A compact starter kit with your favorite microcontroller and a socket for click™ add-on boards. New ideas are just a click away.
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
General Manager

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STM32 M4 clicker is an amazingly compact starter development kit which brings the innovative mikroBUS™ socket to your favorite microcontroller. It features STM32F415RG, a 32-bit ARM® Cortex®-M4 microcontroller, two indication LEDs, two general purpose buttons, a reset button, a USB Mini-B connector and a single mikroBUS™ socket. A JTAG connector and pads for interfacing with external electronics are provided as well. The mikroBUS™ connector consists of two 1x8 female headers with SPI, I²C, UART, RST, PWM, Analog and Interrupt lines as well as 3.3V, 5V and GND power lines. STM32 M4 clicker board can be powered over a USB cable.
Figure 1-2: STM32 M4 clicker schematic
2. Power supply

When the board is powered up the power indication LED will be automatically turned on. The USB connection can provide up to 500mA of current which is more than enough for the operation of all on-board and additional modules.

Figure 2-1: Connecting USB power supply through CN1 connector
3.3V VOLTAGE REGULATOR

Figure 2-2: Power supply schematic
3. STM32F415RG microcontroller

The STM32 M4 clicker development tool comes with the **STM32F415RG** microcontroller. This 32-bit high performance microcontroller is rich with on-chip peripherals and features 1024KB of Flash and 192KB of SRAM. It has integrated full speed USB 2.0 support.

**Key microcontroller features**

- Up to **168 MHz** operation
- 32-bit ARM® Cortex®-M4 architecture
- 1024KB of Flash memory
- 192KB SRAM
- 64 pin LQFP
- 3x 16 ch, 12-bit ADC
- USB 2.0, UART, RTC, SPI, I²C, etc.
4. Programming the microcontroller

The microcontroller can be programmed in two ways:

- **01** Using USB HID mikroBootloader,
- **02** Using external mikroProg™ for STM32 programmer.

Figure 4-1: STM32F415RG microcontroller
You can program the microcontroller with a bootloader which is preprogrammed by default. To transfer .hex file from a PC to MCU you need bootloader software (mikroBootloader USB HID) which can be downloaded from:

www.mikroe.com/downloads/get/2144/mikrobootloader_usb_hid_STM32F415RG.zip

After the mikroBootloader software is downloaded, unzip it to desired location and start it.

To start, connect the USB cable, or if already connected press the **Reset** button on your STM32 M4 clicker. Click the **Connect** button within 5s to enter the bootloader mode, otherwise existing microcontroller program will execute.
step 2 - Browsing for .HEX file

Click the **Browse for HEX** button and from a pop-up window (Figure 3.4) choose the .HEX file which will be uploaded to MCU memory.

Figure 4-3: Browse for HEX

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step 3 - Selecting .HEX file

01 Select .HEX file using open dialog window.

02 Click the **Open** button.

Figure 4-4: Selecting HEX
step 4 – Uploading .HEX file

To start .HEX file bootloading click the *Begin uploading* button.

Progress bar enables you to monitor .HEX file uploading.
step 5 - Finish upload

Figure 4-7: Restarting MCU

01 Click **OK** button after the uploading process is finished.

02 Press **Reset** button on STM32 M4 clicker board and wait for 5 seconds. Your program will run automatically.

Figure 4-8: mikroBootloader ready for next job
The microcontroller can be programmed with external **mikroProg™ for STM32 programmer** and **mikroProg Suite™ for ARM® software**. The external programmer is connected to the development system via 2x5 JTAG connector soldered on the CN2 connector pads, [Figure 4-9](#). **mikroProg™** is a fast USB 2.0 programmer with hardware debugger support. It supports STM32 M3 and M4 devices from STMicroelectronics. Outstanding performance, easy operation and elegant design are its key features.
On-board mikroProg™ programmer requires special programming software called mikroProg Suite™ for ARM®. This software is used for programming of all supported microcontroller families with ARM® Cortex™-M3 and Cortex™-M4 cores. The software has an intuitive interface and SingleClick™ programming technology. To begin, first locate the installation archive on the link below:

http://www.mikroe.com/downloads/get/1809/mikroprog_suite_for_arm.zip

After downloading, extract the package and double click the executable setup file, to start installation.

Quick guide

01 Click the Detect MCU button in order to recognize the device ID.

02 Click the Read button to read the entire microcontroller memory. You can click the Save button to save it to the target HEX file.

03 If you want to write the HEX file into the microcontroller, first make sure to load the target HEX file using the Load button. Then click the Write button to begin programming.

04 Click the Erase button to clear the microcontroller memory.
The microcontroller can also be programmed with the ST-LINK V2 programmer and mikroProg Suite™ for ARM® software, Figure 5-1. This programmer connects with mikromedia board via mikroProg to ST-LINK V2 adapter (Figure 4-11).

In order to adjust the ST-LINK™ V2 programmer to be connected to the development system, it is necessary to provide the appropriate adapter such as the mikroProg to ST-LINK V2 adapter. 2x5 male headers should be first soldered on the CN2 connector pads. Then you should plug the adapter into the ST-LINK V2 programmer (2x10 header), and plug an IDC10 flat cable in headers, Figure 4-12.

Figure 4-11: mikroProg™ to ST-LINK™ V2 adapter

Figure 4-12: Connecting ST-LINK™ V2 programmer
Before attaching the programming connector, you have to solder the provided 2x5 male header to the JTAG (CN2) pads.

Figure 4-13: mikroProg™ connection schematic
5. Buttons and LEDs

The board also contains a reset button and a pair of buttons and LEDs. Each of these additional peripherals are located in the bottom area of the board. Reset button is used to manually reset the microcontroller. Pressing the reset button will generate a low voltage level on microcontroller’s reset pin. LEDs can be used for visual indication of the logic state on two pins (PA1 and PA2). An active LED indicates that a logic high (1) is present on the pin. Pressing any of these buttons can change the logic state of the microcontroller pins (PC0 and PC1) from logic high (1) to logic low (0).
Figure 5-2: Other modules connection schematic
STM32 M4 clicker features RTC battery pads for powering microcontroller’s internal RTC module. Battery is used as an alternative source of power, so the RTC module can keep track of time while primary source of power is OFF or unavailable. In order to use this option it is necessary to connect (solder) external battery (type **CR2032**; voltage range from **1.65 to 3.6 V**) and unsolder jumper **J1**, **Figure 6-1**. Make sure that orientation of the battery is correct (plus on **VBAT** and minus on **GND** pad), otherwise it won’t work properly.
Figure 6-2: RTC battery schematic
Up to now, MikroElektronika has released more than 90 mikroBUS™ compatible click™ Boards. On the average, one click board is released per week. It is our intention to provide you with as many add-on boards as possible, so you will be able to expand your development board with additional functionality. Each board comes with a set of working example code. Please visit the click™ boards webpage for the complete list of currently available boards:

www.mikroe.com/click
8. Dimensions

Legend

- **mm**
- **mils**

Mounting hole size

Ø 2 mm
Ø 79 mils
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