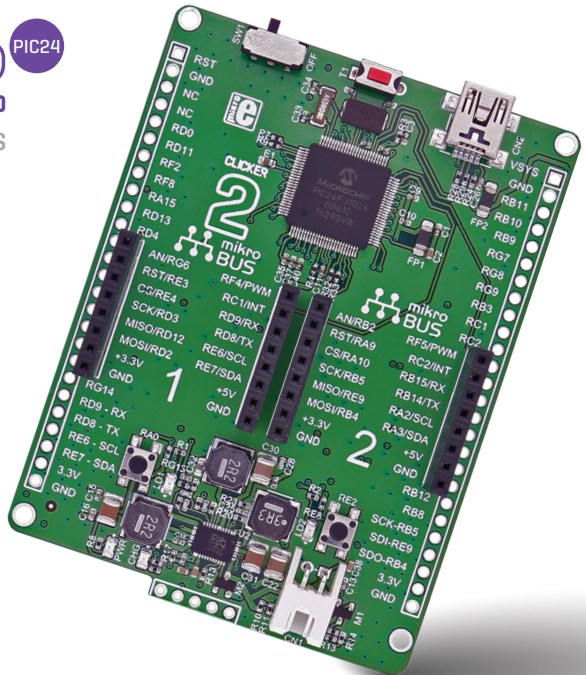
CLICKER 2 PIC24

the possibilities are endless

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

USB | mikro BUS | PIC24



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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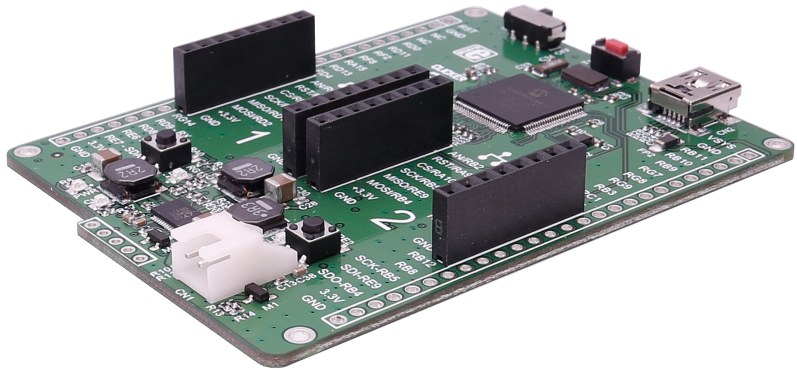
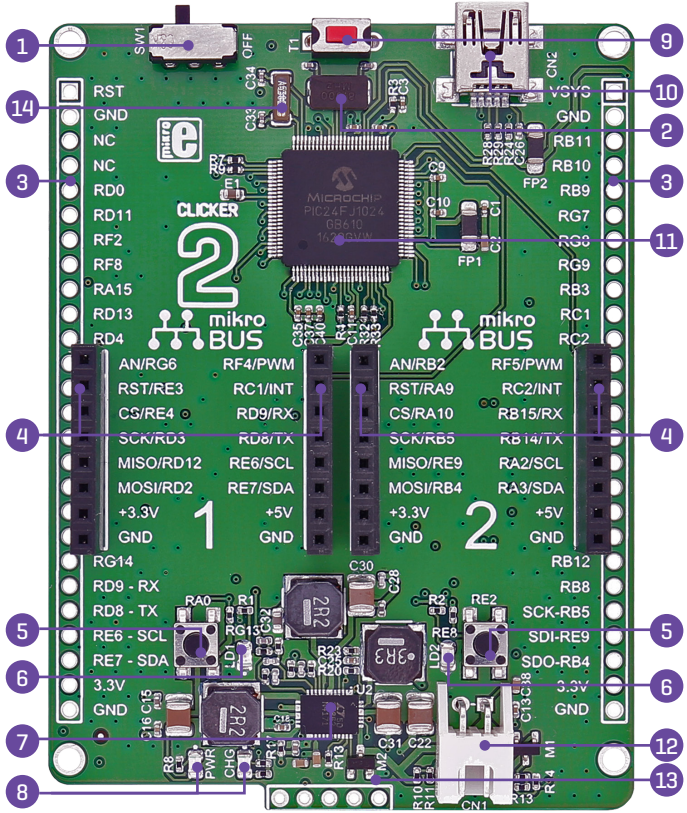
Introduction to clicker 2 for PIC24

clicker 2 for PIC24 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 PIC24FJ1024GB610, 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 PIC24 board can be powered over a USB cable.

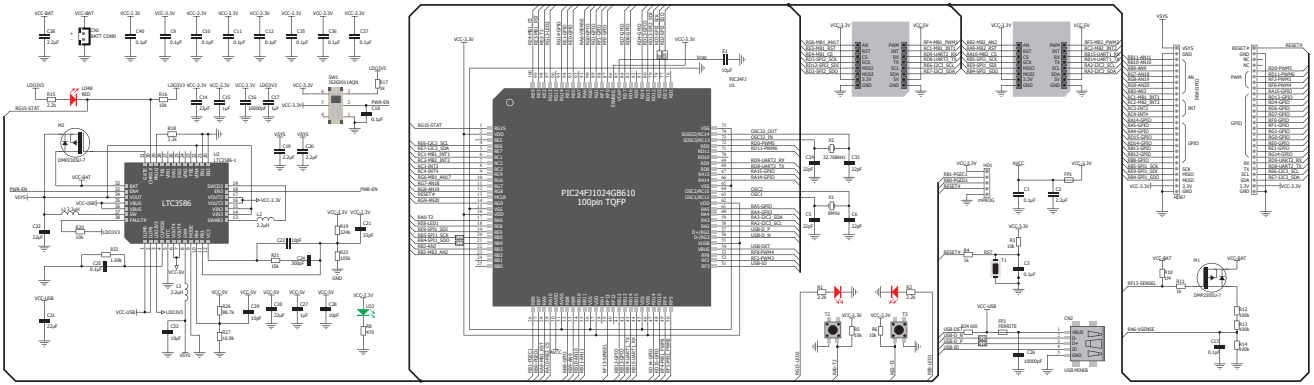


Key features

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. PIC24FJ1024GB610 MCU
12. Li-Polymer battery connector
13. mikroProg programmer connector
14. 32.768 KHz crystal oscillator

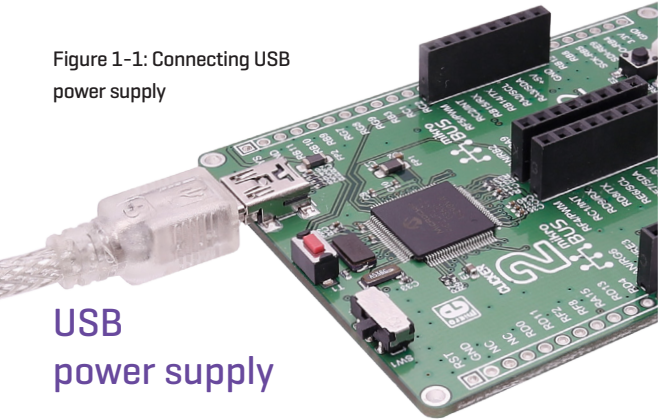


Schematic



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. PIC24FJ1024GB610 microcontroller

The clicker 2 for PIC24 development tool comes with the PIC24FJ1024GB610 device. This 16-bit microcontroller features large dual partition flash with live update capability. This family includes up to 1024KB Flash, 32KB RAM, USB and advanced peripherals.

Key MCU features

- CPU speed: 16 MIPS
- Architecture: 16-bit
- Program memory: 1024KB
- Pin count: 100
- USB v2.0 On-The-Go (OTG) Compliant

3. Programming the microcontroller

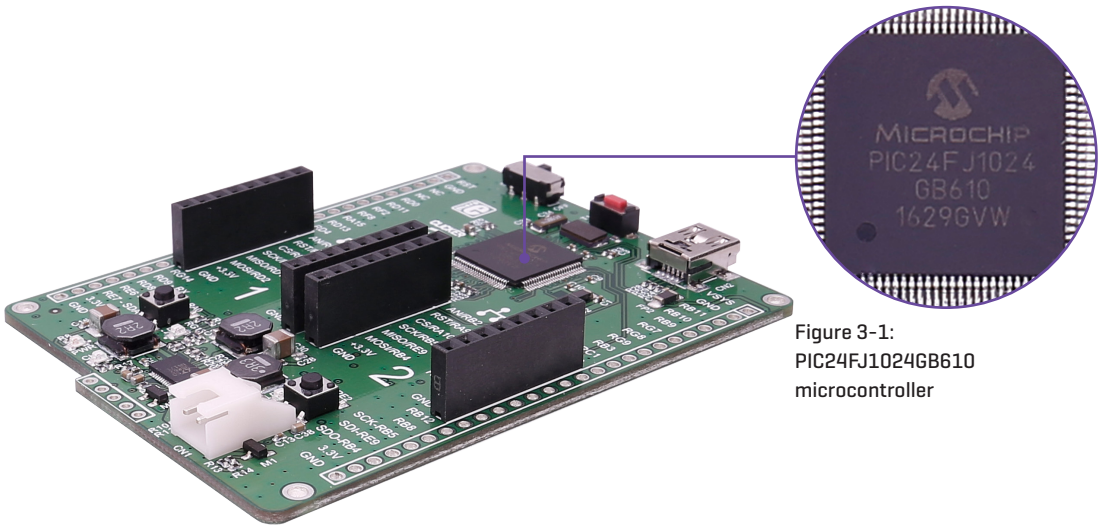


Figure 3-1:
PIC24FJ1024GB610
microcontroller

The microcontroller can be programmed in two ways:

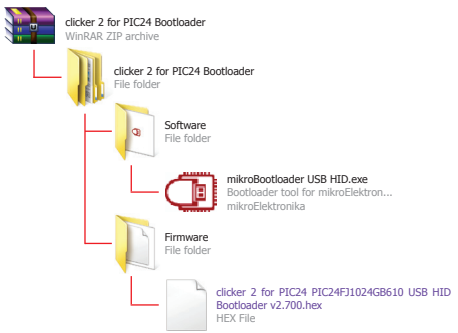
- Using USB HID mikroBootloader,
- Using external mikroProg for PIC24 programmer

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/pic24/clicker-2-pic24-bootloader.zip

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



step 1 – Connecting clicker 2 for PIC24

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 PIC24. 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

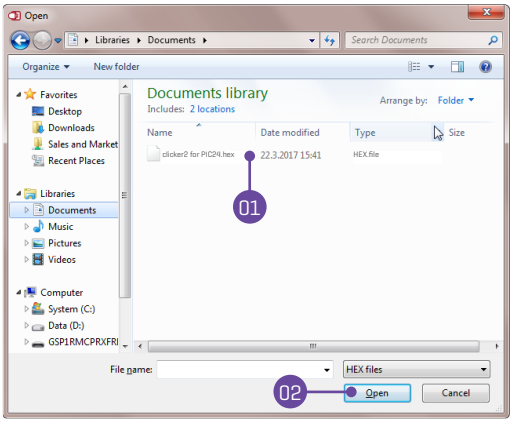


Figure 3-4: Selecting HEX

01 Select .HEX file using open dialog window.

02 Click the Open button.

step 4 – Uploading .HEX file

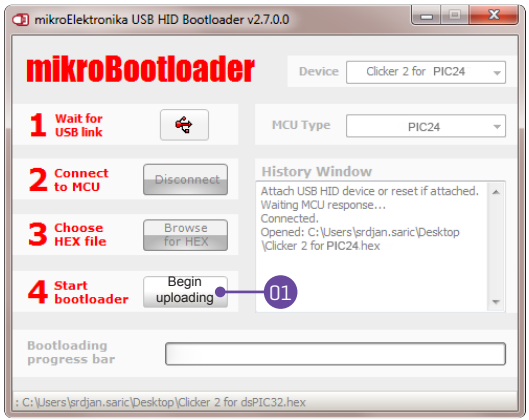


Figure 3-5: Begin uploading

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

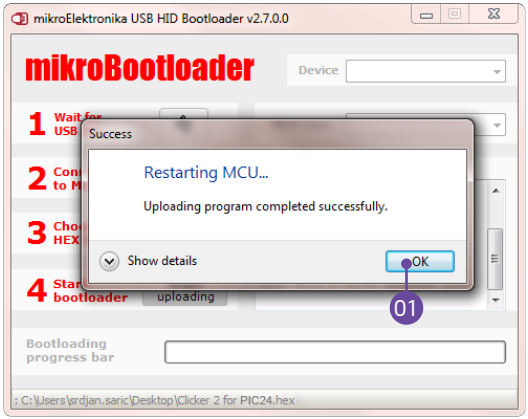


Figure 3-7: Restarting MCU

Figure 3-8: mikroBootloader ready for next job

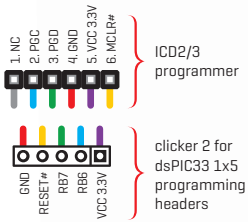
01 Click **OK** button after the uploading process is finished.

02 Press **Reset button** on clicker 2 for PIC24 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 1100 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.



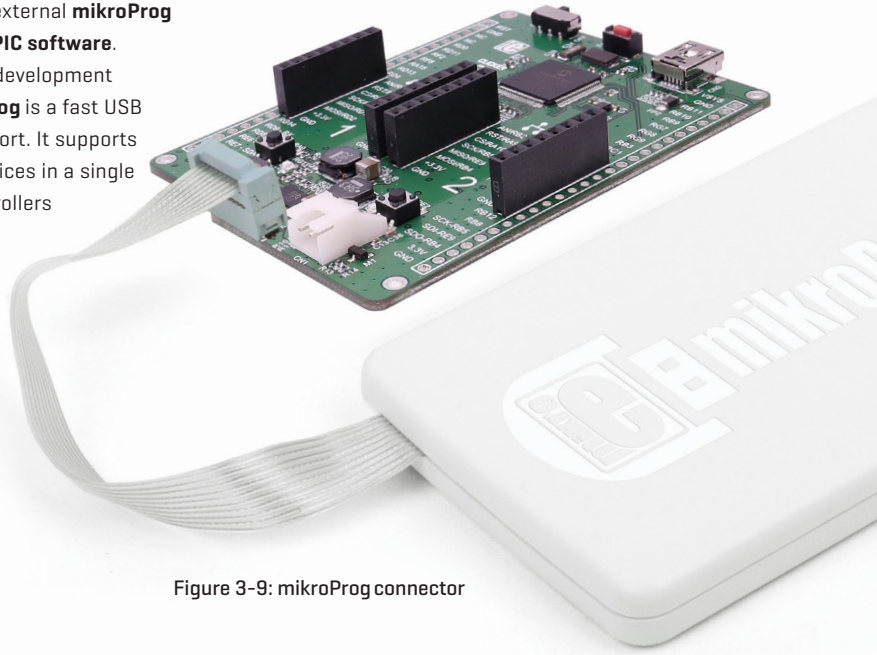


Figure 3-9: mikroProg connector

mikroProg Suite for PIC24® 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.

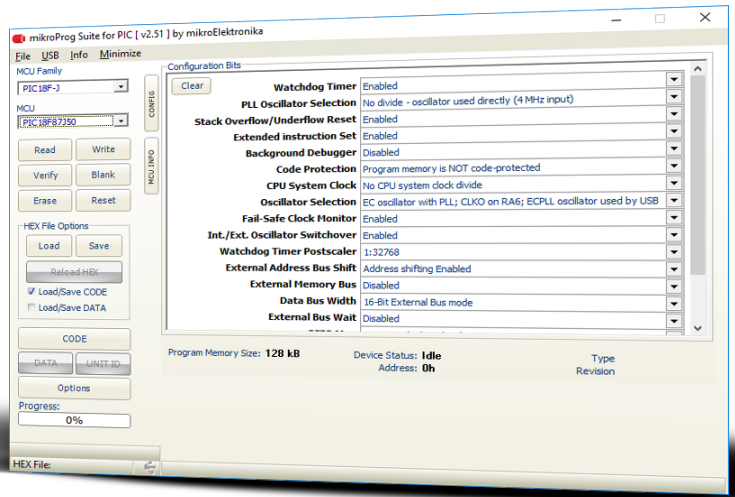


Figure 3-10: Main window of mikroProg Suite for dsPIC® programming software

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 (RG13 and RE8). 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).

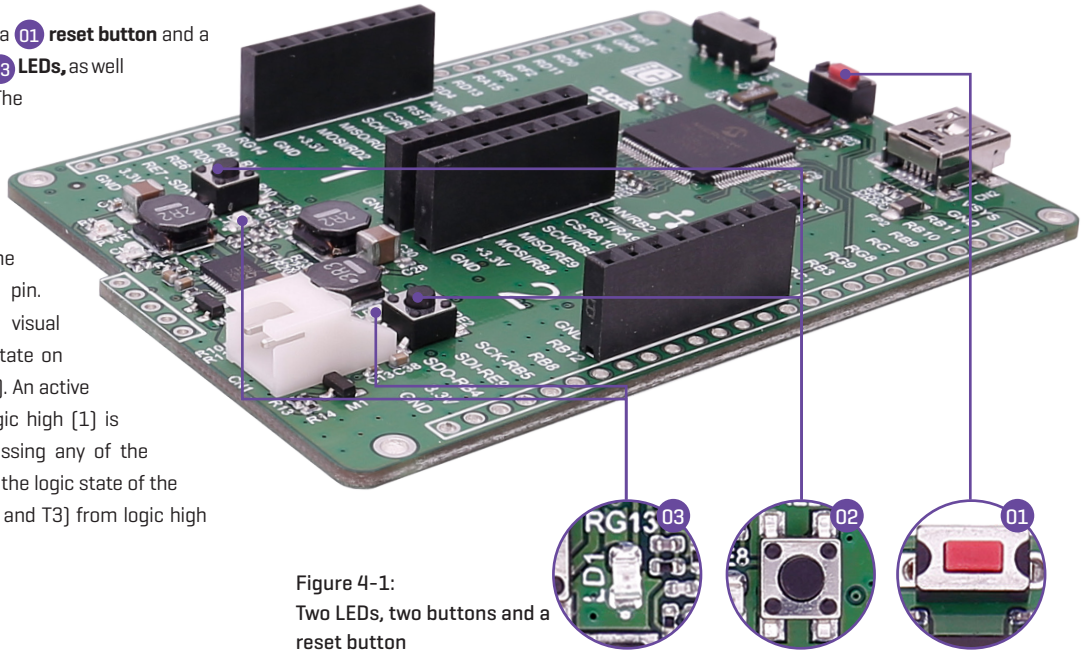
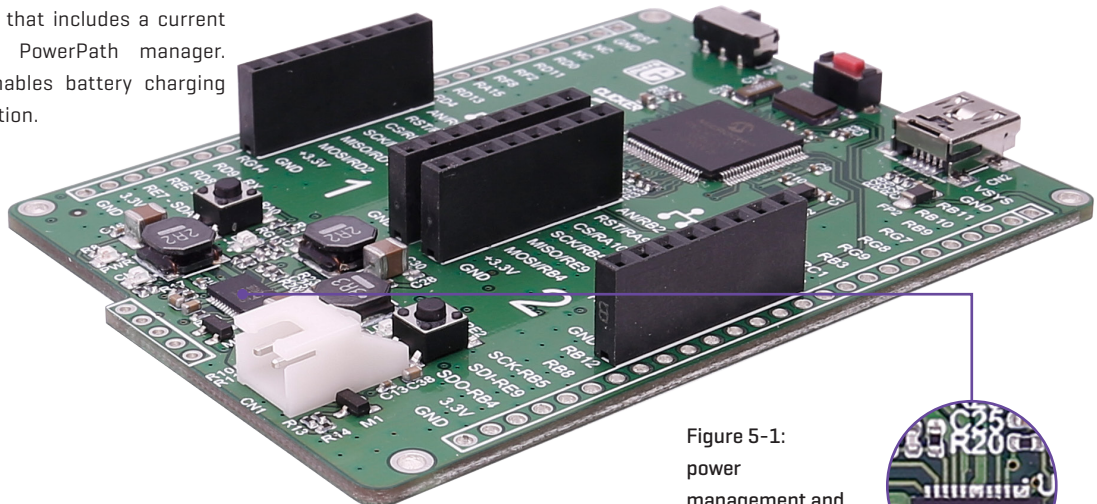


Figure 4-1:
Two LEDs, two buttons and a reset button

5. Power management and battery charger

clicker 2 for PIC24 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.


1
2
3.3V
GND
SCK-RB5
SDI-RE9
SDO-RB4
CS-RB8
RB12
RB11
RB10
RB9
RG1
RG8
RG9
RB3
RC1
VBUS
RG14
RG15
RE7
RE6
RE5
RE4
RE3
RE2
RE1
RE0
RB7
RB6
RB5
RB4
RB2
RB1
RB0
RC2
RC3
RC4
RC5
RC6
RC7
RC8
RC9
RA8
RA9
RA10
RB13
RB14
RB15
RC12
RC13
RC14
RC15
RA0
RA1
RA2
RA3
RA4
RA5
RA6
RA7
RB8
RB9
RB10
RB11
RB12
RB13
RB14
RB15
RC12
RC13
RC14
RC15
RA0
RA1
RA2
RA3
RA4
RA5
RA6
RA7
RB0
RB1
RB2
RB3
RB4
RB5
RB6
RB

6. Oscillators

Board is equipped with 8MHz crystal oscillator (X1) circuit that provides external clock waveform to the microcontroller CLKO and CLKI 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.
There is also 32.768 KHz crystal oscillator for the RTC

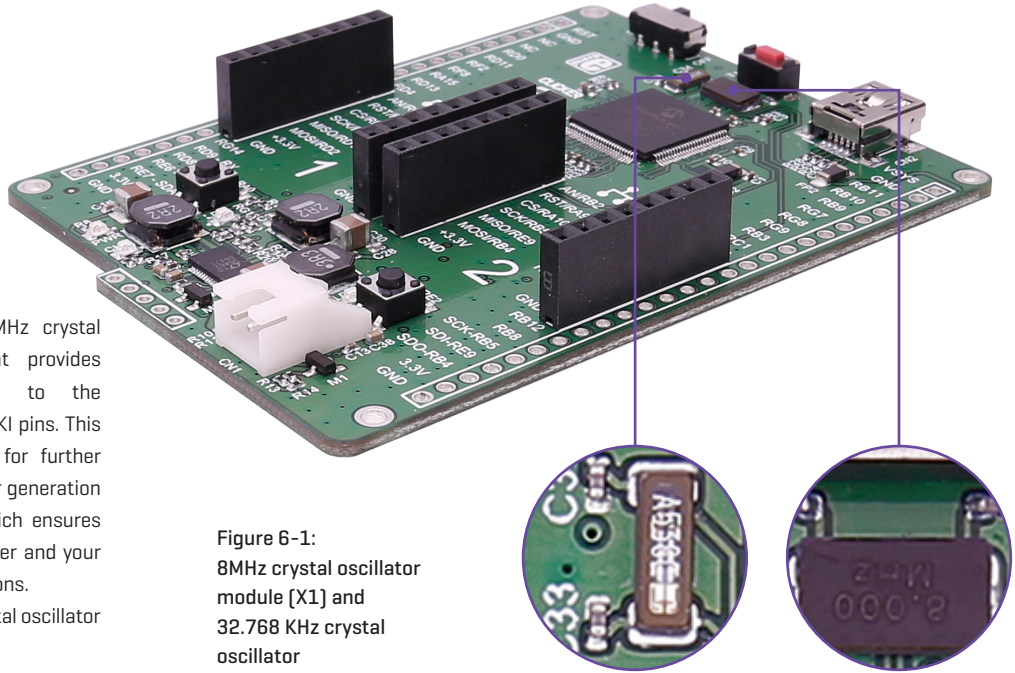


Figure 6-1:
8MHz crystal oscillator module (X1) and 32.768 KHz crystal oscillator

7. USB connection

PIC24 microcontrollers have 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.

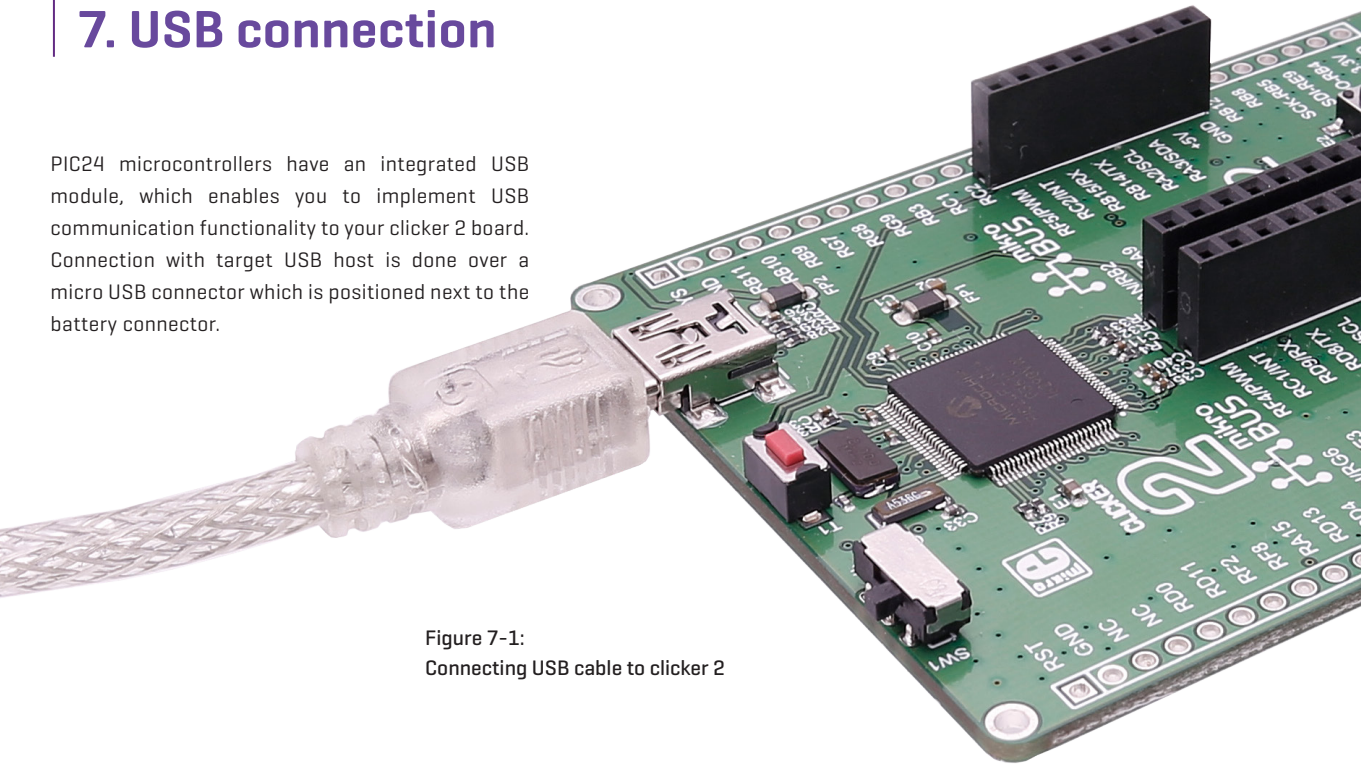
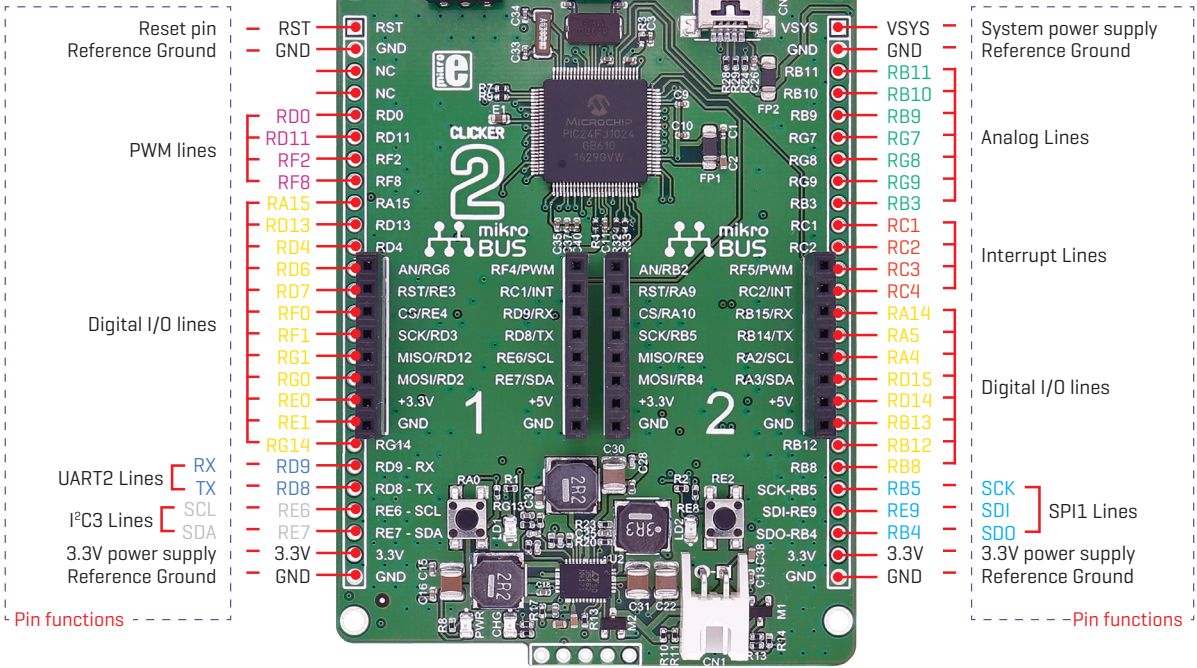


Figure 7-1:
Connecting USB cable to clicker 2

8. Pinout


Reset pin
Reference Ground
RST
GND
PWM lines
RD0
RD11
RF2
RF8
Digital I/O lines
RA15
RD13
RD4
RD6
RD7
RF0
RF1
RG1
RG0
RE0
RE1
RG14
UART2 Lines
RX
TX
I²C3 Lines
SCL
SDA
3.3V power supply
Reference Ground
3.3V
GND
Pin functions
RST
GND
NC
NC
RD0
RD11
RF2
RF8
RA15
RD13
RD4
AN/RG6
RST/RE3
CS/RE4
SCK/RD3
MISO/RD12
MOSI/RD2
+3.3V
GND
RG14
RD9 - RX
RD8 - TX
RE6 - SCL
RE7 - SDA
3.3V
GND
RF4/PWM
RC1/INT
RD9/RX
RD8/TX
RE6/SCL
RE7/SDA
+5V
GND
AN/RB2
RST/RA9
CS/RA10
SCK/RB5
MISO/RE9
MOSI/RB4
+3.3V
GND
RF5/PWM
RC2/INT
RB15/RX
RB14/TX
RA2/SCL
RA3/SDA
+5V
GND
RB12
RB8
SCK-RB5
SDI-RE9
SDO-RB4
3.3V
GND
VSYS
GND
RB11
RB10
RB9
RG7
RG8
RG9
RB3
RC1
RC2
RC3
RC4
RA14
RA5
RA4
RD15
RD14
RB13
RB12
RB8
RB5
RE9
RB4
3.3V
GND
System power supply
Reference Ground
Analog Lines
Interrupt Lines
Digital I/O lines
SCK
SDI
SDO
SPI1 Lines
3.3V power supply
Reference Ground
Pin functions
Digital lines
Analog Lines
Interrupt Lines
SPI Lines
I2C Lines
UART lines
PWM lines

8.1 mikroBUS™ pinout

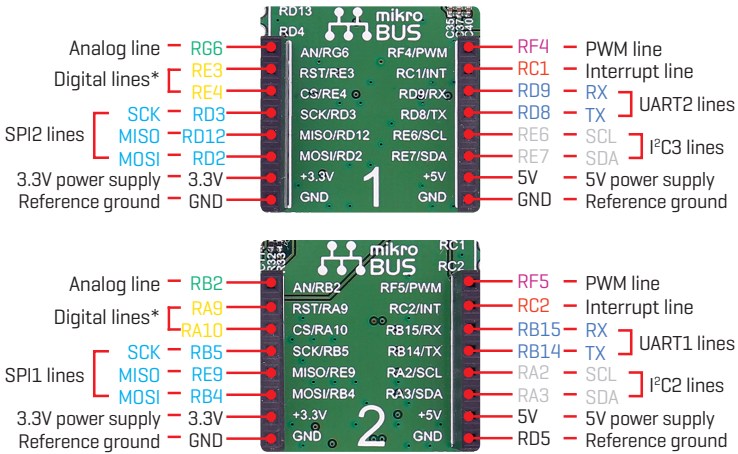
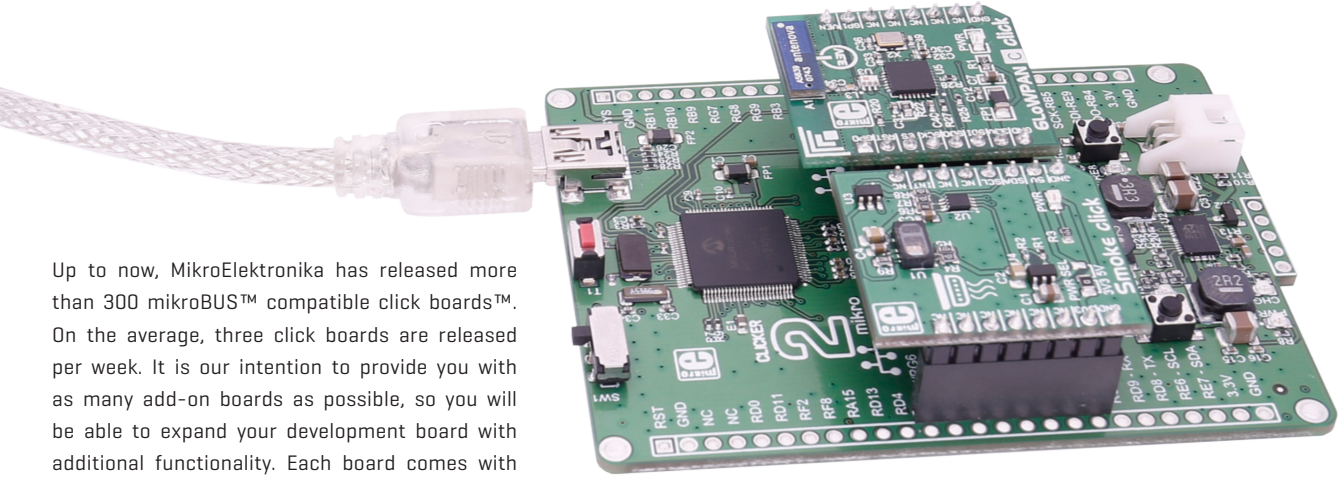


Figure 9-1: mikroBUS™ individual and shared lines

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

9. click boards™ are plug and play!

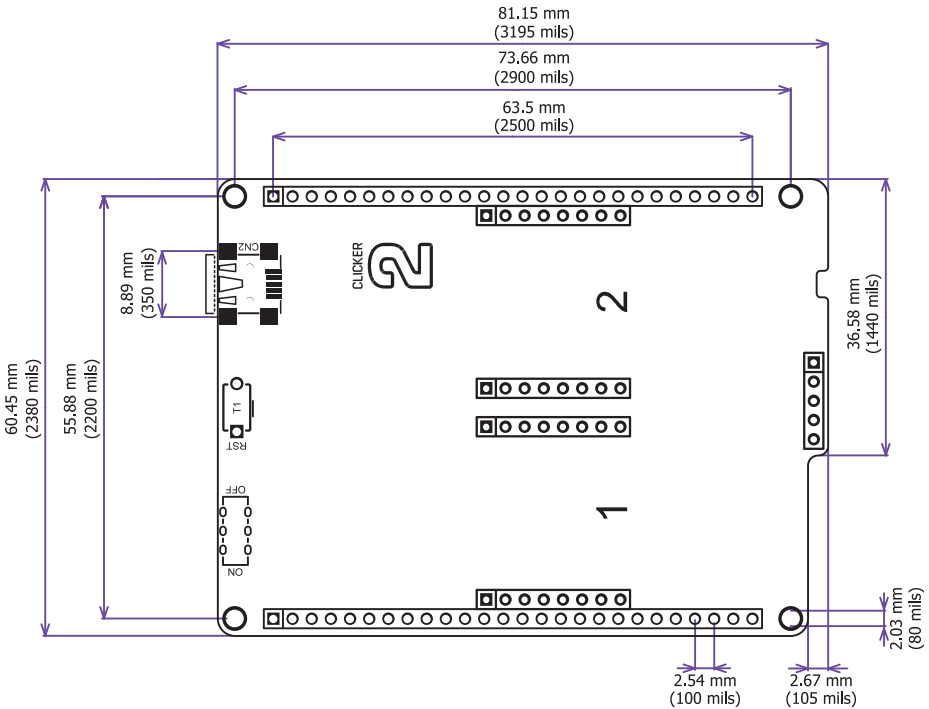


Up to now, MikroElektronika has released more than 300 mikroBUS™ compatible click boards™. On the average, three click boards are released per week. It is our intention to provide you with as many add-on boards as possible, so you will be able to expand your development board with additional functionality. 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 PIC24 driving click boards™

10. Dimensions



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