CLICKER 2
the possibilities are endless

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

PIC18FK
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 PIC18FK

Clicker 2 for PIC18FK 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 *PIC18F67K40*, a 8-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 PIC18FK 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** 26 g (0.057 lbs)
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. PIC18F67K40 MCU
12. Li-Polymer battery connector
13. mikroProg programmer connector
14. PIC16F1454
1. 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.

Figure 1-1: Connecting USB power supply

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. PIC18F67K40 microcontroller

The clicker 2 for PIC18FK development tool comes with the **PIC18F67K40** 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 microcontroller features**

- 128K bytes Program Flash
- 3568 Bytes Data SRAM
- 1024 Bytes Data EEPROM

Sleep mode: Lowest Power Consumption
3. Programming the microcontroller

The microcontroller can be programmed in three ways:

01 Using UART mikroBootloader
02 Using external mikroProg for PIC18FK programmer
03 Using Xpress bootloader
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:


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

step 1 – Connecting clicker 2 for PIC18FK

To start, connect the USB cable, or if already connected press the Reset button on your clicker 2 for PIC18FK. Click the Connect button within 5s to enter the bootloader mode, otherwise existing microcontroller program will execute.
step 2 – Browsing for .HEX file

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.

Figure 3-3: Browse for HEX

step 3 – Selecting .HEX file

Select .HEX file using open dialog window.

Click the Open button.

Figure 3-4: Selecting HEX
step 4 – Uploading .HEX file

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

Progress bar enables you to monitor .HEX file uploading.
step 5 – Finish upload

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

Press **Reset button** on clicker 2 for PIC18FK board and wait for 5 seconds. Your program will run automatically.

**Figure 3-7:** Restarting MCU

**Figure 3-8:** mikroBootloader ready for next job
3.2 XPRESS bootloader

The XPRESS bootloader allows easy drag and drop programming. When plugged into the USB it will show itself as a flash drive onto which you can simply drag a hex file for your MCU. The hex file can be generated by any compiler. After the hex file is placed onto the clicker 2 for PIC18FK it will program the main MCU. This functionality is enabled by the PIC16F1454 which acts both as a drag and drop programmer and Virtual COM port. The additional bootloader in the main MCU is not needed for this to work.

NOTE

When generating HEX files from NECTO Studio or mikroC PRO for PIC compilers, make sure that the “Long HEX format” box is checked.
3.3 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.

Figure 3-9: mikroProg connector
mikroProg programmer requires special programming software called **mikroProg Suite for PIC®**. 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.
4. Buttons and LEDs

The board also contains a **reset button** and a pair of **buttons** and **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 (RH3 and RD7). 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 PIC18FK 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.

Figure 6-1: 8MHz crystal oscillator module (X1)
7. USB connection

PIC18FK 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

Pin functions:
- Digital I/O lines
- SPI Lines
- UART lines
- PWM lines
- Analog Lines
- I2C Lines
- Interrupt Lines

Digital lines:
- RX
- TX
- SCK
- SCL
- SDA
- SDI
- SDO
- 3.3V power supply
- Reference Ground
- GND
- Reset pin

Analog Lines:
- RA2
- RE2
- RF6
- RE4
- RA4
- RC7
- RA5
- RG6
- RF0
- RA6
- RG1
- RA7
- RG2
- RA8
- RG3
- RA9
- RG4
- RA10
- RG5
- RA11
- RG6
- RA12
- RG7
- RA13
- RG8
- RA14
- RG9
- RA15
- RG10

Interrupt Lines:
- RX
- TX
- SCK
- SCL
- SDA
- SDI
- SDO
- 3.3V power supply
- Reference Ground
- GND
- Reset pin

PWM lines:
- RA0
- RB2
- RC6
- RD5
- RE5
- RD6
- RC2
- RD4
- RE3
- RC3
- RD3
- RE1
- RC4

3.3V power supply:
- 3.3V

Reference Ground:
- GND

System power supply:
- VSYS
- GND
- R0
- R1
- R2
- R3
- R4
- R5
- R6

Digital I/O lines:
- RA0
- RA1
- RA2
- RA3
- RA4
- RA5
- RA6
- RA7
- RA8
- RA9
- RA10
- RA11
- RA12
- RA13
- RA14
- RA15

I2C Lines:
- SCL
- SDA

UART2 Lines:
- RX
- TX

SP1 Lines:
- SCK
- SDO
- SDO

Reference Ground:
- GND

3.3V power supply:
- 3.3V
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
Up to now, MikroElektronika has released more than 1000 Click boards™. 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: mikroe.com/click
10. 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)
2.03 mm (80 mils)
2.54 mm (100 mils)
2.67 mm (105 mils)
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