Chipsmall

Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of "Quality Parts,Customers Priority,Honest Operation,and Considerate Service",our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!

Contact us

mikromedia+

for PIC32MX7®

Amazingly compact, all-on-single-pcb development board carring 4.3" TFT Touch Screen and lots of multimedia peripherals, all driven by powerful PIC32MX795F512L microcontroller.

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 mikromedia+ for PIC32MX7®

The **mikromedia+ for PIC32MX7®** is a compact development system which allows development of devices with multimedia contents. The central part of the system is a 32-bit 100-pin **PIC32MX795F512L** microcontroller. The mikromedia+ for PIC32MX7® feature lots of on board modules such as stereo MP3 codec, **4.3" TFT 480x272** touch screen display, port expander, accelerometer, microSD card slot, buzzer, IR receiver, RGB LED diode, PIN photodiode, temperature sensor, 2.4GHz RF transceiver, Ethernet transceiver, 8 Mbit flash memory, Li-Polimer battery charger etc. The board also contains MINI-B USB connector, power screw terminals, 2x5 mikroProg™ connector, two 1x26 connection pads, ON/OFF switch and other. It comes pre-programmed with USB HID bootloader, but can also be programmed with **mikroProg™ for PIC®, dsPIC® and PIC32®** external programmer. mikromedia is compact and slim, and perfectly fits in the palm of your hand, which makes it a convenient platform for mobile and other multimedia devices. We have also prepared a **mikromedia+ SHIELD for PIC32MX7®** extension board which enables you to easily expand the functionality of your board.
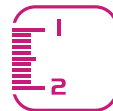
System Specification

power supply
Via USB cable (5V DC) or via screw terminals (5 - 12V DC)

power consumption
65mA with erased MCU
(when on-board modules are inactive)

board dimensions
119.54 x 78mm (4.71 x 3.07inch)
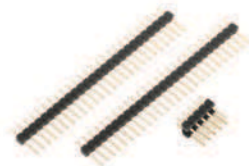
weight
~115g (0.253lbs)

Package Contains

01 Damage resistant protective box

02 mikromedia+ for PIC32MX7® development system

03 Two 1x26 male headers and one 2x5 header

04 mikromedia+ for PIC32MX7® user's guide
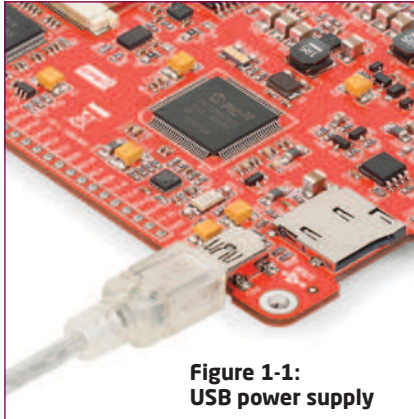

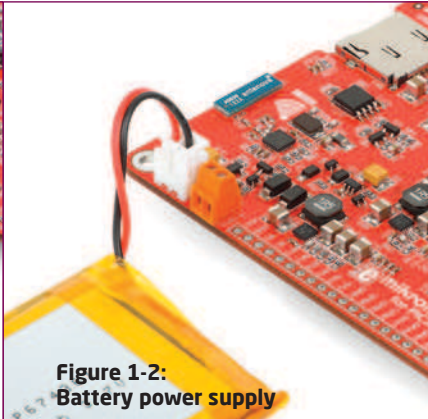**05** mikromedia+ for PIC32MX7® schematic
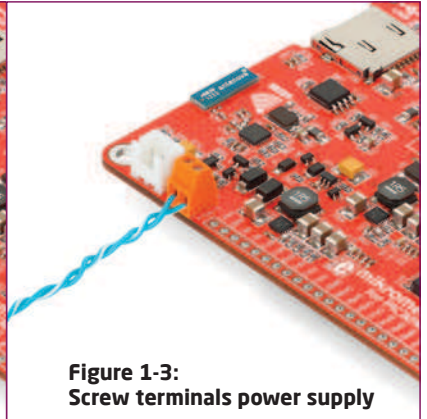

06 USB cable and microSD card

1. Power Supply

Figure 1-1:
USB power supply

Figure 1-2:
Battery power supply

Figure 1-3:
Screw terminals power supply

The mikromedia+ for PIC32MX7® board can be powered in three different ways: via USB connector using MINI-B USB cable provided with the board **(CN4)**, via battery connector using Li-Polymer battery **(CN5)** or via screw terminals using laboratory power supply **(CN3)**. After you plug in the appropriate power supply turn the power switch ON **(SW1)**. The USB connection can provide up to 500mA of current which is more than enough for the operation of all on-board modules and the microcontroller as well. If you decide to use external power supply via screw terminals, voltage levels must be within **5-12V DC** range. Power **LED ON (GREEN)** indicates the presence of power supply. On-board battery charger circuit **MCP73832** enables you to charge the battery over USB connection or via screw terminals. **LED diode (RED)** indicates when battery is charging. Charging current is ~250mA and charging voltage is 4.2V DC.
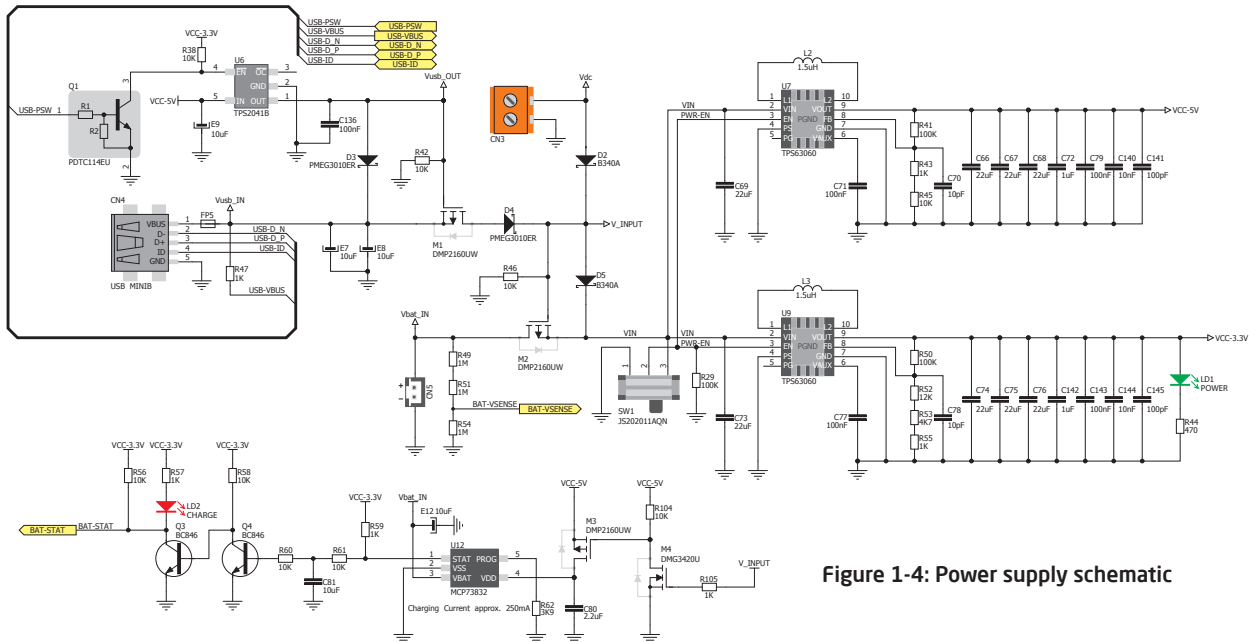
Figure 1-4: Power supply schematic

2. PIC32MX795F512L microcontroller

The mikromedia+ for PIC32MX7® development board comes with the 100-pin **PIC32MX795F512L** microcontroller. This high-performance **32-bit** microcontroller has integrated modules, such as 512K of flash and 128K of RAM easily handling demanding applications.

Key microcontroller features

- Up to **125 DMIPS** Operation (80MHz);

- 512K bytes of Flash memory;

- 128K bytes of RAM memory;

- up to 85 I/O pins;

- 16-bit timers;

- 8MHz internal oscillator, 32kHz RTCC, PLL;

- 6xUART, 4xSPI, 5xI²C, 2xCAN, ADC etc., and
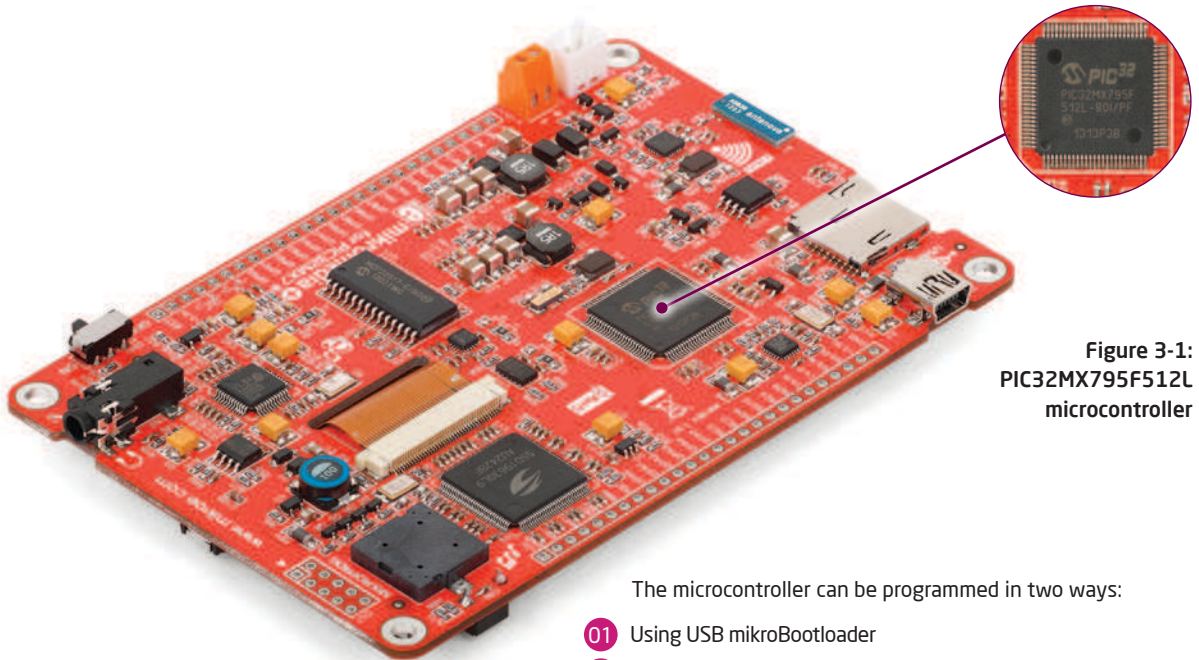
- Ethernet, USB etc.
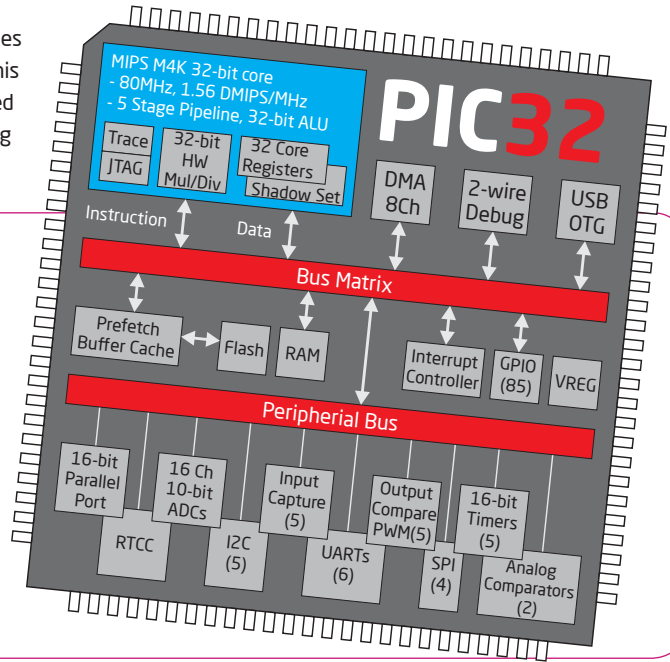
3. Programming the microcontroller

Figure 3-1:
PIC32MX795F512L
microcontroller

The microcontroller can be programmed in two ways:

01 Using USB mikroBootloader

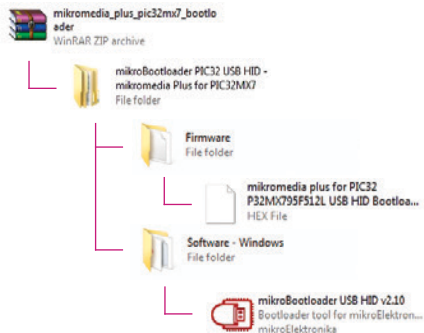**02** Using external mikroProg™ for PIC®, dsPIC®, PIC32® programmer

Programming with mikroBootloader

Microcontroller is pre-programmed 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/2031/mikromedia_plus_pic32mx7_bootloader.zip

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

mikromedia_plus_pic32mx7_bootloader
WinRAR ZIP archive

└ mikroBootloader PIC32 USB HID -
mikromedia Plus for PIC32MX7
File folder

  ├ **Firmware**
  File folder

    └ mikromedia plus for PIC32
    P32MX795F512L USB HID Bootloa...
    HEX File

  └ **Software - Windows**
  File folder

    └ mikroBootloader USB HID v2.10
    Bootloader tool for mikroElektron...
    mikroElektronika

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.
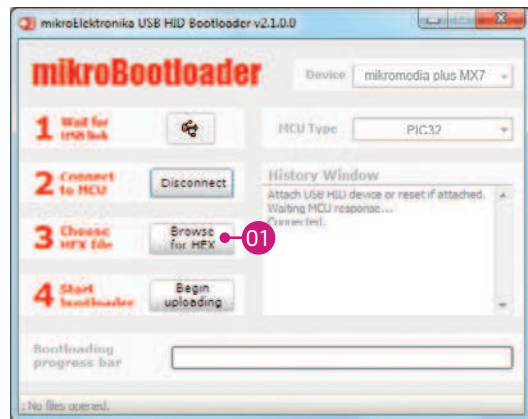
step 2 - Browsing for .HEX file

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 that will be uploaded to MCU memory.
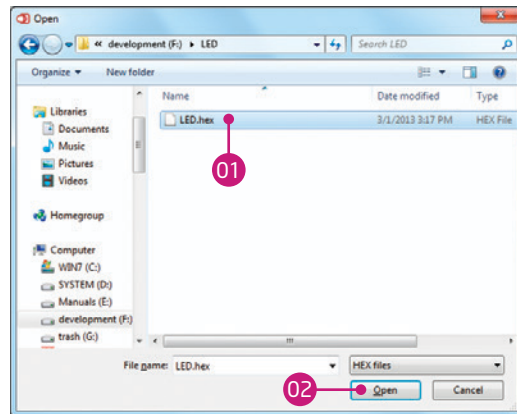
step 3 - Selecting .HEX file

Figure 3-4: Selecting HEX

01 Select .HEX file from the Open dialog window.

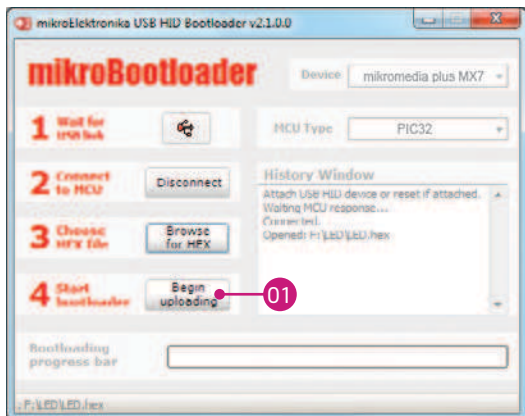**02** Click the **Open** button.

step 4 - Uploading .HEX file

Figure 3-5: Begin uploading

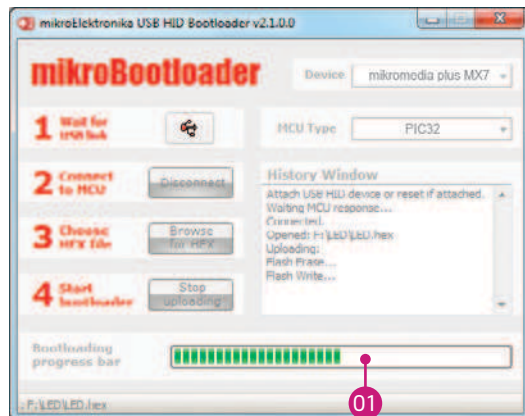Figure 3-6: Progress bar

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

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

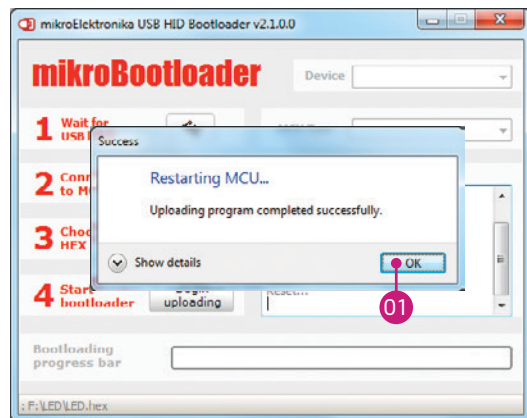# step 5 - Finish Upload

Figure 3-7: Restarting MCU

Figure 3-8: mikroBootloader ready to use

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.

Programming with mikroProg™ Programmer

Figure 3-9:
mikroProg™
connector

The microcontroller can be programmed with external **mikroProg™ for PIC®, dsPIC® and PIC32® programmer** and **mikroProg Suite™ for PIC® software**. The external programmer is connected to the development system via 2X5 mikroProg™ connector, **Figure 3-9. mikroProg™** is a fast USB 2.0 programmer with hardware Debugger support. It supports IC10®, PIC12®, PIC16®, PIC18®, dsPIC30/33®, PIC24® and PIC32® devices from Microchip®. Outstanding performance, easy operation and elegant design are it's key features.
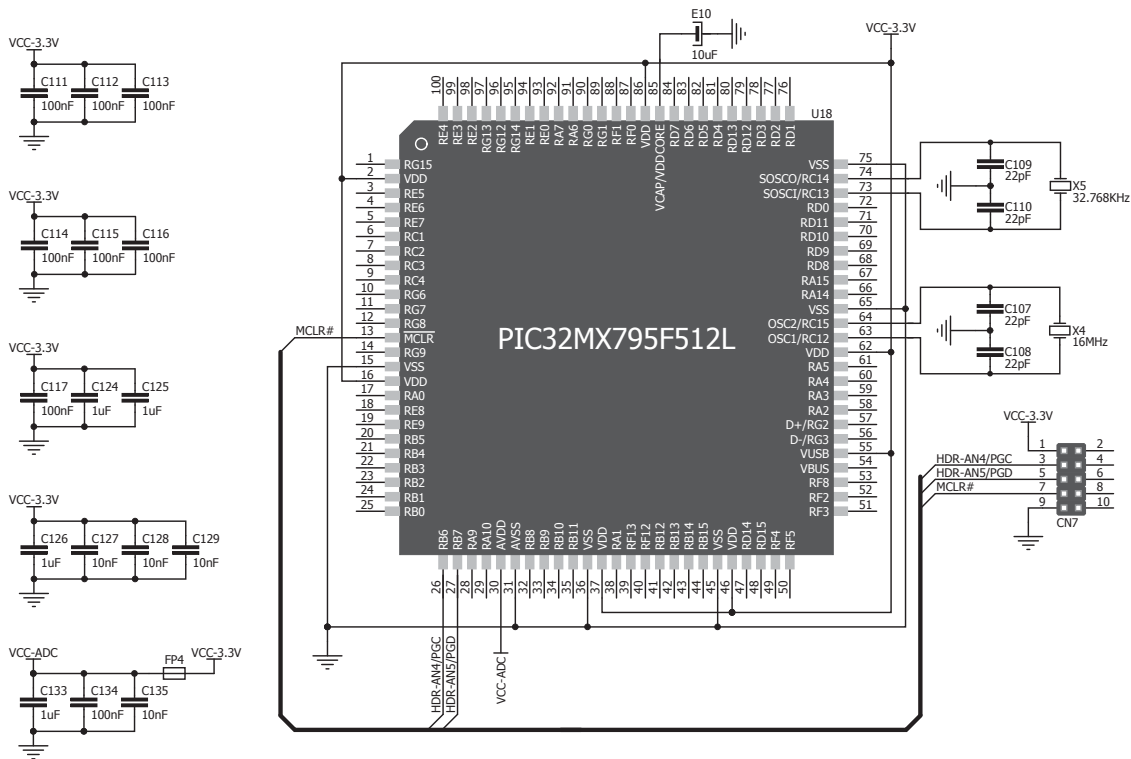
Figure 3-10: mikroProg™ connection schematic

mikroProg Suite™ for PIC® Software

The **mikroProg™** programmer requires special programming software called **mikroProg Suite™ for PIC®**. It can be used for programming all Microchip® microcontroller families, including PIC10®, PIC12®, PIC16®, PIC18®, dsPIC30/33®, PIC24® and PIC32®. Software has intuitive interface and SingleClick™ programming technology. Download the latest version of **mikroProg Suite™** and 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.
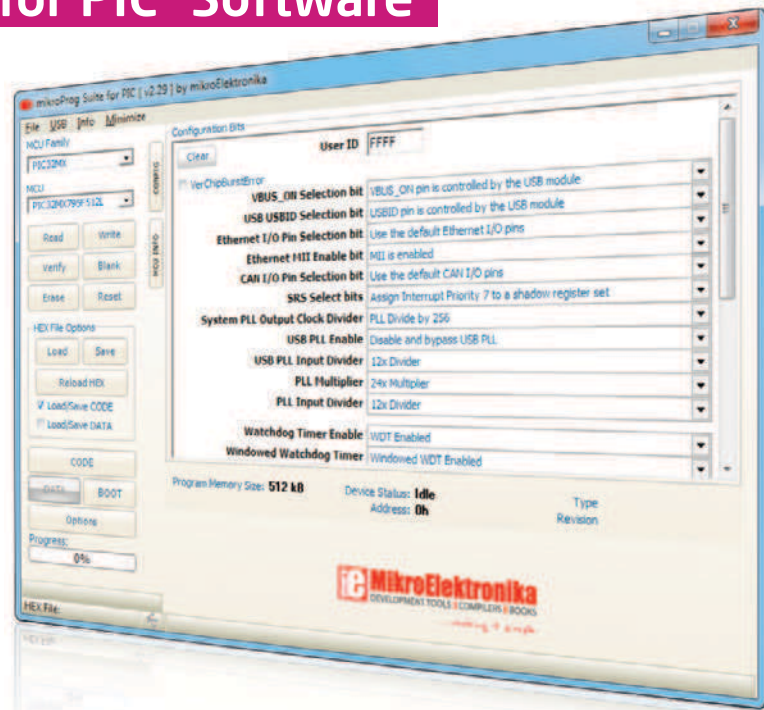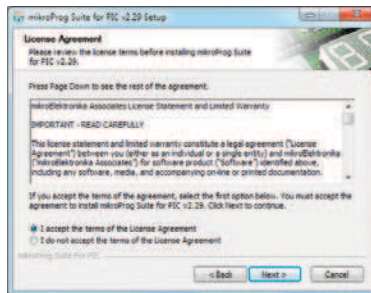
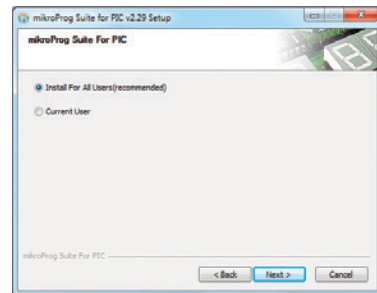**Figure 3-11: Main window of mikroProg Suite™ for PIC® programming software**

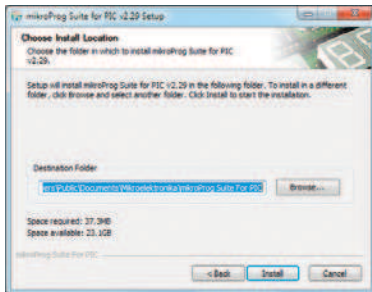# Software Installation Wizard

01 Start Installation

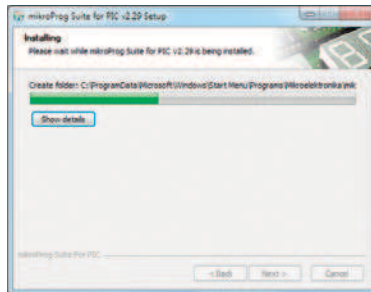**02** Accept EULA and continue

03 Install for all users

**04** Choose destination folder

05 Installation in progress

06 Finish installation

4. Reset Button

The board is equipped with reset button, which is located on the front side of the board. One press on the reset button will generate a low voltage level on the microcontroller reset pin (input). Reset button can also be externally provided through the **pin 27** on the side headers.
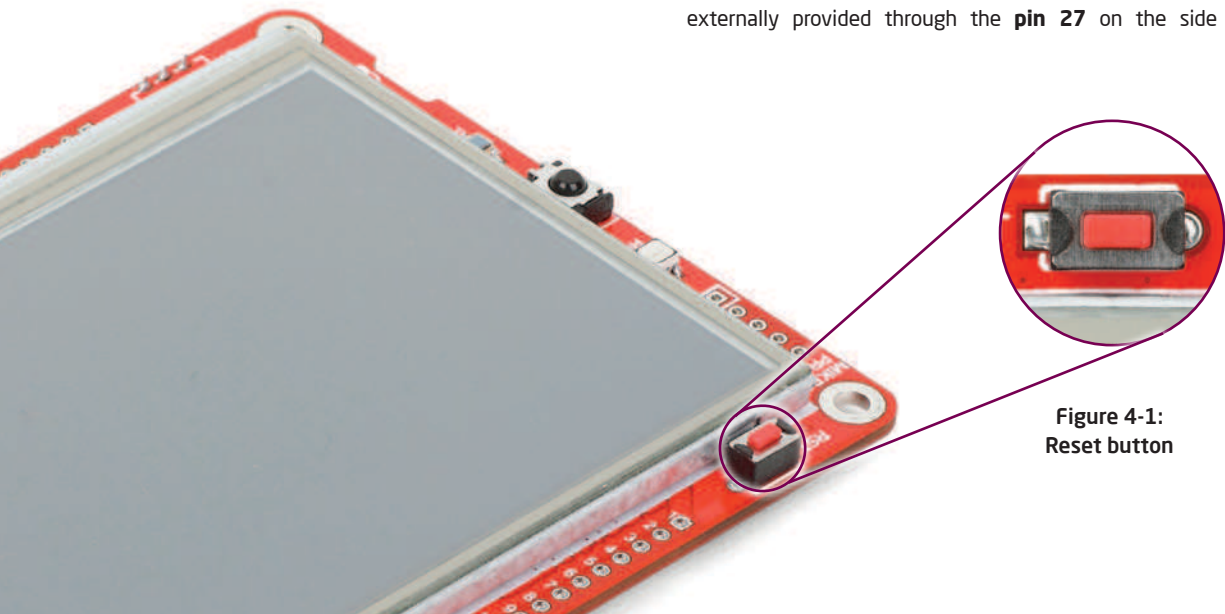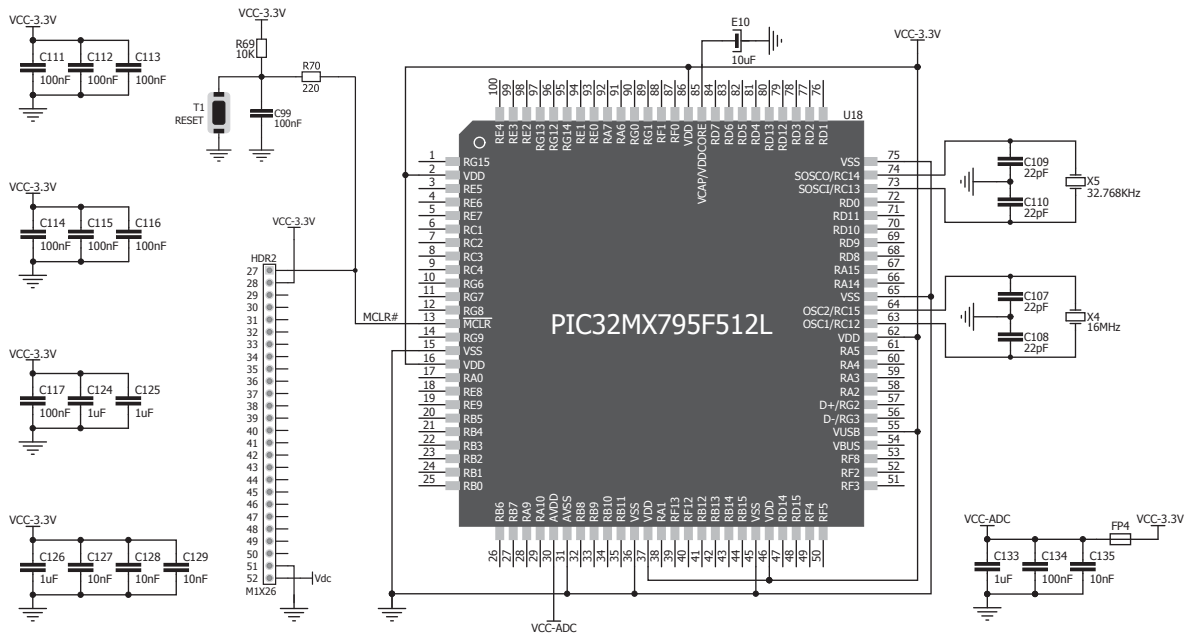

Figure 4-1:
Reset button

Figure 4-2: Reset button connection schematic

5. Crystal Oscillators and 2.048V Reference

The board is equipped with **01** **16MHz crystal oscillator (X4)** 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. The board also contains **02** **32.768kHz crystal oscillator (X5)** which provides external clock for internal RTCC module. Microcontroller ADC requires an accurate source of reference voltage signal. That is why we provide the external **03** **voltage reference** to the microcontroller VREF pin which is **2.048V**.
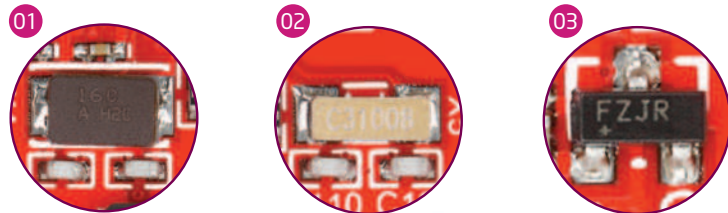

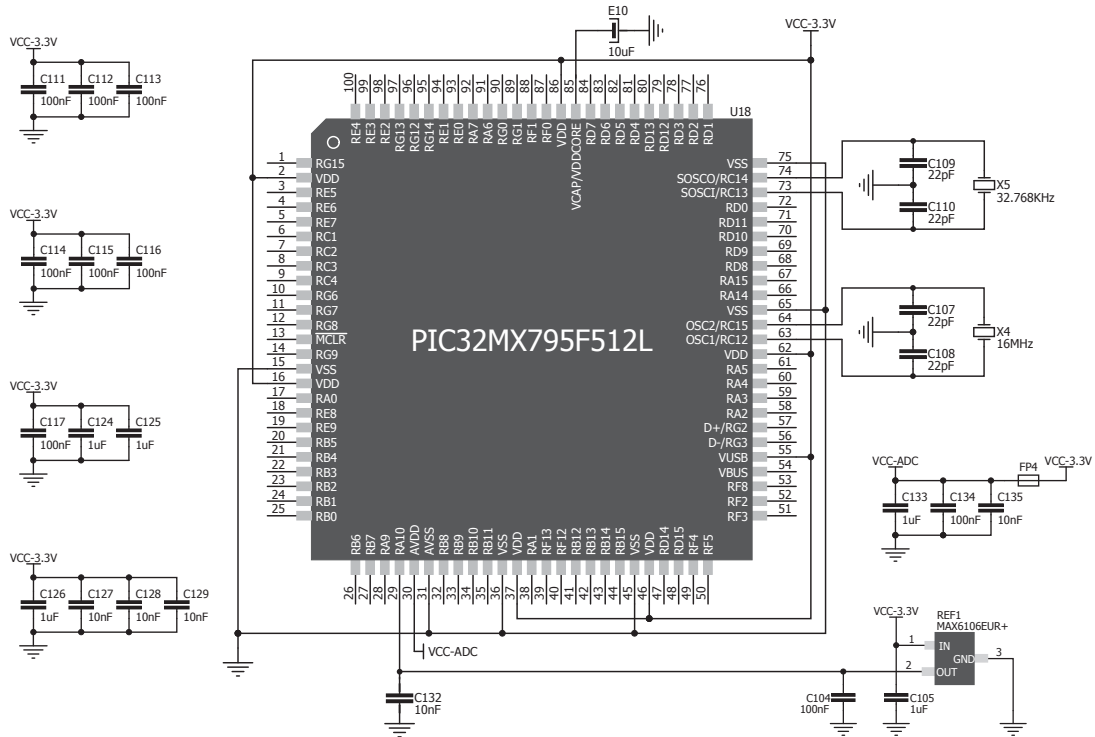**Figure 5-1: Crystal oscillator and 2.048V reference**

Figure 5-2: Crystal oscillators and voltage reference connection schematic
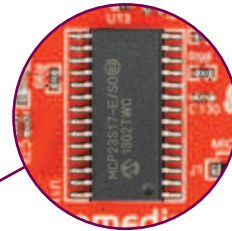
6. Port Expander

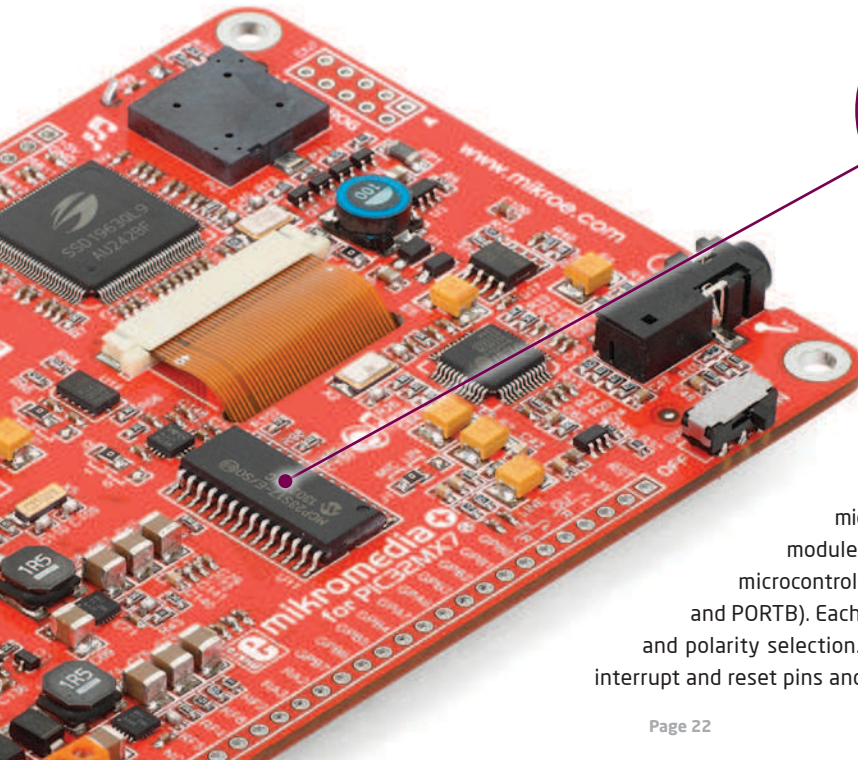
Figure 6-1:
Port Expander

mikromedia+ for PIC32MX7® features a 16-bit I/O port expander module **MCP23S17** which communicates with PIC32MX795F512L microcontroller via SPI serial interface. This module enables you to expand the number of microcontroller I/O pins with two 8-bit I/O ports (PORTA and PORTB). Each of them consists of registers for input, output and polarity selection. In addition, the **MCP23S17** module contains interrupt and reset pins and has 25mA sink/source capability per I/O pin.

Figure 6-2: Port Expander connection schematic

7. microSD Card Slot

Figure 7-1:
microSD Card Slot
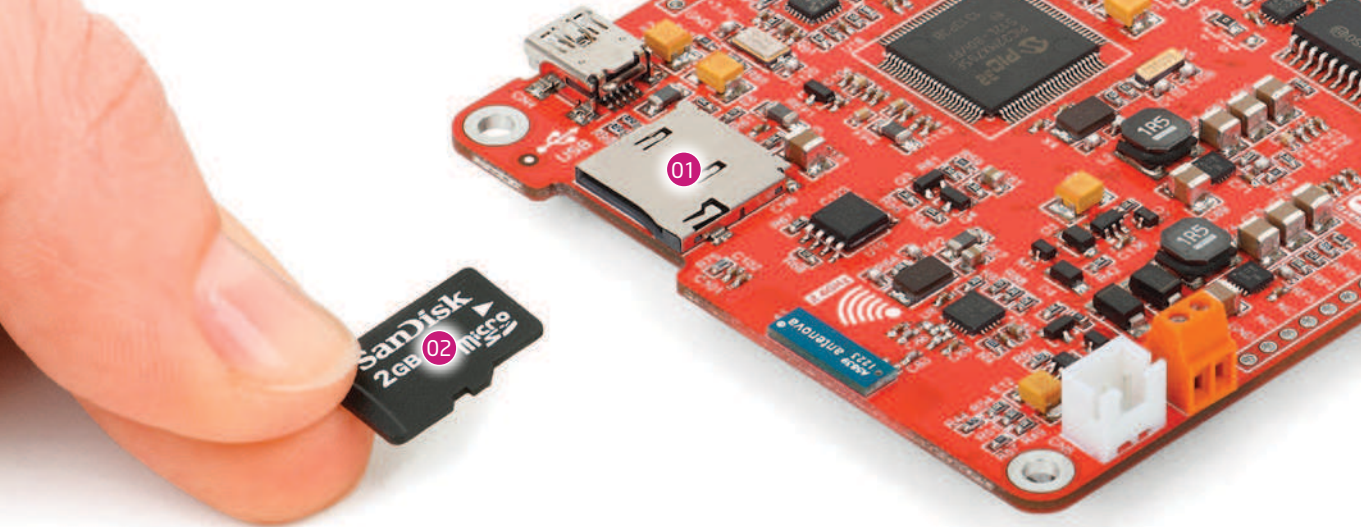
The board contains **01** **microSD card slot** for using **02** microSD cards in your projects. It enables you to store large amounts of data externally, thus saving microcontroller memory. microSD cards use Serial Peripheral Interface (**SPI**) for communication with the microcontroller. Ferrite and capacitor are provided to compensate the voltage and current glitch that can occur when pushing-in and pushing-out microSD card into the socket. Proper insertion of the microSD card is shown in **Figure 7-1**.
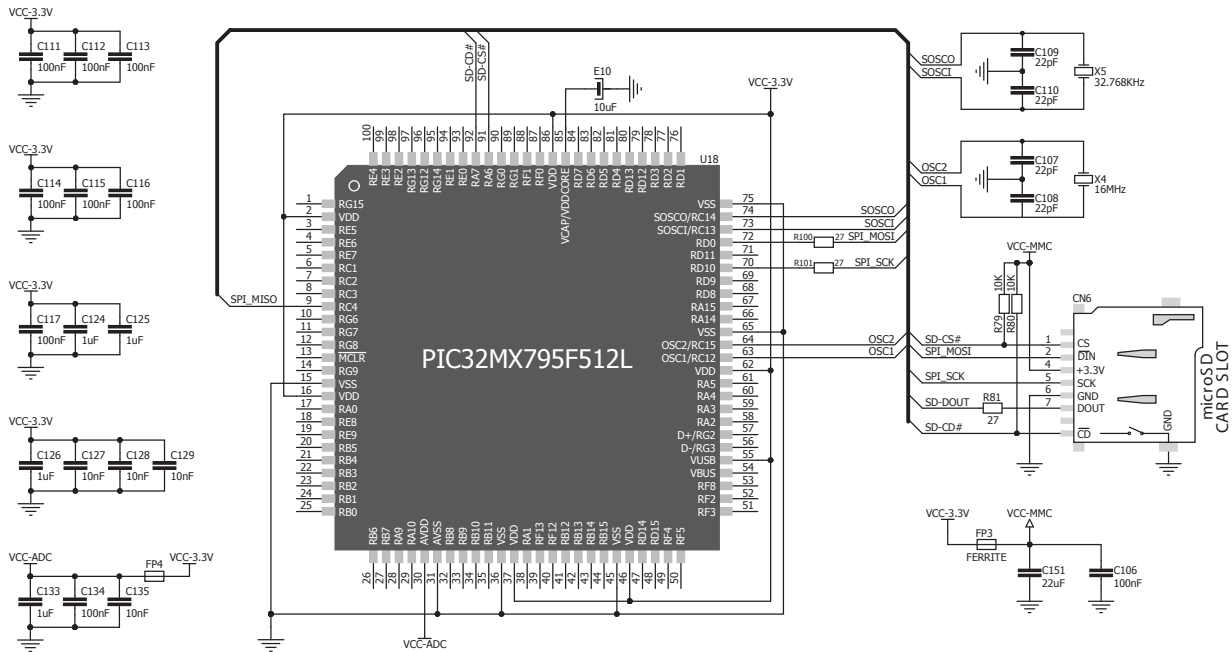
Figure 7-2: microSD Card Slot module connection schematic