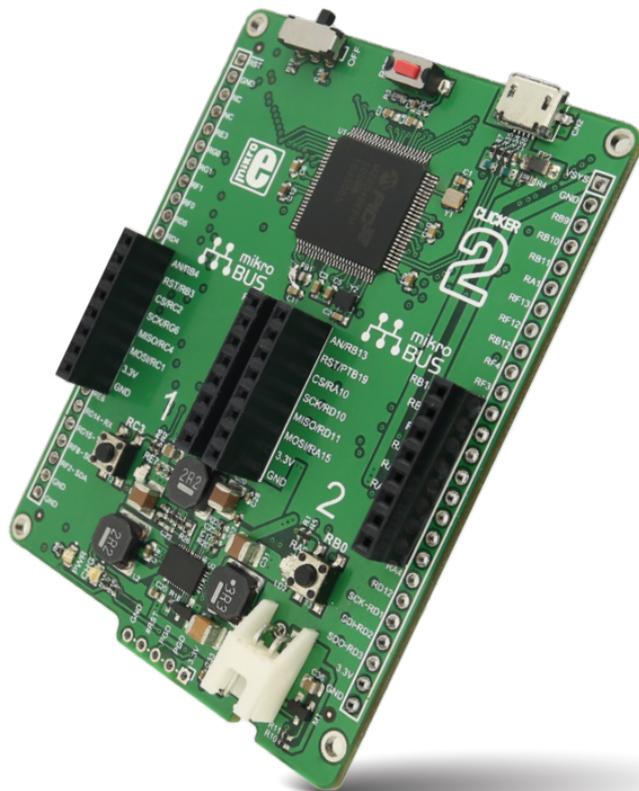


# CLICKER 2 <sup>PIC 32MZ</sup>

the possibilities are endless

A compact starter kit with your favorite microcontroller and two mikroBUS™ sockets



# 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.

A handwritten signature in black ink, appearing to read 'Nebojsa Matic', written in a cursive style.

Nebojsa Matic  
General Manager

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# Introduction to Clicker 2 for PIC32MZ

**Clicker 2 for PIC32MZ** is a compact development kit with two mikroBUS™ sockets for click board™ connectivity. You can use it to quickly build your own gadgets with unique functionalities and features. It carries the PIC32MZ 32-bit microcontroller, two indication LEDs, two general purpose buttons, a reset button, an ON/OFF switch, a li-polymer battery connector, a micro USB connector and two mikroBUS™ sockets. A mikroProg connector and a 2x26 pinout for interfacing with external electronics are also provided. The mikroBUS™ connector consists of two 1x8 female headers with SPI, I<sup>2</sup>C, UART, RST, PWM, Analog and Interrupt lines as well as 3.3V, 5V and GND power lines. clicker 2 for PIC32MZ board can be powered over a USB cable.



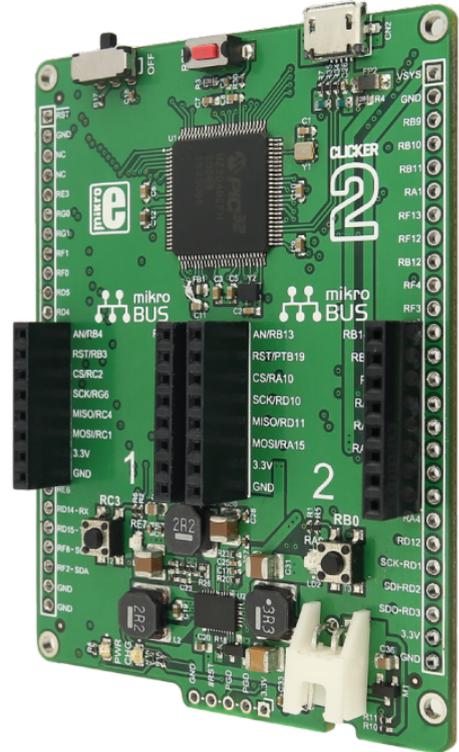
power supply  
via USB cable [5V DC]



board dimensions  
60.4 x 81 mm [2.4 x 3.2 inch]

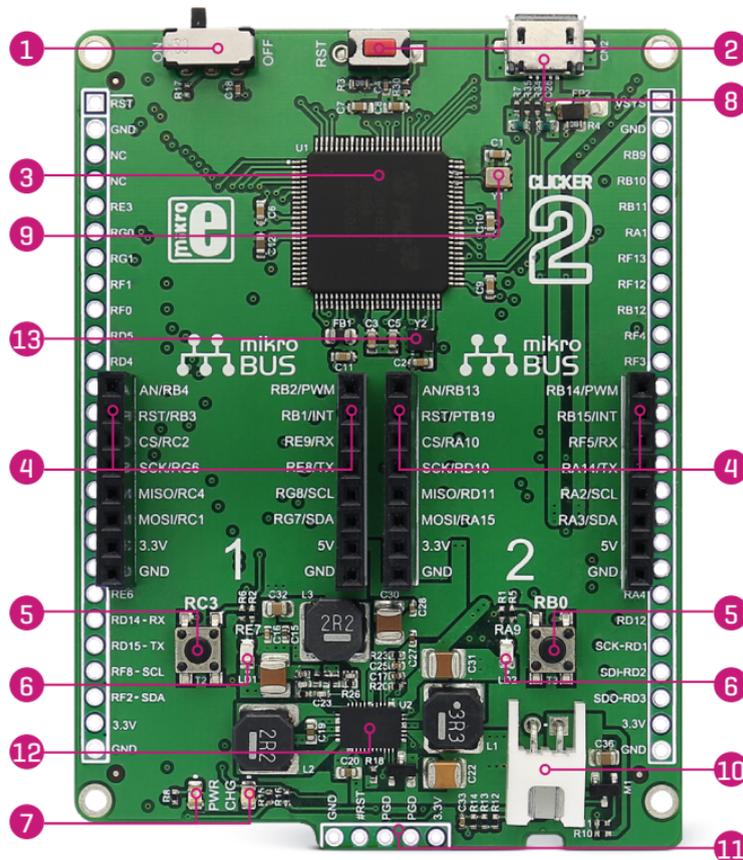


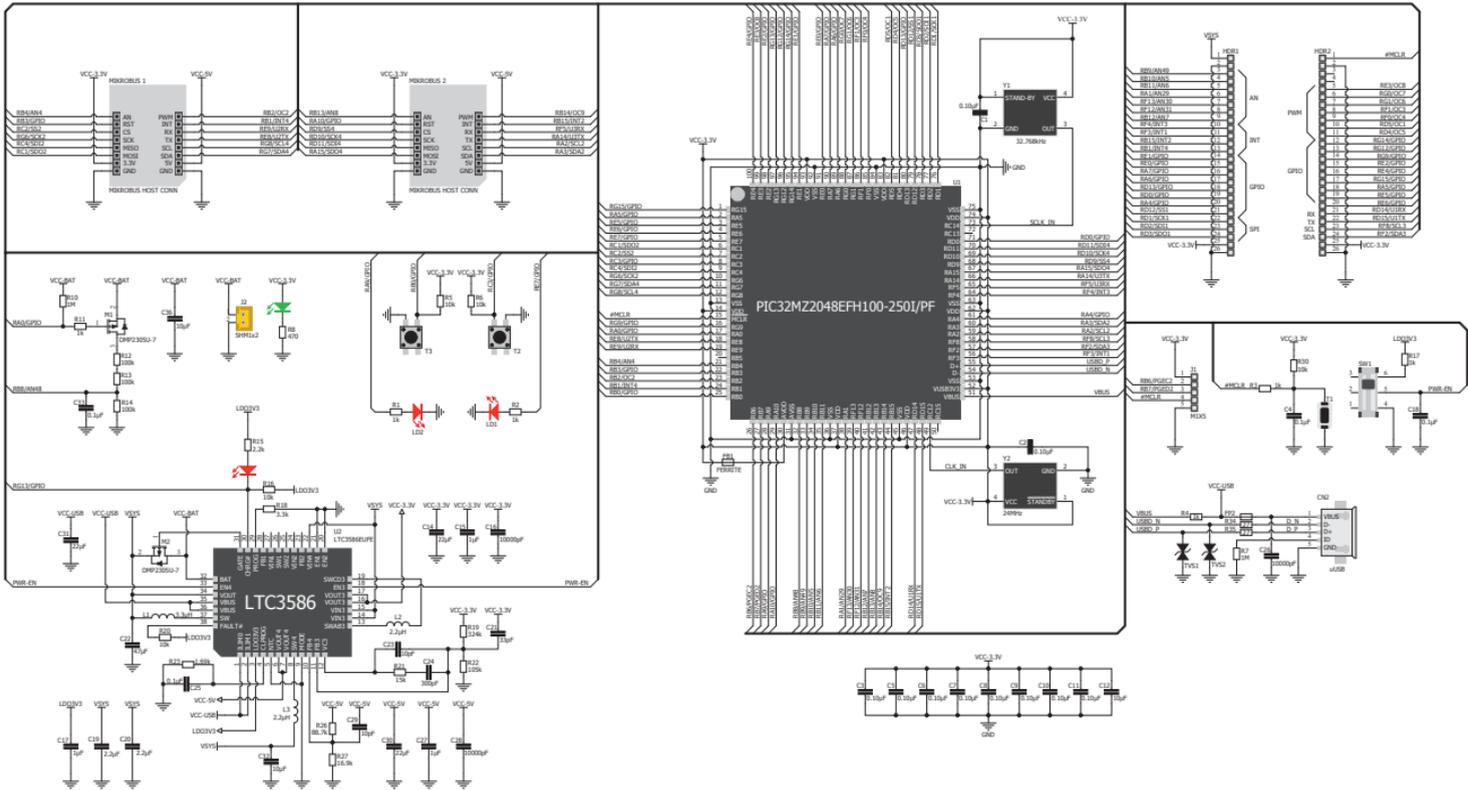
weight  
48 g [0.105 lbs]



# Key Features

- 1 ON/OFF switch
- 2 Reset button
- 3 PIC32MZ MCU
- 4 mikroBUS™ sockets 1 and 2
- 5 Pushbuttons
- 6 Additional LEDs
- 7 Indication LEDs
- 8 Micro USB connector
- 9 32.768 KHz Crystal
- 10 Battery connector
- 11 mikroProg connector
- 12 LTC3568 USB power manager IC
- 13 24MHz Crystal Oscillator





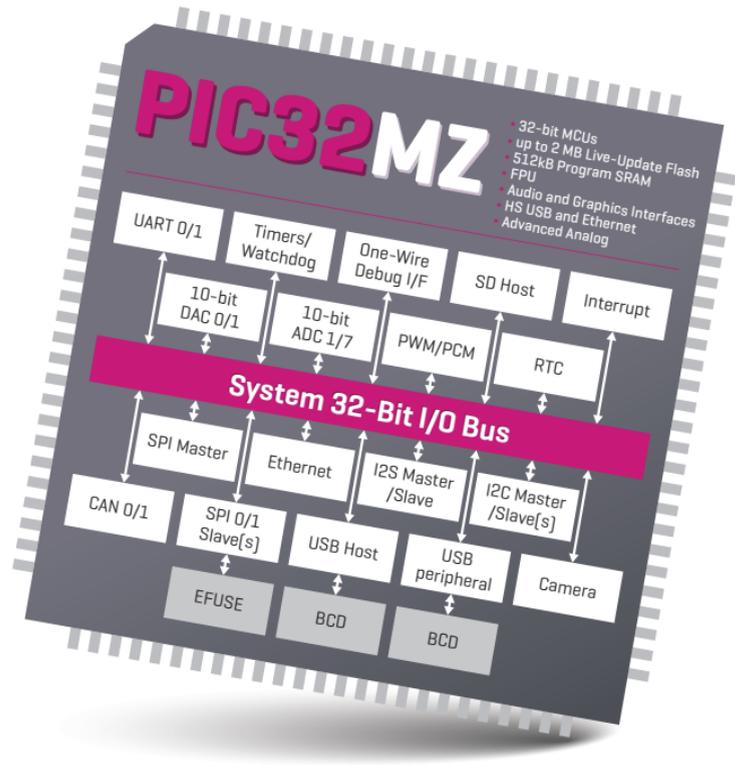
Clicker 2 for PIC32MZ schematic

## 2. PIC32MZ microcontroller

The Clicker 2 for PIC32MZ development tool comes with the PIC32MZ microcontroller. This 32-bit (up to 1 MB Live- Update Flash and 512 KB SRAM) microcontroller with FPU is rich with on-chip peripherals.

### Key microcontroller features

- 1MB of Live-Update flash
- Core: 200MHz
- Nine 16-bit or up to four 32-bit timers/counters
- 5V-tolerant pins with up to 32 mA source/sink



# 3. Programming the microcontroller

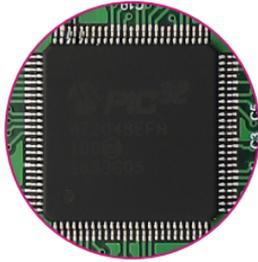
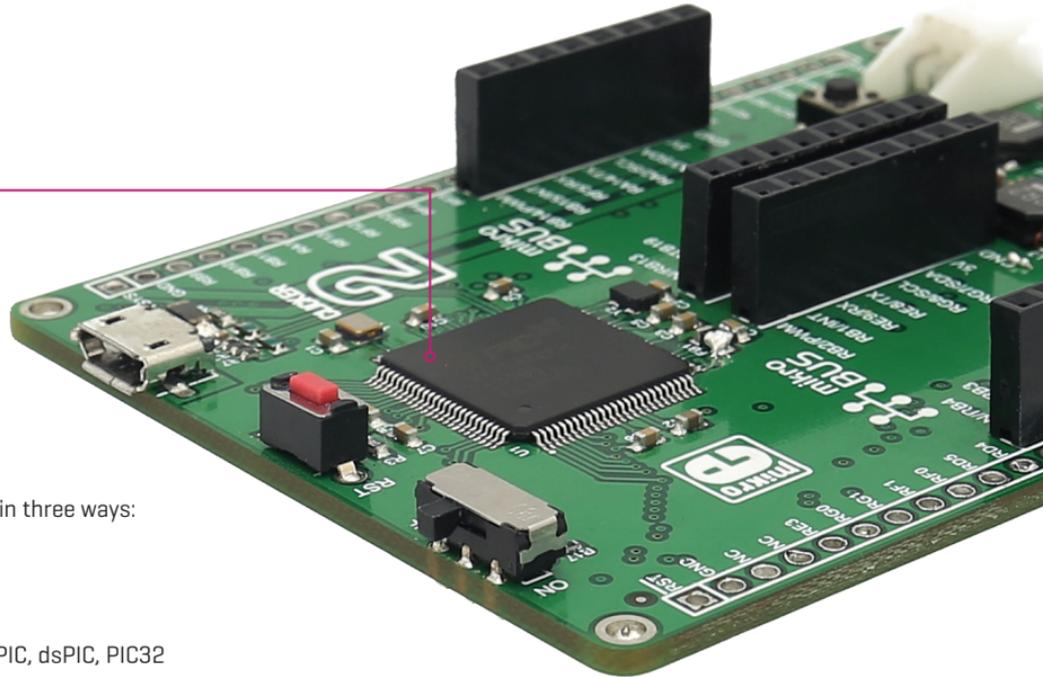


Figure 3-1:  
PIC32MZ  
microcontroller



The microcontroller can be programmed in three ways:

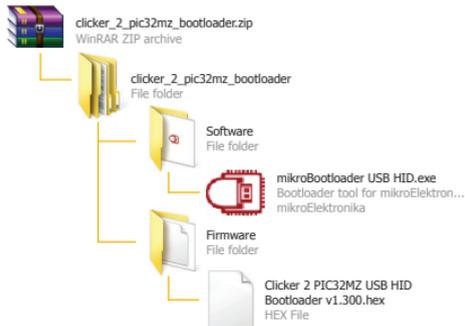
- 1 Using USB HID mikroBootloader,
- 2 Using external mikroProg for PIC, dsPIC, PIC32

# 3.1 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:

[download.mikroe.com/examples/starter-boards/clicker-2/pic32mz/clicker-2-pic32mz-mikrobootloader-usb-hid-v100.zip](http://download.mikroe.com/examples/starter-boards/clicker-2/pic32mz/clicker-2-pic32mz-mikrobootloader-usb-hid-v100.zip)

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



## step 1 – Connecting clicker 2 for PIC32MZ



Figure 3-2: USB HID mikroBootloader window

- 1 To start, connect the USB cable, or if already connected press the **Reset** button on your Clicker 2 for PIC32MZ. Click the **Connect** button within 5s to enter the bootloader mode, otherwise existing microcontroller program will execute.

## step 2 – Browsing for .HEX file



Figure 3-3: Browse for HEX

## step 3 – Selecting .HEX file

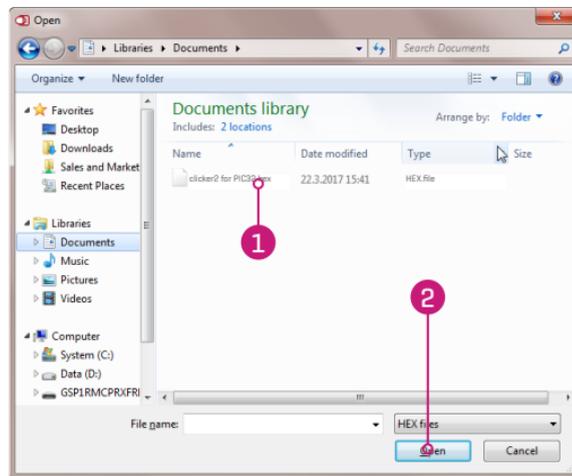


Figure 3-4: Selecting HEX

- 1 Select **.HEX file** using open dialog window.
- 2 Click the **Open** button.

## step 4 – Uploading .HEX file



Figure 3-5: Begin uploading

- 1 To start .HEX file bootloading click the Begin uploading button.



Figure 3-6: Progress bar

- 1 Progress bar enables you to monitor .HEX file uploading.

## step 5 – Finish upload

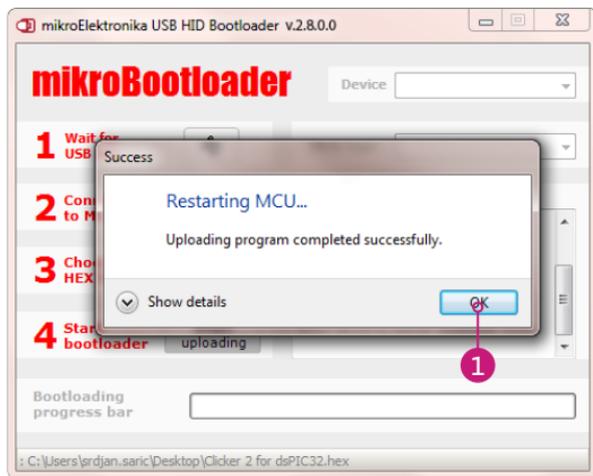


Figure 3-7: Restarting MCU



Figure 3-8: mikroBootloader ready for next job

- 1 Click **OK** button after the uploading process is finished.
- 2 Press **Reset** button on Clicker 2 for PIC32MZ board and wait for 5 seconds. Your program will run automatically.

## 3.2 Programming with mikroProg programmer

The microcontroller can be programmed with external mikroProg for PIC, dsPIC, and PIC32 programmer and mikroProg Suite for PIC32MZ software. The external programmer is connected to the development system via 2x5 connector Figure 3-9. mikroProg is a fast USB 2.0 programmer with hardware debugger support. It supports all PIC, dsPIC, and PIC32 devices in a single programmer. Outstanding performance, easy operation and elegant design are its key features.



Figure 3-8:  
mikroProg connector

# mikroProg Suite for PIC32MZ software



**mikroProg** programmer requires special programming software called **mikroProg Suite for PIC32®**. This software is used for programming of ALL Microchip® microcontroller families, including PIC10®, PIC12®, PIC16®, PIC18®, dsPIC30/33®, PIC24® and PIC32®. Software has intuitive interface and SingleClick programming technology. Just by downloading the latest version of **mikroProg Suite** your programmer is ready to program new devices. **mikroProg Suite** is updated regularly, at least four times a year, so your programmer will be more and more powerful with each new release.

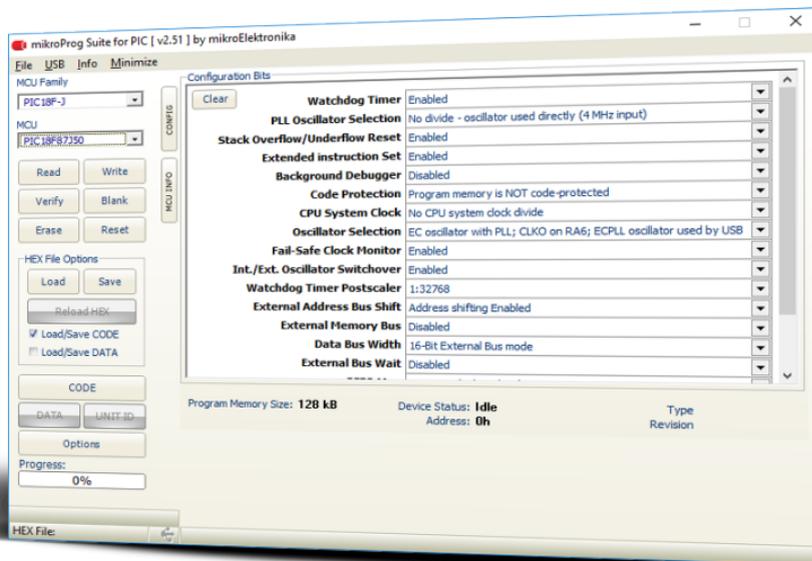


Figure 3-10: mikroProg Suite for PIC32 window

## 4. Buttons and LEDs

The board also contains a **1** reset button and a pair of **2** buttons and **3** LEDs, as well as an ON/OFF switch. The Reset button is used to manually reset the microcontroller – it generates a low voltage level on the microcontroller’s reset pin. LEDs can be used for visual indication of the logic state on two pins [P34 and P18]. An active LED indicates that a logic high [1] is present on the pin. Pressing any of the two buttons can change the logic state of the microcontroller pins [P35 and P2] from logic high [1] to logic low [0]. In addition to the onboard ON/OFF switch, two pins allow you to connect your own external switch [located beneath the switch].

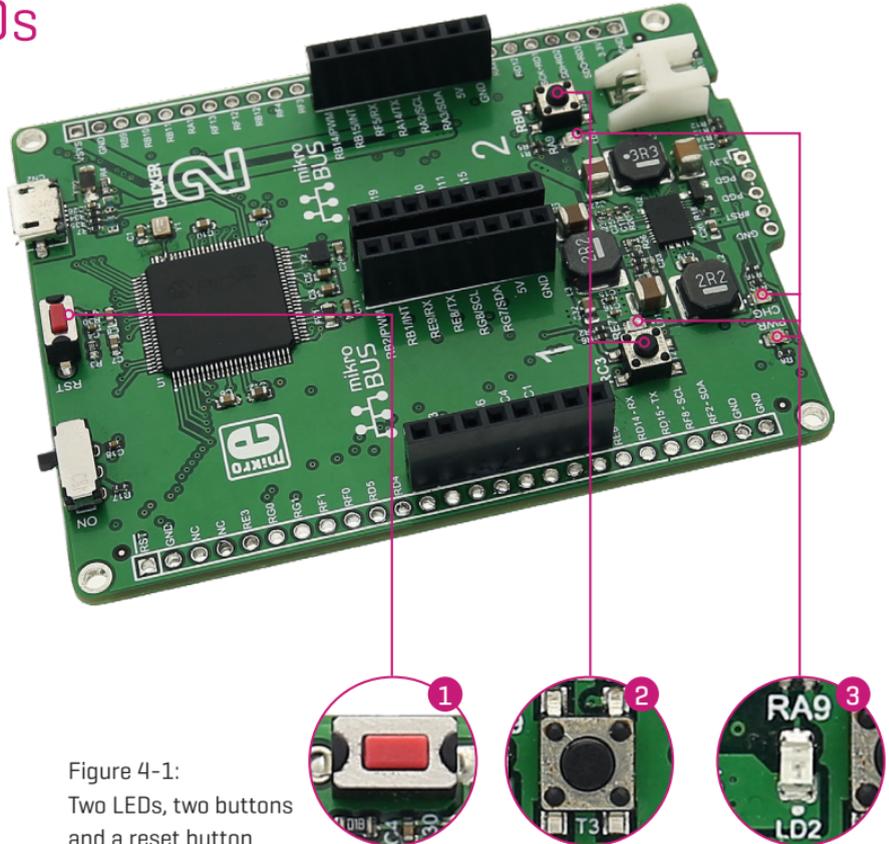
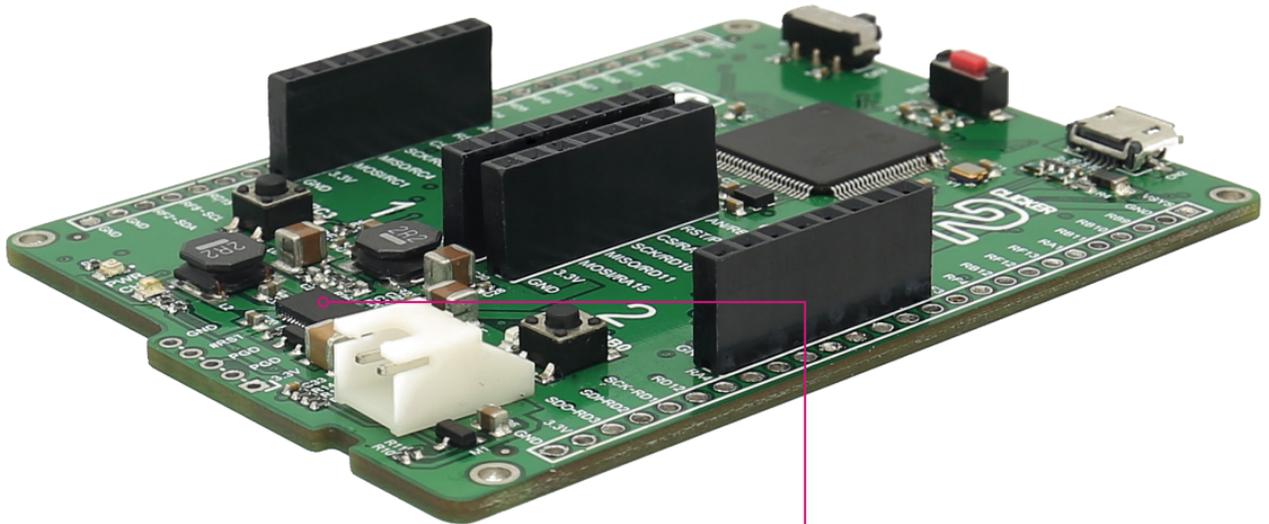


Figure 4-1:  
Two LEDs, two buttons  
and a reset button

# 5. Power management and battery charger



Clicker 2 for PIC32MZ features LTC®3586, a highly integrated power management and battery charger IC that includes a current limited switching PowerPath manager. LTC®3586 also enables battery charging over a USB connection.

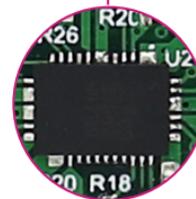


Figure 5-2: power management and battery charger IC

# 6. Oscillators

Two onboard oscillators act as external sources for PIC32MZ's two system clocks. A 24 MHz oscillator provides a reference frequency output to the clock multiplier PLL. A 32.768kHz oscillator provides a clock for the internal RTCC.

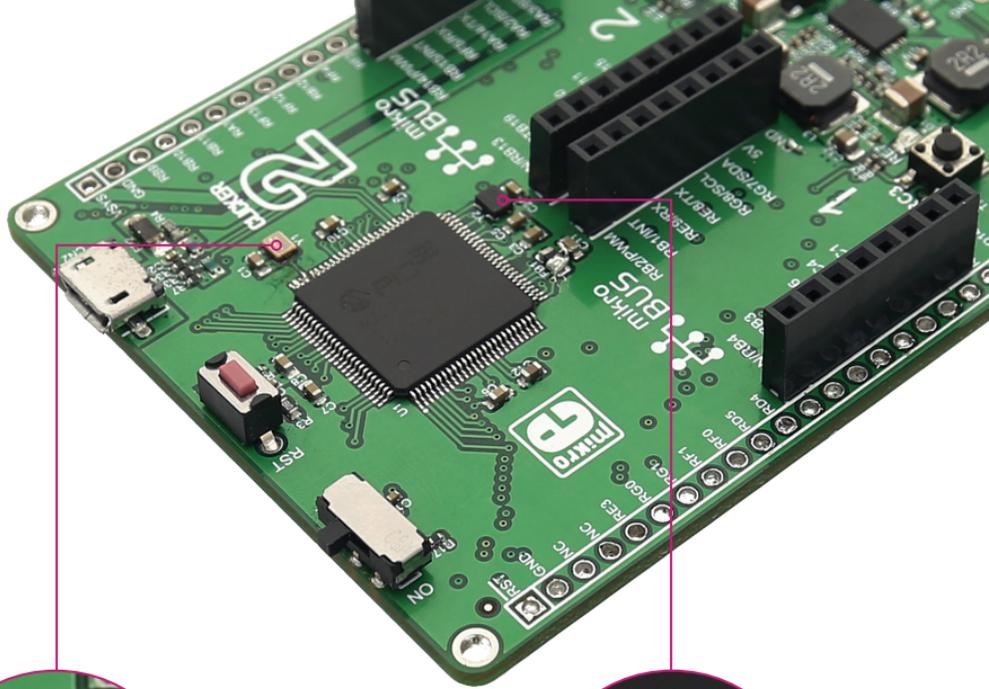


Figure 6-1:  
32.768 kHz crystal  
oscillator module  
[Y1]

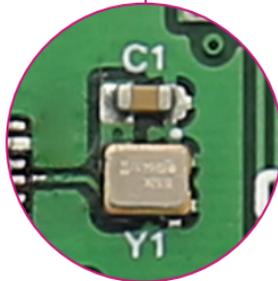
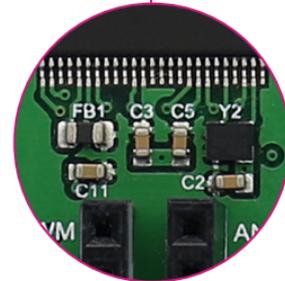


Figure 6-2:  
24MHz crystal  
oscillator module  
[Y2]



# 7. USB connection

PIC32MZ microcontrollers has an integrated USB module, which enables you to implement USB communication functionality to your Clicker 2 board. Connection with target USB host is done over a micro USB connector which is positioned next to the battery connector.

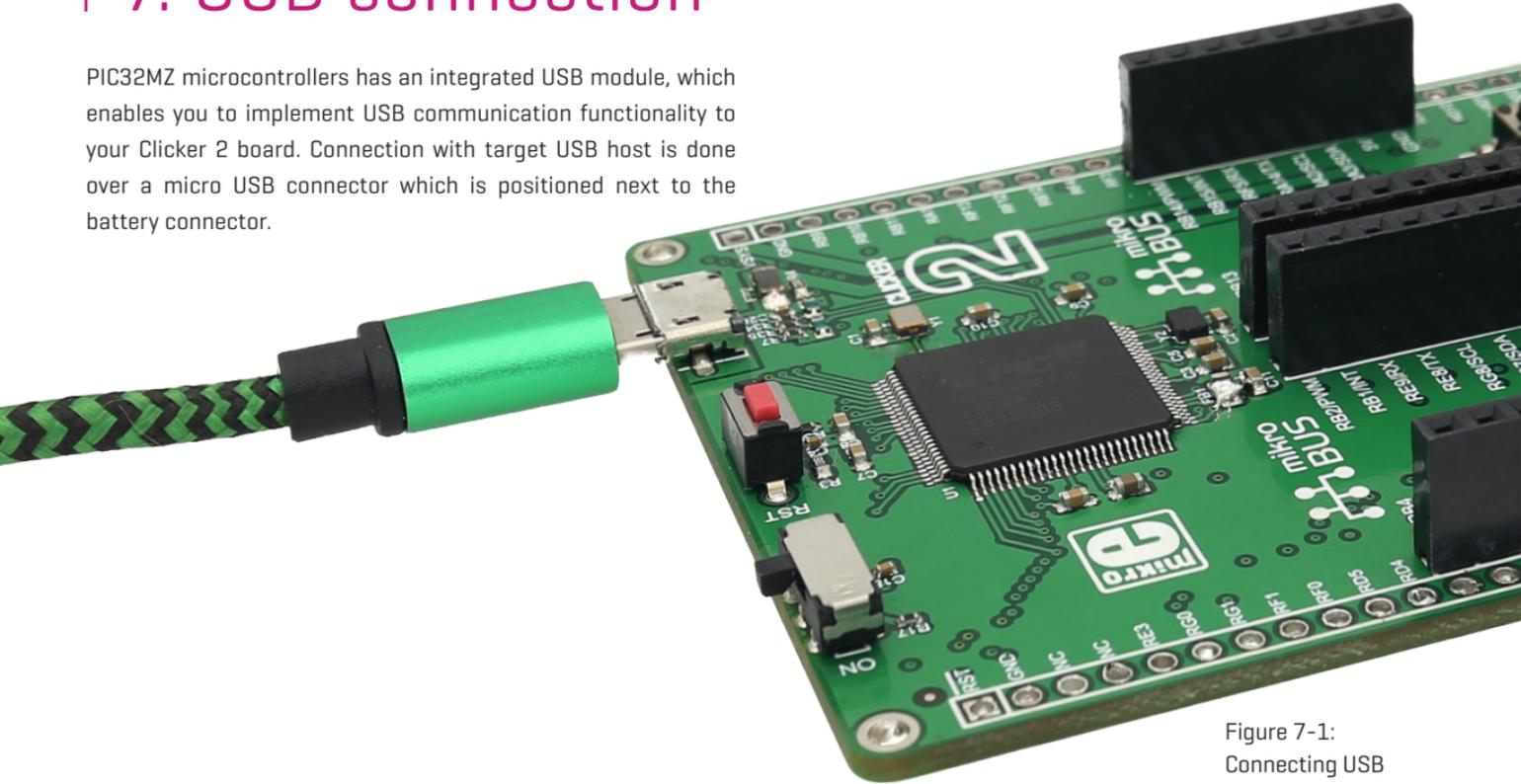
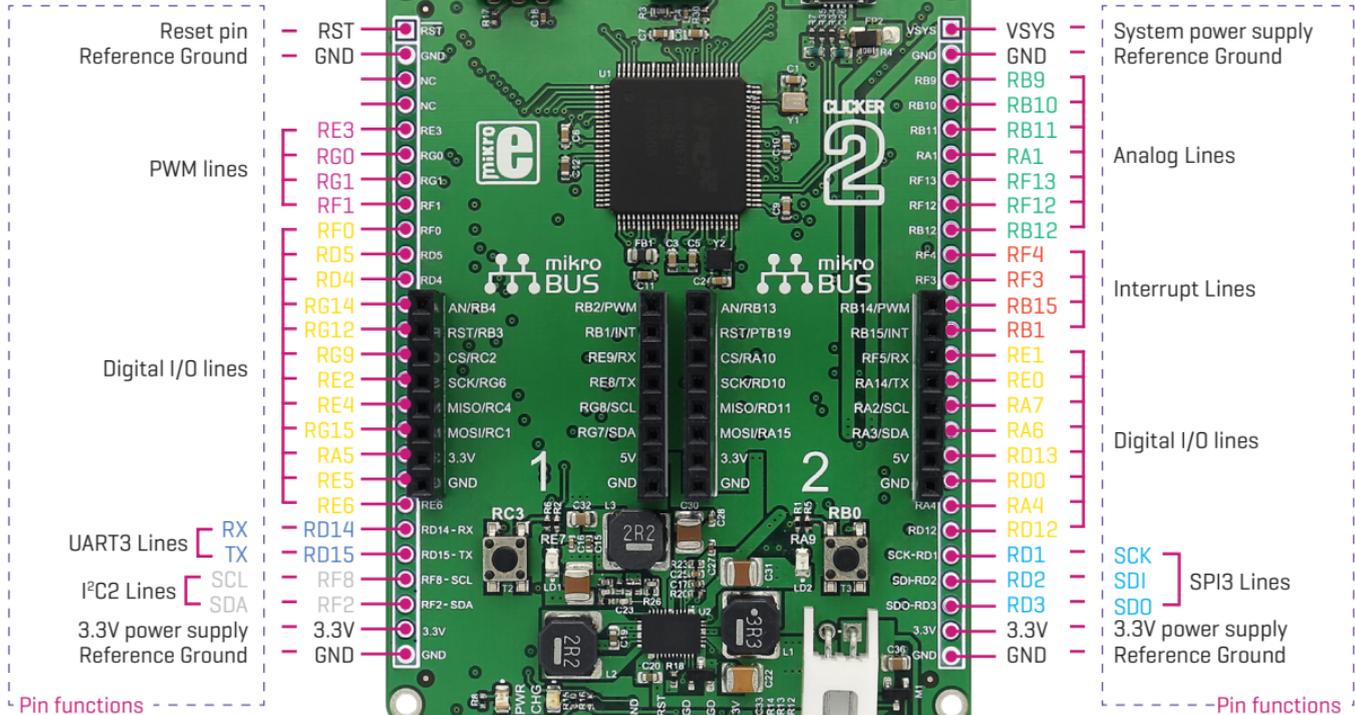


Figure 7-1:  
Connecting USB  
cable to Clicker 2

# 9. Pinout



■ Digital lines 
 ■ Analog Lines 
 ■ Interrupt Lines 
 ■ SPI Lines 
 ■ I2C Lines 
 ■ UART lines 
 ■ PWM lines

# 10. click boards™ are plug and play!

Up to now, MikroElektronika has released more than a 350 mikroBUS™ compatible click boards™. On the average, three click boards™ are 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](http://www.mikroe.com/click)



Figure 10-1:  
Clicker 2 for PIC32MZ  
driving click boards™



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