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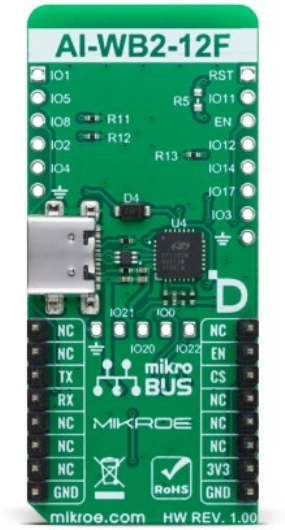
Ai-WB2-12F Click



PID: MIKROE-5983

Ai-WB2-12F Click is a compact add-on board for easy integration into the Internet of Things (IoT) and smart home applications. This board features the Ai-WB2-12F, a WiFi and BLE module from Ai-Thinker Technology, powered by the BL602 chip supporting WiFi 802.11b/g/n and BLE 5.0 protocols. With a low-power 32-bit RISC CPU, 276KB of RAM, and various peripheral interfaces, it is well-equipped for a wide range of development projects. The module has an inbuilt PCB antenna, extensive WiFi security protocols, and many operational modes, making it highly efficient for power-sensitive applications. It also supports secure boot, AES encryption, and a public key accelerator, which ensures safe operation. This Click board™ is perfect for developers who need WiFi and BLE for their projects, providing a simple and secure platform for creating IoT, wearable, and smart home devices.

Ai-WB2-12F Click is fully compatible with the mikroBUS™ socket and can be used on any host system supporting the mikroBUS™ standard. It comes with the mikroSDK open-source libraries, offering unparalleled flexibility for evaluation and customization. What sets this Click board™ apart is the groundbreaking ClickID feature, enabling your host system to seamlessly and automatically detect and identify this add-on board.

How does it work?

Ai-WB2-12F Click is based on the Ai-WB2-12F, a WiFi and BLE module from Ai-Thinker Technology. At its center lies the BL602 chip, which serves as the primary processor. This chip equips the module with support for WiFi 802.11b/g/n and BLE 5.0 protocols, featuring a low-power 32-bit RISC CPU, 276KB of RAM, and a comprehensive range of peripheral interfaces such as SDIO, SPI, UART, I2C, IR Remote, PWM, ADC, DAC, PIR, and GPIO, among others. Its design is made for extensive application in the Internet of Things (IoT), wearable technology,

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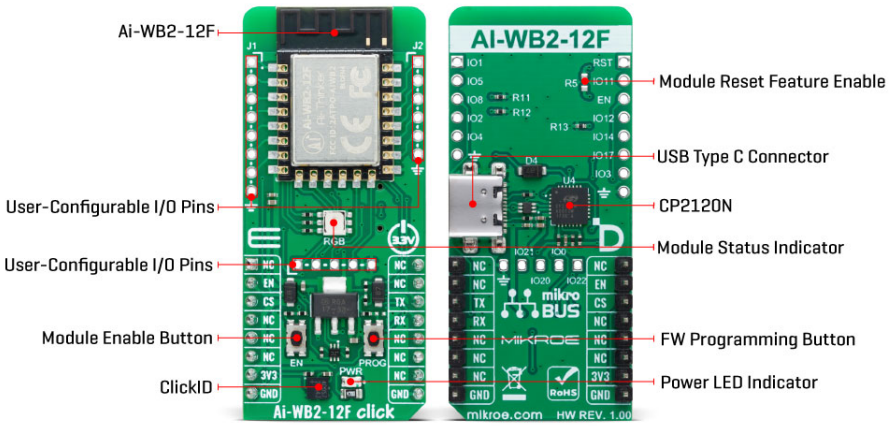
smart home solutions, and more.



In terms of additional specifications, the module boasts an inbuilt PCB antenna covering a frequency range from 2400 to 2483.5MHz, alongside extensive WiFi security protocols, including WPS, WEP, WPA, WPA2 Personal, WPA2 Enterprise, and WPA3. It also supports BLE 5.0 and Bluetooth Mesh, various operational modes such as Station + BLE and Station + SoftAP + BLE, secure boot with ECC-256 signature mirroring, an AES encryption engine for 128/192/256-bit keys, a true random number generator, and a public key accelerator for extensive cryptographic operations. The module facilitates a variety of sleep modes, boasting a deep sleep current of just 12µA, and allows for easy setup with universal AT commands.

Moving on to the board's connectivity features, this Click board™ employs a UART interface for communication with the host MCU, using standard UART RX and TX pins to exchange AT commands. By default, it communicates at a baud rate of 115200bps. The Click board™ is additionally equipped with a USB type C connector, enabling direct power supply and configuration via a PC.

The board also incorporates a reset feature through the R5 resistor (disabled by default with unpopulated R5 resistor) connected to the EN pin of the mikroBUS™ socket, an EN button for module enabling, and a PROG button dedicated to firmware programming. An RGB diode serves as a status indicator, signaling the active I/O pin—red for IO14, green for IO17, and blue for IO3. Depending on the user's requirements, these pins are adaptable for various uses such as SPI, PWM, or ADC. The user-configurable I/O pins are not available by default. If you need to use it, please contact Ai-Thinker.

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

Specifications

Type	WiFi+BLE
Applications	Ideal for developers who need WiFi and BLE for their projects, providing a simple and secure platform for creating IoT, wearable, and smart home devices

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On-board modules	Ai-WB2-12F - WiFi and BLE module from Ai-Thinker Technology
Key Features	Supporting WiFi 802.11b/g/n and BLE 5.0 protocols, low-power 32-bit RISC CPU, many peripheral interfaces, onboard PCB antenna, WiFi security protocols, BLE 5.0 and Bluetooth Mesh, encryption and security, and more
Interface	UART,USB
Feature	ClickID
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V

Pinout diagram

This table shows how the pinout on Ai-WB2-12F Click corresponds to the pinout on the mikroBUS™ socket (the latter shown in the two middle columns).

Notes	Pin	mikroBUS™				Pin	Notes
	NC	1	AN	PWM	16	NC	
Module Enable / Reset	**EN**	2	RST	INT	15	NC	
ID COMM	**CS**	3	CS	RX	14	**TX**	UART TX
	NC	4	SCK	TX	13	**RX**	UART RX
	NC	5	MISO	SCL	12	NC	
	NC	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
LD2	RGB	-	Module Status LED Indicator
T1	PROG	-	FW Programming Button
T2	EN	-	Module Enable Button

Ai-WB2-12F Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Frequency Range	2400	-	2483.5	MHz
WiFi Output Power	-	19	-	dBm
BLE Output Power	-	9	15	dBm
WiFi Sensitivity	-	-98	-	dBm
BLE Sensitivity	-	-96	-	dBm

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Software Support

We provide a library for the Ai-WB2-12F Click as well as a demo application (example), developed using MIKROE compilers. The demo can run on all the main MIKROE development boards.

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

Library Description

This library contains API for Ai-WB2-12F Click driver.

Key functions

- aiwb212f_send_cmd Ai-WB2-12F send command function.
- aiwb212f_send_cmd_with_par Ai-WB2-12F send command with parameter function.
- aiwb212f_send_cmd_check Ai-WB2-12F send command check function.

Example Description

This example demonstrates the use of Ai-WB2-12F Click board™ by processing the incoming data and displaying them on the USB UART.

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

Other Mikroe Libraries used in the example:

- MikroSDK.Board
- MikroSDK.Log
- Click.AiWB212F

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. UART terminal is available in all MIKROE compilers.

mikroSDK

This Click board™ is supported with mikroSDK - MIKROE 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

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mikroBUS™

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Click board™ Catalog

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Downloads

Ai-WB2-12F click example on Libstock

Ai-WB2-12F datasheet

Ai-WB2-12F click 2D and 3D files

Ai-WB2-12F click schematic

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