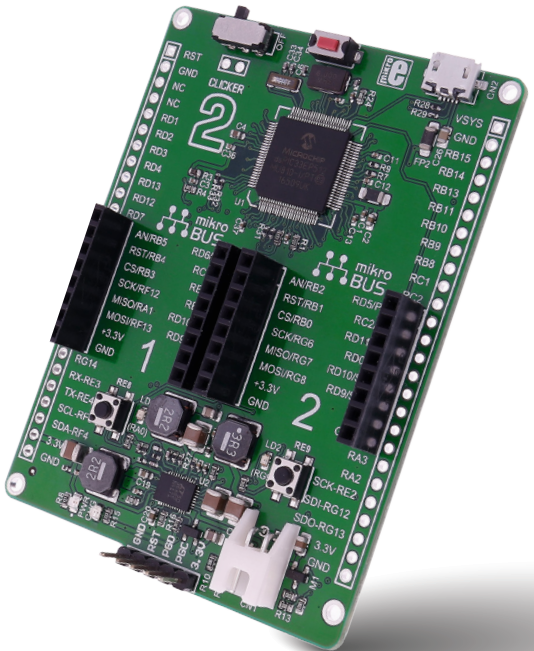
CLICKER 2 dsPIC33

the possibilities are endless

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

USB | mikroBUS | dsPIC



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

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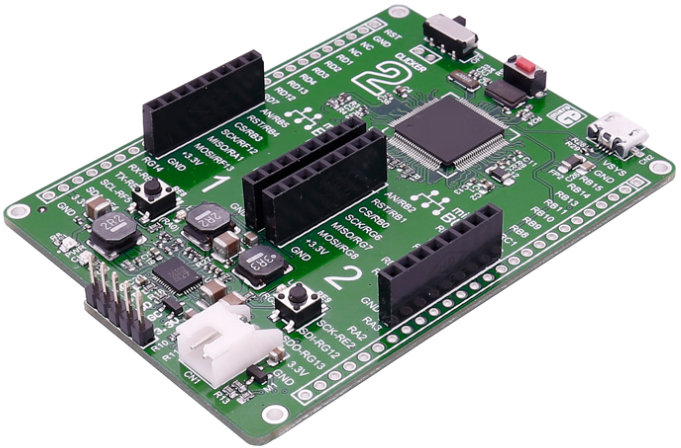
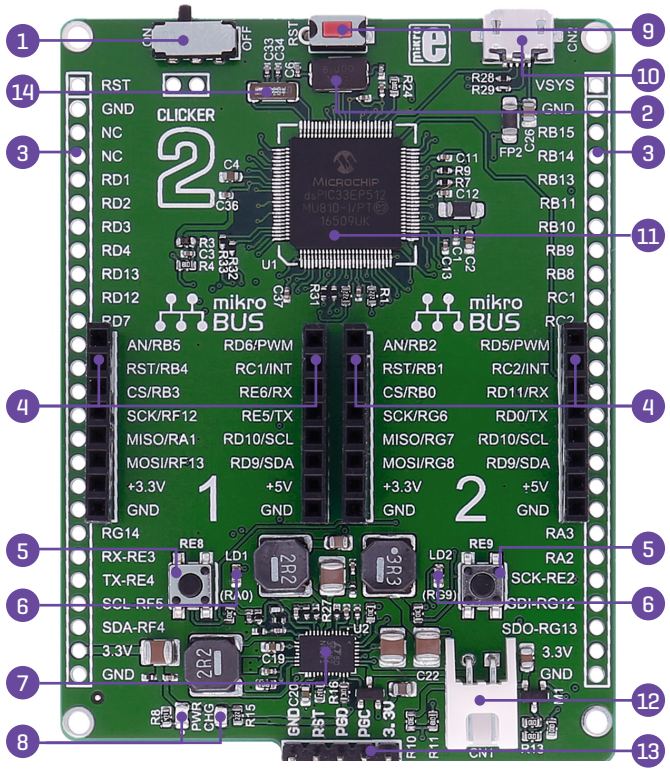
Introduction to clicker 2 for dsPIC33

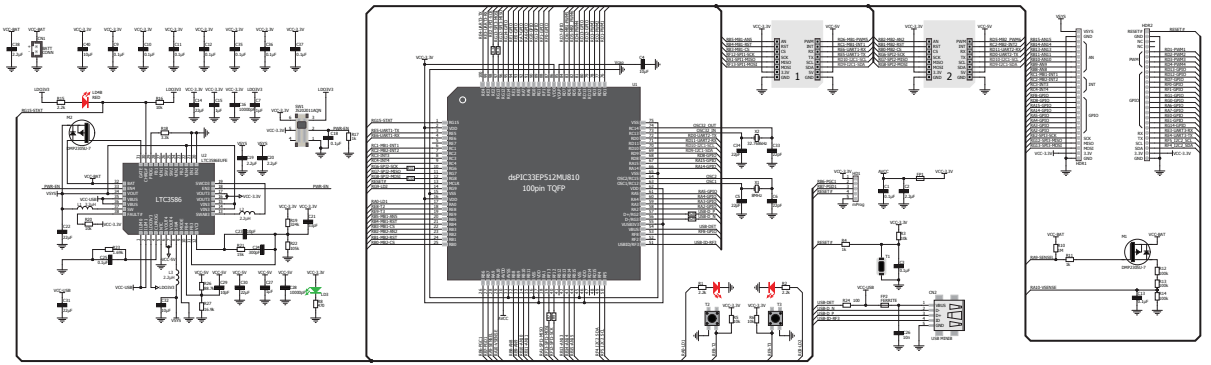
clicker 2 for dsPIC33 is a compact development kit with two mikroBUS™ sockets for click board™ connectivity. You can use it to quickly build your own gadgets with unique functionalities and features. It carries the **dsPIC33EP512MU810**, a 16-bit microcontroller, two indication LEDs, two general purpose 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 dsPIC33 board can be powered over a USB cable.



Key features

1. ON/OFF switch
2. 8 MHz crystal oscillator
3. two 1x26 connection pads
4. mikroBUS™ sockets 1 and 2
5. Pushbuttons
6. Additional LEDs
7. LTC3586 USB power manager IC
8. Power and Charge indication LEDs
9. RESET button
10. Micro USB connector
11. dsPIC33EP512MU810 MCU
12. Li-Polymer battery connector
13. mikroProg programmer connector
14. 32.768 KHz crystal oscillator

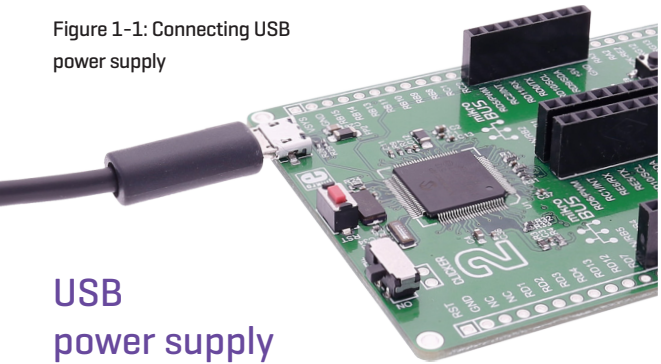




clicker 2 for dsPIC33 schematic

1. Power supply

Figure 1-1: Connecting USB power supply



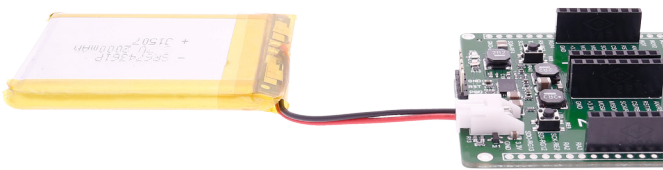
USB power supply

You can supply power to the board with a micro USB cable provided in the package. On-board voltage regulators provide the appropriate voltage levels to each component on the board. Power LED (GREEN) will indicate the presence of power supply.

Battery power supply

You can also power the board using a Li-Polymer battery, via onboard battery connector. On-board battery charger circuit enables you to charge the battery over USB connection. LED diode (RED) will indicate when battery is charging. Charging current is ~300mA and charging voltage is 4.2V DC.t

Figure 1-2: Connecting Li-Polymer battery



NOTE | *Some click boards need more current than the USB connection can supply. For 3.3V clicks, the upper limit is 750 mA; for 5V clicks, it's 500 mA. In those cases you would need to use the battery as the power supply, or the vsys pin on the side of the board.*

2. dsPIC33EP512MU810 microcontroller

The clicker 2 for dsPIC33 development tool comes with the dsPIC33EP512MU810 device. This 16-bit low power high performance microcontroller is rich with on-chip peripherals and features 512 KB of program memory and 53,248 bytes of RAM. It has integrated full speed USB 2.0. support.

Key MCU features

- CPU speed: 70 MIPS
- 3568 Bytes Data SRAM
- Architecture: 16-bit
- Program memory: 512KB
- Pin count: 100
- RAM memory: 53,248 KB

3. Programming the microcontroller

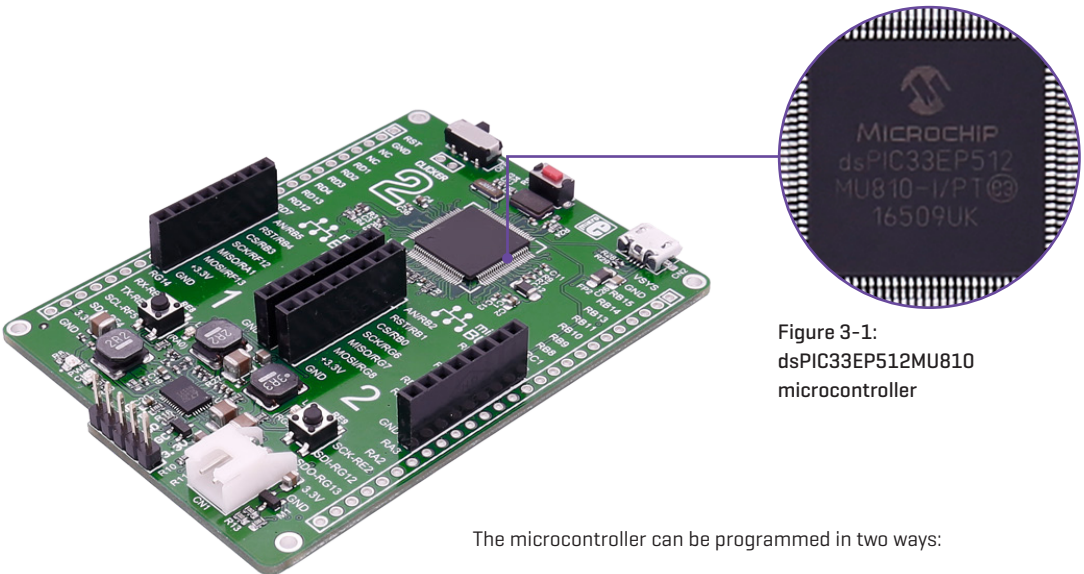


Figure 3-1:
dsPIC33EP512MU810
microcontroller

The microcontroller can be programmed in two ways:

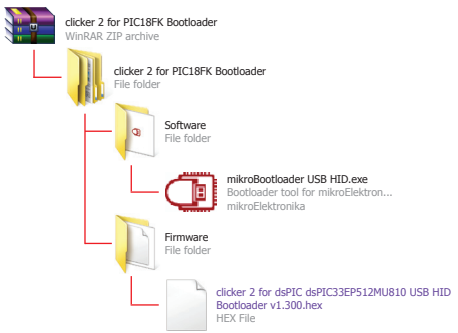
- Using USB HID mikroBootloader,
- Using external mikroProg for dsPIC33 programmer

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:

https://download.mikroe.com/examples/starter-boards/clicker-2/dspic33/clicker-2-dspic33-usb-hid-bootloader.zip

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



step 1 – Connecting clicker 2 for dsPIC33

Figure 3-2: USB HID mikroBootloader window

01 To start, connect the USB cable, or if already connected press the Reset button on your clicker 2 for dsPIC33. 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

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

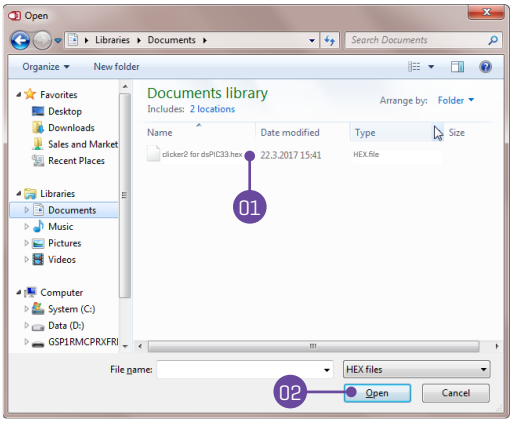


Figure 3-4: Selecting HEX

01 Select .HEX file using open dialog window.

02 Click the Open button.

step 4 – Uploading .HEX file

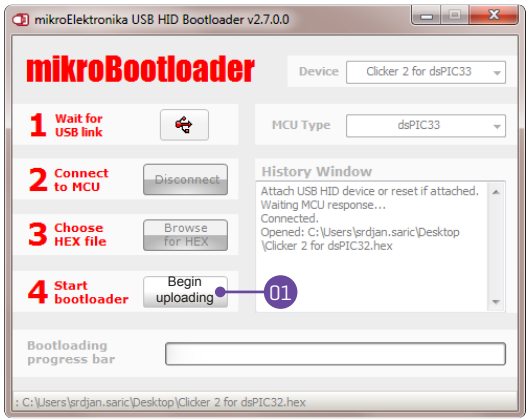


Figure 3-5: Begin uploading

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

Figure 3-6: Progress bar

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

step 5 – Finish upload

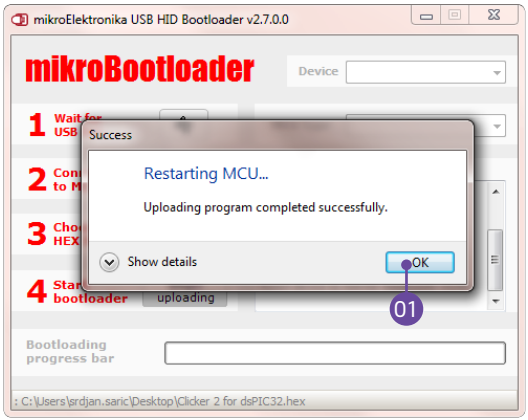


Figure 3-7: Restarting MCU

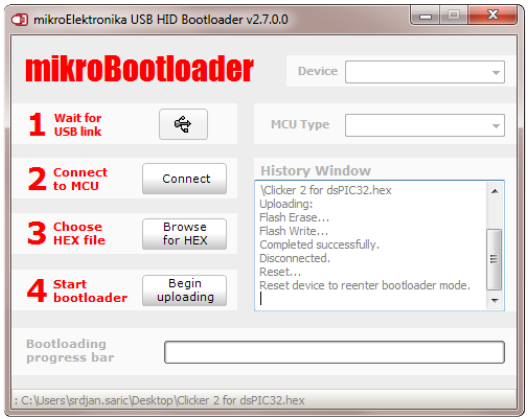


Figure 3-8: mikroBootloader ready for next job

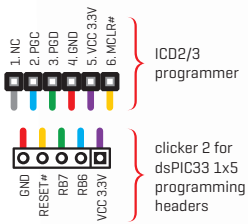
01 Click **OK** button after the uploading process is finished.

02 Press **Reset button** on clicker 2 for dsPIC33 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 programmer** and **mikroProg Suite for PIC software**. The external programmer is connected to the development system via 1x5 connector **Figure 3-9. mikroProg** is a fast USB 2.0 programmer with hardware debugger support. It supports PIC10®, dsPIC30/33®, PIC24® and PIC32® devices in a single programmer. It supports over 570 microcontrollers from Microchip®. Outstanding performance, easy operation and elegant design are its key features.

You can also program it with ICD2® or ICD3® if you reroute the wires like shown here.



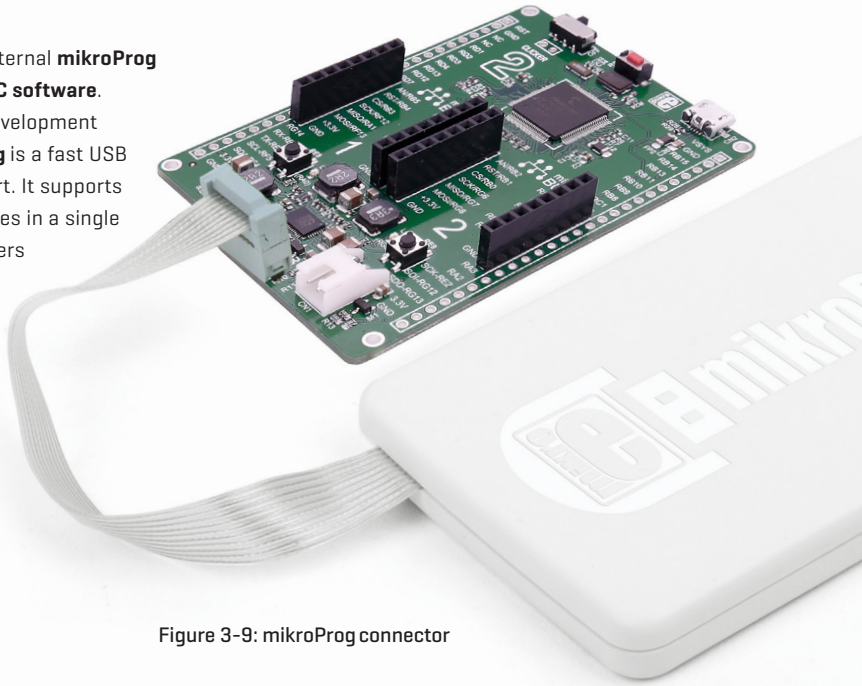


Figure 3-9: mikroProg connector

mikroProg Suite for dsPIC® software

mikroProg programmer requires special programming software called **mikroProg Suite for dsPIC®**. 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.

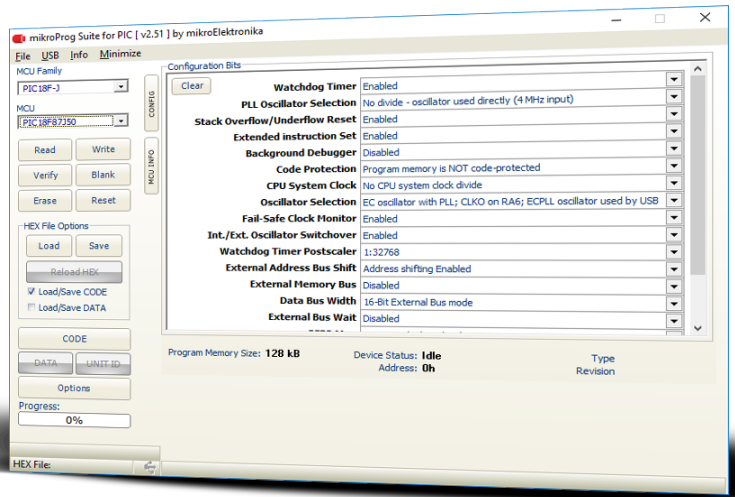


Figure 3-10: Main window of mikroProg Suite for dsPIC® programming software

4. Buttons and LEDs

The board also contains a 01 **reset button** and a pair of 02 **buttons** and 03 **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 (RA0 and RG9). 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 (T2 and T3) from logic high (1) to logic low (0).

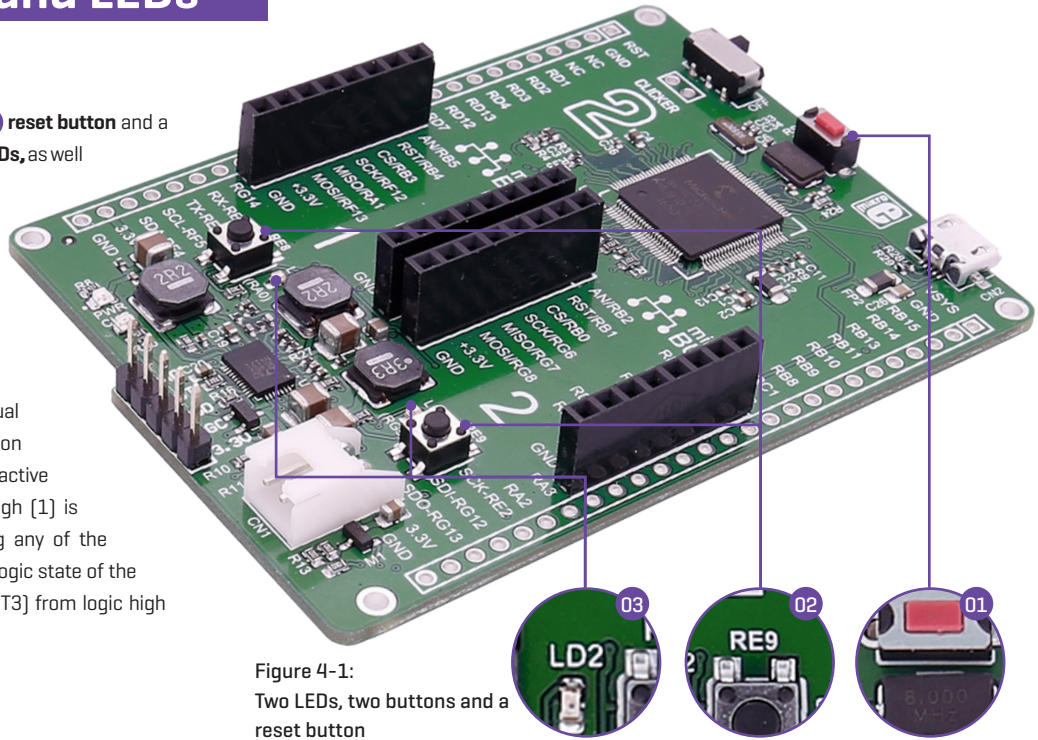


Figure 4-1:
Two LEDs, two buttons and a reset button

5. Power management and battery charger

clicker 2 for dsPIC33 features LTC®3586-2, 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.

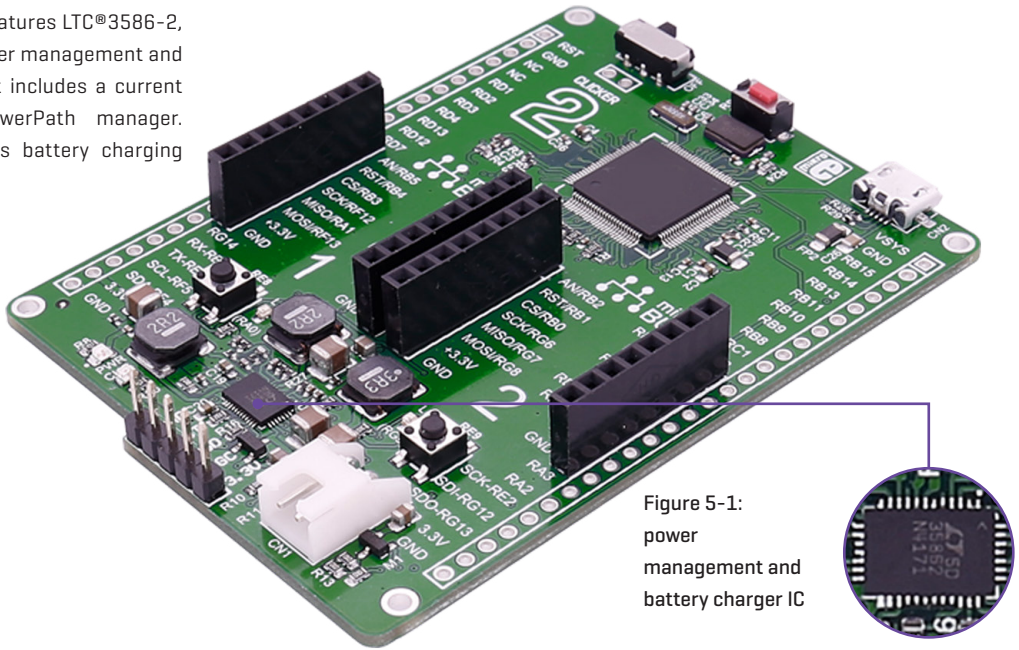


Figure 5-1: power management and battery charger IC

6. Oscillators

Board is equipped with **8MHz crystal oscillator (X1)** circuit that provides external clock waveform to the microcontroller **OSC1** and **OSC2** pins. This base frequency is suitable for further clock multipliers and ideal for generation of necessary USB clock, which ensures proper operation of bootloader and your custom USB-based applications. And the **32. TK MHz oscillator (X2)**, a Real-Time Clock and Calendar (RTCC) module.

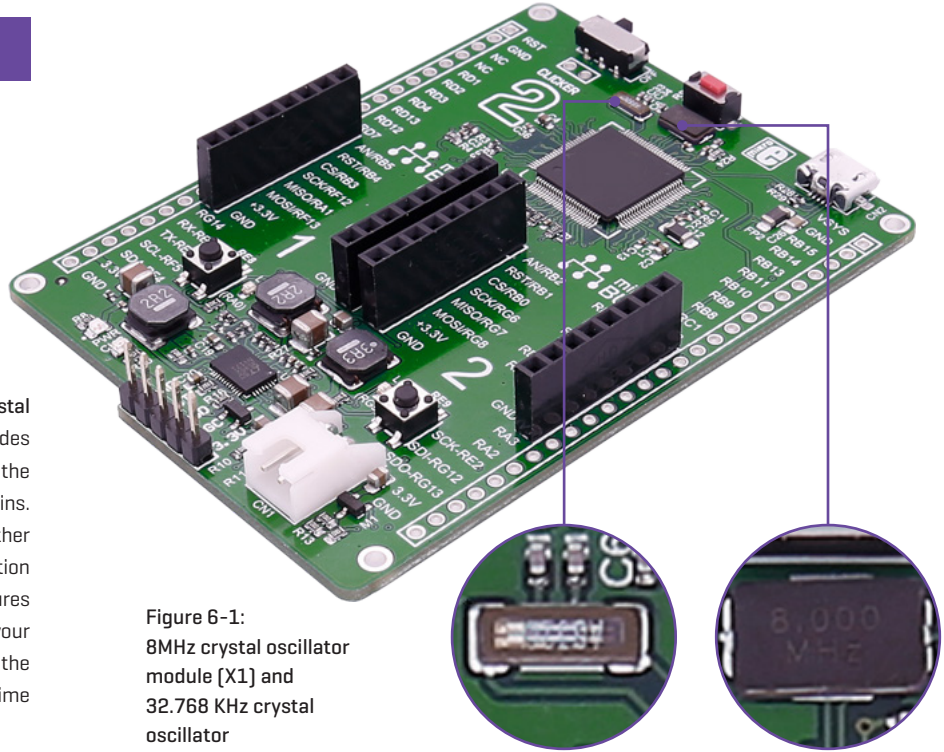


Figure 6-1:
8MHz crystal oscillator module (X1) and 32.768 KHz crystal oscillator

7. USB connection

dsPIC33 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.

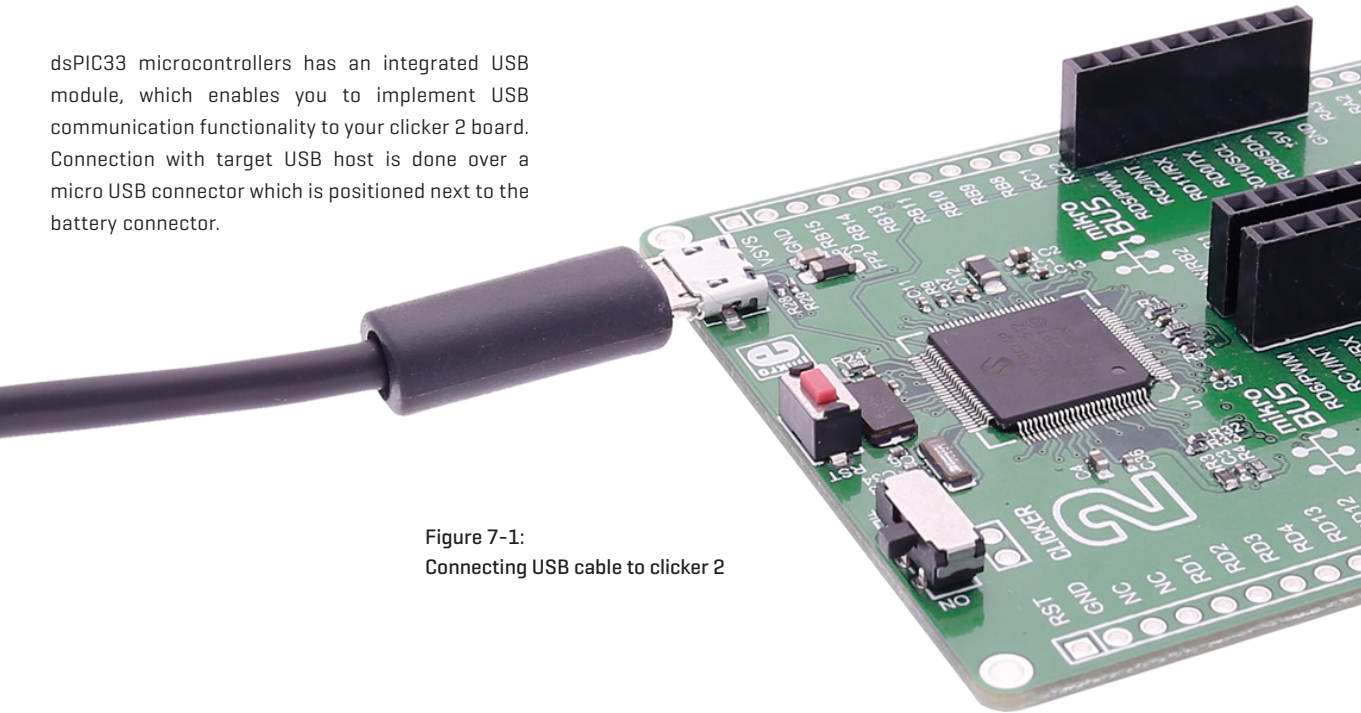
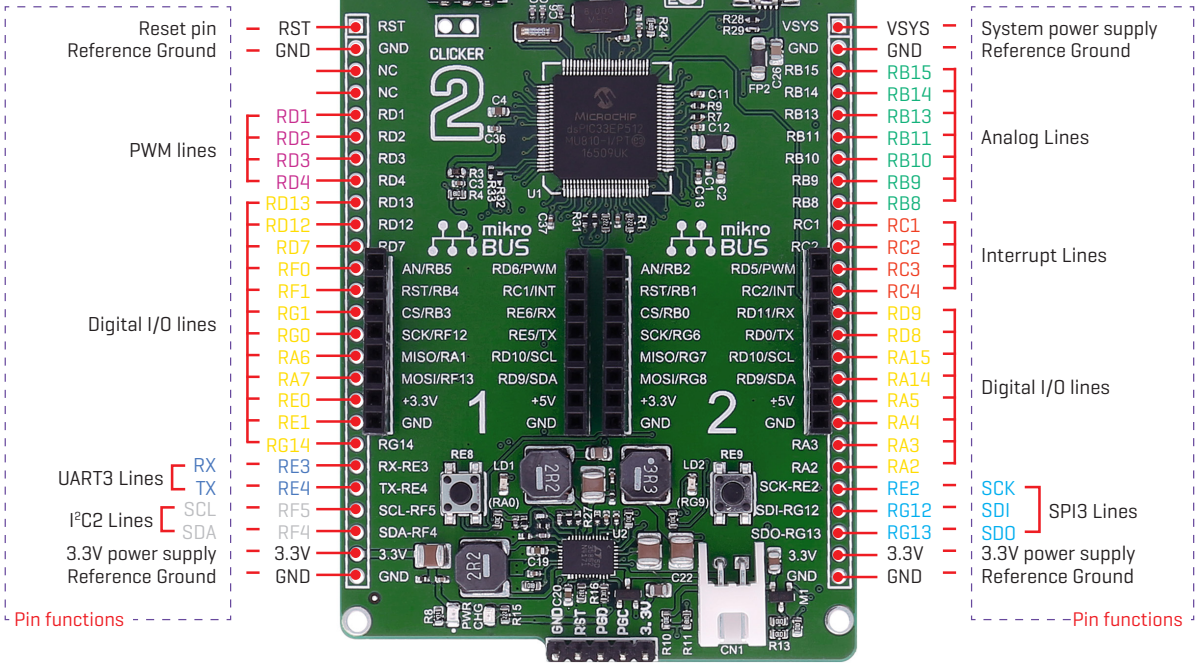


Figure 7-1:
Connecting USB cable to clicker 2

8. Pinout



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

8.1 mikroBUS™ pinouts

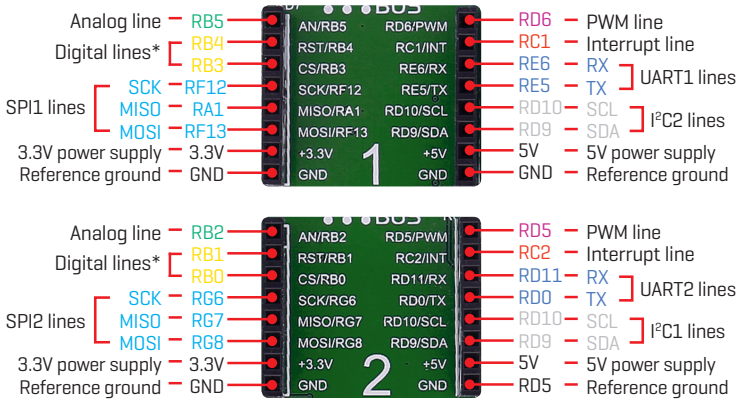
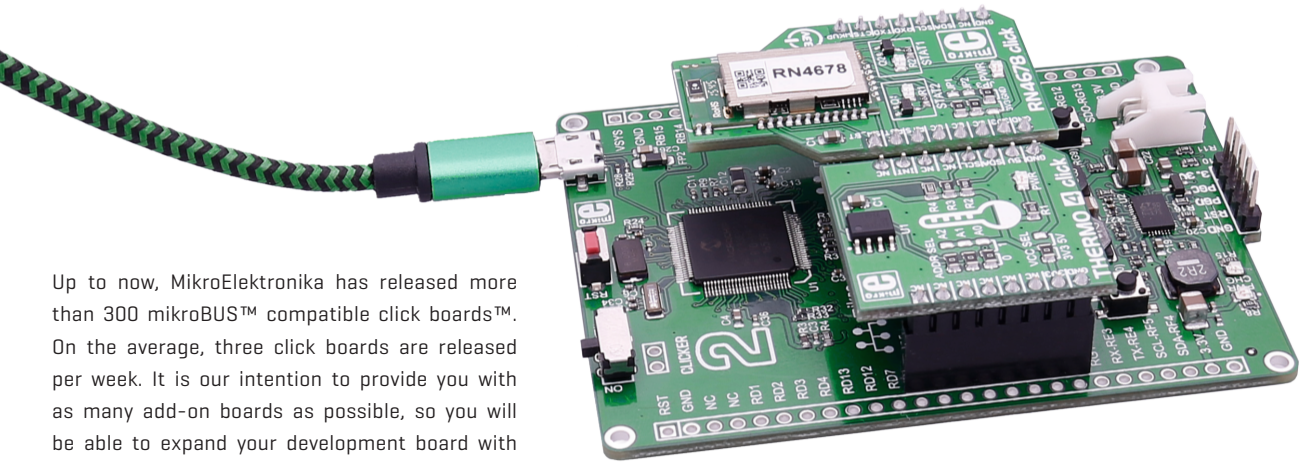


Figure 9-1: mikroBUS™ individual and shared lines

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

9. click boards™ are plug and play!

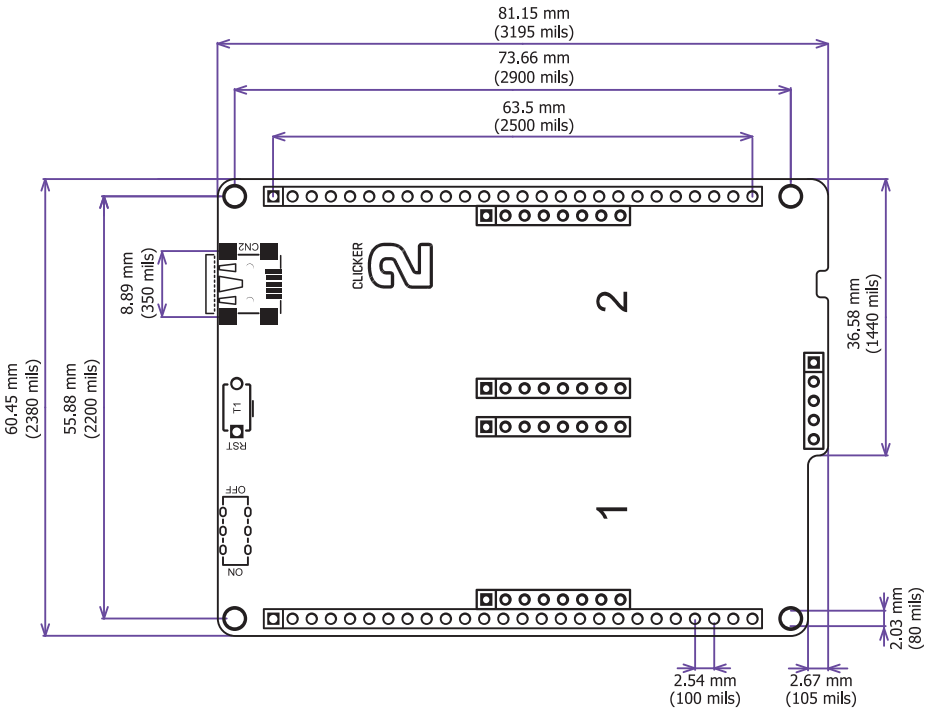


Up to now, MikroElektronika has released more than 300 mikroBUS™ compatible click boards™. On the average, three click boards are released per week. It is our intention to provide you with as many add-on boards as possible, so you will be able to expand your development board with additional functionality. Each board comes with a set of working example code. Please visit the click boards™ webpage for the complete list of currently available boards:

https://shop.mikroe.com/click

Figure 10-1:
clicker 2 for dsPIC33 driving click boards™

10. Dimensions



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