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BLE 9 Click

PID: MIKROE-4487

BLE 9 Click is a compact add-on board that provides BT/BLE connectivity for any embedded application. This board features the BGM220P, an RF performance Bluetooth Low Energy solution for IoT developers from Silicon Labs. Based on the EFR32BG22 SoC, the BGM220P enables Bluetooth Low-Energy (BLE) connectivity while delivering RF range and performance, firmware updates, enhanced security features, and low power consumption. It is optimized for wireless performance supporting Bluetooth 5.2, direction-finding, and Bluetooth Mesh Low Power Node protocols to deliver industry-leading accuracy. This Click board™ is suitable for wireless networking in applications such as portable medical, connected home, asset tags and beacons, and more.

BLE 9 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.

How does it work?

BLE 9 Click is based on the BGM220P, an RF performance Bluetooth Low Energy solution that provides BT/BLE connectivity for any embedded application from Silicon Labs. It supports Bluetooth 5.2, direction-finding, and Bluetooth Mesh Low Power Node protocols to deliver industry-leading accuracy. It comes with worldwide regulatory certifications and a fully-upgradeable software stack as advanced development and debugging tool. The BGM220P module combines the EFR32BG22 wireless System on a Chip (SoC), required decoupling capacitors and inductors, 38.4 MHz and 32.768 kHz crystals, RF matching circuit, and an integrated ceramic onboard chip antenna.
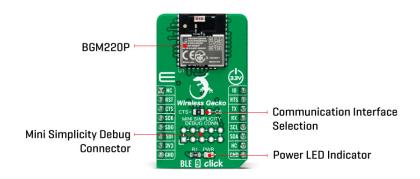
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The EFR32BG22 SoC, inside the BGM220P module, includes an Arm Cortex-M33 processing core, up to 32Kb of RAM, up to 512kB of flash memory, and a 2.4GHz radio transceiver, offering up to 8dB output power. This Click board™ offers enhanced performance, security, and reliability to support IoT products running on Bluetooth networks.

BLE 9 Click communicates with MCU using the UART interface as its default communication protocol with the option for the users to use other interfaces such as SPI and I2C if they want to configure the module and write the library by themselves using these protocols. It also can be used in a stand-alone SoC configuration without an external host processor.

In addition to these protocol pins, this Click board™ also has serial UART connections labeled as CTS and RTS, routed on the CS and INT pins of the mikroBUS™ socket, as well as Reset pin provided and routed at the RST pin of the mikroBUS™ socket. An additional GPIO pin, labeled as IO routed on the PWM pin of the mikroBUS™ socket, is left for configuration purposes as desired by the user.

An onboard jumper selects the function of the CS mikroBUS™ pin between the SPI or UART communication pin. Selection is performed by positioning the SMD jumper to an appropriate position, labeled as CTS or CS. At the bottom of the BLE 9 Click is an additional header, the Mini Simplicity Debug Connector, which offers full support of debugging and programming capabilities. With this header, the user can use a serial wire debug interface for programming and debugging, using SWCLK and SWDIO pins, with Virtual UART COM port and Virtual UART-SWD-based interface also available through the SWD interface (SWDIO, SWCLK, and SWO).

This Click board™ is designed to be operated only with a 3.3V logic voltage 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
Applications	Can be used for wireless networking in applications such as portable medical, connected home, asset tags and beacons, and more.
On-board modules	BGM220P, an RF performance Bluetooth Low

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	Energy solution that provides BT/BLE connectivity for any embedded application from Silicon Labs.
Key Features	Bluetooth 5.2 Low-Energy (BLE) solution, firmware updates, enhanced security features, low power consumption, direction-finding, Bluetooth Mesh Low Power Node protocols to deliver industry-leading accuracy, and more.
Interface	I2C,SPI,UART
Feature	No ClickID
Compatibility	mikroBUS™
Click board size	M (42.9 x 25.4 mm)
Input Voltage	3.3V

Pinout diagram

This table shows how the pinout on BLE 9 Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikro™ BUS			Pin	Notes
	NC	1	AN	PWM	16	**IO**	Configurable I/0 pin
Reset	**RST**	2	RST	INT	15	**RTS**	UART RTS
UART CTS / SPI Chip Select	**CTS**	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	**SCL**	I2C Clock
SPI Data IN	**SDI**	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

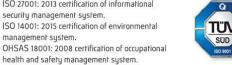| Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
JP1	COMM SEL	Left	Communication Interface Selection CTS/CS: Left position CTS, Right position CS
J1	MINI SIMPLICITY DEBUG CONN	Unpopulated	Mini Simplicity Debug Connector

BLE 9 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Frequency Range	2.4	-	2.4835	GHz
Sensitivity	-	-98.9	-	dBm
Data Rate	-	-	2	Mbps

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Operating Temperature Range	-40	+25	+105	°C

Software Support

We provide a library for the BLE 9 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 9 Click driver.

Key functions:

- void ble9_cfg_setup (ble9_cfg_t *cfg); - function initializes click configuration structure to initial values.
- BLE9_RETVAL ble9_init (ble9_t *ctx, ble9_cfg_t *cfg); - function initializes all necessary peripherals.

Examples description

This example reads and processes data from BLE 9 clicks.

The demo application is composed of two sections :

The full application code, and ready to use projects can be installed directly form compilers IDE(recommneded) or found on LibStock page or mikroE GitHub accaunt.

Other mikroE Libraries used in the example:

- MikroSDK.Board
- MikroSDK.Log
- Click.Ble9

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.

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