CLICKER 2 PIC 32MZ
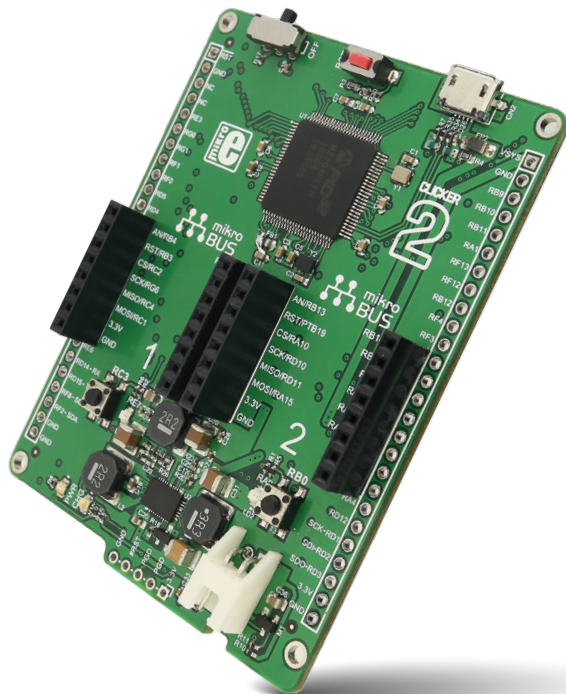
the possibilites are endless

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

USB E mikroBUS PIC32MZ

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

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 2C, 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
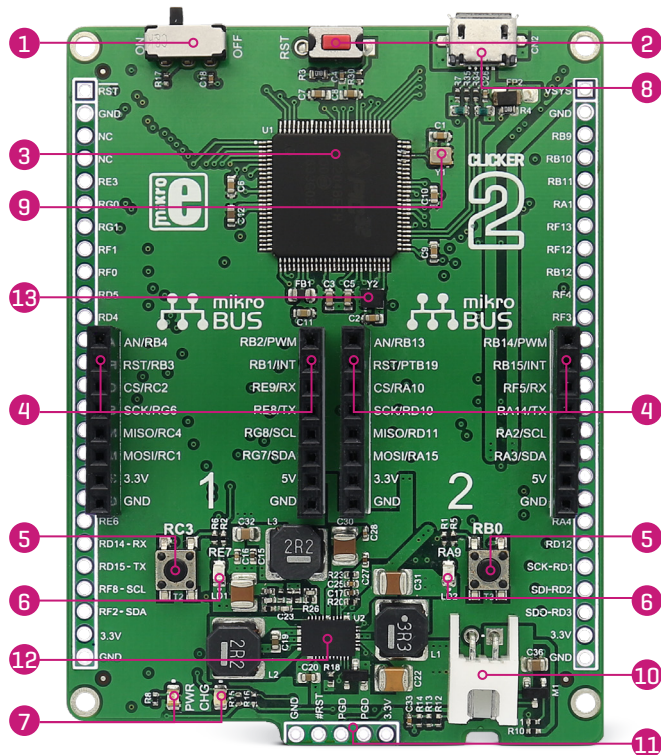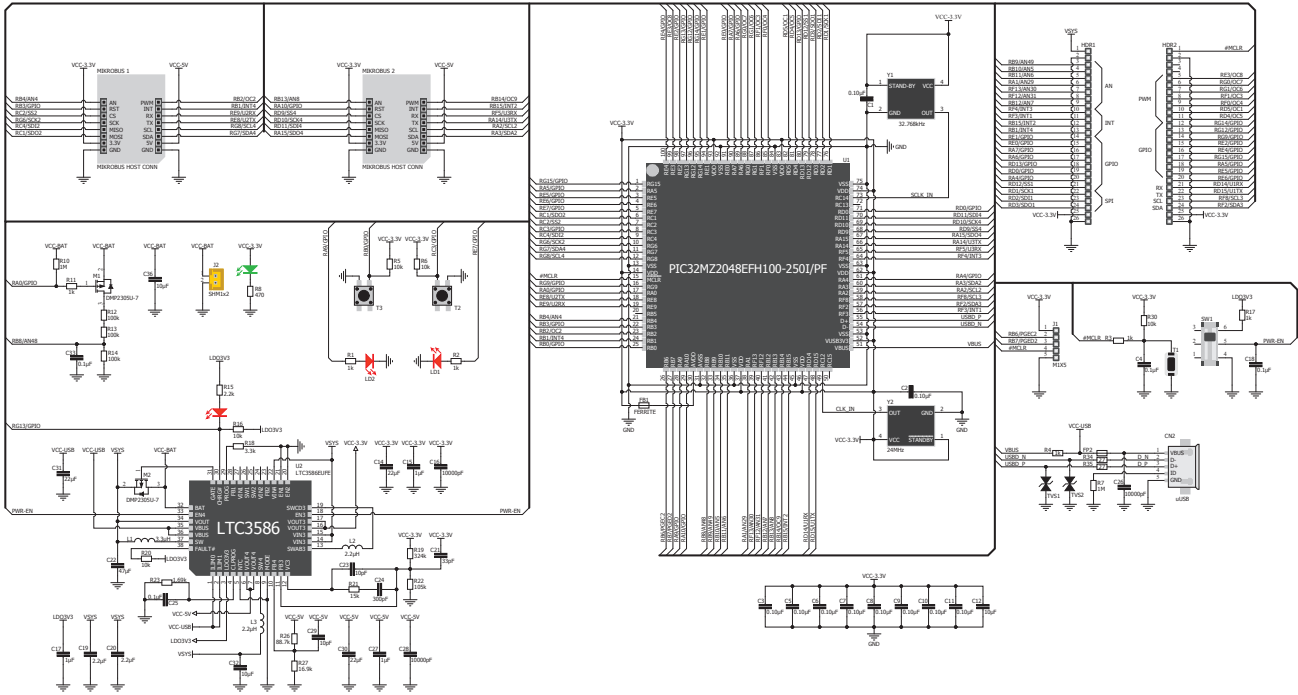60.4 x 81 mm [2.4 x 3.2 inch]

weight
48 g [0.105 lbs]
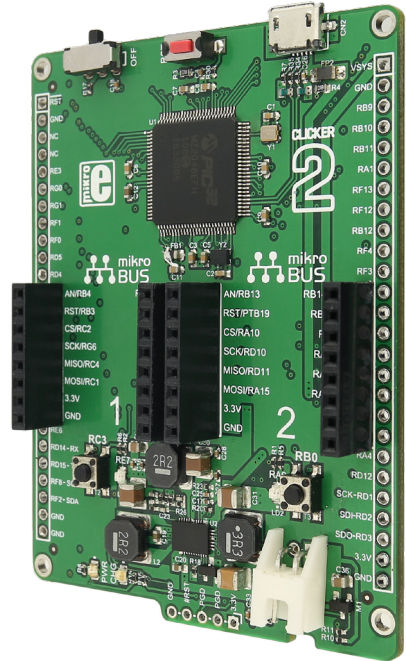
Key Features

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
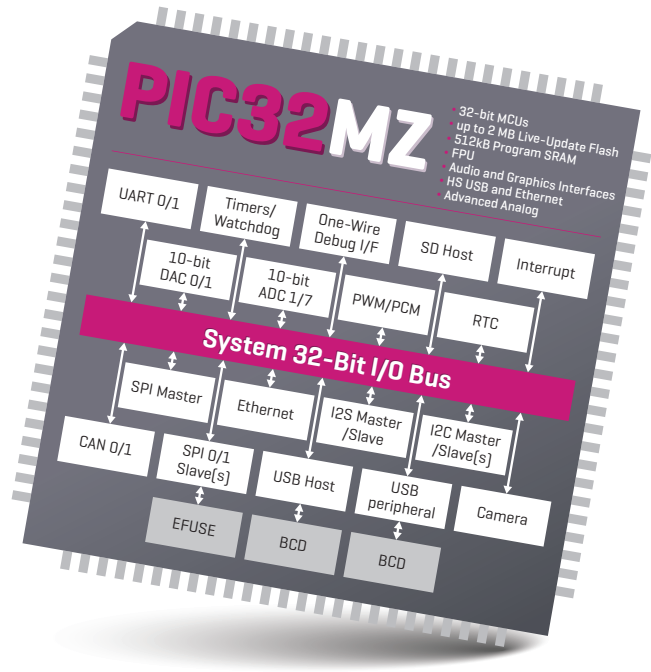
3. Programming the microcontroller

Figure 3-1:
PIC32MZ
microcontroller

The microcontroller can be programmed in three ways:

1 Using USB HID mikroBootloader,

2 Using 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:
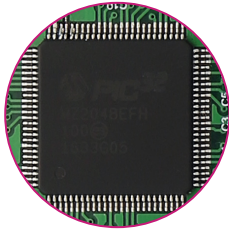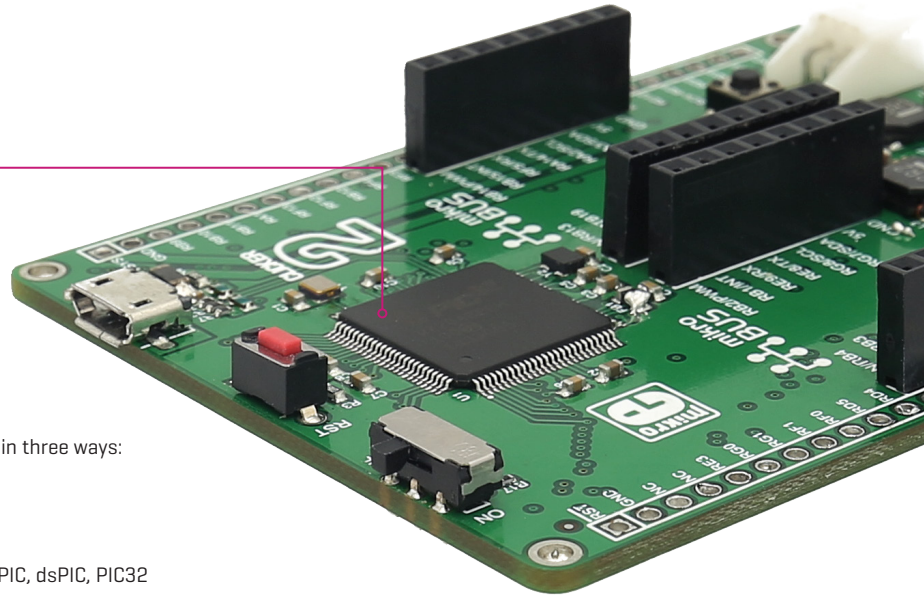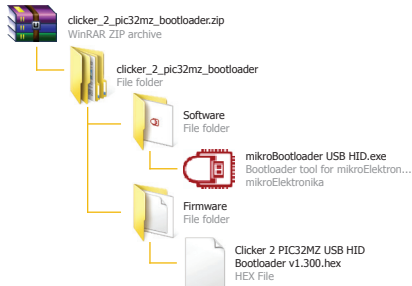
download.mikroe.com/examples/starter-boards/clicker-2/
pic32mz/clicker-2-pic32mz-mikrobootloader-usb-hid-v100.zip

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

clicker_2_pic32mz_bootloader.zip
WinRAR ZIP archive

clicker_2_pic32mz_bootloader
File folder

Software
File folder

mikroBootloader USB HID.exe
Bootloader tool for mikroElektron…
mikroElektronika

Firmware
File folder

Clicker 2 PIC32MZ USB HID
Bootloader v1.300.hex
HEX File

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
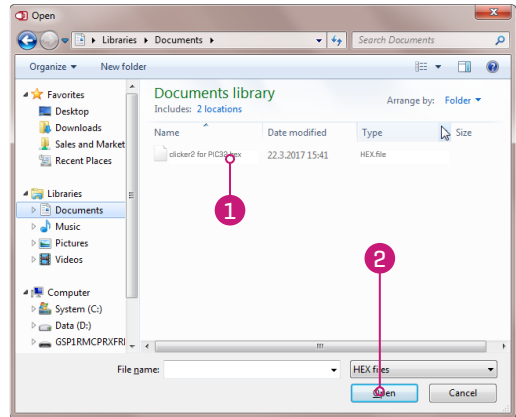
Figure 3-4: Selecting HEX

1 Select **.HEX file** using open dialog window.

2 Click the **Open** button.

step 4 – Uploading .HEX file

Figure 3-5: Begin uploading

Figure 3-6: Progress bar

1 To start .HEX file bootloading click the Begin uploading button.
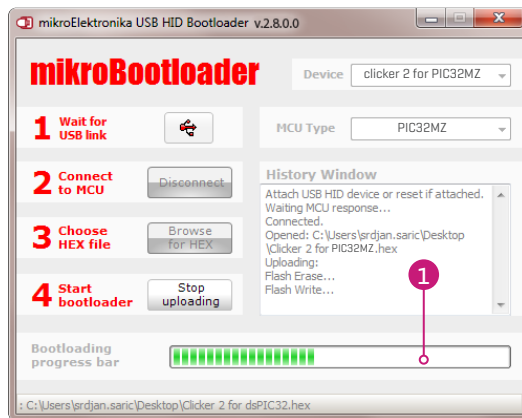
1 Progress bar enables you to monitor .HEX file uploading.

step 5 – Finish upload
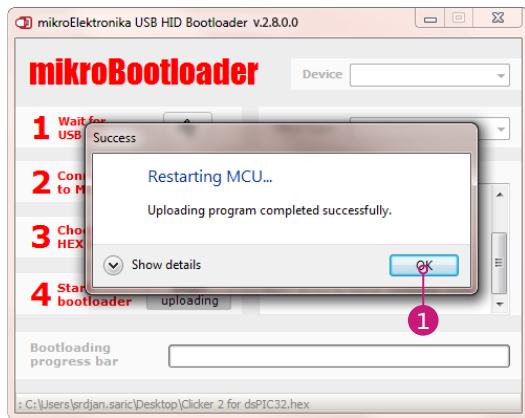
Figure 3-7: Restarting MCU

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.
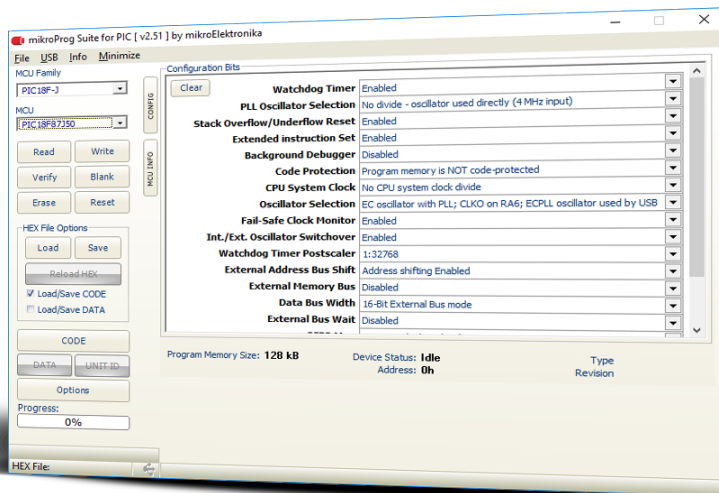
Figure 3-10: mikroProg Suite for PIC32 window

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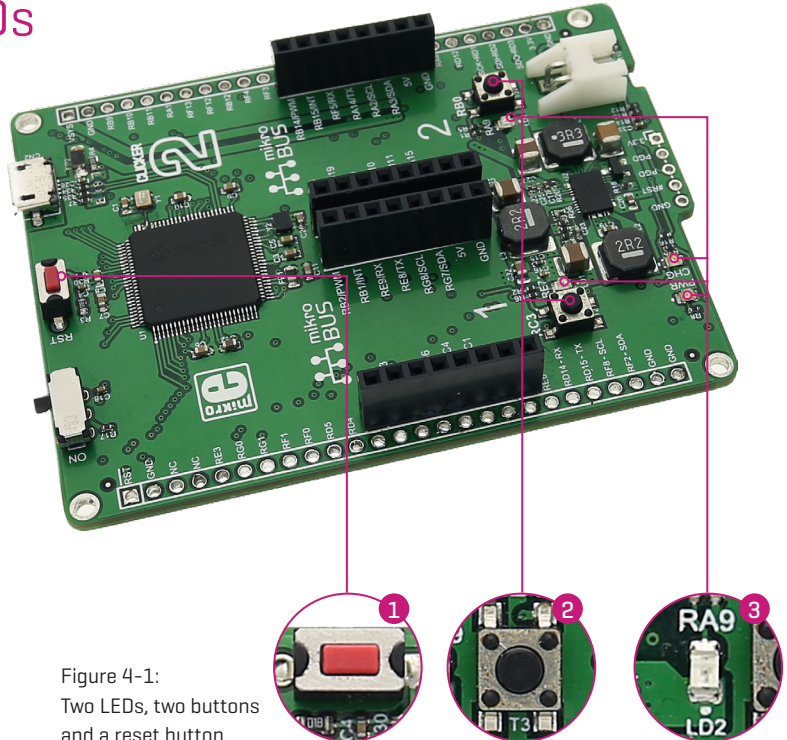
Figure 4-1:
Two LEDs, two buttons
and a reset button

5. Power management and battery charger
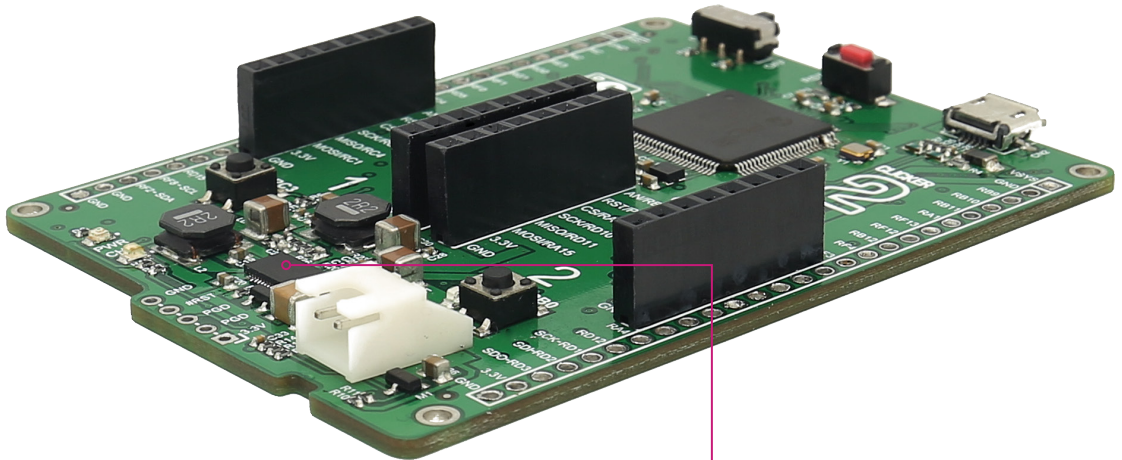
Clicker 2 for PIC32MZ features LTC®3586, a highly integrated power management and battery charger IC that includes a current limited switching PowerPath manager. LTC®3586 also enables battery charging over a USB connection.
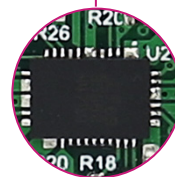
Figure 5-2: power management and battery charger IC

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 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.
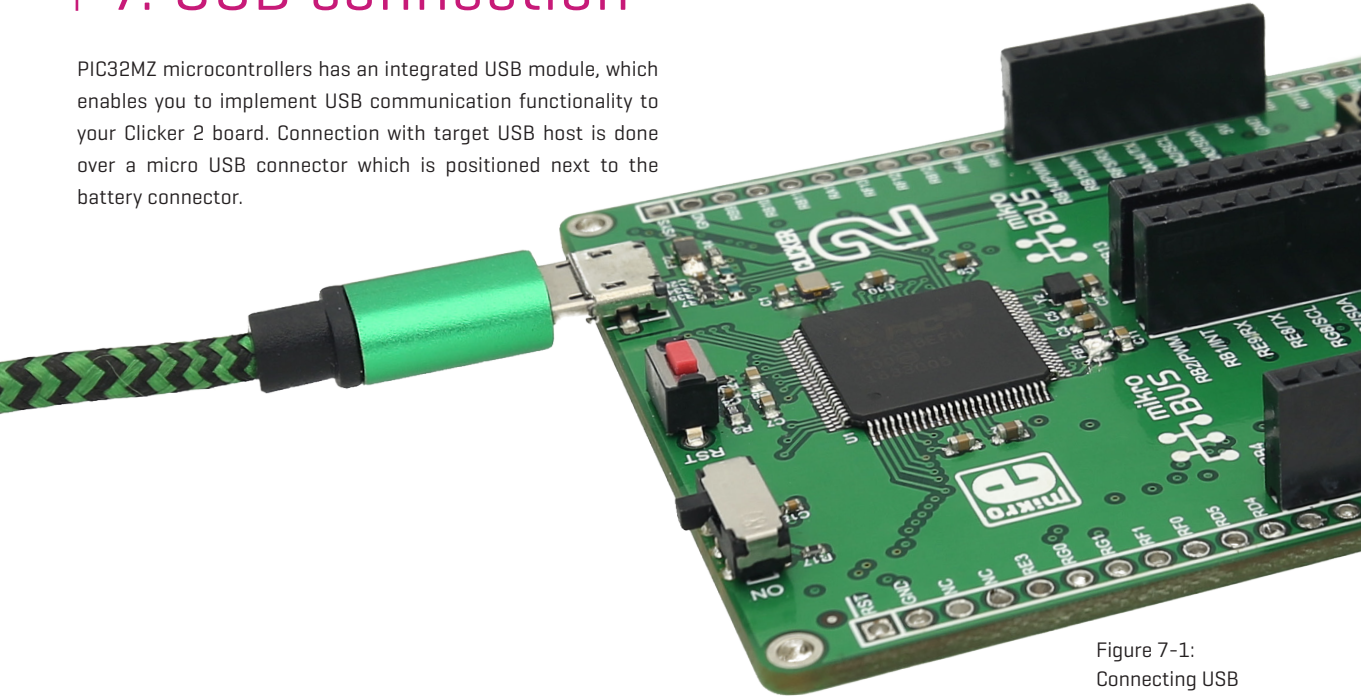
Figure 7-1:
Connecting USB cable to Clicker 2

9. Pinout

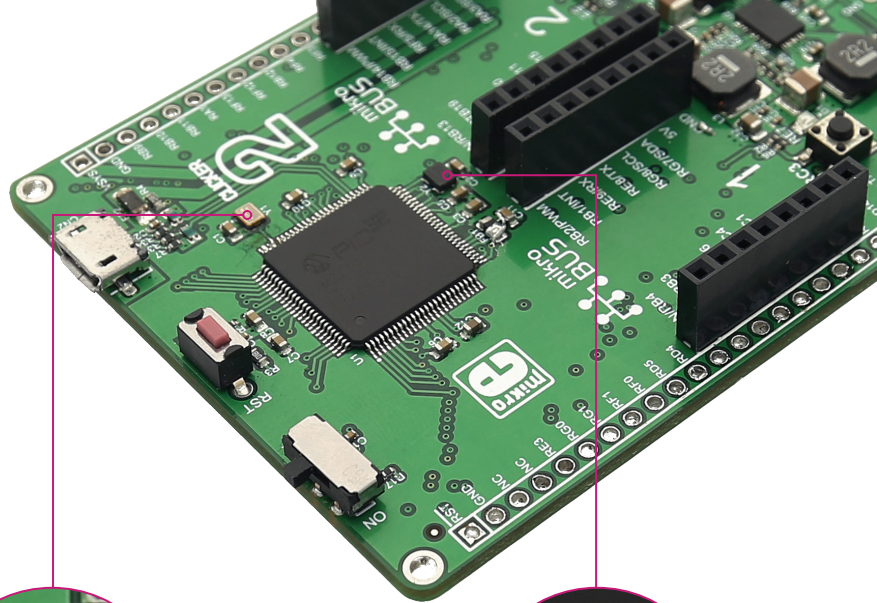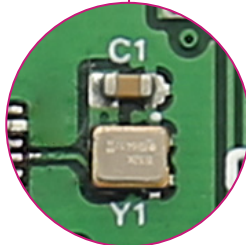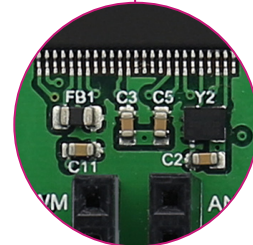| Pin functions		
Reset pin	RST	RST
Reference Ground	GND	GND
		NC
		NC
PWM lines	RE3	RE3
	RG0	RG0
	RG1	RG1
	RF1	RF1
	RF0	RF0
	RD5	RD5
	RD4	RD4
Digital I/O lines	RG14	AN/RB4
	RG12	RST/RB3
	RG9	CS/RC2
	RE2	SCK/RG6
	RE4	MISO/RC4
	RG15	MOSI/RC1
	RA5	3.3V
	RE5	GND
	RE6	RE6
UART3 Lines RX TX	RD14	RD14 - RX
	RD15	RD15 - TX
I²C2 Lines SCL SDA	RF8	RF8 - SCL
	RF2	RF2 - SDA
3.3V power supply	3.3V	3.3V
Reference Ground	GND	GND

Center board labels: RB2/PWM, RST/PTB19, RE9/RX, RE8/TX, RG8/SCL, RG7/SDA, 5V, GND

mikroBUS 1 / mikroBUS 2

Center board labels (2): AN/RB13, RST/PTB19, CS/RA10, SCK/RD10, MISO/RD11, MOSI/RA15, 3.3V, 5V, GND

RC3 / RB0 / RA9

		Pin functions
VSYS	VSYS	System power supply
GND	GND	Reference Ground
RB9	RB9	
RB10	RB10	
RB11	RB11	Analog Lines
RA1	RA1	
RF13	RF13	
RF12	RF12	
RB12	RB12	
RF4	RF4	
RF3	RF3	Interrupt Lines
RB15	RB15	
RB1	RB1	
RE1	RB14/PWM	
RE0	RB15/INT	
RA7	RF5/RX	
RA6	RA14/TX	Digital I/O lines
RD13	RA2/SCL	
RD0	RA3/SDA	
RA4	3.3V	
RD12	GND	
RD1	SCK-RD1	SCK
RD2	SDI-RD2	SDI SPI3 Lines
RD3	SDO-RD3	SDO
3.3V	3.3V	3.3V power supply
GND	GND	Reference Ground

Legend:
- 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

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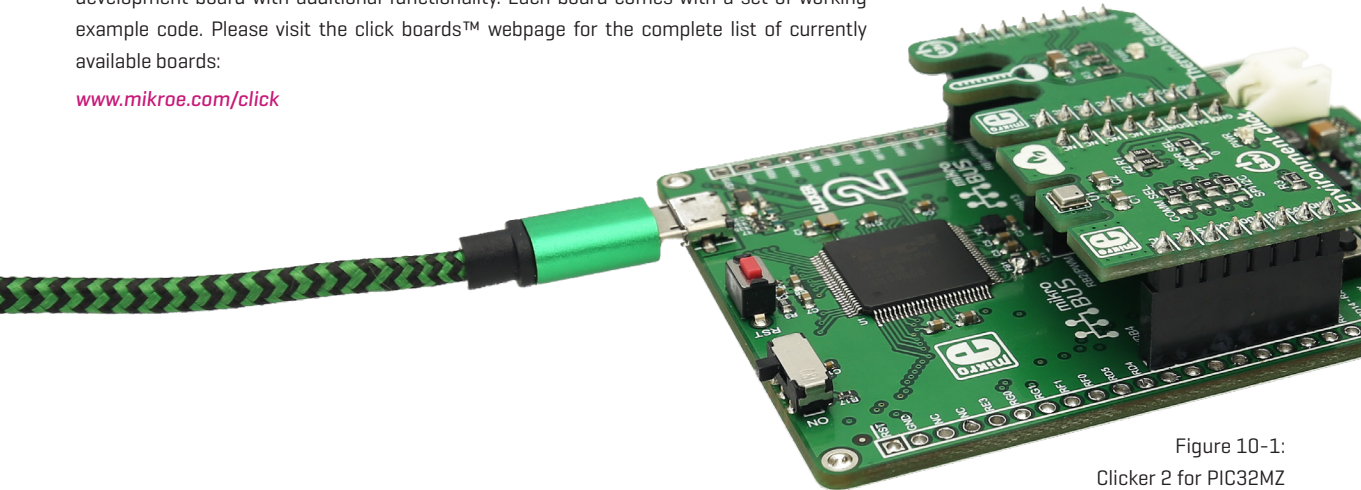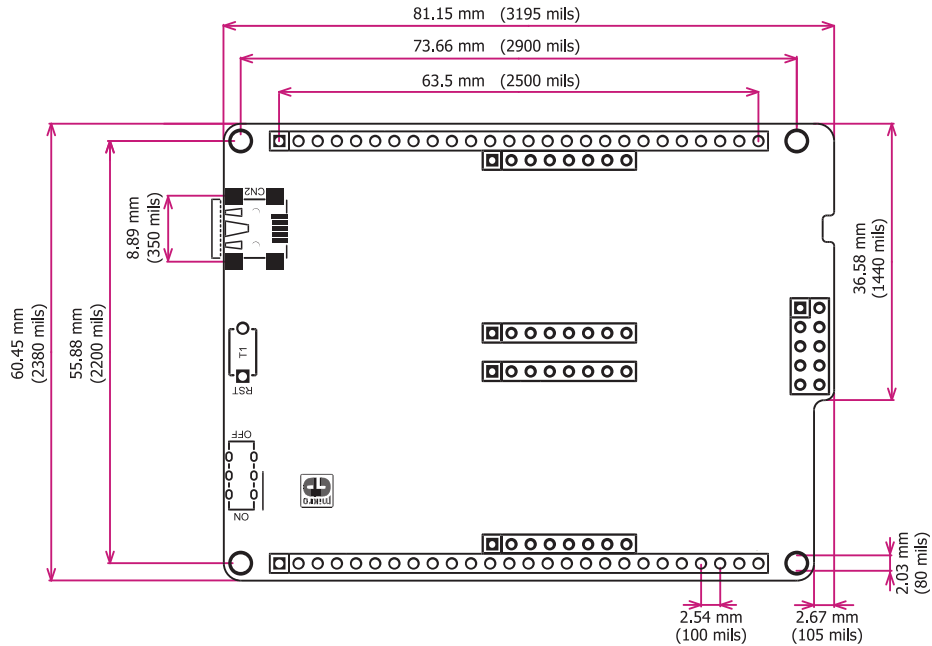driving click boards™

11. Dimensions

81.15 mm (3195 mils)
73.66 mm (2900 mils)
63.5 mm (2500 mils)

60.45 mm (2380 mils)
55.88 mm (2200 mils)
8.89 mm (350 mils)

36.58 mm (1440 mils)

2.54 mm (100 mils)
2.67 mm (105 mils)
2.03 mm (80 mils)

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