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!
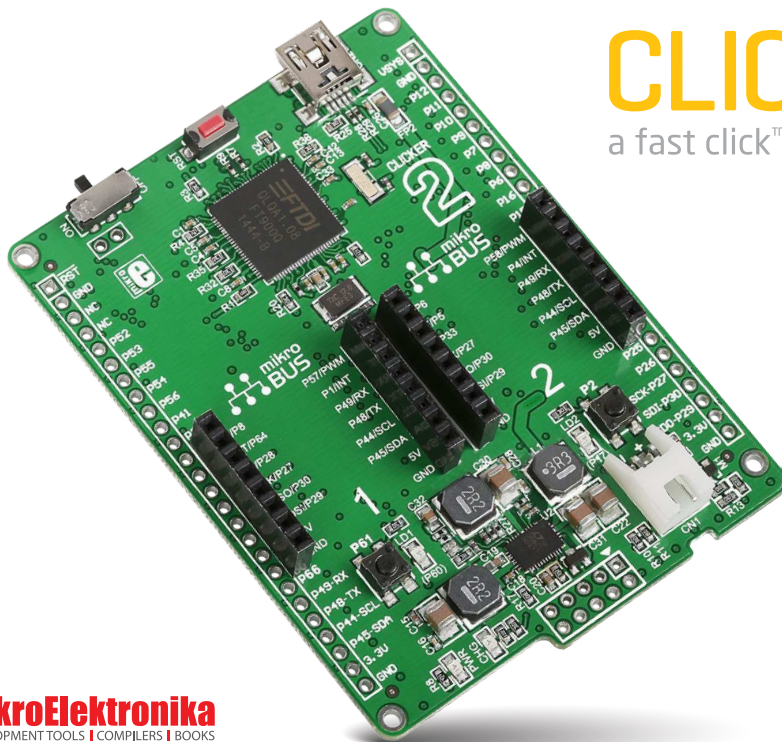
Contact us

CLICKER 2 ^{FT90x}

a fast click™ board two-seater

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

USB E

mikroBUS

FT90x

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 clicker 2 for FT90x

Clicker 2 for FT90x is a compact dev. 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 **FT900**, a 32-bit FT32 core microcontroller, two indication LEDs, two general purpose buttons, a reset button, an on/off switch, a li-polymer battery connector, a USB Mini-B connector and two mikroBUS™ socket. 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**, **I²C**, **UART**, **RST**, **PWM**, **Analog** and **Interrupt** lines as well as **3.3V**, **5V** and **GND** power lines. **Clicker 2 for FT90x** board can be powered over a USB cable.
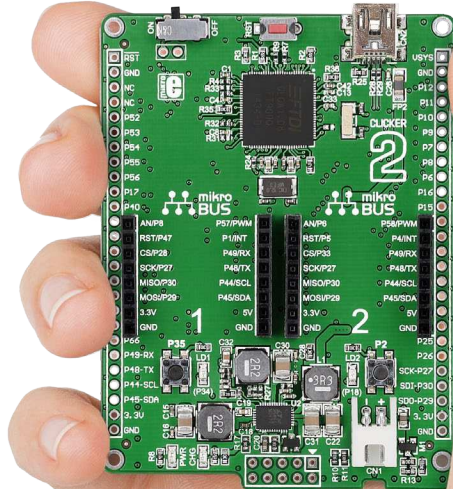
USB E 5V

power supply
via USB cable (5V DC)

**board dimensions**
60.4 x 81 mm (2.4 x 3.2 inch)

kg

weight
26 g (0. 057 lbs)

Key features

1. ON/OFF switch
2. Pads for connecting external ON/OFF switch
3. FT900Q
4. 32.768 kHz crystal oscillator
5. 12 mHz crystal oscillator
6. 2x26 connection pads
7. mikroBUS™ sockets 1 and 2
8. Pushbuttons
9. Additional LEDs
10. LTC3586 USB power manager IC
11. Power and Charge indication LEDs
12. RESET button
13. USB mini-B connector
14. Li-Polymer battery connector
15. Programmer connector
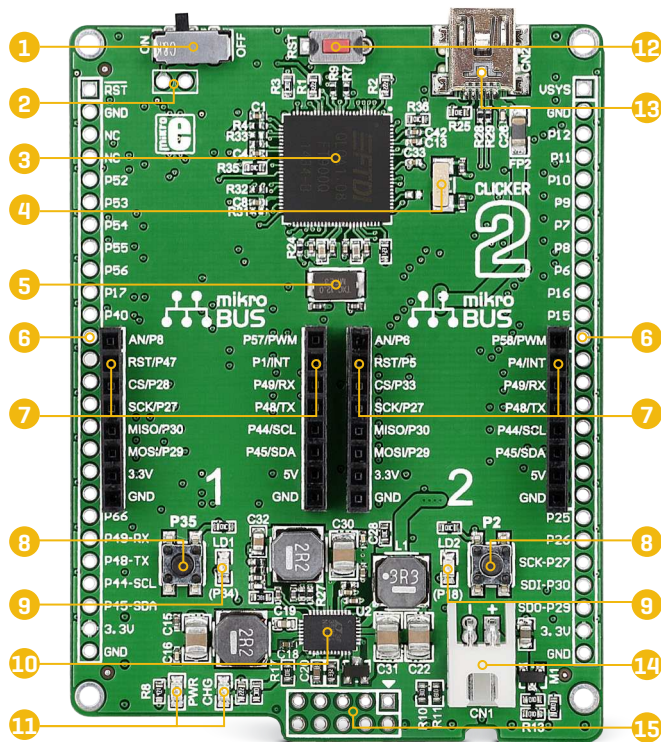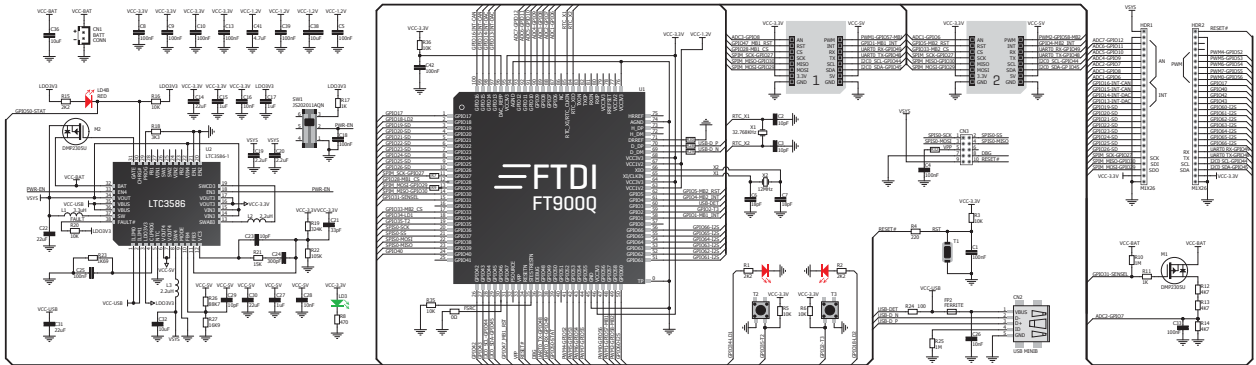
clicker 2 for FT90x schematic
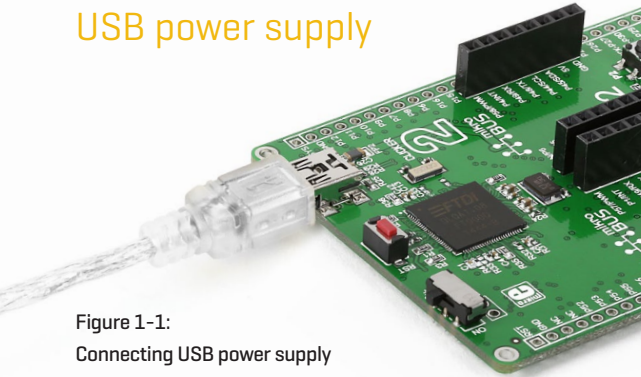
1. Power supply

USB power supply

Figure 1-1:
Connecting USB power supply

You can supply power to the board with a **Mini-B 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 on-board 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 1-2: Connecting
Li-Polymer battery

NOTE *click™ boards that use a 3.3V power supply can draw up to 750 mA of current, which is more current than a USB can supply (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.*
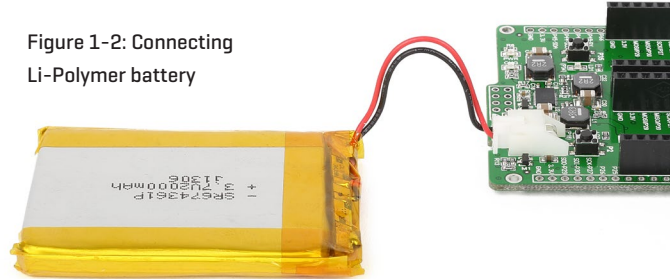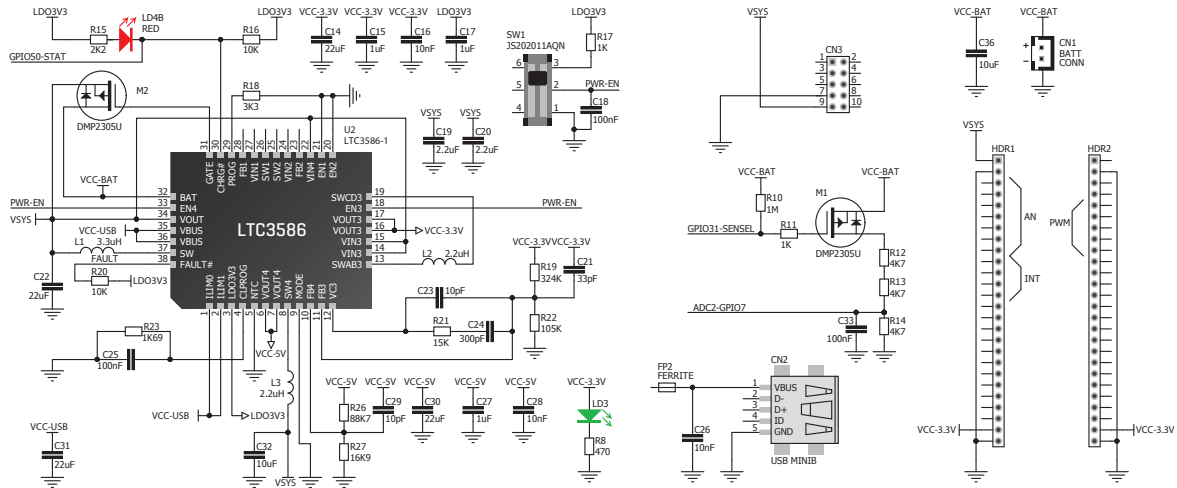
Figure 1-3: Power supply schematic

2. FT900 microcontroller

The FT90x clicker development tool comes with the **FT900Q** microcontroller. This 32-bit FT32 Core high performance microcontroller executes instructions from Shadow RAM, achieving true zero wait states at up to 100mHz, resulting in 310 DMIPS of performance.

Key microcontroller features

- 310 DMIPS/ 100mHz, 32-bit FT32 Core
- 256kB Flash memory
- 64kb Data memory
- 256kB Shadow program memory
- 67 I/O pins
- SPI, I^{2}C, I^{2}S, A/D, UART, Etrenet, DAC, CAN, SD
- 16-bit, 32-bit Digital Timers
- Camera parallel interface
- RTCC, one wire debugger, etc.
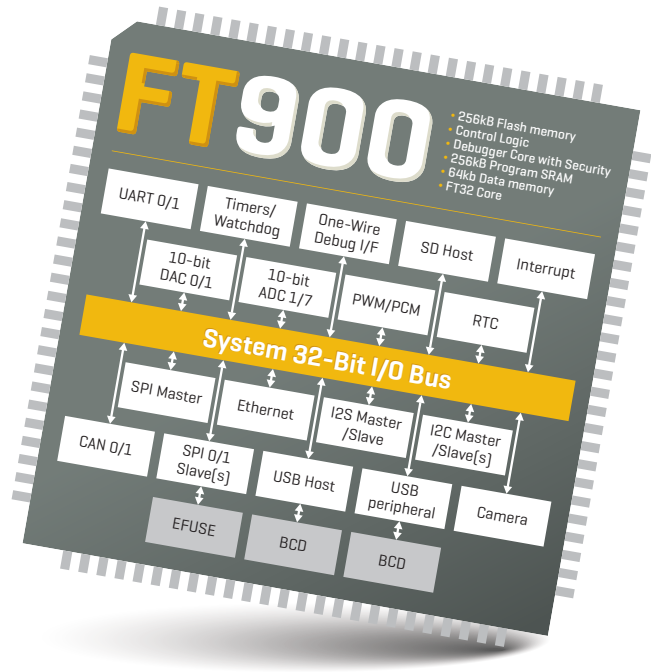
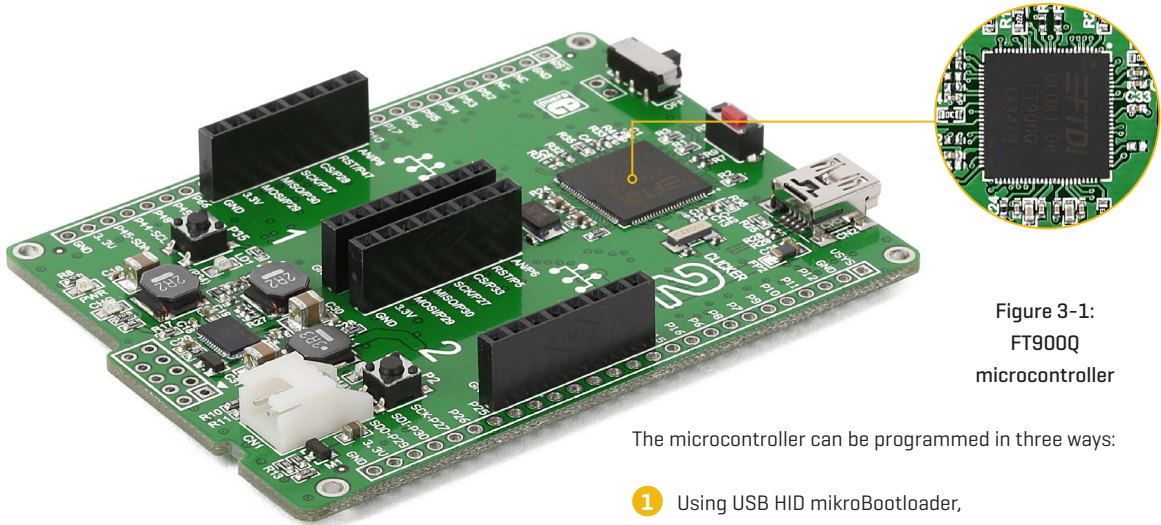# 3. Programming the microcontroller

Figure 3-1:
FT900Q
microcontroller

The microcontroller can be programmed in three ways:

1 Using USB HID mikroBootloader,

2 Using external mikroProg™ for FT90x 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:

🔗 *www.mikroe.com/downloads/get/2230/clicker_2_ft90x_bootloader.zip*

After the mikroBootloader software is downloaded, unzip it to desired location and start it.
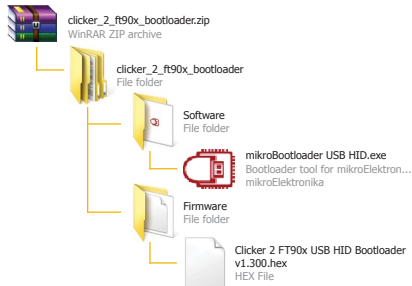
step 1 – Connecting clicker 2 for FT90x

Figure 3-2: USB HID mikroBootloader window

1 To start, connect the USB cable, or if already connected press the **Reset** button on your clicker 2 for FT90x. 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

1 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.

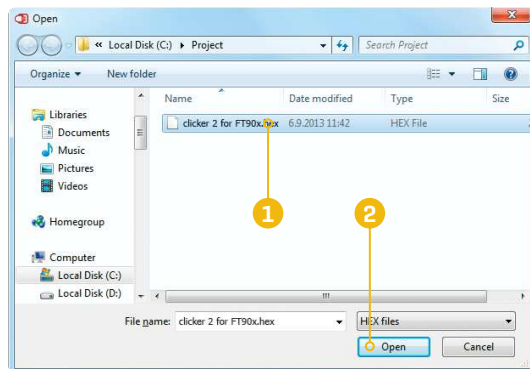## step 3 – Selecting .HEX file

Figure 3-4: Selecting HEX

1 Select .HEX file using open dialog window.

2 Click the **Open** button.

step 4 – Uploading .HEX file

Figure 3-5: Begin uploading

Figure 3-6: Progress bar

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

1 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

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

2 Press **Reset** button on clicker 2 for FT90x 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 FT90x programmer** and **mikroProg Suite™ for FT90x® software**. The external programmer is connected to the development system via 2x5 connector **Figure 3-9. mikroProg™** is a fast USB 2.0 programmer with hardware debugger support. It supports all FT90x devices in a single programmer. Outstanding performance, easy operation and elegant design are its key features.

Figure 3-8:
mikroProg™ connector

mikroProg Suite™ for FT90x software

A standalone programming software utility called **mikroProg Suite™ for FT90x** is available as an alternative to programming the MCU directly from the FT90x compiler. This software is used for programming of all supported FT90x microcontrollers. The software has an intuitive interface and **SingleClick™** programming technology. To begin, first locate the installation archive on our web site:

🔗 *www.mikroe.com/downloads/get/2215/mikroprog_suite_ft90x_v100.zip*

After downloading, extract the package and double click the executable setup file, to start the installation.

Quick guide

1 Click the **Detect MCU** button in order to recognize the device ID.

2 Click the **Read** button to read the entire microcontroller memory. You can click the **Save** button to save it to the target HEX file.

3 If you want to write the HEX file into the microcontroller, first make sure to load the target HEX file using the **Load** button. Then click the **Write** button to begin programming.

4 Click the **Erase** button to clear the microcontroller memory.

Figure 3-10:
mikroProg Suite™ for
FT90x window

Figure 3-13: mikroProg™ connection schematic
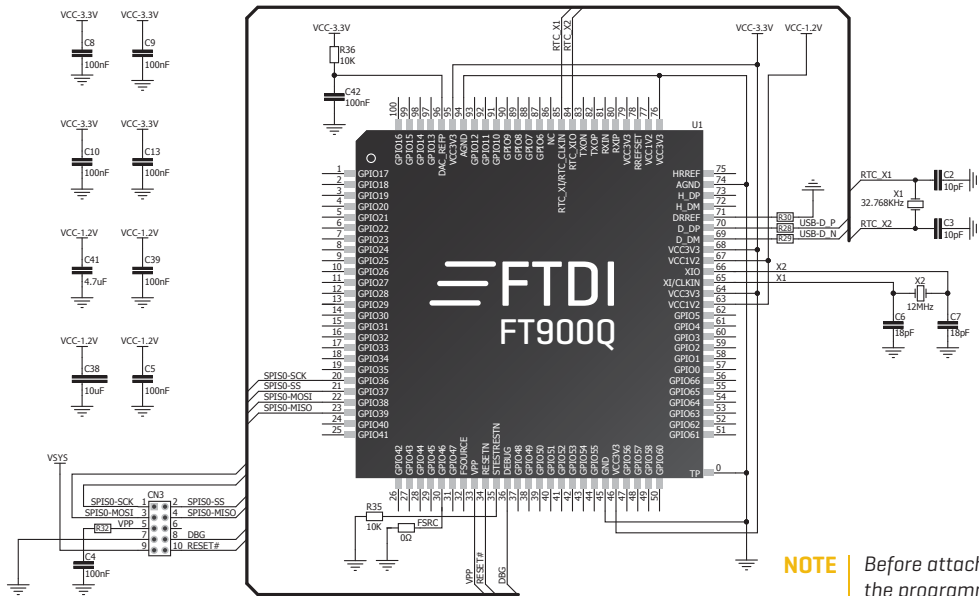
NOTE | *Before attaching the programming connector, you have to solder the provided 2x5 male header to the connection pads.*

4. Buttons and LEDs

The board also contains a **1 reset button** and a pair of **2 buttons** and **3 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 (**P34** and **P18**). 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 (**P35** and **P2**) from logic high (1) to logic low (0). In addition to the onboard ON/OFF switch, two pins allow you to connect your own external switch (located beneath the switch).
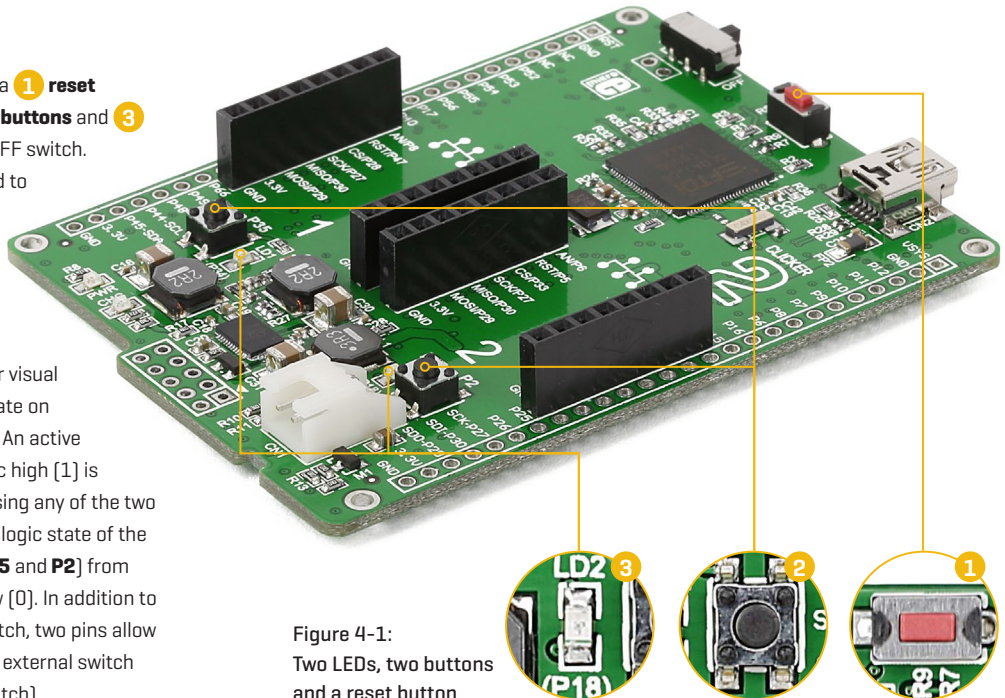

Figure 4-1:
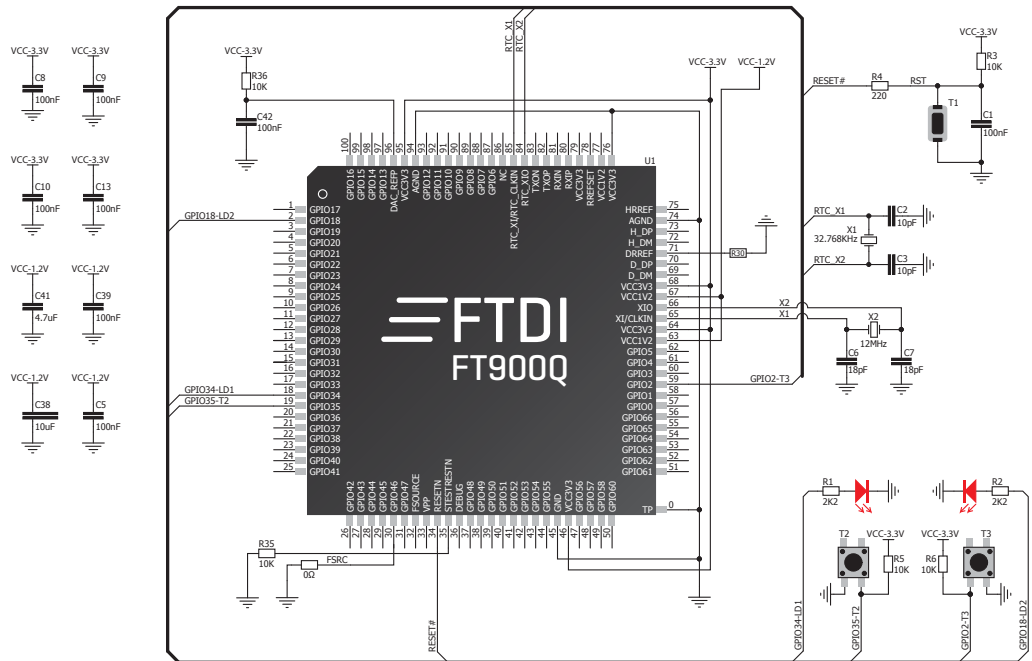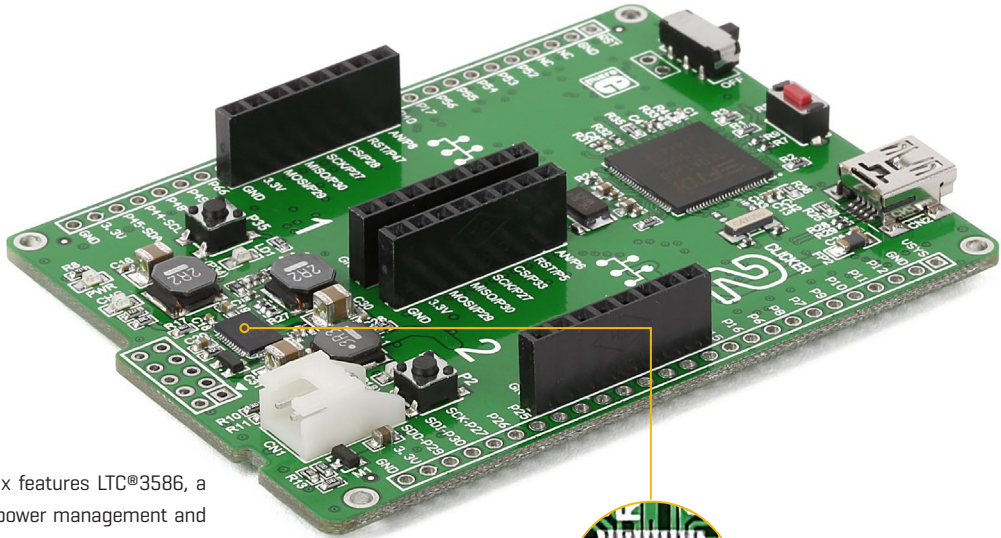Two LEDs, two buttons
and a reset button

Figure 4-2: Other modules connection schematic

5. Power management and battery charger

Clicker 2 for FT90x features LTC®3586, 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 5-2: power management and battery charger IC

6. Oscillators
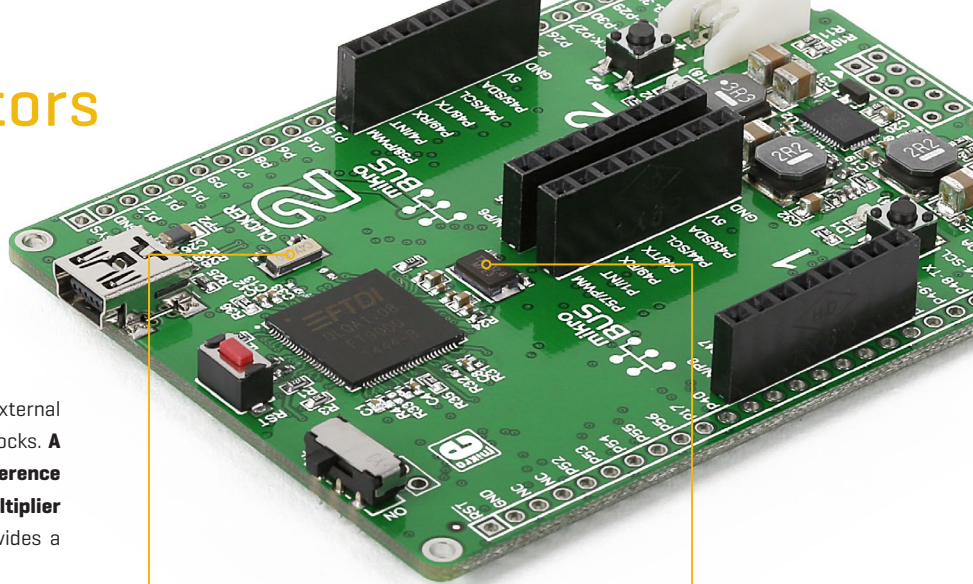
Two onboard oscillators act as external sources for FT90x's two system clocks. **A 12 MHz oscillator provides a reference frequency output to the clock multiplier PLL**. A a **32.768kHz** oscilator provides a clock for the internal RTCC.
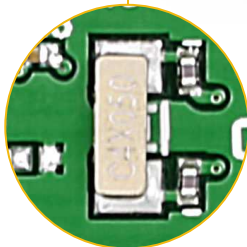
Figure 6-1:
32.768 kHz crystal oscillator module [X2]

Figure 6-2:
12MHz crystal oscillator module [X1]

Figure 6-3: Crystal oscillator schematic

7. USB connection

FT90x 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 Mini-B USB connector which is positioned next to the battery connector.
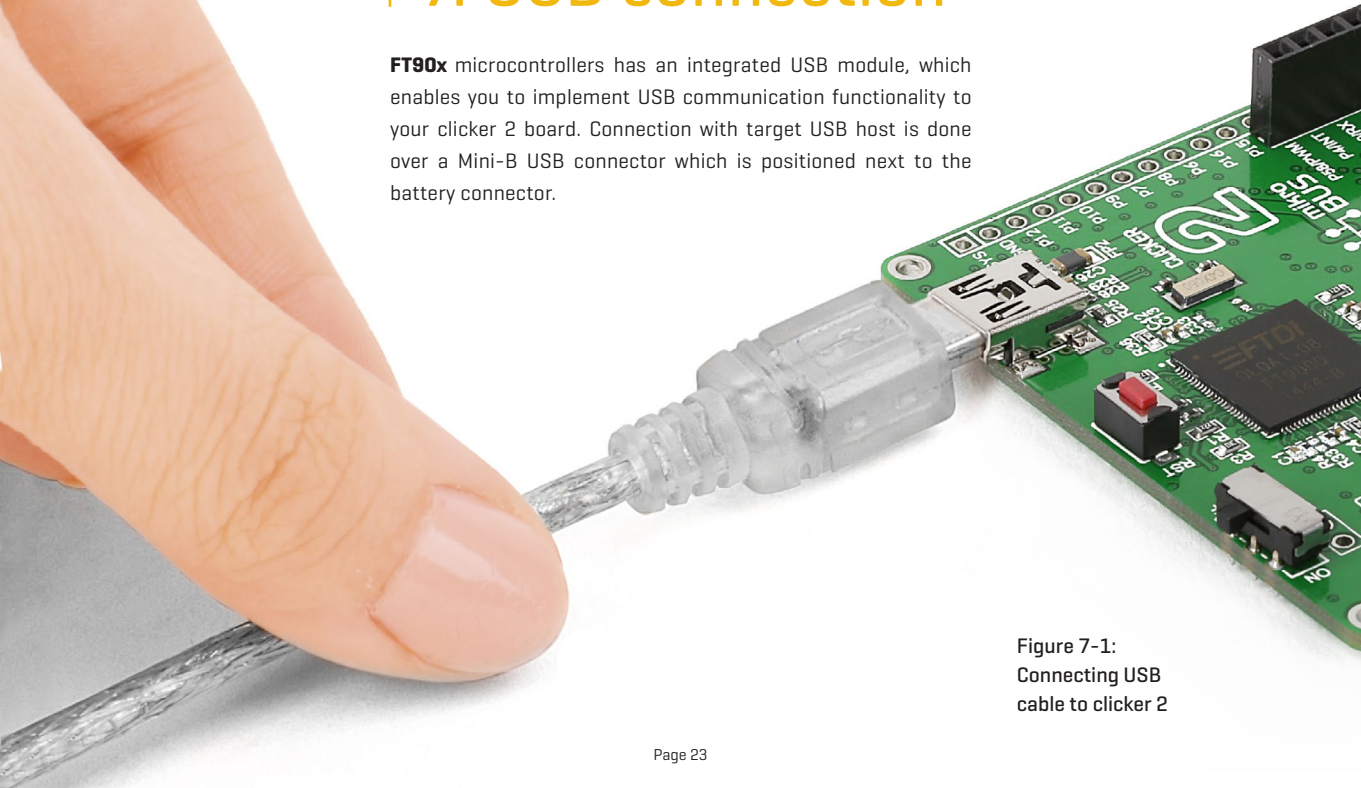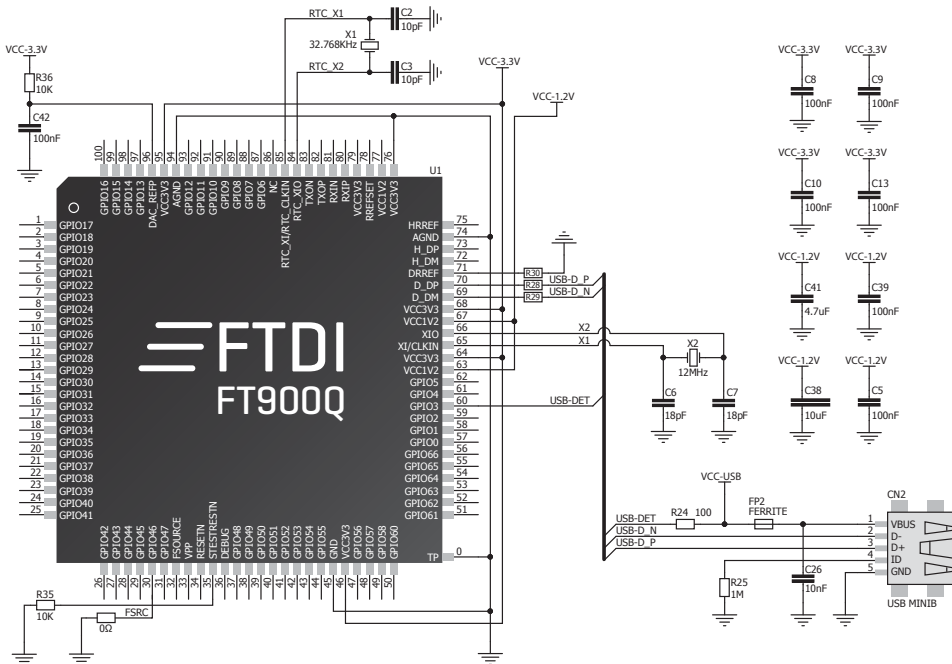
Figure 7-1:
Connecting USB
cable to clicker 2

Figure 7-2: USB module connection schematic

8. Pads

Pads HDR2   **Figure 8-1: Connecting pads schematic**   Pads HDR1

Most microcontroller pins are available for further connectivity via two 1x26 rows of connection pads on both sides of the clicker 2 for FT90x board. They are designed to match additional shields, such as Battery Boost shield, Gaming, PROTO shield and others.