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IoT Expresslink 2 Click

PID: MIKROE-5927

IoT ExpressLink 2 Click is a compact add-on board that allows users to connect to IoT ExpressLink services easily and securely interact with cloud applications and other services. This board features the SARA-R510AWS, an LTE-M AWS IoT EsxpressLink module from u-blox. It supports a comprehensive set of 3GPP Rel. 14 features that are relevant for IoT applications, like improvements to power consumption, coverage, data rate, mobility, and positioning. They are 5G-ready, meaning customers will be able to (software) upgrade their deployed devices once 5G LTE has been fully rolled out by mobile operators, greatly improving end-product scalability and lifetime. This Click board™ makes the perfect solution for the development of smart homes, industrial automation, health care, consumer electronics, and many more.

IoT ExpressLink 2 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?

IoT ExpressLink 2 Click is based on the SARA-R510AWS, an LTE-M AWS IoT EsxpressLink module from u-blox. The embedded AWS IoT ExpressLink certified software provides a new tailored AT command set that paves the way to AWS cloud access straight out of the box, significantly accelerating time-to-market. It features direct AWS IoT cloud access secured with a hardware-based root of trust, secure boot, uFOTA, FOAT, host OTA, ultra-low sleep, and more. The module provides access to an AWS service without requiring the user to integrate any additional API on the host MCU. Every single step is handled inside the module.

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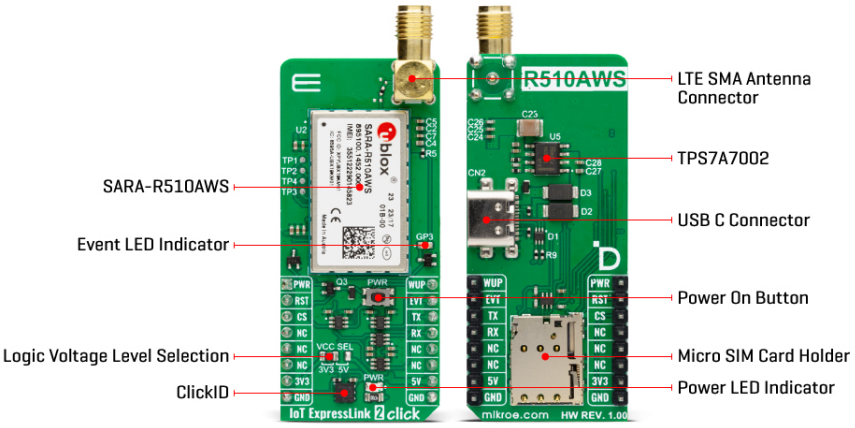

The module features TCP/IP, MQTT, and TLS/DTLS protocols. Some u-blox-supported compatible services are CellLocate and Zero Touch Provisioning for AWS IoT ExpressLink. By using Cat M1 half-duplex, it can achieve 375kbit/s DL and 1200 kbit/s UL. The module possesses the SMA antenna connector, which can be used to connect the appropriate antenna that MIKROE offers for improved range and received signal strength. The Micro SIM card holder on the back of the Click board™ is used to install a micro-SIM card. This device cannot be used without a valid SIM card, which allows connection to the cellular network. Both 1.8V and 3V (U)SIM card types are supported.

Onboard, a PWR key allows you to power on the device. There are four test pads for testing purposes. One is the Power On, while the rest are reset, TXD, and RXD of the Sara module. There is a yellow LED that represents the asynchronous event flag. The module supports a high-speed USB 2.0 compliant interface available over the USB C connector. The USB interface supports a maximum of 480Mbit/s of data rate. The module itself acts as a USB device and can be connected to any USB host. The USB interface is available for diagnostic purposes only. The module can be powered over the USB C connector or the 5V of the mikroBUS™ socket. It uses the TPS7A7002 for voltage regulation, a very low input and dropout 3A regulator from Texas Instruments.

IoT ExpressLink 2 Click uses a standard 2-Wire USRT interface to communicate with the host MCU, with a fixed 115200kbps baud rate. Besides the onboard PWR key, you can power the device over the PWR pin. The WUP pin is configured as a low-power sleep state wakeup pin. The RST is for resetting the device. Also, besides the mentioned yellow LED, the event flags can be monitored over the EVT pin.

This Click board™ can operate with either 3.3V or 5V logic voltage levels selected via the VCC SEL jumper. This way, both 3.3V and 5V capable MCUs can use the communication lines properly. Also, this Click board™ comes equipped with a library containing easy-to-use functions and an example code that can be used as a reference for further development.

Specifications

Type	Cloud Routers,LTE IoT
Applications	Can be used for the development of smart homes, industrial automation, health care, consumer electronics, and many more

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On-board modules	SARA-R510AWS - LTE-M AWS IoT EsxpressLink module from u-blox
Key Features	Direct AWS IoT cloud access secured with hardware-based root of trust, s upports a comprehensive set of 3GPP Rel. 14 features that are relevant for IoT applications, 5G ready upgradable over the software, micro-SIM card, SMA antenna, and more
Interface	UART,USB
Feature	ClickID
Compatibility	mikroBUS™
Click board size	L (57.15 x 25.4 mm)
Input Voltage	3.3V or 5V

Pinout diagram

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

Notes	Pin	mikroBUS™				Pin	Notes
Module Power-ON	**PWR**	1	AN	PWM	16	**WUP**	Module Wake-Up
Reset	**RST**	2	RST	INT	15	**EVT**	Event Interrupt
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	**5V**	Power Supply
Ground	**GND**	8	GND	GND	9	**GND**	Ground

Onboard settings and indicators

Label	Name	Default	Description
LD1	PWR	-	Power LED Indicator
LD2	GP3	-	Event LED Indicator
JP1	ID COMM	Left	Logic Level Voltage Selection 3V3/5V: Left position 3V3, Right position 5V
T1	PWR	-	Power-on Button

IoT Expresslink 2 Click electrical specifications

Description	Min	Typ	Max	Unit
Supply Voltage	3.3	-	5	V
Cellular Operating Bands	700	-	2100	MHz
Cellular Data Rate	-	-	1200	Kbit/s

Software Support

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We provide a library for the IoT ExpressLink 2 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), downloaded from our LibStock™ or found on Mikroe github account.

Library Description

This library contains API for IoT ExpressLink 2 Click driver.

Key functions

- iotexpresslink2_power_on This function performs the power on sequence.
- iotexpresslink2_send_cmd This function send command string by using UART serial interface.
- iotexpresslink2_generic_read This function reads a desired number of data bytes by using UART serial interface.

Example Description

This example demonstrates the use of IoT ExpressLink 2 Click board™ by connecting to the selected AWS account's data endpoint and showcasing the messaging topic model through sending and receiving messages to/from AWS IoT console.

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.IoTExpressLink2

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 MikroElektronika compilers.

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

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mikroBUS™

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Click board™ Catalog

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Downloads

IoT Expresslink 2 click example on Libstock

IoT Expresslink 2 click 2D and 3D files

IoT Expresslink 2 click schematic

TPS7A7002 datasheet

SN74LVC1T45 datasheet

SARA-R510AWS-01B datasheet

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