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Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China





mikromedia™

for PIC18FJ®

Compact development system rich with on-board peripherals for all-round multimedia development on PIC18F87J50 device.



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 white ink, appearing to read 'N. Matic', is positioned on the right side of the page. The signature is fluid and cursive, with a large initial 'N' and 'M'.

Nebojsa Matic
General Manager

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Introduction to mikromedia™ for PIC18FJ®

The **mikromedia™ for PIC18FJ®** is a compact development system with lots of on-board peripherals which allow development of devices with multimedia contents. The central part of the system is a 8-bit **PIC18F87J50** microcontroller. The mikromedia™ for PIC18FJ® features integrated modules such as stereo MP3 codec, **TFT 320x240 touch screen** display, accelerometer, USB connector, audio connector, MMC/SD card slot, 8 Mbit flash memory, 2x26 connection pads and other. It comes preprogrammed with USB bootloader, but can also be programmed with external programmers, such as mikroProg™ or ICD2/3. Mikromedia is compact and slim, and perfectly fits in the palm of the hand, which makes it convenient platform for mobile devices.



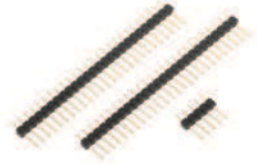
Package Contains



- 01 Damage resistant protective box



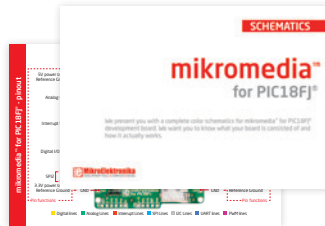
- 02 mikromedia™ for PIC18FJ® development system



- 03 Two 1x26 male headers and one 1x5 header



- 04 mikromedia™ for PIC18FJ® user's guide



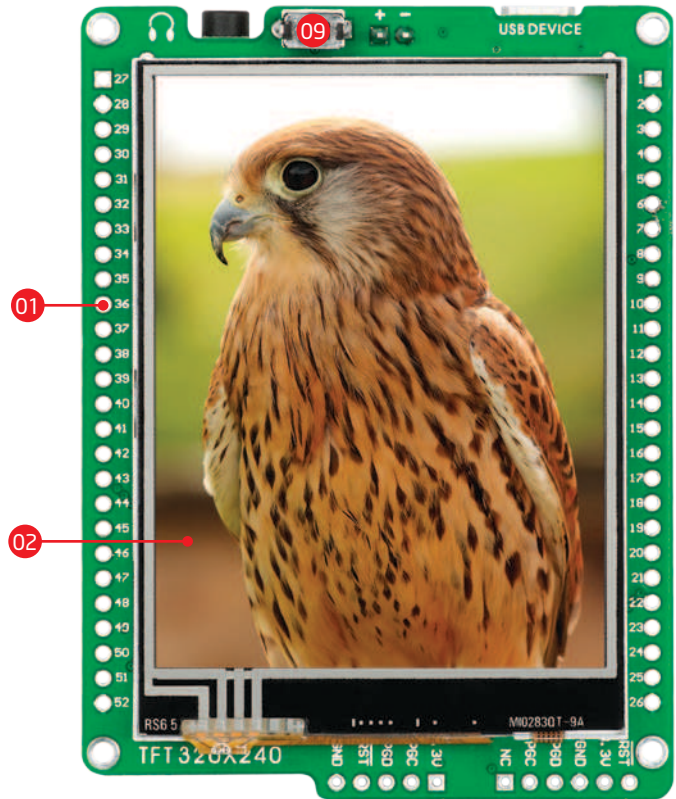
- 05 mikromedia™ for PIC18FJ® schematics and pinout

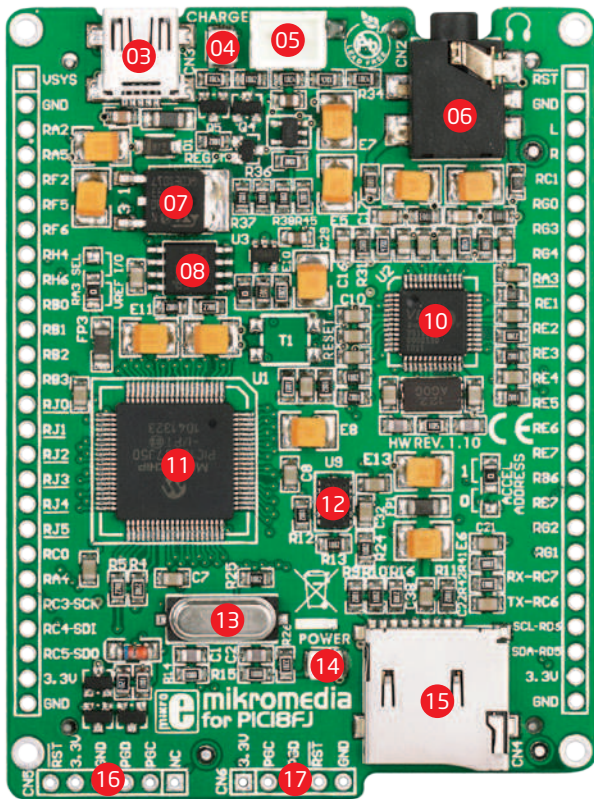


- 06 USB cable

Key Features

- 01 Connection Pads
- 02 TFT 320x240 display
- 03 USB MINI-B connector
- 04 CHARGE indication LED
- 05 LI-Polymer battery connector
- 06 3.5mm headphone connector
- 07 Power supply regulator
- 08 Serial Flash memory
- 09 RESET button
- 10 VS1053 Stereo mp3 coder/decoder
- 11 PIC18F87J50 microcontroller
- 12 Accelerometer
- 13 Crystal oscillator
- 14 Power indication LED
- 15 microSD Card Slot
- 16 ICD2/3 connector
- 17 mikroProg connector





System Specification



power supply

Via USB cable (5V DC)



power consumption

52 mA with erased MCU (when back-light is ON)



board dimensions

81.2 x 60.5 mm (3.19 x 2.38 inch)



weight

~45.5g (0.10lbs)



class B product

Product complies with the Class B limit of EN 55022 and can be used in the domestic, residential, commercial and industrial environments.



CAUTION: Electrostatic Sensitive Device

Permanent damage may occur on devices subjected to high energy electrostatic discharges which readily accumulate on the human body or test equipment and can discharge without detection.

1. Power supply

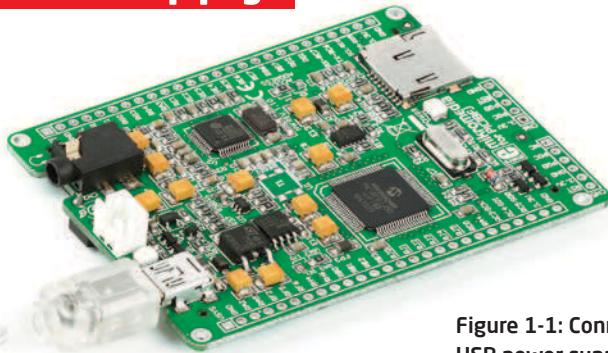


Figure 1-1: Connecting USB power supply

USB power supply

You can apply power supply to the board using **MINI-B USB** cable provided with the board. 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 **Li-Polymer** battery, via on-board battery connector. On-board battery charger circuit **MCP73832** enables you to charge the battery over USB connection. **LED diode (RED)** will indicate when battery is charging. Charging current is ~250mA and charging voltage is 4.2V DC.



Figure 1-2: Connecting Li-Polymer battery

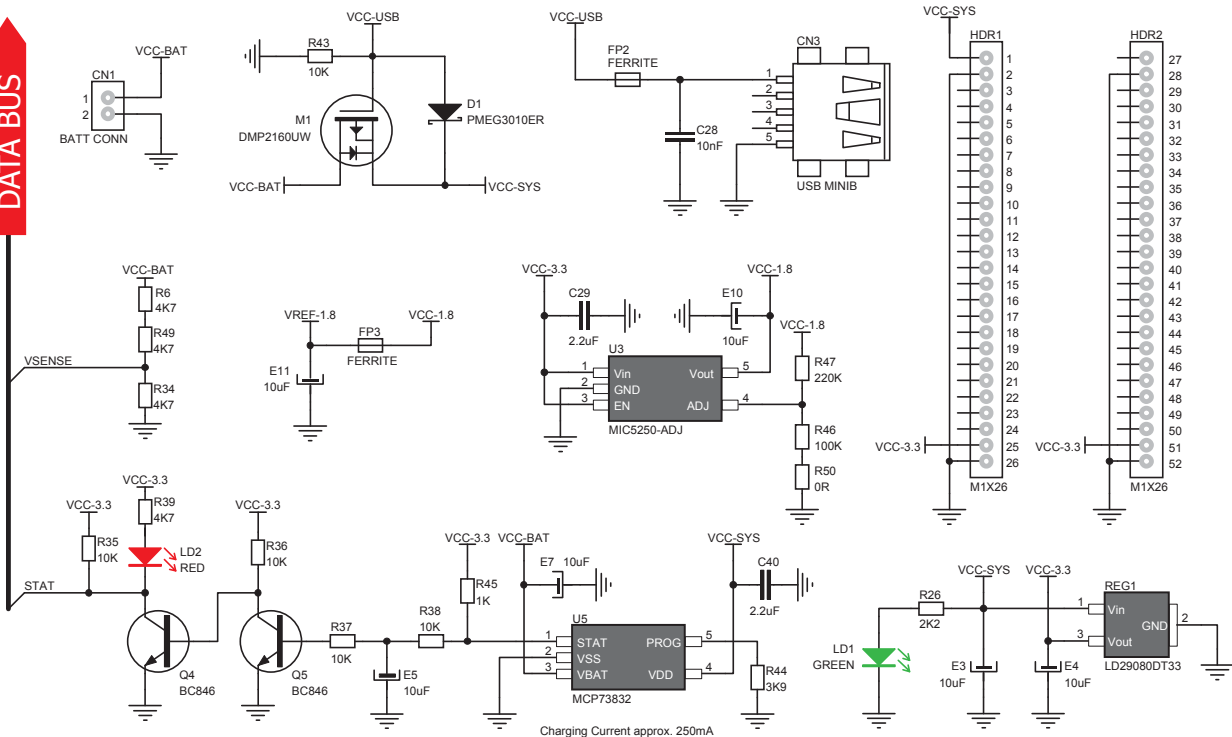


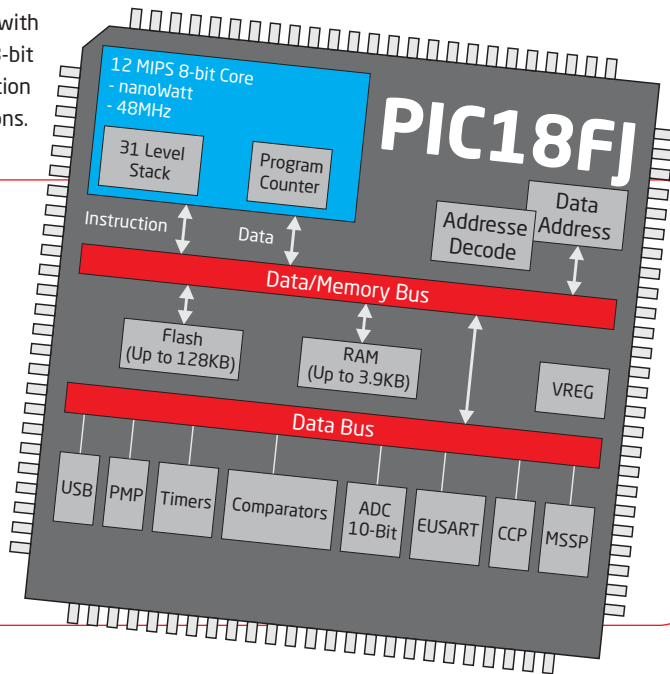
Figure 1-3: Power supply schematics

2. PIC18F87J50 microcontroller

The mikromedia™ for PIC18FJ® development system comes with the **PIC18F87J50** microcontroller. This high-performance 8-bit microcontroller with its integrated modules and in combination with other on-board modules is ideal for multimedia applications.

Key microcontroller features

- Up to 12 MIPS Operation;
- 8-bit architecture;
- 128KB of program memory;
- 3.904 bytes of RAM;
- 65 I/O pins;
- Internal Oscillator 8 MHz, 32 kHz;
- 2-UART, 2-SPI, 2-I²C, USB 2.0;
- DAC, ADC, etc.



3. Programming the microcontroller

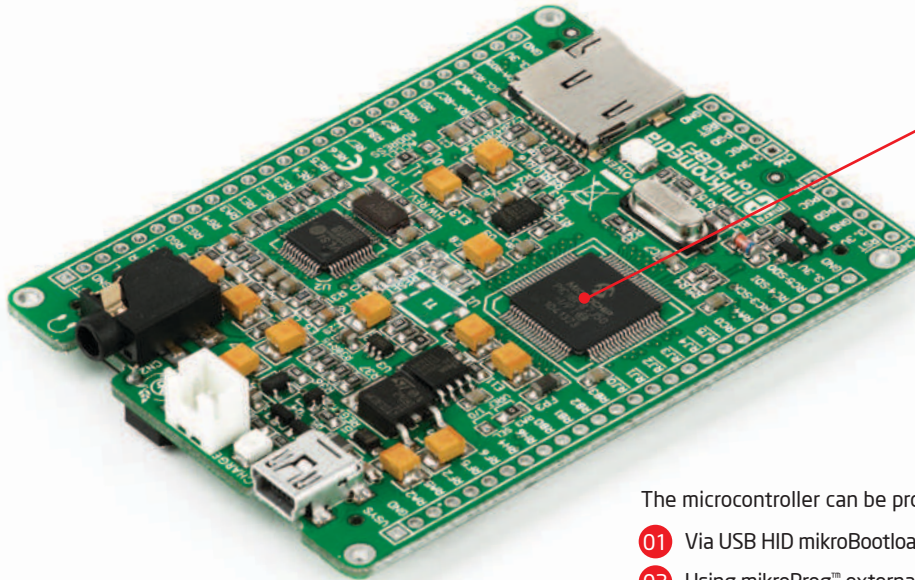


Figure 3-1:
PIC18F87J50
microcontroller

The microcontroller can be programmed in three ways:

- 01 Via USB HID mikroBootloader
- 02 Using mikroProg™ external programmer
- 03 Using ICD2/3® external programmer

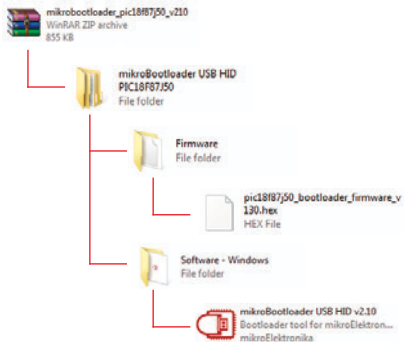
Programming with mikroBootloader

Microcontroller is preprogrammed with USB HID Bootloader, which can be used to upload new device firmware. To transfer firmware .HEX file from a PC to MCU you need to use mikroBootloader USB HID application, which can be downloaded from:



http://www.mikroe.com/downloads/get/1682/mikrobootloader_pic18f87j50_v210.zip

Upon download, unzip it to desired location and start the mikroBootloader application:



step 1 - Connecting mikromedia

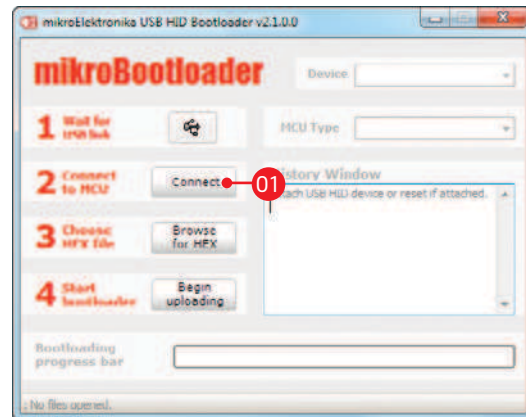


Figure 3-2: USB HID mikroBootloader window

- 01 In order to start, connect the USB cable or (if already connected) press the **Reset** button on your mikromedia board. Click the **Connect** button within 5s to enter the bootloader mode, otherwise the existing microcontroller program will be executed.

step 2 - Browsing for .HEX file

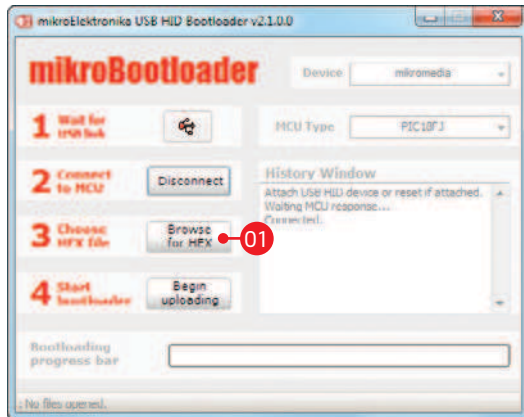


Figure 3-3: Browse for HEX

- 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

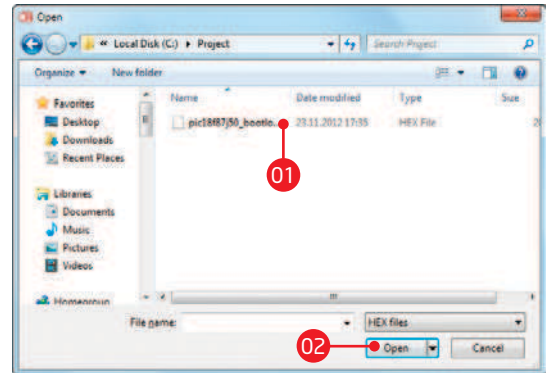


Figure 3-4: Selecting HEX

- 01 Select .HEX file using open dialog window.
- 02 Click the **Open** button.

step 4 - Uploading .HEX file

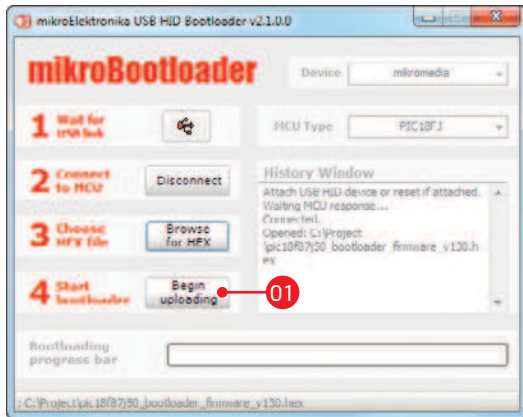


Figure 3-5: Begin uploading

- 01 In order to upload .HEX file click the **Begin uploading** button.



Figure 3-6: Progress bar

- 01 .HEX file uploading can be monitored via progress bar.

step 5 - Finish upload

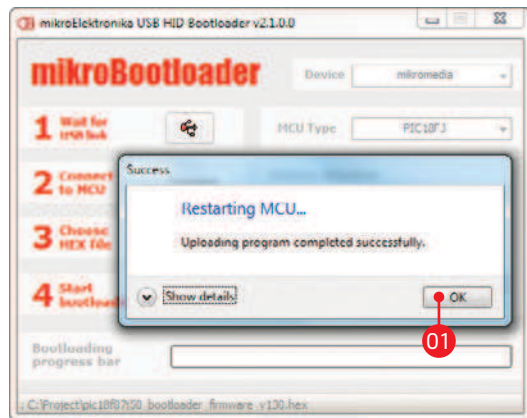


Figure 3-7: Restarting MCU

- 01** Click the **OK** button after uploading is finished. The board will be automatically reset and after 5 seconds your new program will be executed.

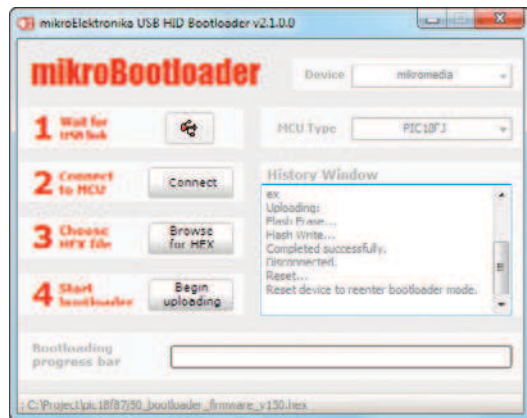


Figure 3-8: mikroBootloader ready for next job

Programming with mikroProg™

programmer

The microcontroller can be programmed with **mikroProg™ programmer** and **mikroProg Suite™ for PIC®** software. The mikroProg™ programmer is connected to the development system via the CN6 connector, **Figure 3-9**.



Figure 3-9:
Connecting mikroProg™ to mikromedia™

mikroProg™ is a fast USB 2.0 programmer with mikroICD™ hardware In-Circuit Debugger. Smart engineering allows mikroProg™ to support PIC10®, PIC12®, PIC16®, PIC18®, 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.

mikroProg Suite™ for PIC® Software



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.

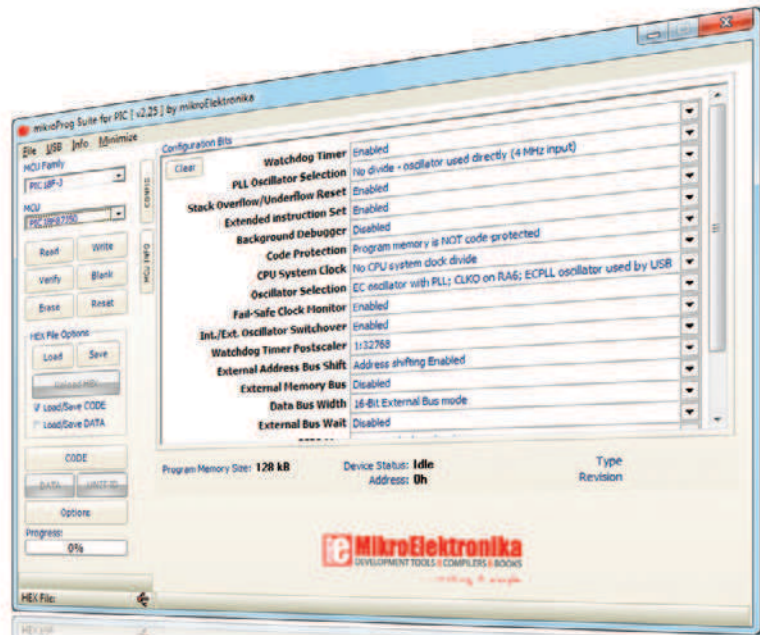


Figure 3-10: Main Window of mikroProg Suite™ for PIC® programming software

Programming with ICD2® or ICD3® programmer

The microcontroller can be also programmed with **ICD2® or ICD3® programmer**. These programmers connects with mikromedia board via **ICD2 CONNECTOR BOARD**.

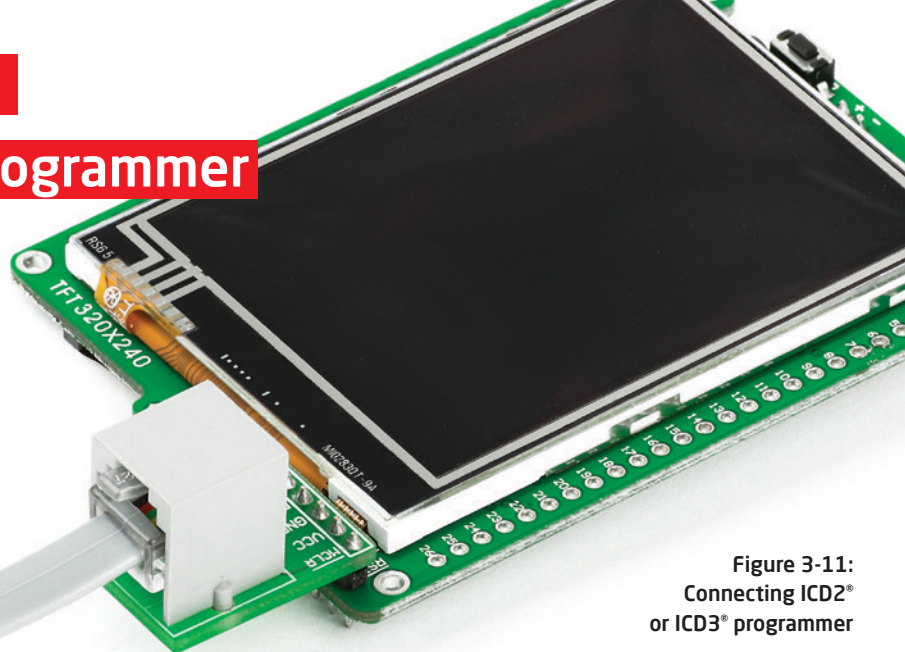


Figure 3-11:
Connecting ICD2®
or ICD3® programmer

In order to enable the ICD2® and ICD3® programmers to be connected to the development system, it is necessary to provide the appropriate connector such as the **ICD2 CONNECTOR BOARD**. This connector should be first soldered on the CN5 connector. Then you should plug the ICD2® or ICD3® programmer into it, **Figure 3-11**.

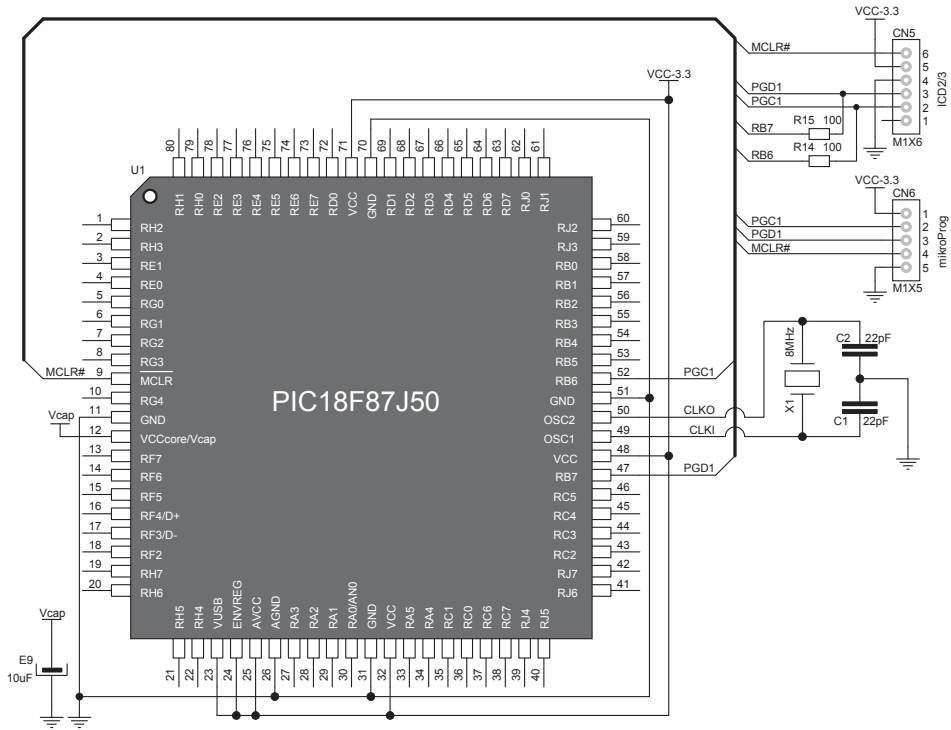
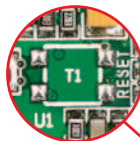


Figure 3-12: mikroProg™ and ICD2®/ICD3® programmer connection schematic

4. Reset Button

Board is equipped with reset button, which is located at the top of the front side (Figure 4-2). If you want to reset the circuit, press the reset button. It will generate low voltage level on microcontroller reset pin (input). In addition, a reset can be externally provided through **pin 27** on side headers (Figure 4-3).



NOTE

You can also solder additional reset button on the appropriate place at the back side of the board, Figure 4-1.

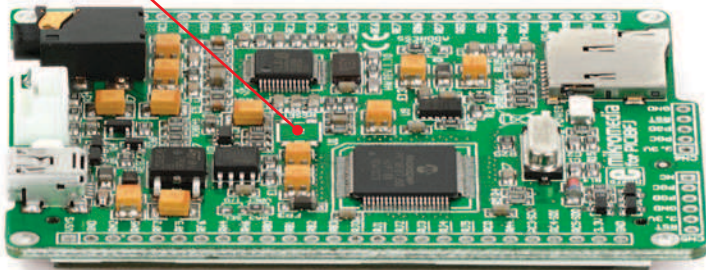


Figure 4-1: Location of additional reset button

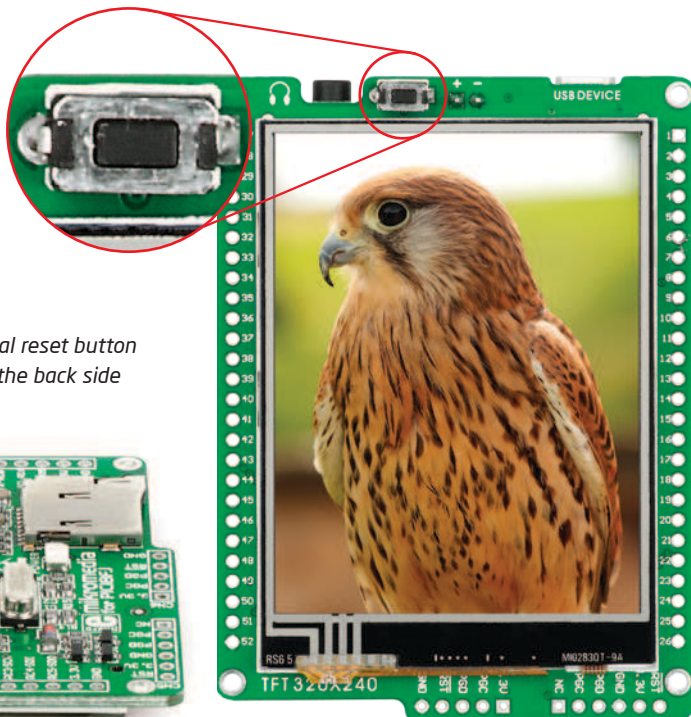


Figure 4-2: Frontal reset button

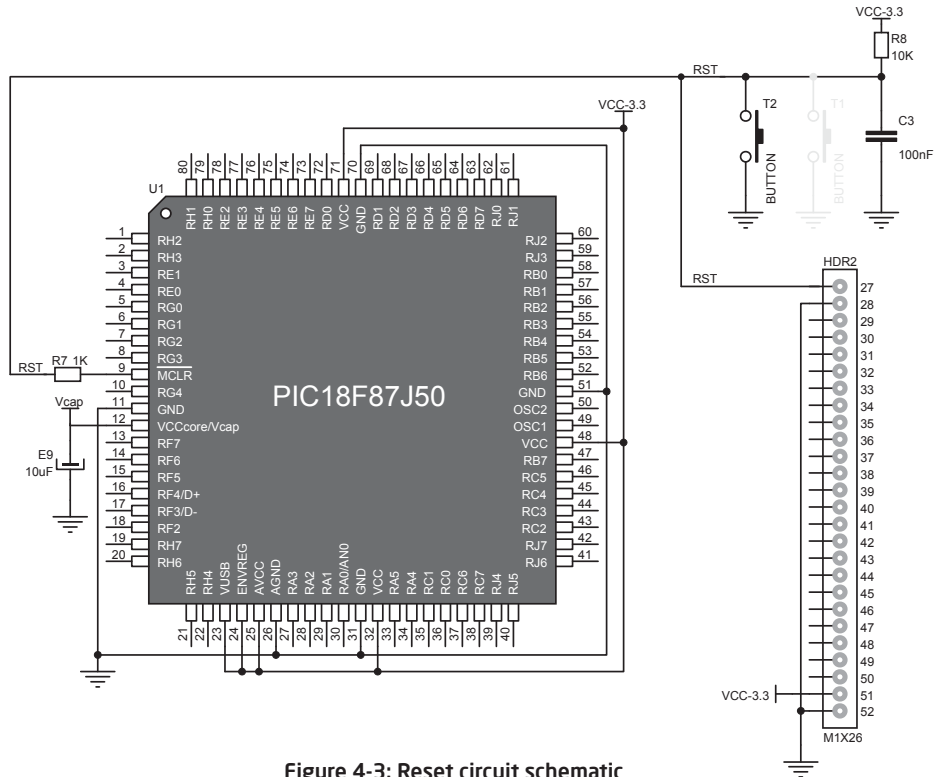


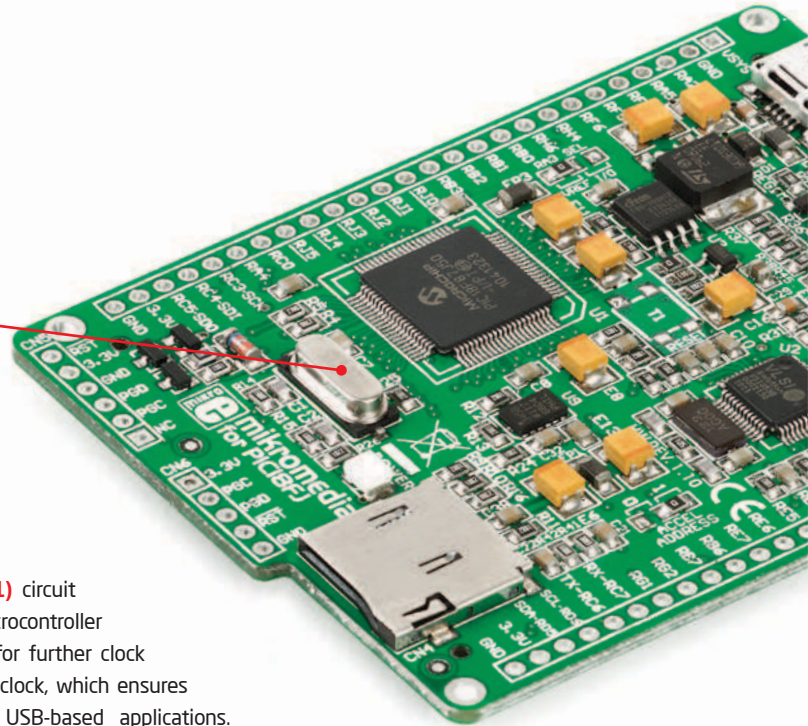
Figure 4-3: Reset circuit schematic

5. Crystal oscillator



Figure 5-1:
Crystal oscillator
module

Board is equipped with **8MHz crystal oscillator (X1)** circuit that provides external clock waveform to the microcontroller CLK0 and CLK1 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.



NOTE : The use of crystal in all other schematics is implied even if it is purposely left out, because of the schematics clarity.

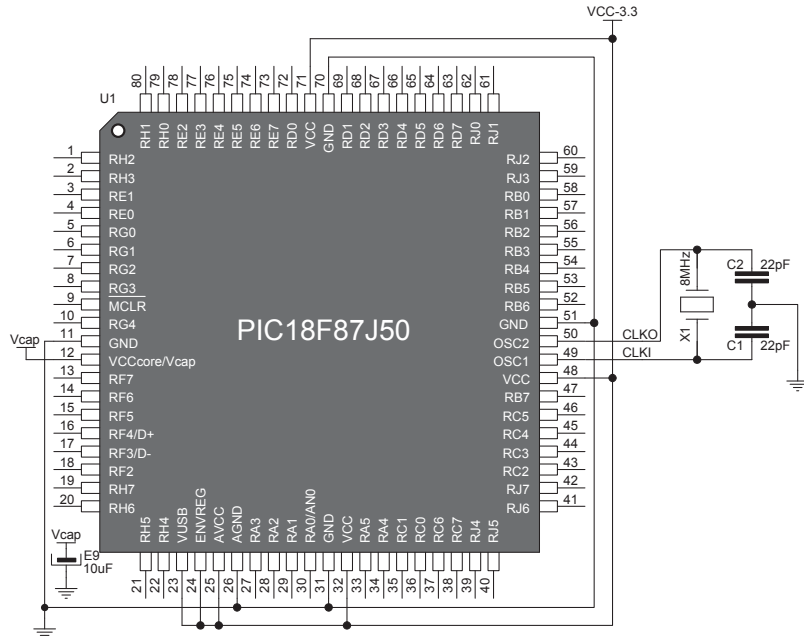


Figure 5-2: Crystal oscillator schematic

6. microSD Card Slot

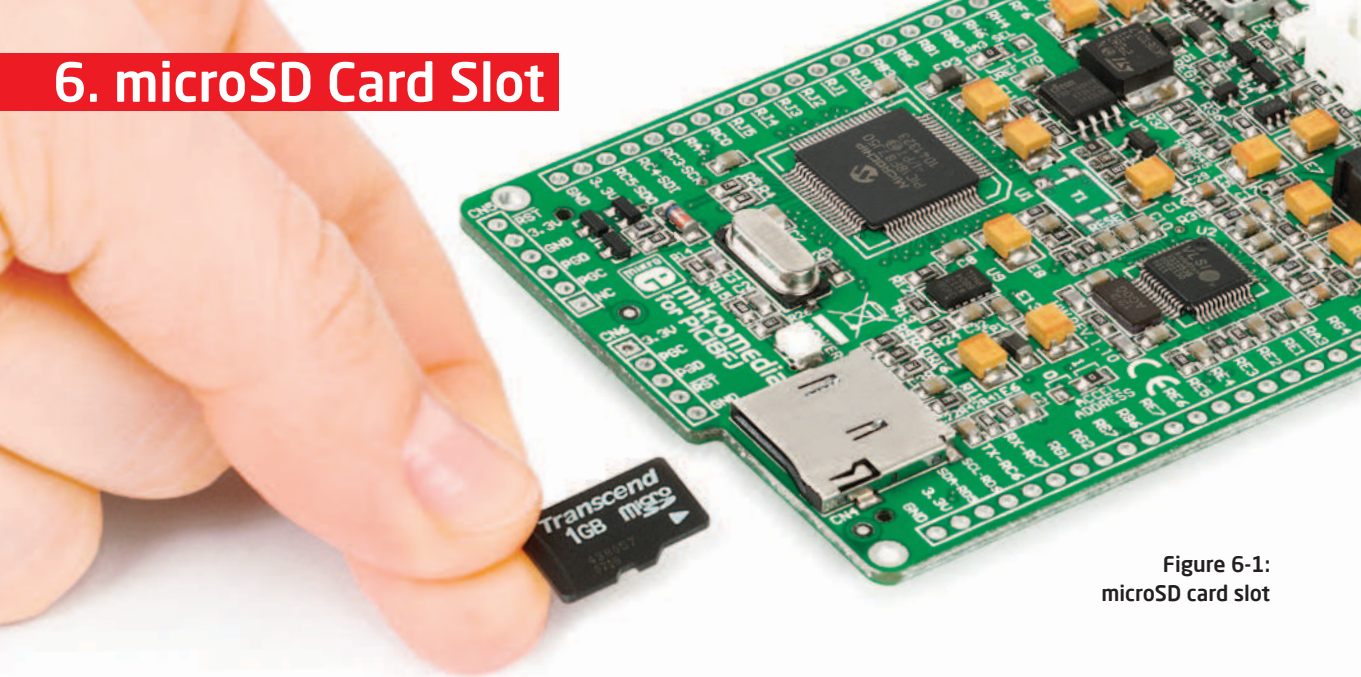


Figure 6-1:
microSD card slot

Board contains **microSD card slot** for using microSD cards in your projects. It enables you to store large amounts of data externally, thus saving microcontroller memory. microSD cards use Serial Peripheral Interface (**SPI**) for communication with the microcontroller.

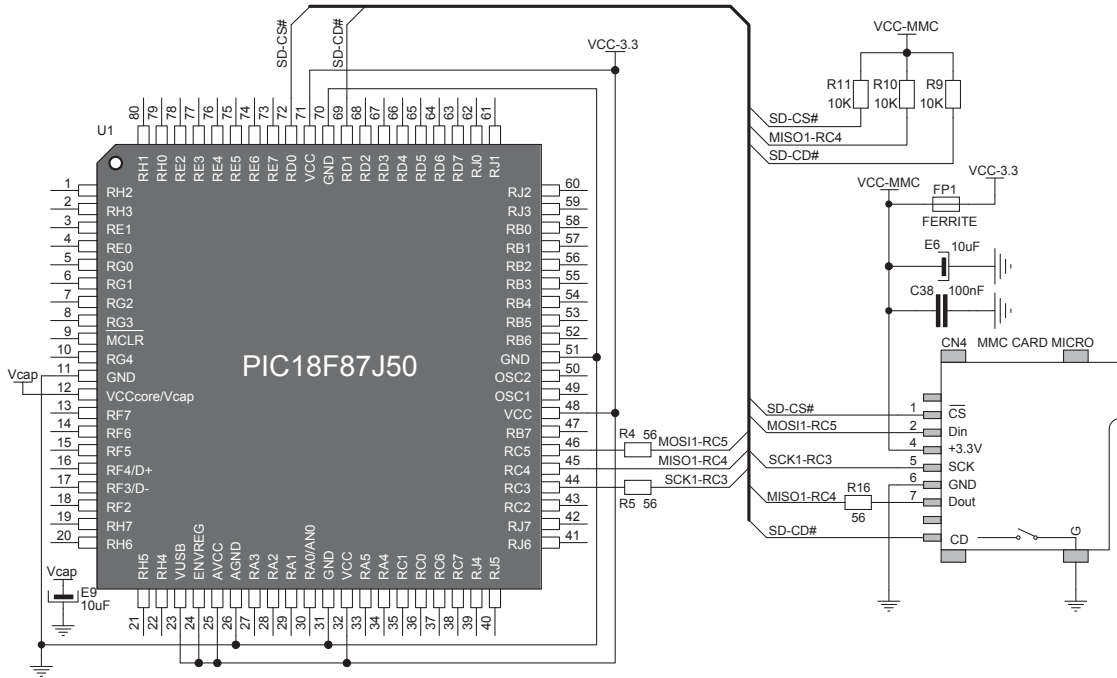


Figure 6-2: microSD Card Slot module connection schematic