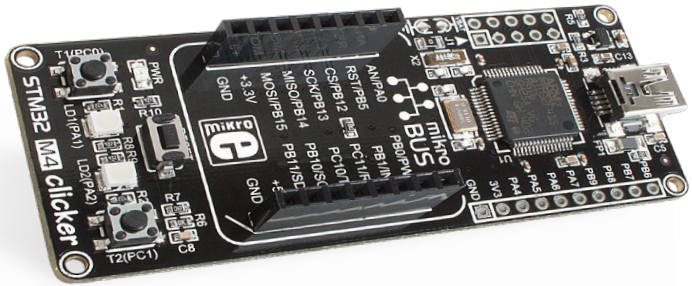


STM32

clicker

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

USB

mikro BUS

ARM cortex

MikroElektronika
DEVELOPMENT TOOLS | COMPILERS | BOOKS

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
General Manager

Table of contents

1. What is STM32 M4 clicker?

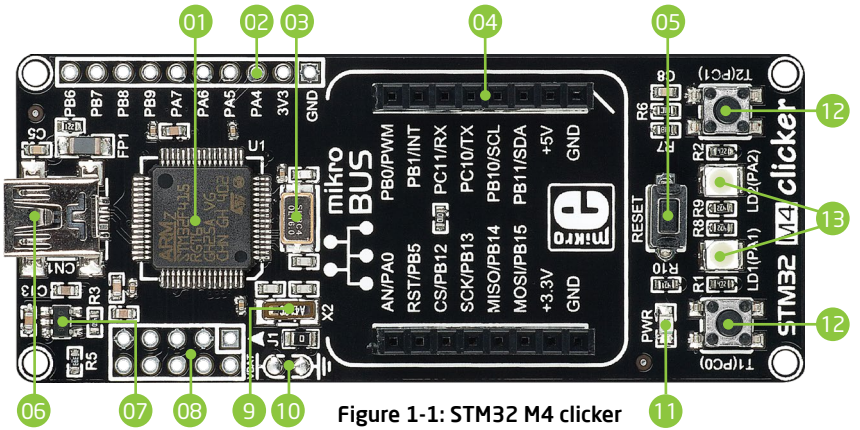


Figure 1-1: STM32 M4 clicker

01 64-pin STM32F415RG MCU
02 Connection pads
03 16 MHz crystal oscillator
04 mikroBUS™ socket
05 RESET button
06 USB Mini-B connector
07 3.3V Voltage regulator
08 JTAG Programmer connector
09 32.768 KHz crystal oscillator
10 RTC battery pads
11 Power indication LED
12 Additional buttons
13 Additional LEDs

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.

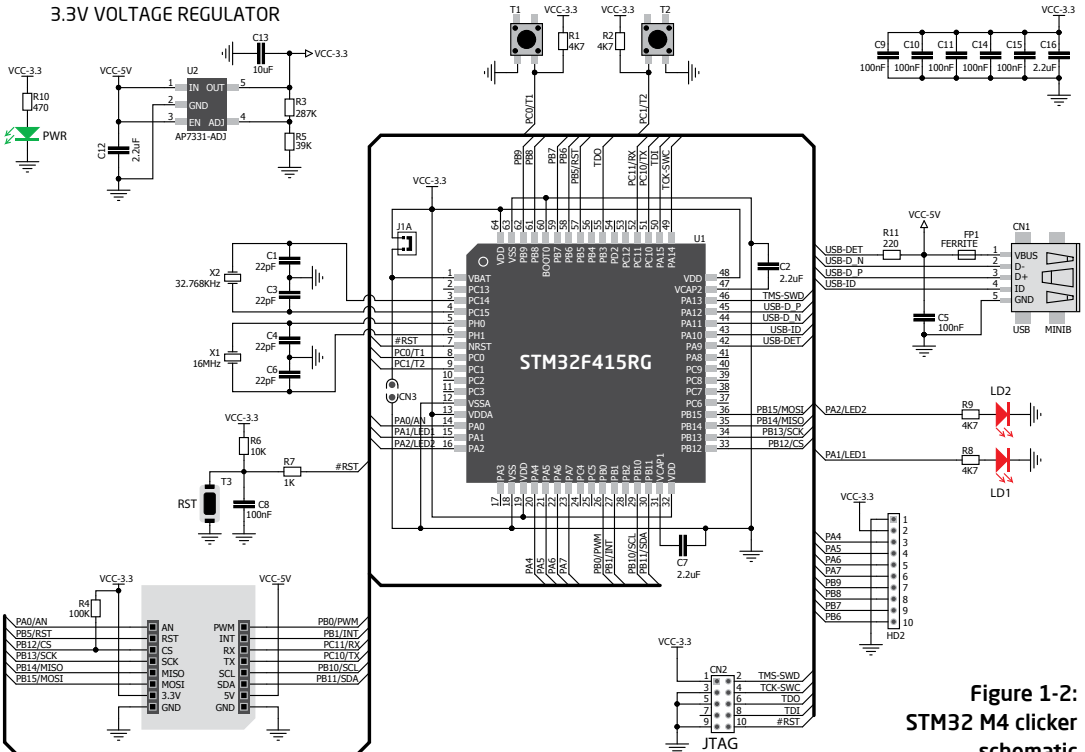


Figure 1-2: STM32 M4 clicker schematic

2. Power supply

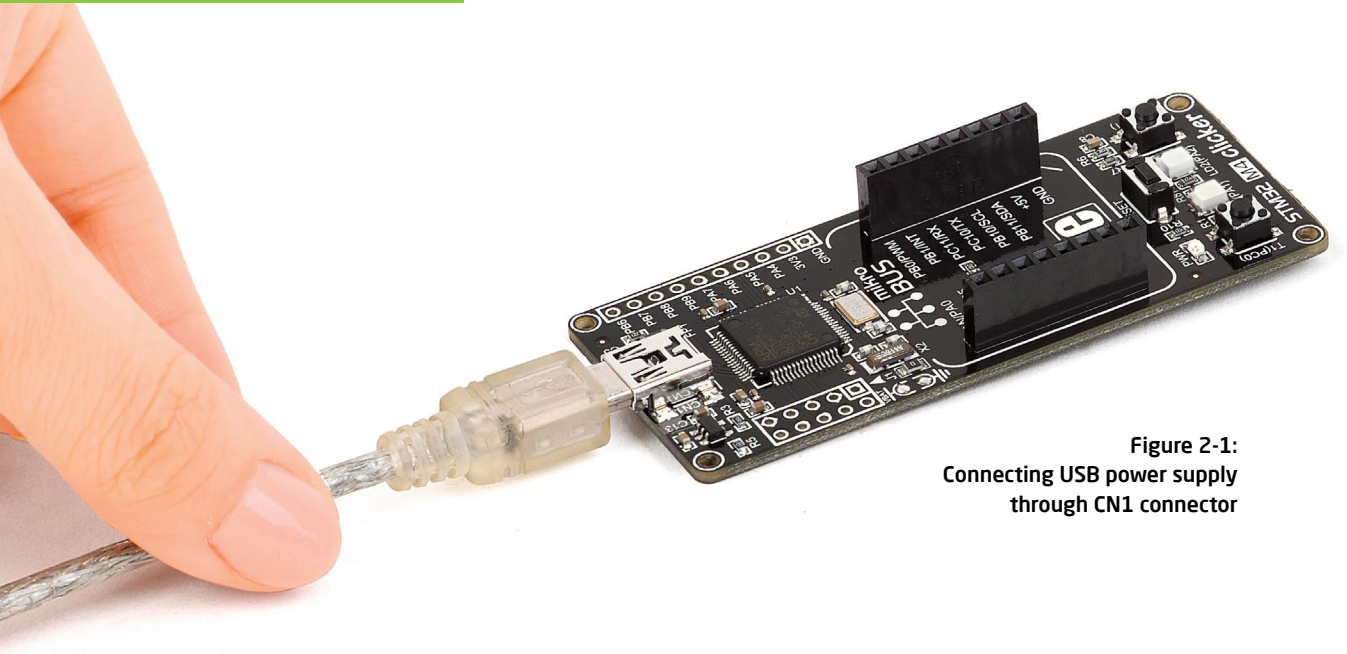


Figure 2-1:
Connecting USB power supply through CN1 connector

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.

3.3V VOLTAGE REGULATOR

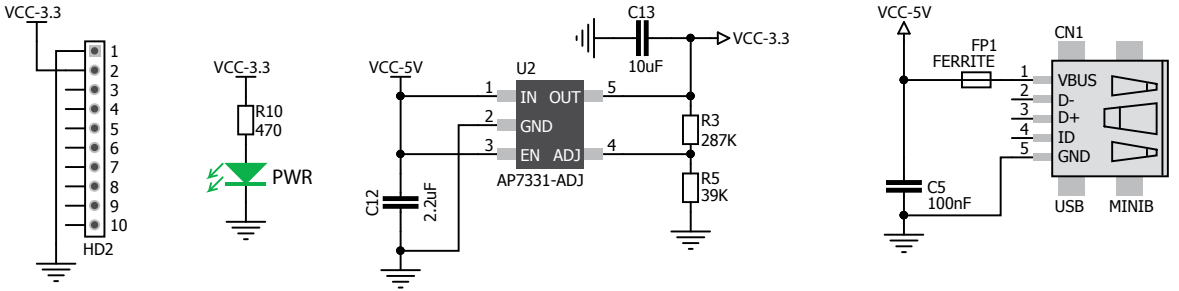
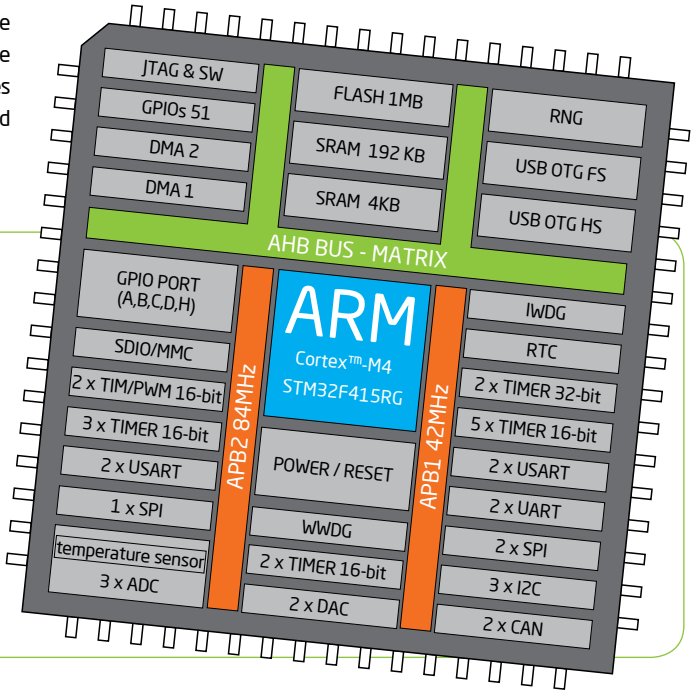


Figure 2-2: Power supply schematic

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

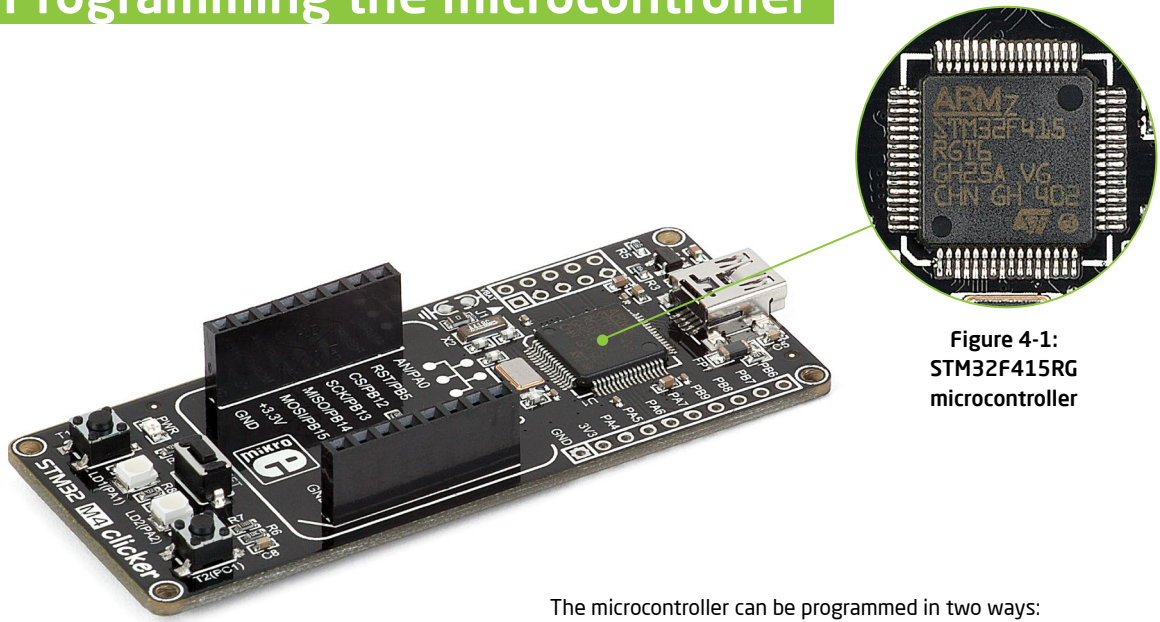


Figure 4-1: STM32F415RG microcontroller

The microcontroller can be programmed in two ways:

01 Using USB HID mikroBootloader,

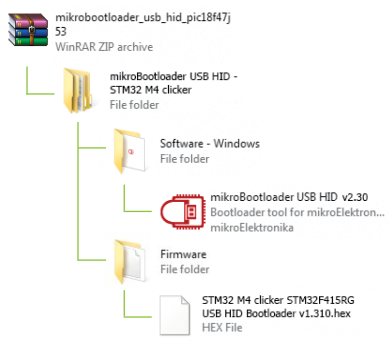
02 Using external mikroProg™ for STM32 programmer.

Programming with mikroBootloader

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.



step 1 - Connecting STM32 M4 clicker

Figure 4-2: USB HID mikroBootloader window

01 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

Figure 4-3: Browse for HEX

01 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.

step 3 - Selecting .HEX file

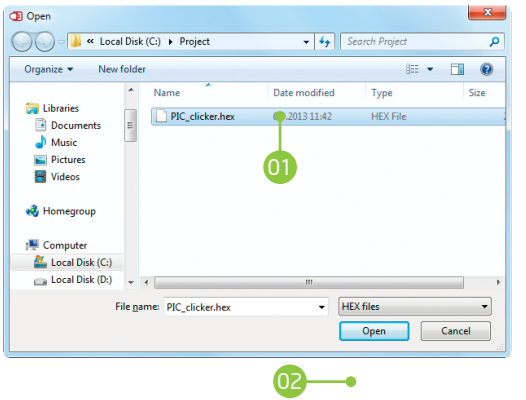


Figure 4-4: Selecting HEX

01 Select .HEX file using open dialog window.

02 Click the **Open** button.

step 4 - Uploading .HEX file

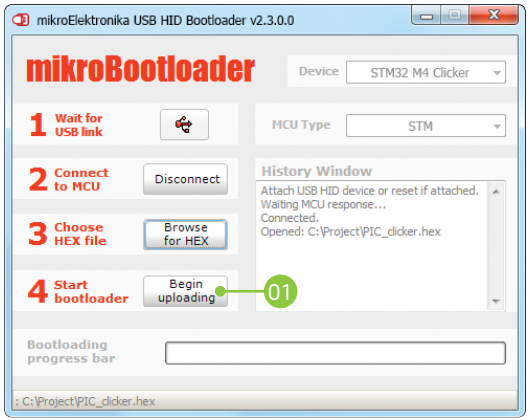


Figure 4-5: Begin uploading

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

Figure 4-6: Progress bar

01 Progress bar enables you to monitor .HEX file uploading.

step 5 - Finish upload

Figure 4-7: Restarting MCU

Figure 4-8: mikroBootloader ready for next job

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.

Programming with mikroProg™ programmer

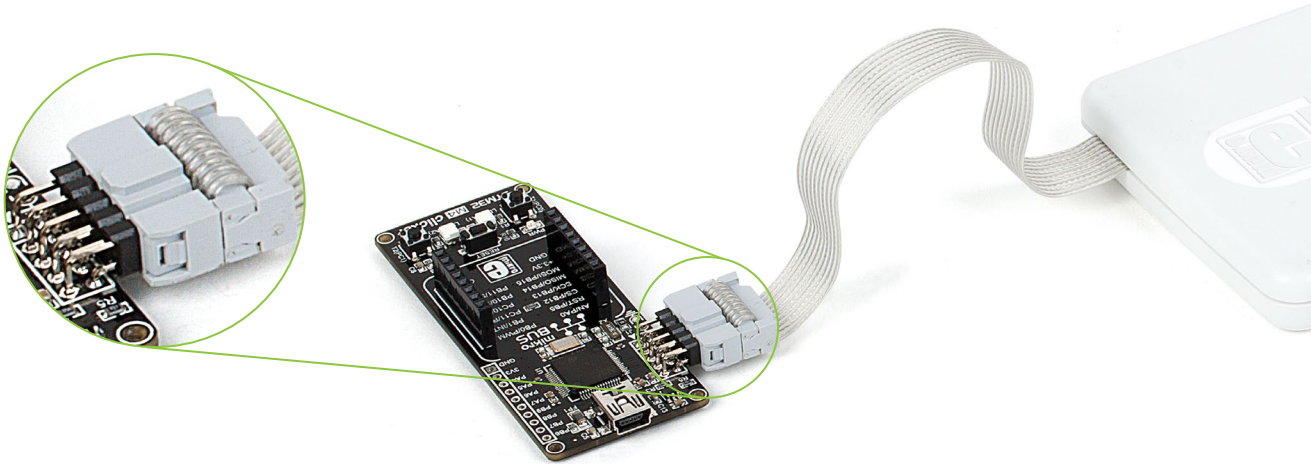


Figure 4-9: mikroProg™ connector

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.

mikroProg Suite™ for ARM® software

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 bellow:

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.

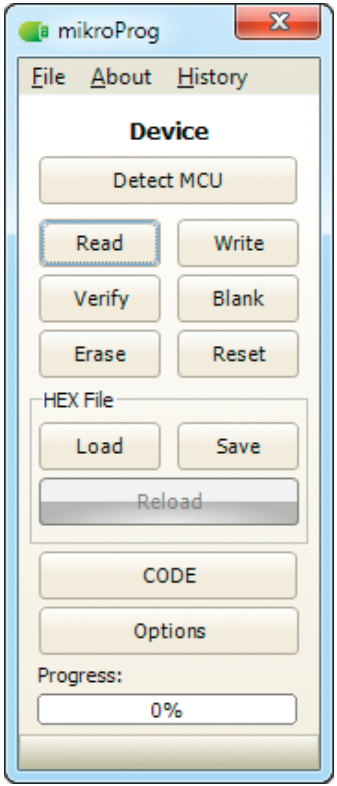


Figure 4-10: mikroProg Suite™ for ARM® window

Programming with ST-LINK V2 programmer

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 adaper

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).**

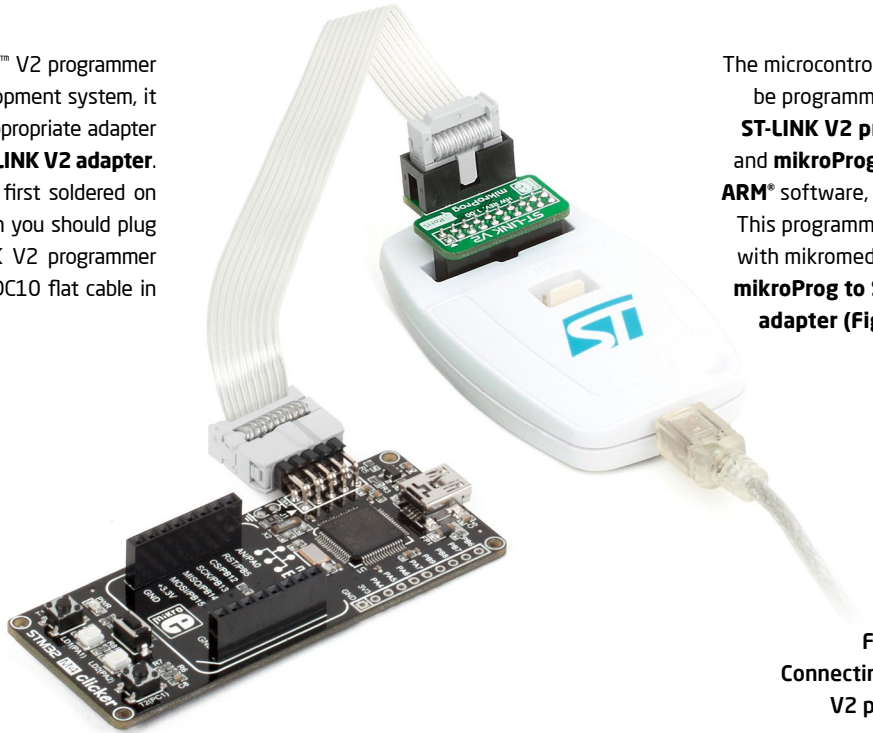
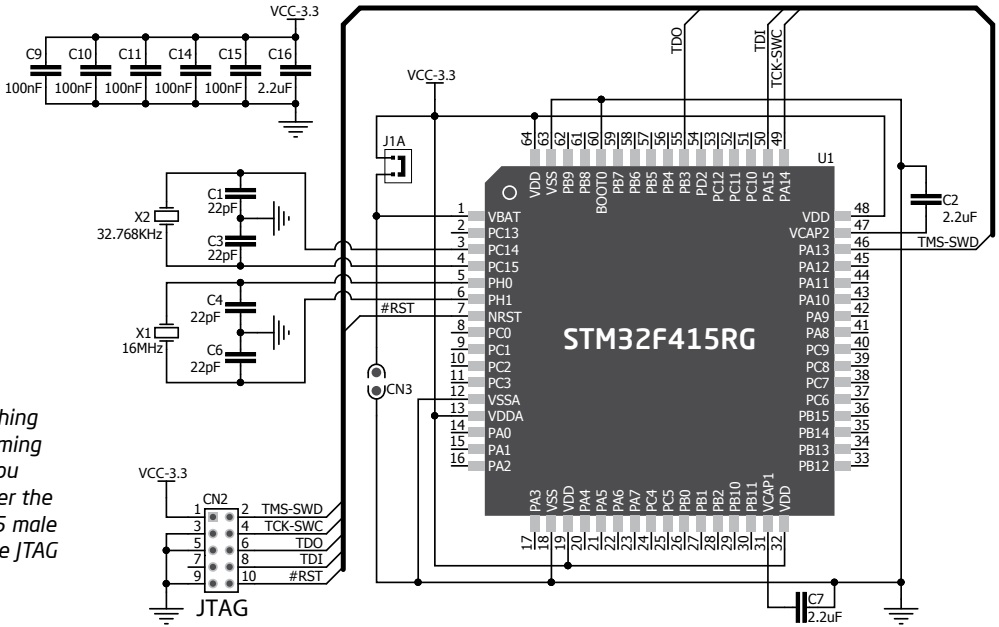


Figure 4-12: Connecting ST-LINK™ V2 programmer



NOTE | *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

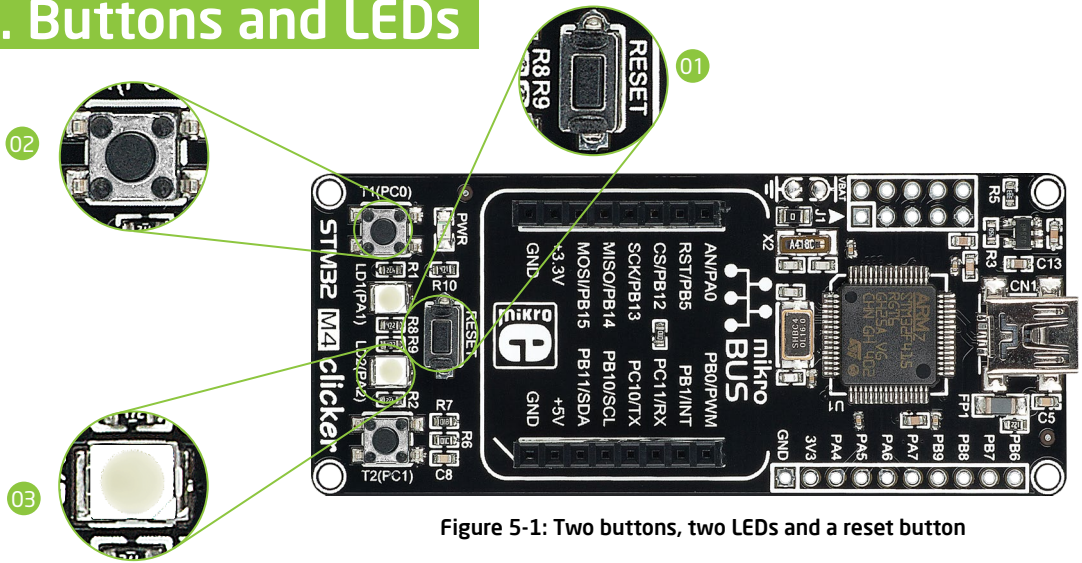


Figure 5-1: Two buttons, two LEDs and a reset button

The board also contains a 01 **reset button** and a pair of 02 **buttons** and 03 **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 (**RA0** and **RA1**). 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 (**RD2** and **RD3**) from logic high (1) to logic low (0).

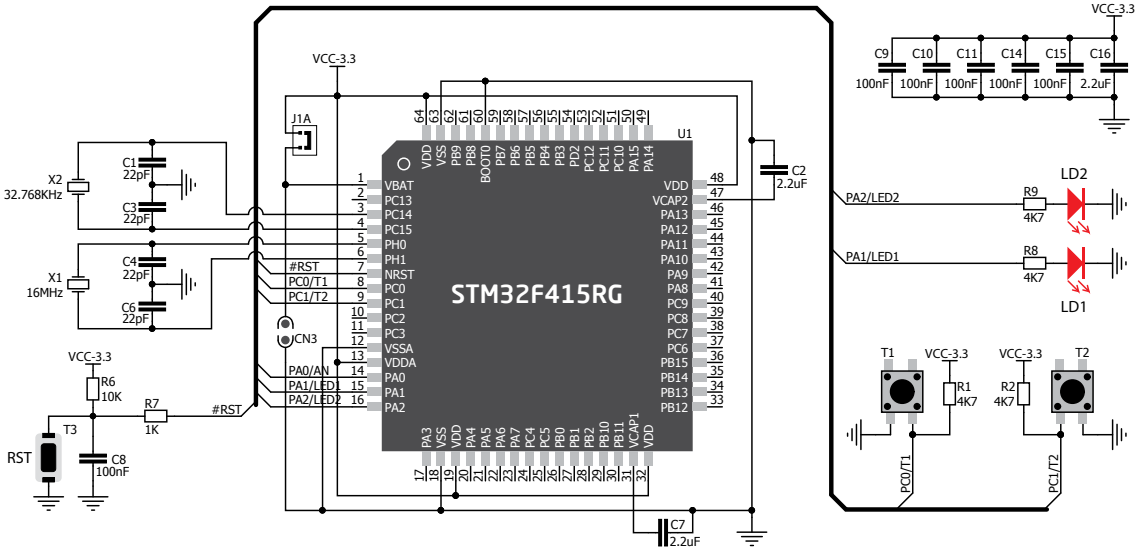


Figure 5-2: Other modules connection schematic

6. RTC battery

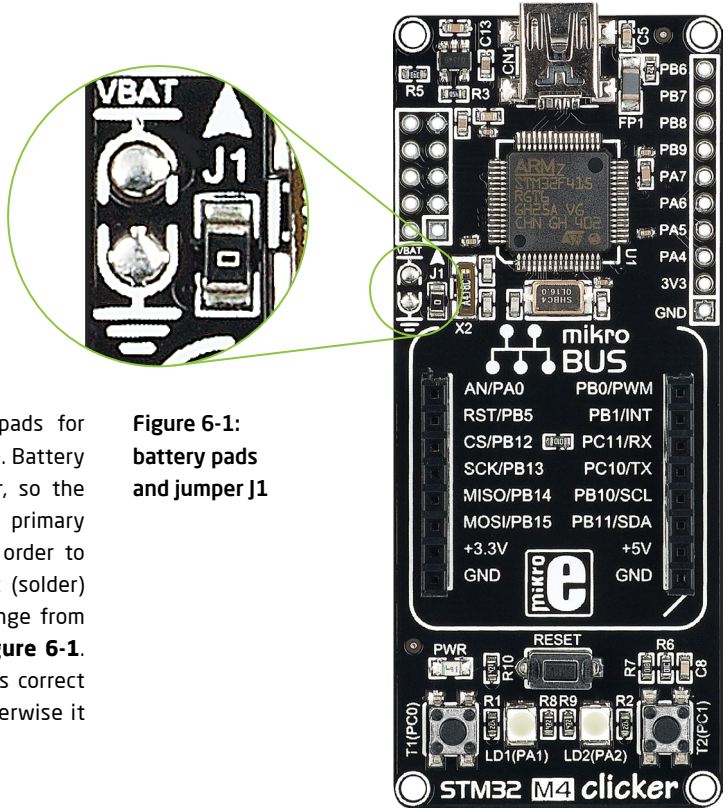


Figure 6-1: battery pads and jumper J1

STM32 M4 clicker features RTC battery pads for powering microntroller'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.

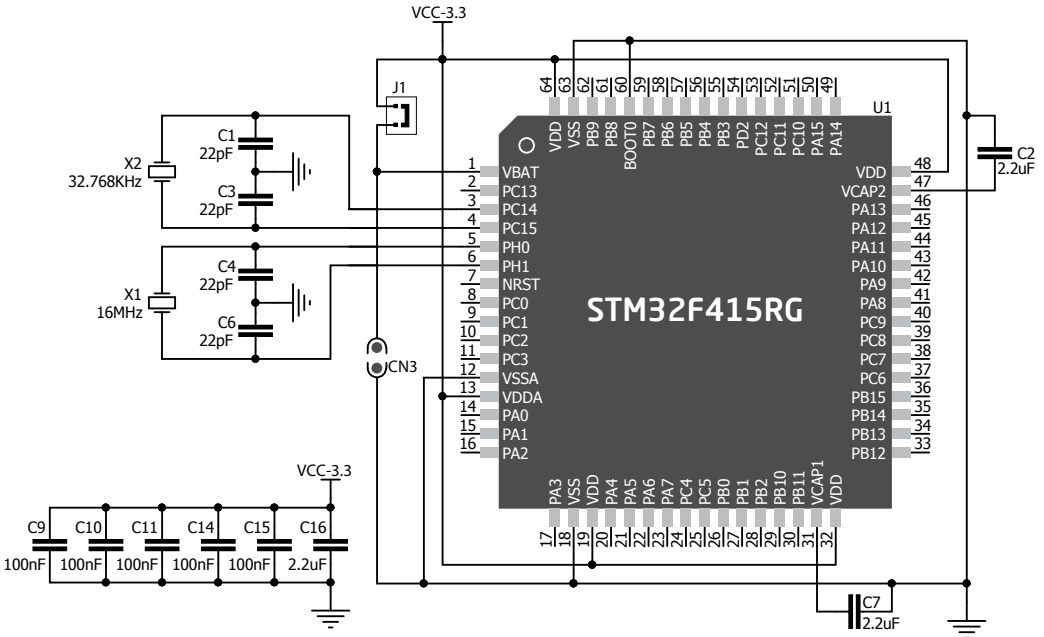


Figure 6-2: RTC battery schematic

7. click boards are plug and play!

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:

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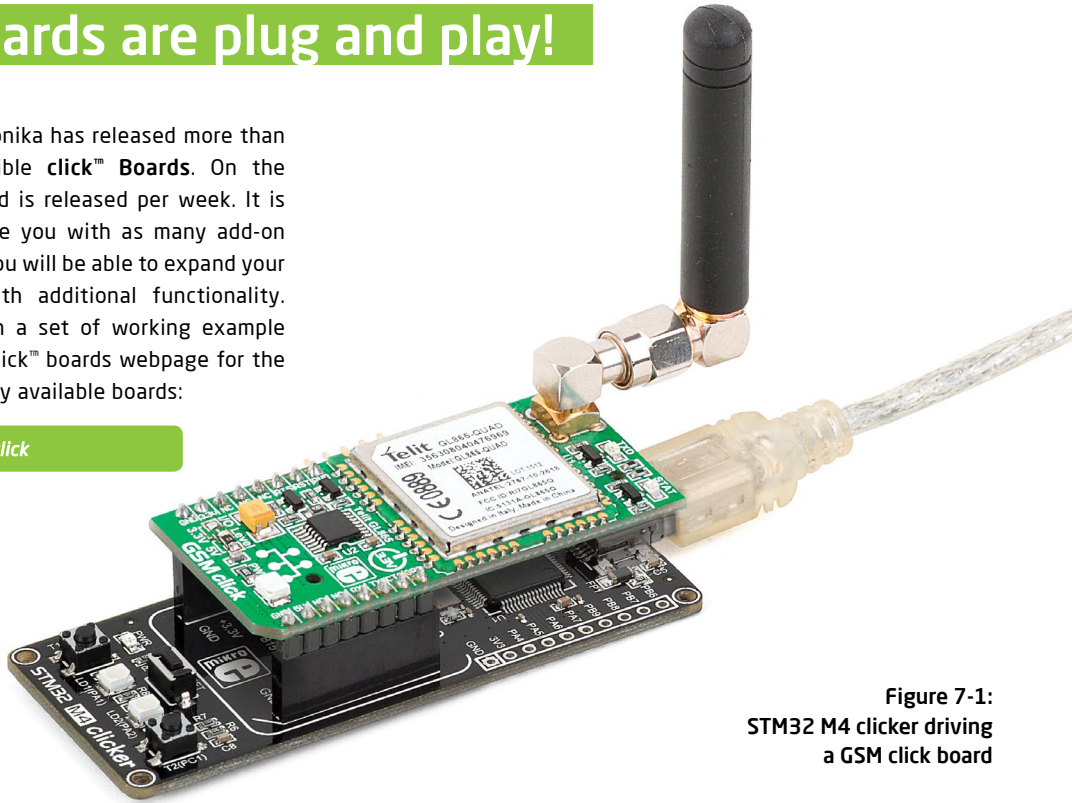
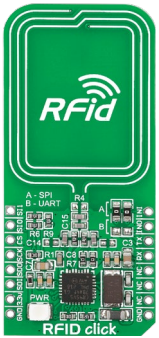
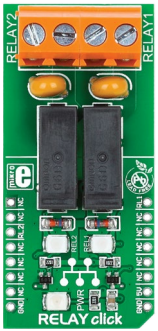


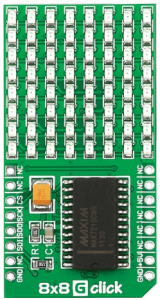
Figure 7-1:
STM32 M4 clicker driving a GSM click board



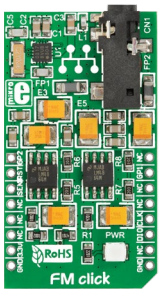
RFid click™



Relay click™

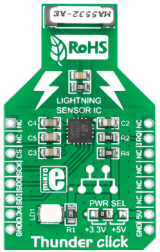


8x8 click™

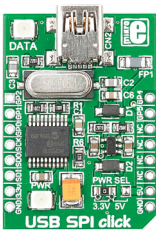


FM click™

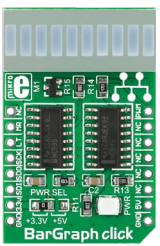
Bluetooth2 click™



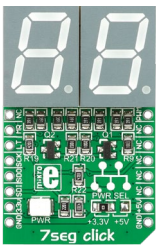
Thunder click™



USB SPI click™

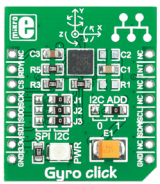


BarGraph click™

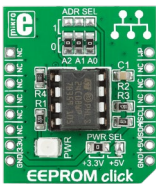


7seg click™

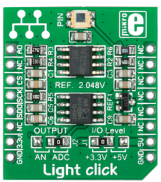
THERMO click™



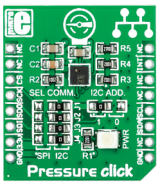
Gyro click™



EEPROM click™

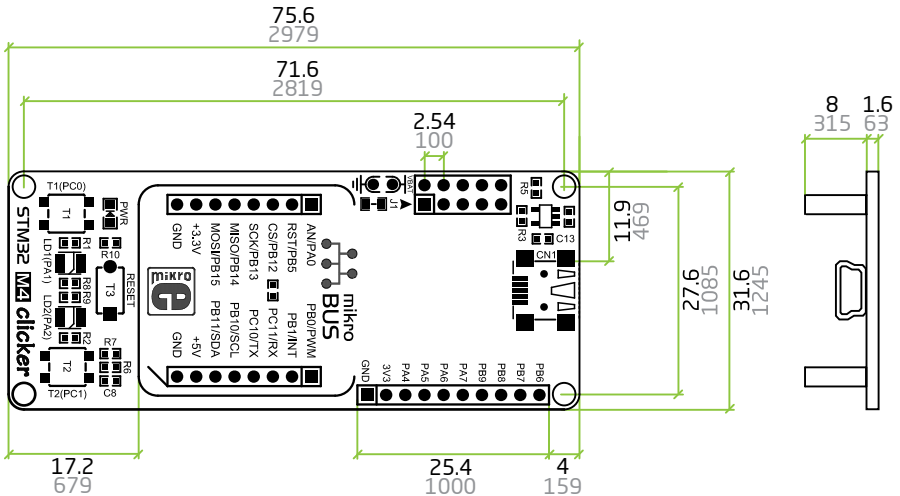


LightHz click™



Pressure click™

8. Dimensions



Legend

mm

mils

Mounting hole size

ø2 mm

ø79 mils

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HIGH RISK ACTIVITIES

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