on-board iWRAP Bluetooth Stack. The WT41u is a replacement for the WT41. The WT41u provides a superior 110 dB link budget and more than 1000-meter line-of-sight connectivity for Bluetooth applications where extreme radio performance or reliability is required. It also constitutes an ideal solution for developers that want to quickly integrate extremely high performing Bluetooth wireless technology into their design without investing several months in Bluetooth radio and stack development. The WT41u

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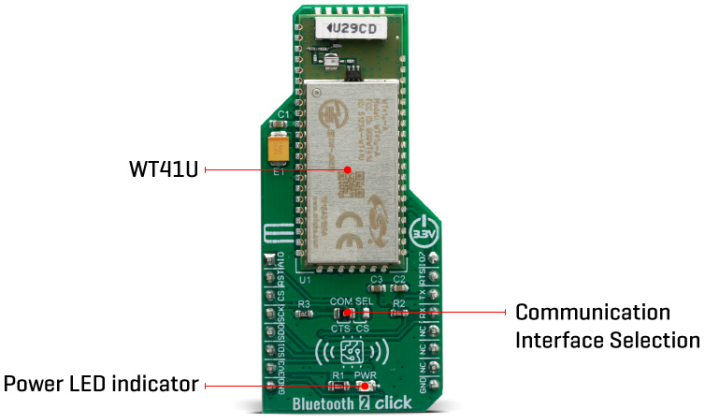
uses Bluegiga's iWRAP Bluetooth stack, which is an embedded Bluetooth stack implementing 13 different Bluetooth profiles and Apple iAP connectivity. By using WT41u combined with iWRAP Bluetooth stack and Bluegiga's excellent technical support, designers ensure quick time-to-market, and low development costs and risks.



Targeted applications are Handheld terminals, Industrial devices, Point-of-Sale systems, PCs, Personal Digital Assistants (PDAs), Computer Accessories, Access Points, Automotive Diagnostics Units.

Bluetooth 2 Click uses a standard UART interface for communicating with other serial devices. Implemented WT41u module UART interface provides a simple mechanism for communicating with other serial devices using the RS232 protocol. Four signals are used to implement the UART function. When WT41u is connected to another digital device, UART_RX and UART_TX transfer data between the two devices. The remaining two signals, UART_CTS and UART_RTS, can be used to implement RS232 hardware flow control where both are active low indicators. All UART connections are implemented using CMOS technology and have signaling levels of 0V and VDD. UART configuration parameters, such as data rate and packet format, are set using WT41u software.

Besides the commonly used UART RX, TX, RTS, and CTS, Bluetooth 2 Click also has Reset, PIO7, and AIO pins, which are routed to the RST, PWM and AN pins of the mikroBUS™ socket, respectively. The SPI port can be used for system debugging. It can also be used for programming the Flash memory and setting the PSKEY configurations. WT41u uses 16-bit data and 16-bit address serial peripheral interface, where transactions may occur when the internal processor is running or is stopped. SPI interface is connected using the MOSI, MISO, CS, and SCK pins.

The communication interface can be selected by moving the SMD jumper designated as COM SEL to an appropriate position (CTS or CS) for RS232 or SPI protocol.

This Click Board™ is designed to be operated only with a 3.3V logic level. A proper logic voltage level conversion should be performed before the Click board™ is used with MCUs with different logic levels.

Specifications

Type	BT/BLE

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Applications	Handheld terminals, Industrial devices, Point-of-Sale systems, PCs, Personal Digital Assistants (PDAs), Computer Accessories, Access Points, Automotive Diagnostics Units.
On-board modules	Bluetooth 2 Click uses the WT41u module, a fully integrated Bluetooth 2.1 + EDR class 1 module, from Silicon Labs.
Key Features	Exceptional radio performance (TX power: +20 dBm, RX sensitivity: -90 dBm). Superior radio performance 110dB link budget provides 1000+ meter line-of-sight connectivity.
Interface	GPIO,SPI,UART
Feature	No ClickID
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V
Category	Click Boards

Pinout diagram

This table shows how the pinout on Bluetooth 2 click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS™				Pin	Notes
Analog	**AIO**	1	AN	PWM	16	**IO7**	GPIO
Reset	**RST**	2	RST	INT	15	**RTS**	UART RTS
Chip Select	**CS**	3	CS	RX	14	**TX**	UART TX
SPI Clock	**SCK**	4	SCK	TX	13	**RX**	UART RX
SPI Data OUT	**SDO**	5	MISO	SCL	12	NC	
SPI Data IN	**SDI**	6	MOSI	SDA	11	NC	
Power Supply	**3.3V**	7	3.3V	5V	10	NC	
Ground	**GND**	8	GND	GND	9	**GND**	Ground

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
JP1	COM SEL	Left	Communication interface selection, left position RS232, right position SPI

Bluetooth 2 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-0.4	3.3	3.7	V
Operating Temperature Range	-40	-	85	°C

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Max transmit power	16	17	18	dBm
Transmit power variation over temperature range	-2	-	2	dB

Software Support

We provide a library for the Bluetooth 2 Click on our LibStock page, as well as a demo application (example), developed using MikroElektronika compilers. The demo can run on all the main MikroElektronika development boards.

Library Description

The library covers all the necessary functions to control Bluetooth 2 Click board. A library performs the communication with the device via UART interface with WT41U-A Bluetooth 2 module.

Key functions:

- void bluetooth2_write_byte (uint8_t input) - Write Single Byte.
- uint8_t bluetooth2_read_byte (void) - Read Single Byte.
- void bluetooth2_uart_write (uint8_t *tx_data) - UART write function.

Examples description

The application is composed of three sections :

- System Initialization - Initializes peripherals and pins.
- Application Initialization - Initializes UART serial interface, UART interrupt, and write log.
- Application Task - (code snippet) - This function allows user to enter a commands, module configurations, data which will be transmitted, and also to check all module and connection status by using the serial terminal. Note: XX:XX:XX:XX:XX:XX replace with your device's Bluetooth address. Special commands: Press 'Enter' when you want to send the entered command (data). Press 'Backspace' to delete the wrong entered character before you send the command. Press 'Up-Down' or 'Left-Right' to see and enter a 3 last sent commands. Press 'Esc' and then 'r' character to perform a hardware reset via RST pin. The second segment allows user to read and check response from the SIM868 module when the response is ready.

Additional Functions :

- _strcpy - Allows user to copy content of one string to second string, starting from the first place.
- _strcmp - Allows user to compare a content of two selected strings.
- prev_cmd - Checks the character (Up, Down, Left, Right, Esc) that was entered by the user side.
- check_prev_cmd - Determines which of 3 previous entered commands will be entered again.
- exe_cmd - Compares an entered command with the predefined commands and if any of these commands is matched, then executes a desired operation.
- add_cmd_line - Adds a new command line for entering new data/command/request.
- check_rx - Executes a received character parsering, entered from the user side.

The full application code, and ready to use projects can be found on our LibStock page.

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Other mikroE Libraries used in the example:

- UART
- Conversions

Additional notes and informations

Depending on the development board you are using, you may need USB UART click, USB UART 2 click or RS232 click to connect to your PC, for development systems with no UART to USB interface available on the board. The terminal available in all MikroElektronika compilers, or any other terminal application of your choice, can be used to read the message.

mikroSDK

This Click board™ is supported with mikroSDK - MikroElektronika Software Development Kit. To ensure proper operation of mikroSDK compliant Click board™ demo applications, mikroSDK should be downloaded from the LibStock and installed for the compiler you are using.

For more information about mikroSDK, visit the official page.

Resources

mikroBUS™

mikroBUS™

Click board™ Catalog

Click Boards™

Downloads

Bluetooth 2 click example on Libstock

WT41U datasheet

Bluetooth 2 click schematic

Bluetooth 2 click 2D and 3D files

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