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

BLE TX Click

PID: MIKROE-4668

BLE TX Click is a compact add-on board that contains a low-energy Bluetooth transmitter. This board features the AK1595, a Bluetooth 5.2 transmitter with incorporated proprietary algorithm software from AKM Semiconductor. The AK1595 transmitter simplifies wireless connectivity to a system with no need to develop complicated, proprietary microcontroller code. Bluetooth Low Energy compliant advertising transmission can be achieved by simply configuring the transmission power, data, and transmission start-trigger via the UART or I2C interface. This Click board™ is suitable for general data transmission applications such as thermometers, blood pressure monitors, weight scales, toys, pet supplies, IoT sensor nodes, and more.

BLE TX 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.

NOTE: AK1595 does not support extended advertising PDU, secondary advertising, LE2M, AoA, AoD options.
Enhance your connectivity options with our WiFi Active FPC Antenna, designed to integrate with this Click board™ seamlessly. Unlock the true potential of wireless connectivity in your projects using this high-performance antenna, currently available in our offer.

How does it work?

BLE TX Click as its foundation uses the AK1595, a low-power Bluetooth 5.2 transmitter from AKM Semiconductor. The AK1595 incorporates proprietary algorithm software and can achieve Bluetooth Low Energy transmitter (BLE TX) functionality without a particular development environment and programming required for conventional Bluetooth SoCs. The BLE function can

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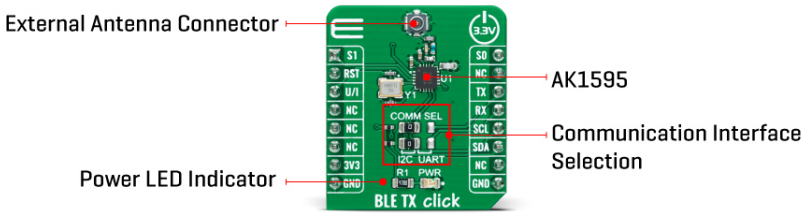
be realized by simply setting the data to be transmitted to the built-in register, making it ideal for applications that add the BLE function to existing microcomputers.



The AK1595 has high-speed responsiveness that starts advertising transmission within 3ms from the Power-Down state. This fact allows the power consumption between transmissions to be kept Standby at a low power consumption of 15nA typical by controlling BLE advertising transmission, which is intermittent transmission, to be in the whole Power-Down state. Also, it supports 1Mbps GFSK +/- modulation, where the modulation clock is generated from a 32MHz onboard clock generator.

BLE TX Click provides the possibility of using both UART and I2C interfaces. The AK1595 configures its selected interface via three GPIO pins labeled as U/I, S1, and S0 routed on the CS, AN, and PWM pins of the mikroBUS™ socket. In addition to the I/O pin on the mikroBUS™ socket, which activates a particular serial communication based on the set logical level, this Click board™ also has two jumpers intended for the hardware interface selection itself. The choice can be made by positioning SMD jumpers labeled as COMM SEL to an appropriate position. Note that all the jumpers' positions must be on the same side, or else the Click board™ may become unresponsive.

When the UART interface is selected, the UART controller block is initialized when the S1 pin detects low logic state for more than 1µs. Also, by setting a specific logic level on pin S0, the user can set the baud rate of the UART communication itself (set S0 to a low logic state for 9600bps or S0 to a high logic state for 115200bps). The I2C interface of AK1595 supports the Standard with a clock frequency up to 100kHz and the Fast Mode up to 400kHz. Also, this Click board™ has a Reset pin routed to the RST pin on the mikroBUS™ socket, which holds registers in their default states until the RST pin is set to a logic low state.

BLE TX Click possesses a miniature coaxial N.FL series antenna connector which in combination with IPEX-SMA cable allows connecting the appropriate antenna, such as WIFI Rubber Antenna 2.4GHz right angle SMA or WIFI Rubber Antenna for improved range and received signal strength.

This Click board™ can be operated only with a 3.3V logic voltage level. The board must perform appropriate logic voltage level conversion before use with MCUs with different logic levels. However, the Click board™ comes equipped with a library containing functions and an example code that can be used, as a reference, for further development.

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Specifications

Type	BT/BLE
Applications	Can be used for general data transmission applications such as thermometers, blood pressure monitors, weight scales, toys, pet supplies, IoT sensor nodes, and more
On-board modules	AK1595 - low power Bluetooth 5.2 transmitter with incorporated proprietary algorithm software from AKM Semiconductor
Key Features	Low power consumption, supports BLE 5.2 transmitter functionality, high-speed responsiveness, UART/I2C interface, selectable UART baud rate, and more
Interface	I2C,UART
Feature	No ClickID
Compatibility	mikroBUS™
Click board size	S (28.6 x 25.4 mm)
Input Voltage	3.3V

Pinout diagram

This table shows how the pinout on BLE TX Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS™				Pin	Notes
UART Initialization	**S1**	1	AN	PWM	16	**S0**	UART Baud Rate Selection
Reset	**RST**	2	RST	INT	15	NC	
Serial Communication Activation	**U/I**	3	CS	RX	14	**TX**	UART TX
	NC	4	SCK	TX	13	**RX**	UART RX
	NC	5	MISO	SCL	12	**SCL**	I2C Clock
	NC	6	MOSI	SDA	11	**SDA**	I2C Data
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-JP2	COMM SEL	Left	Communication Interface Selection I2C/UART: Left position I2C, Right position UART

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BLE TX Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Operating Frequency Range 1	-	2402	-	MHz
Operating Frequency Range 2	-	2426	-	MHz
Operating Frequency Range 3	-	2480	-	MHz
Operating Temperature Range	-40	+25	+85	°C

Software Support

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

Package can be downloaded/installed directly from NECTO Studio Package Manager(recommended way), downloaded from our LibStock™ or found on mikroE github account.

Library Description

This library contains API for BLE TX Click driver.

Key functions:

- bletx_cfg_setup - Config Object Initialization function.
- bletx_init - Initialization function.
- bletx_default_cfg - Click Default Configuration function.

Examples description

This library contains API for the BLE TX Click driver. This example processes data from BLE TX Click. BLE TX Click Bluetooth® Low Energy compliant advertising transmission can be achieved by simply configuring the transmission power, data, and transmission - start trigger.

The demo application is composed of two sections :

The full application code, and ready to use projects can be installed directly from NECTO Studio Package Manager(recommended way), downloaded from our LibStock™ or found on mikroE github account.

Other mikroE Libraries used in the example:

- MikroSDK.Board
- MikroSDK.Log
- Click.BleTx

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

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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™

mikroSDK

Click board™ Catalog

Click boards™

Downloads

BLE TX click 2D and 3D files

AK1595 datasheet

BLE TX click schematic

BLE TX click example on Libstock

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