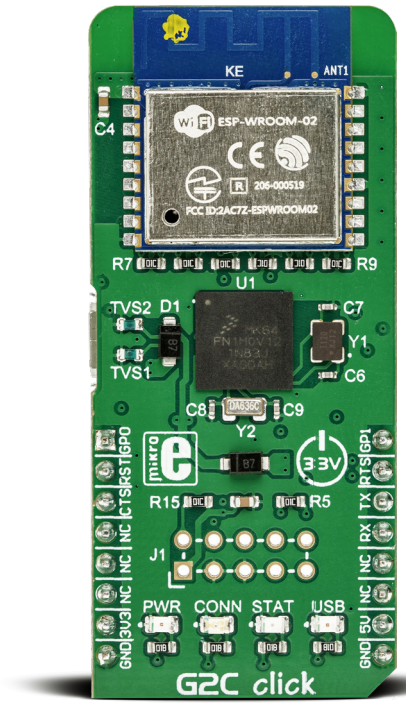
Go to Cloud (G2C) click

USER MANUAL

The WiFi IoT gateway Click board™ which connects your IoT devices with the Click Cloud service provided by Mikroelektronika. Simple and reliable.



To our valued customers

I want to express my thanks to you for being interested in our products and for having confidence in Mikroelektronika.

The primary aim of our company is to design and produce high quality electronic products and to constantly improve the performance thereof in order to better suit your needs.

Nebojsa Matic
CEO

Table of Contents

Introduction to Go to Cloud (G2C) click

Go to Cloud (G2C) click is composed of two main components:

- **MK64FN1M0VDC12**, a 32-bit ARM® Cortex® M4 microcontroller, from NXP
- **ESP WROOM-02**, a Wi-Fi connector module, from Espressif systems

The ESP-WROOM-02 is used as the connector module which can establish a link with the Click cloud service over the Internet. It is an all-in-one solution, with the complete Wi-Fi stack on-board, which allows a very simple operation. This feature, along with the proven reliability, small form-factor, and low count of components it requires, makes the ESP WROOM-02 module an ideal solution for using it on the Go to Cloud (G2C) click.

The ESP-WROOM-02 module uses the UART communication interface, and it can be controlled by using simple AT commands. However, the MK64FN1M0VDC12 MCU is added too, introducing an additional application layer, exposing only a set of commands that allow connection with the Click Cloud, reducing the possibility of errors and failures due to wrongly set connection parameters and simplifying HOST MCU application. The MCU is also used to drive status LEDs, which are used to indicate a successful connection to the Internet, a successful connection with the Click Cloud service, as well as some other types of indication.

Figure 1:
ESP-WROOM-02

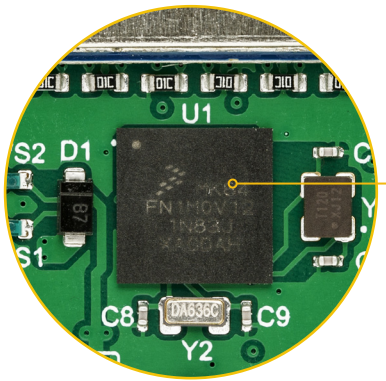


Figure 2:
MK64FN1
M0VDC12 MCU

Finally, there is a micro USB connector, which is used to update the firmware of the Go to Cloud (G2C) click. The firmware update is simple, error-proof, and straight-forward. More information about the update procedure can be found in this manual.

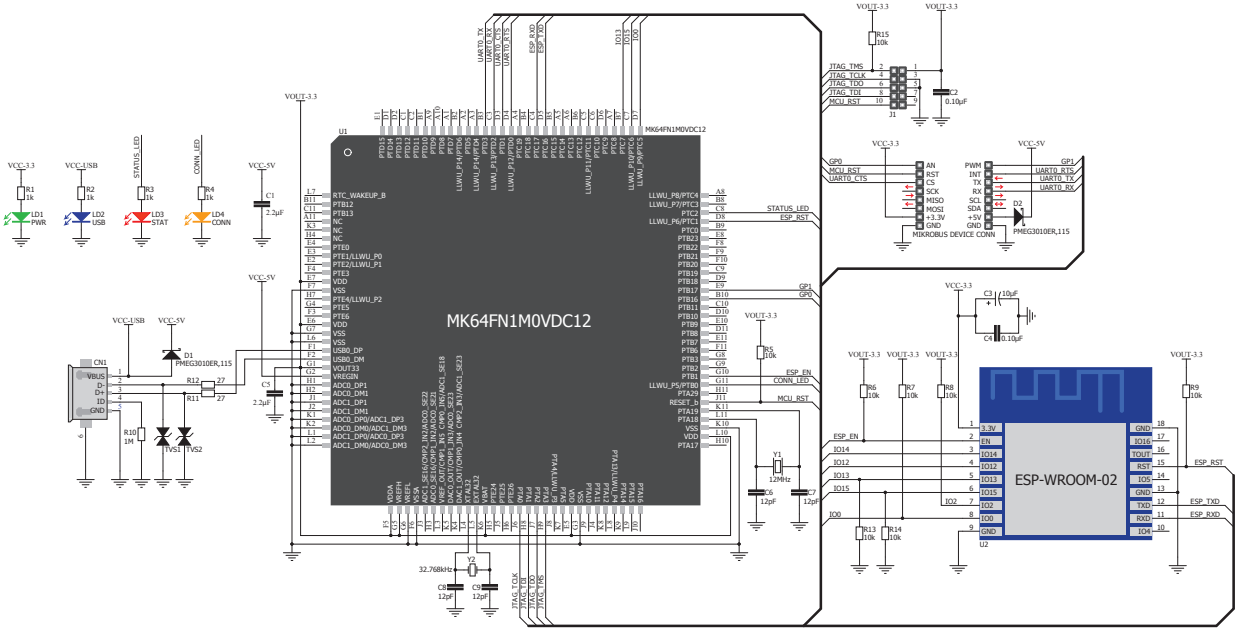


Figure 3: Main Schematic

An additional JTAG interface in the form of 2x5 pin header is used only during the production phase for the upload of the initial firmware and it should not be used by the user, as it may lead to malfunction of the Go to Cloud (G2C) click due to an internal firmware damage.

mikroBUS™ pins

Notes	Pin	mikroBUS				Pin	Notes
General Purpose #0	**GP0**	1	AN	PWM	16	**GP1**	General Purpose #1
Hardware Reset	**RST**	2	RST	INT	15	**RTS**	Request to Send
UART Clear to Send	**CTS**	3	CS	RX	14	**TX**	UART Transmit
	NC	4	SCK	TX	13	**RX**	UART Receive
	NC	5	MISO	SCL	12	NC	
	NC	6	MOSI	SDA	11	NC	
Power supply	**3V3**	7	3.3V	5V	10	**5V**	Power supply
Ground	**GND**	8	GND	GND	9	**GND**	Ground

Onboard indicators and LED indicators

Label	Name	Description
LD1	PWR	Power LED indicator
LD2	USB	USB connection indicator
LD3	STAT	Status and network indicator
LD4	CONN	Broker connection indicator
CN1	-	Micro USB connector

NOTE: *The Go to Cloud (G2C) click requires both 3.3V and 5V for a proper operation.*

Pins description:

- **RST - Hardware reset** - (INPUT) This pin is used to reset the MCU. This pin is internally pulled up to a HIGH logic level. Driving this pin to a LOW logic level for 50 ms, a reset function will be performed. After each reset cycle, the complete boot sequence of the Go to Cloud (G2C) click is repeated.

- **CTS - Clear to send** [1] - (INPUT) A LOW logic level on this pin means that HOST MCU is ready to receive data sent from Go to Cloud (G2C) click.
- **RTS - Request to send** [1] - (OUTPUT) A LOW logic level on this pin means that the Go to Cloud (G2C) click is ready to accept incoming data from the host MCU. There is also a secondary function of this pin: if set to a HIGH logic level during the boot-up sequence, the five-second bootloader timeout will be completely skipped, allowing for a faster start of the Go to Cloud (G2C) click. More information about the secondary function of this pin is provided in the Boot-up section of this manual.
- **GP0, GP1 - General purpose pins** [1] - (INPUT) A LOW logic level on this pin means that HOST MCU is ready to receive data sent from Go to Cloud (G2C) click.

[1] *The current version of the firmware (ver.F091) does not have these options implemented yet, but they are planned to be added in future updates.*

UART interface – configuration:

- **Baud rate:** 57600
- **Data bits:** 8
- **Parity:** NO
- **Stop bit:** 1

The complete control of the Go to Cloud (G2C) click is done over the UART interface, by using AT commands. The list of the available AT commands, along with the explanation and example for each of them can be found in the **AT Command Manual**.

The Go to Cloud (G2C) click firmware accepts AT commands, which can be sent over the UART interface pins of the mikroBUS™, either from a terminal application on a personal computer (with the addition of the USB-to-UART adapter) or from the host MCU. When transmitting the AT command string, a timing interval between consecutive characters should not exceed 5 seconds. The timing interval greater than 5 seconds is considered as the EOL for any AT command (end-of-line), and the received command will be parsed as such.

More information about all the available AT commands with the detailed explanation can be found in the **AT Command Manual**.

UART interface – configuration:

After the power-on, the Go to Cloud (G2C) click will start in the bootloader mode, which will be terminated after 5 seconds. During these 5 seconds, the MK64F MCU onboard the Go to Cloud (G2C) click will be visible to the USB HID Bootloader application, allowing its firmware to be updated. When the connection with the USB HID Bootloader application is established, it will take over the control of the Go to Cloud (G2C) click and will keep it in the bootloader

mode. If there is no response from the USB HID Bootloader application while the Go to Cloud (G2C) click is in the bootloader mode, the normal operation of the Go to Cloud (G2C) click will be resumed and the MK64F MCU will not be visible for the USB HID Bootloader application anymore.

After a connection with the USB Bootloader application is established, the STAT LED will be turned on and it will stay that way as long as the bootloader mode is active. Leaving the bootloader mode will be indicated by the CONN LED, which will blink once, while the STAT LED will be turned off.

The bootloader mode will be automatically initiated after each power-on event, leading to a five-second startup delay. To skip the bootloader mode completely and boot-up directly into the normal mode, the CTS pin can be set to a HIGH logic level after the restart, for at least 100ms. This prevents the five-second delay during the power on if the firmware update was not intended, shortening the boot-up time before the Go to Cloud (G2C) click is ready to be used.

During the boot-up sequence, the default configuration values will be restored from the internal non-volatile memory. More details about storing and restoring the default configuration parameters can be found in the **AT Command Manual.**

The end of the boot-up sequence will be indicated by a single blink of both the STAT and CONN LEDs, simultaneously.

NOTE: *After leaving the bootloader, a delay of at least 3 seconds has to be made, allowing the connector module to reboot properly.*

Firmware update

The Go to Cloud (G2C) click is shipped with the latest version of firmware. However, the firmware will be continuously improved in the future. Therefore, the Go to Cloud (G2C) click has a firmware update option, in a form of a micro USB connector (CN1) and an implementation of the HID bootloader within the firmware itself.

To properly update the firmware, please use the provided micro USB connector (CN1) with the HID bootloader application and a proper firmware file. The JTAG 2x5-pin header (J1) is not to be used for uploading the update since it can destroy the base firmware and render the G2C click inoperable. It is used only for the initial firmware update during the production. The Go to Cloud (G2C) click is shipped with this header unpopulated.

The firmware update can be done by using the USB HID Bootloader application. After a USB cable is connected to the micro USB connector on the Go to Cloud (G2C) click, the application will detect the onboard MK64F MCU, as displayed on the picture below:

Figure 4: USB HID Bootloader connected to the Go to Cloud (G2C) click

Note that there is a five seconds timeout interval during which the Go to Cloud (G2C) click operates in a firmware update mode as explained in the Boot-up sequence section of this manual. After this, the Go to Cloud (G2C) click is restarted and will continue running in a normal mode, completely skipping the bootloader, and will be undetectable for the HID bootloader application. If this happens, it is necessary to disconnect the USB cable and connect it again, initiating another five seconds interval.

After the MCU of the Go to Cloud (G2C) click is detected as on the picture above, an appropriate HEX file with a proper firmware version should be selected by clicking on the Browse for HEX button. This will open a file selection window, where you can browse for the updated firmware file with the .hex extension. Once selected, the programming process can be started by clicking the Begin uploading button. The programming process should take up to 60 seconds. If it takes longer, or the process is interrupted during the update, it should be repeated from the beginning.

DISCLAIMER

HIGH RISK ACTIVITIES

The products of MikroElektronika are not fault – tolerant nor designed, manufactured or intended for use or resale as on – line control equipment in hazardous environments requiring fail – safe performance, such as in the operation of nuclear facilities, aircraft navigation or communication systems, air traffic control, direct life support machines or weapons systems in which the failure of Software could lead directly to death, personal injury or severe physical or environmental damage ('High Risk Activities'). MikroElektronika and its suppliers specifically disclaim any expressed or implied warranty of fitness for High Risk Activities.

TRADEMARKS

If you want to learn more about our products, please visit our website at www.mikroe.com

If you are experiencing some problems with any of our products or just need additional information, please place your ticket at www.mikroe.com/support

If you have any questions, comments or business proposals, do not hesitate to contact us at office@mikroe.com

MIKROE

Designed by Mikroelektronika Ltd.