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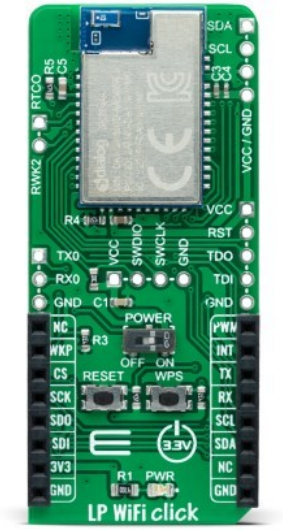
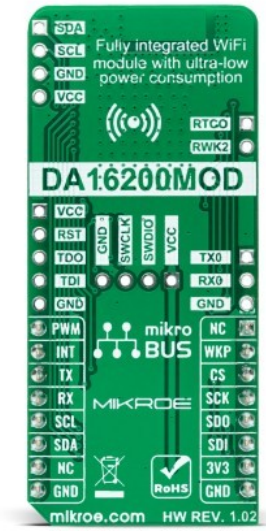
LP WiFi Click





PID: MIKROE-4836

LP WiFi Click is a compact add-on board that represents an ultra-low-power Wi-Fi solution. This board features the DA16200, a fully integrated Wi-Fi module with ultra-low power consumption, best RF performance, and a comfortable development environment from Renesas. In addition to the highly integrated ultra-low power Wi-Fi SoC, which is the basis of this module, it also includes a 40MHz crystal oscillator, 32.768kHz RTC clock, 4Mbyte flash memory, and chip antenna. Such low power operation can extend the battery life as long as a year or more, depending on the application. This Click board™ is suitable for highly integrated and cost-effective IoT applications such as security systems, door locks, pet and asset trackers, sprinkler systems, connected lighting, wearables, and other IoT devices.

LP WiFi 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?

LP WiFi Click as its foundation uses the DA16200MOD-AA, a highly integrated ultra low power Wi-Fi module with the best RF performance and a comfortable development environment from Renesas. It consists of the DA16200 SoC, 4MB flash memory, RF components including a crystal oscillator, RF lumped filter and an onboard 2.4GHz chip antenna. Such low power operation can extend the battery life for a year or more, depending on the application, even when the board is continuously connected to the Wi-Fi network. This module also features strong IoT security, including WPA3 and TLS for authentication and encryption at Wi-Fi and higher stack layers.

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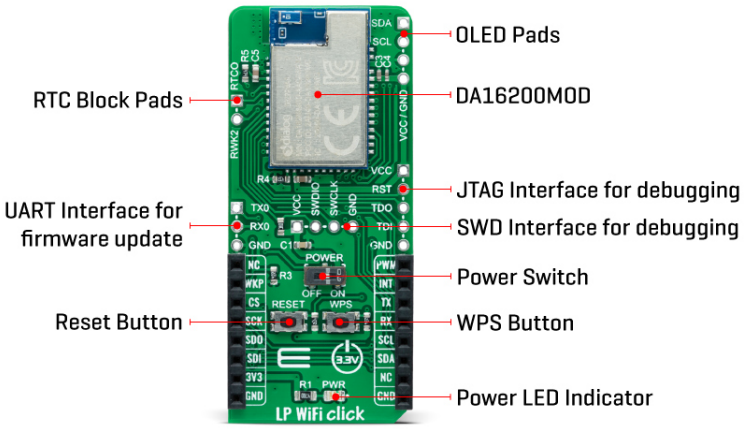

The DA16200MOD has an integrated RTC block (36-bit real-time counter), with a 32.768kHz clock source necessary for the free-running counter in the RTC block of the SoC, which provides power management and function control for low power operation. The RTC block is always powered ON when an onboard switch labeled as POWER is set to the appropriate ON position during normal operation, which optimizes power consumption and is used for power ON/OFF purposes. Also, the upper left header of the board, labeled as RTC Block Pads, is connected to the internal RTC block to connect and receive external event signals from an external device like a sensor.

LP WiFi Click communicates with MCU using the UART interface as its default communication protocol. Users can use other interfaces such as SPI and I2C to improve and communicate with peripherals. It should be noted that the DA16200 module comes with firmware that only supports UART communication with the host microcontroller, and I2C with peripherals such as sensors (SPI interface is not supported by default and can be enabled by firmware update).

Additional options that this board has are certain buttons and headers. The onboard pushbuttons are labeled as RESET, and WPS represents a Factory reset button and WiFi Protected Setup (WPS) button. As for the headers, the first one marked with TX and RX signals is suitable for debugging purposes using the UART interface, while the second lets you add a small but bright and crisp OLED display to your design by connecting it on the upper-right header with I2C signals suitable for controlling the OLED.

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.

Dialog SDK and support

The LP WiFi Click is coming already programmed with the default AT command firmware. Developers interested in creating and loading custom firmware on the DA16200 can do so by using the UART_0 interface (J3 header) available on the left side for module programming. For debugging your custom firmware you can use either JTAG (J1 header) or the SWD (J2 header) debugging interfaces.

The DA16200 is a highly integrated ultra-low power Wi-Fi system on chip (SoC) that allows users to develop the Wi-Fi solution and store application on a single chip, that way creating a

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standalone device without any additional microcontroller needed.

To get started with development first you should learn how to setup development environment for the DA16200 SDK, you can do that by reading DA16200 FreeRTOS SDK Startup Guide. After that, you are ready to start development / customization relying on the document describing the SDK API with the peripheral device drivers and interfaces, called FreeRTOS SDK Programmer Guide.

For all additional questions and support for firmware customization as well as application development, users can contact the official Technical Support of Renesas Semiconductor.

Specifications

Type	WiFi
Applications	Can be used for highly integrated and cost-effective IoT applications such as security systems, door locks, pet and asset trackers, sprinkler systems, connected lighting, wearables, and other IoT devices
On-board modules	DA16200MOD-AAC4WA32 - highly integrated ultra low power Wi-Fi module from Renesas
Key Features	Ultra low power consumption, best RF performance, full offload, integrated chip antenna, various interfaces, WiFi alliance certifications, advanced security, battery life extension, and more
Interface	GPIO,I2C,SPI,UART
Feature	No 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 LP WiFi 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	**PWM**	PWM Signal
Wake-Up	**WKP**	2	RST	INT	15	**INT**	Interrupt
SPI 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	**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

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Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
SW1	POWER	Left	Power Switch
J1	-	Unpopulated	JTAG Interface for debugging
J2	-	Unpopulated	SWD Interface for debugging
J3	-	Unpopulated	UART Interface for firmware update
J4	-	Unpopulated	RTC Block Header
J5	-	Unpopulated	OLED Header
T1	WPS	-	WiFi Protected Setup (WPS) Button
T2	RESET	-	Factory Reset Button

LP WiFi Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	-	3.3	-	V
Operating Frequency Range	-	2.4	-	GHz
RF Performance: TX Power	-	>+20	-	dBm
RF Performance: RX Sensitivity	-	>-100	-	dBm
Current Consumption in Active State (TX)	-	200 - 280	-	mA
Current Consumption in Active State (RX)	-	28.1 - 37.4	-	mA
Current Consumption in Low Power State	-	0.2	-	uA
Operating Temperature Range	-40	+25	+85	°C

Software Support

We provide a library for the LP WiFi 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 LP WiFi Click driver.

Key functions:

- lpwifi_cfg_setup - Config Object Initialization function.
- lpwifi_init - Initialization function.
- lpwifi_default_cfg - Click Default Configuration function.

Example description

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This example reads and processes data from LP WiFi clicks.

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.LPWiFi

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™

mikroSDK

Click board™ Catalog

Click boards™

Downloads

LP WiFi click example on Libstock

LP WiFi click 2D and 3D files

DA16200MOD datasheet

LP WiFi click schematic