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

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 STM32 ARM®

Amazingly compact, all-on-single-pcb development board carring 4.3" TFT Touch Screen and lots of multimedia peripherals, all driven by powerful STM32F407ZG microcontroller from ARM® Cortex™-M4 family

ARM cortex

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

Table of Contents

Introduction to mikromedia+ for STM32 ARM®

The **mikromedia+ for STM32 ARM®** 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 32-bit **ARM® Cortex™-M4 STM32F407ZG** 144-pin microcontroller. The mikromedia+ for STM32 ARM® features integrated modules such as stereo MP3 codec, **4.3" TFT 480x272** touch screen display, accelerometer, microSD card slot, buzzer, IR receiver, RGB LED diode, PIN photodiode, temperature sensor, 2.4GHz RF transceiver, Ethernet transceiver, 8 Mbit flash memory, RTC battery, Li-Polimer battery charger etc. The board also contains MINI-B USB connector, power screw terminals, 2x5 JTAG connector, two 1x26 connection pads, ON/OFF switch and other. It comes pre-programmed with USB HID bootloader, but can also be programmed with external programmers, such as **mikroProg™ for STM32** or ST-LINK 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 STM32 ARM®** 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

38 mA with erased MCU

(when on-board modules are inactive)

board dimensions

119.54 x 78 mm (4.71 x 3.07 inch)

weight

~112 g (0.247 lbs)

Package Contains

01 Damage resistant protective box

02 mikromedia+ for STM32 ARM® development system

03 Two 1x26 male headers and one 2x5 header

04 mikromedia+ for STM32 ARM® user's guide

05 mikromedia+ for STM32 ARM® schematic

06 USB cable and microSD card

1. Power supply

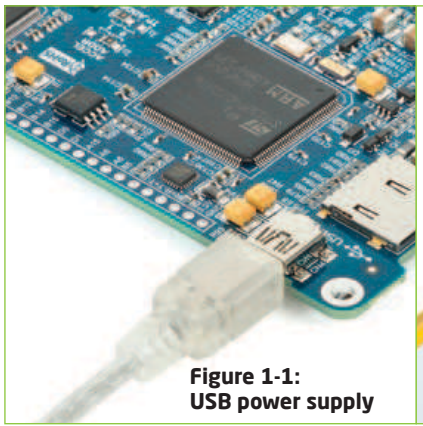


Figure 1-1:
USB power supply

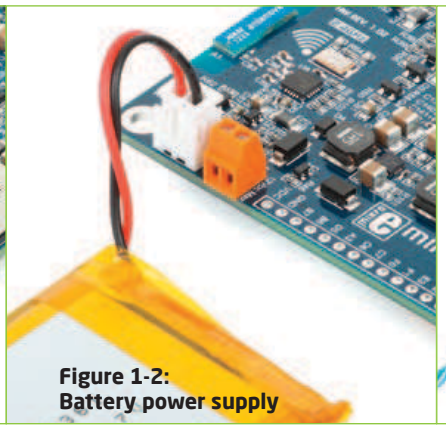


Figure 1-2:
Battery power supply

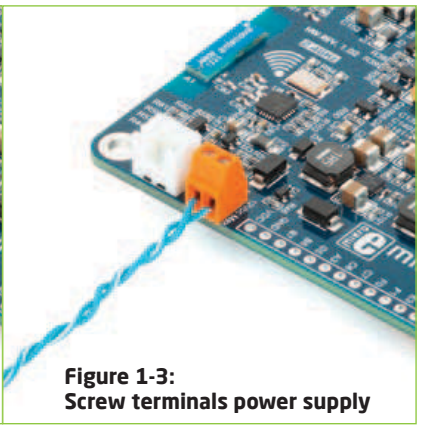


Figure 1-3:
Screw terminals power supply

The mikromedia+ for STM32 ARM® 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 values must be within **2.5-12V 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.

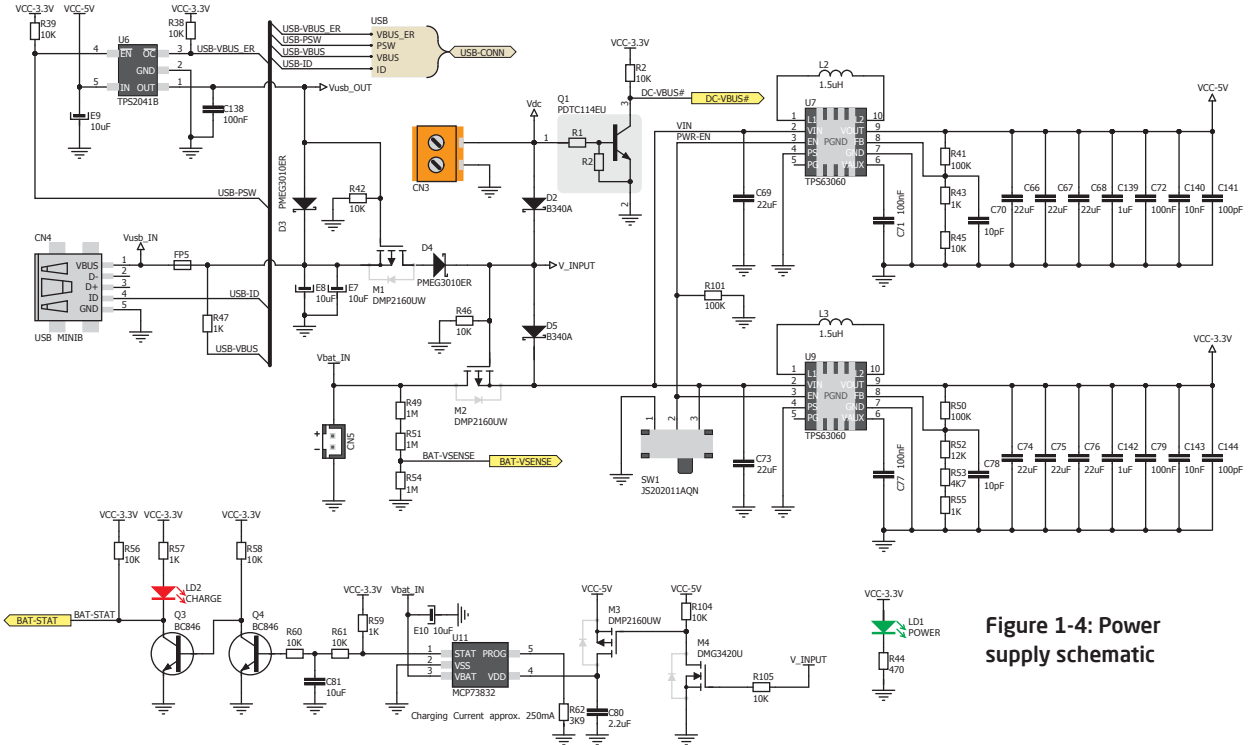
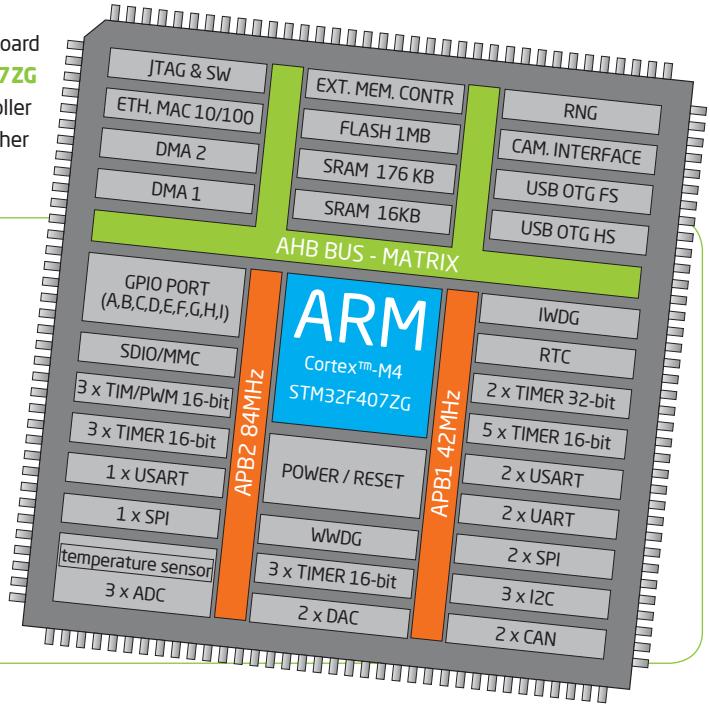


Figure 1-4: Power supply schematic

2. STM32F407ZG microcontroller

The mikromedia+ for STM32 ARM® development board comes with the 144-pin **ARM® Cortex™-M4 STM32F407ZG** microcontroller. This high-performance **32-bit** microcontroller with its integrated modules and in combination with other on-board modules is ideal for multimedia applications.



Key microcontroller features

- Up to **210 DMIPS** Operation (168MHz);
- 1 MB of Flash memory;
- 192 + 4 KB of SRAM memory;
- up to 140 I/O pins;
- 16/32-bit timers
- 16MHz internal oscillator, 32kHz RTCC, PLL;
- 4xUART, 3xSPI, 3xI²C, 2xCAN, 3xADC, 3XADC etc.
- Ethernet, USB etc.

3. Programming the microcontroller

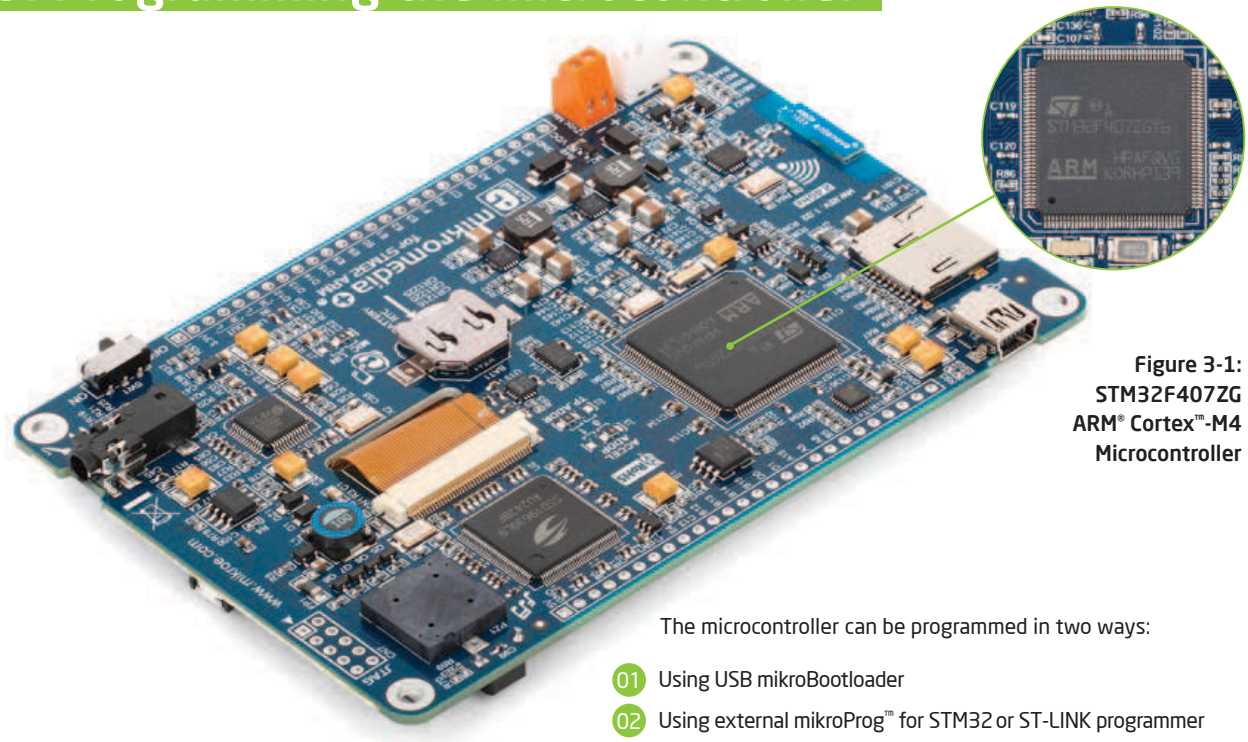


Figure 3-1: STM32F407ZG ARM® Cortex™-M4 Microcontroller

The microcontroller can be programmed in two ways:

01 Using USB mikroBootloader

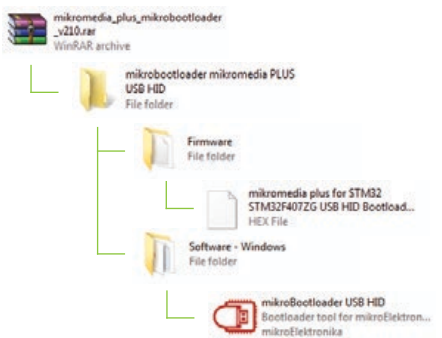
02 Using external mikroProg™ for STM32 or ST-LINK programmer

Programming with mikroBootloader

You can program the microcontroller with bootloader which is pre programmed into the device by default. To transfer .HEX file from a PC to MCU you need bootloader software (**mikroBootloader USB HID**) which can be downloaded from:

http://www.mikroe.com/downloads/get/1976/mikromedia_plus_mikrobootloader_v210.zip

After software is downloaded unzip it to desired location and start mikroBootloader USB HID software.



step 1 - Connecting mikromedia

Figure 3-2: USB HID mikroBootloader window

01 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 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 that will be uploaded to MCU memory.

step 3 - Selecting .HEX file

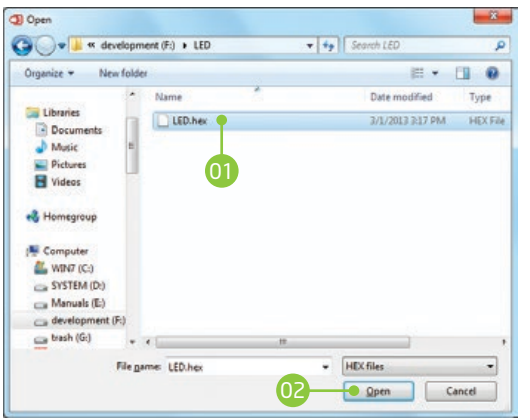


Figure 3-4: Selecting HEX

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 uploading click the **Begin uploading** button.

Figure 3-6: Progress bar

01 You can monitor .HEX file uploading via progress bar

step 5 - Finish upload

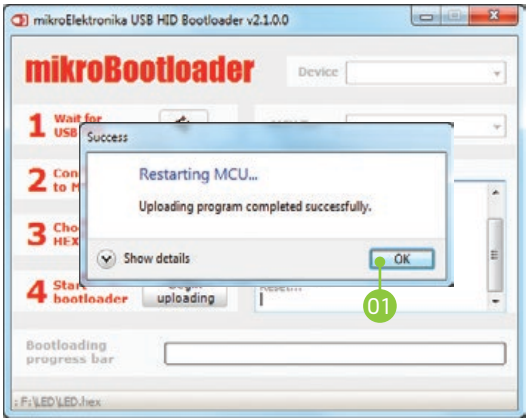


Figure 3-7: Restarting MCU

Figure 3-8: mikroBootloader ready for next job

01 Click the **OK** button after uploading is finished. Board will automatically reset and after 5 seconds your new program will execute.

Programming with mikroProg™ programmer

Figure 3-9: mikroProg™ JTAG connector

The microcontroller can be programmed with external **mikroProg™ for STM32 programmer** and **mikroProg Suite™ for ARM® software**. The external programmer is connected to the development system via JTAG connector, **Figure 3-9.** **mikroProg™** is a fast USB 2.0 programmer with hardware Debugger support. It supports ARM® Cortex™-M3 and Cortex™-M4 microcontrollers from STM32. Outstanding performance, easy operation and elegant design are it's key features.

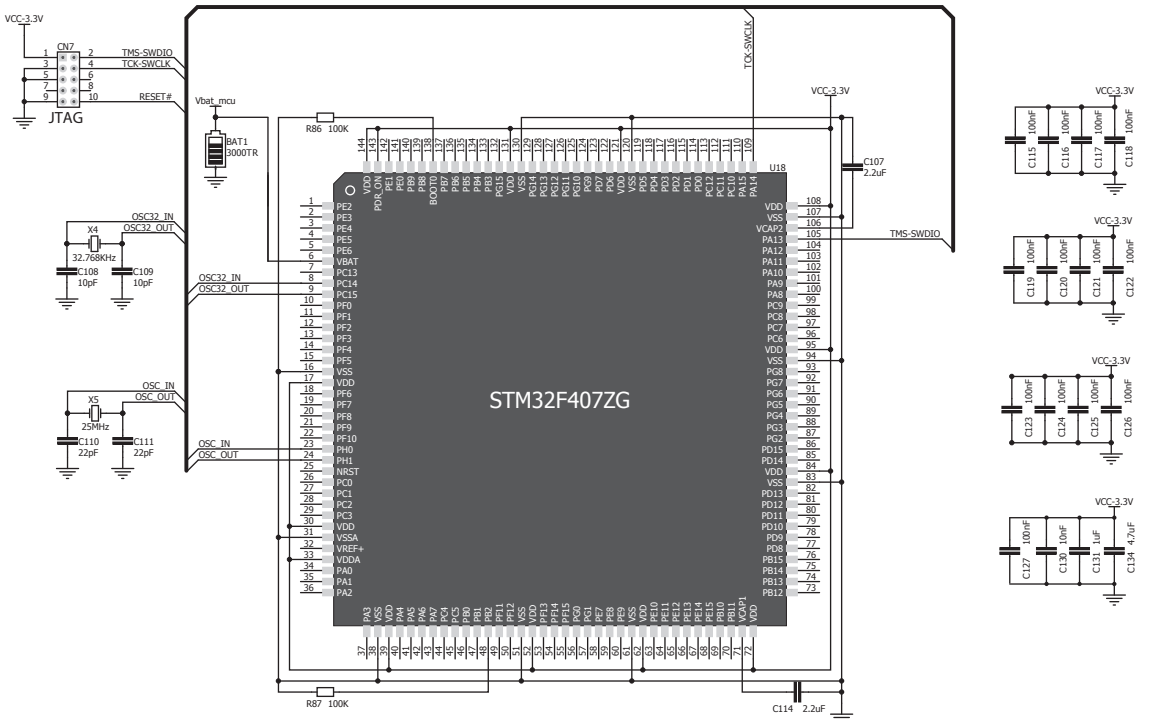
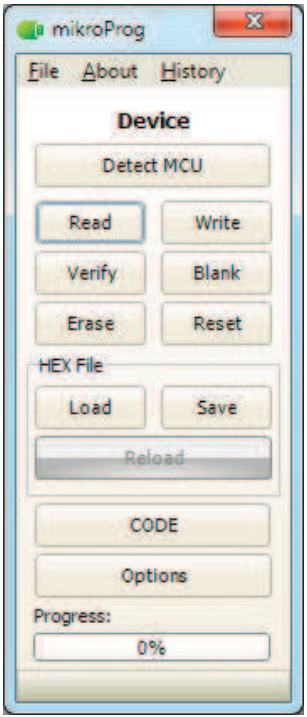


Figure 3-10: mikroProg™ JTAG connector connection schematic

mikroProg Suite™ for ARM® software



mikroProg™ for STM32 programmer requires special programming software called mikroProg Suite™ for ARM®. This software is used for programming ALL of STM32 ARM® Cortex-M3™ and Cortex-M4™ microcontroller families. It features intuitive interface and SingleClick™ programming technology. Software installation is available on a Product DVD:

http://www.mikroe.com/downloads/get/1809/mikroprog_suite_for_arm.zip

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

Quick Guide

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

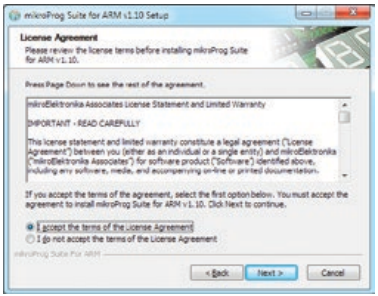
02 Click the **Read** button to read the entire microcontroller memory. You can click the **Save** button to save it to target HEX file.

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

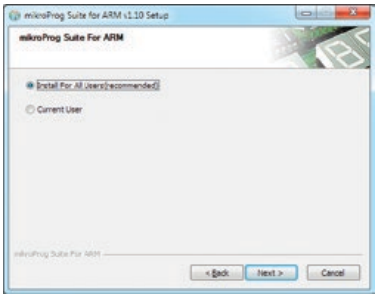
04 Click the **Erase** button to wipe out the microcontroller memory.

Software installation wizard

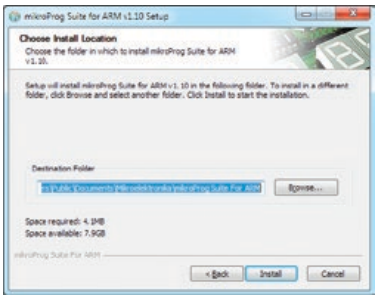
01 Start Installation



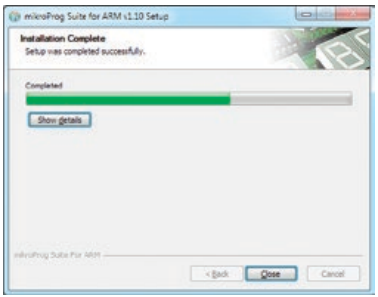
02 Accept EULA and continue



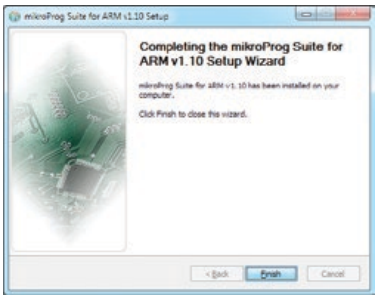
03 Install for all users



04 Choose destination folder

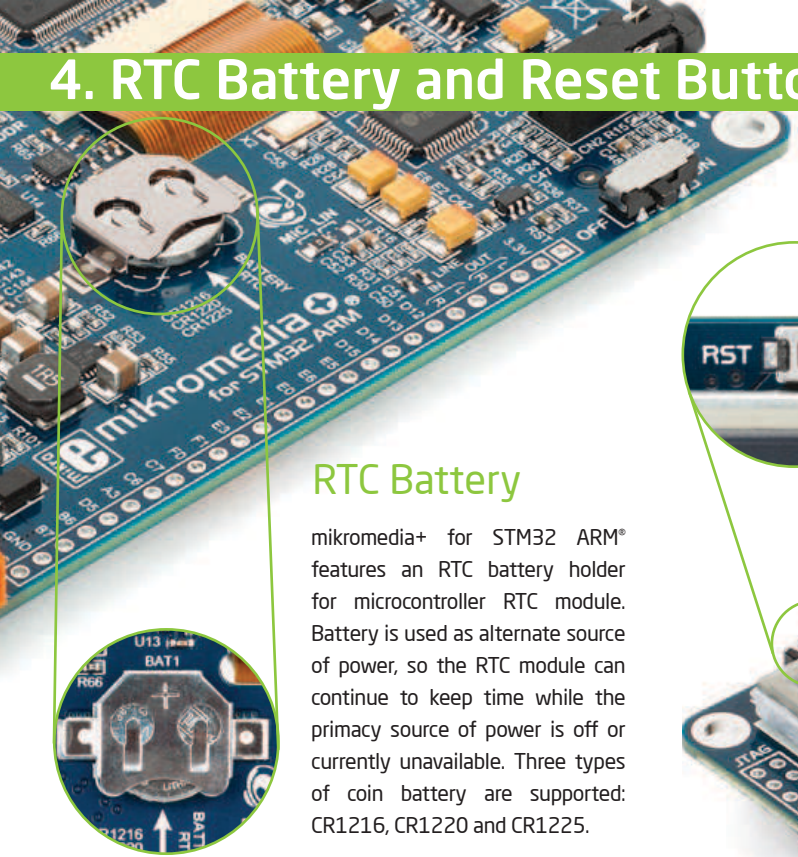


05 Installation in progress



06 Finish installation

4. RTC Battery and Reset Button



RTC Battery

mikromedia+ for STM32 ARM® features an RTC battery holder for microcontroller RTC module. Battery is used as alternate source of power, so the RTC module can continue to keep time while the primacy source of power is off or currently unavailable. Three types of coin battery are supported: CR1216, CR1220 and CR1225.

Reset Button

The board is equipped with reset button, which is located on the front side of the board. If you want to reset the circuit, press the reset button. It will generate low voltage level on the microcontroller reset pin (input). A reset can also be externally provided through the **pin 27** on the side headers.

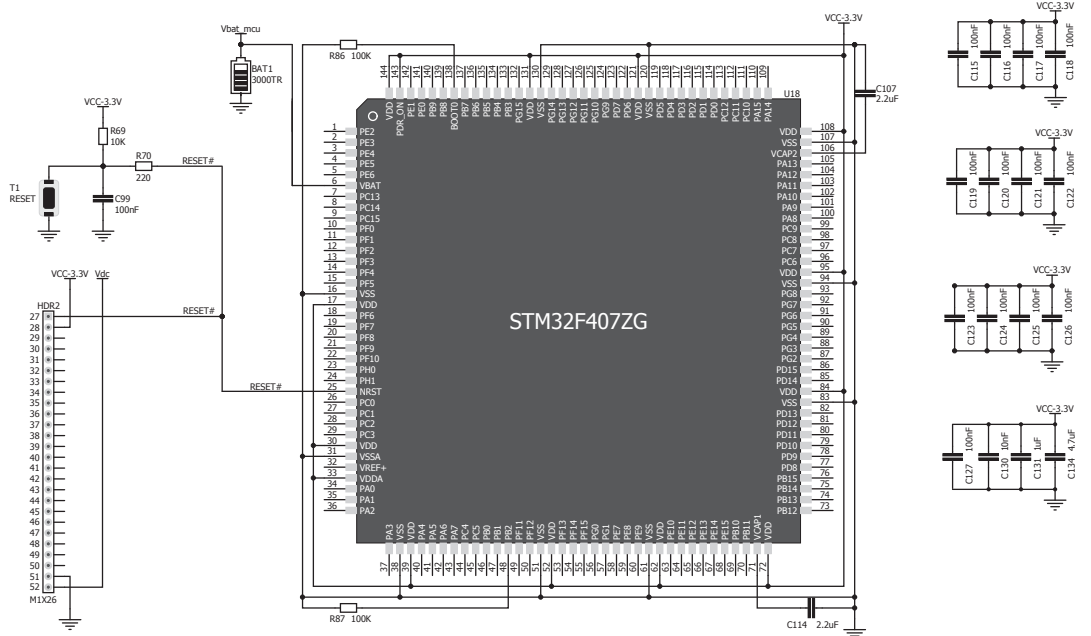


Figure 4-1: Reset circuit and RTC battery schematic

5. Crystal oscillator and 2.048V reference

The board is equipped with 01 **25MHz crystal oscillator (X5)** circuit that provides external clock waveform to the microcontroller OSC0 and OSCI 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 **32.768 kHz crystal oscillator (X4)** 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**.

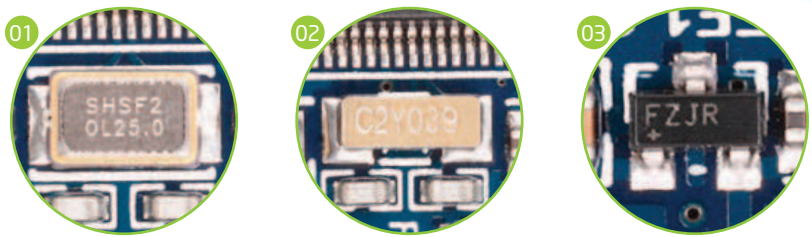


Figure 5-1: Crystal oscillator and 2.048V reference

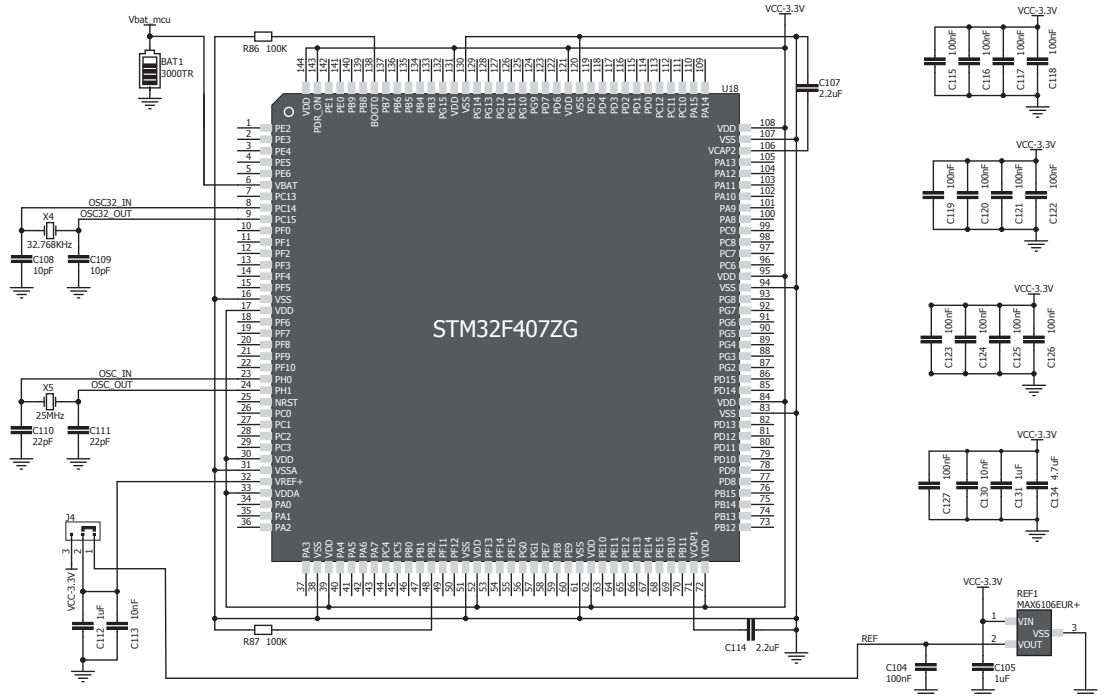
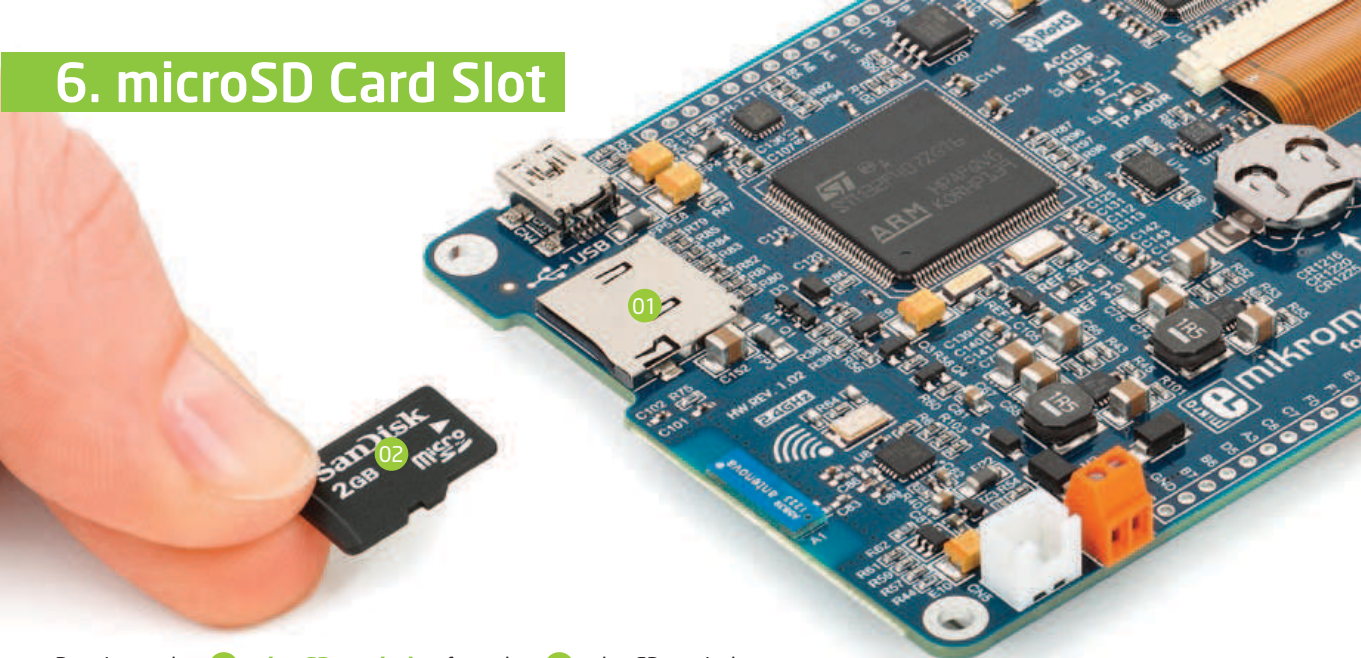


Figure 5-2: Crystal oscillator and voltage reference schematic

6. microSD Card Slot



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 capcitor 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 6-1**.

Figure 6-1: microSD card slot

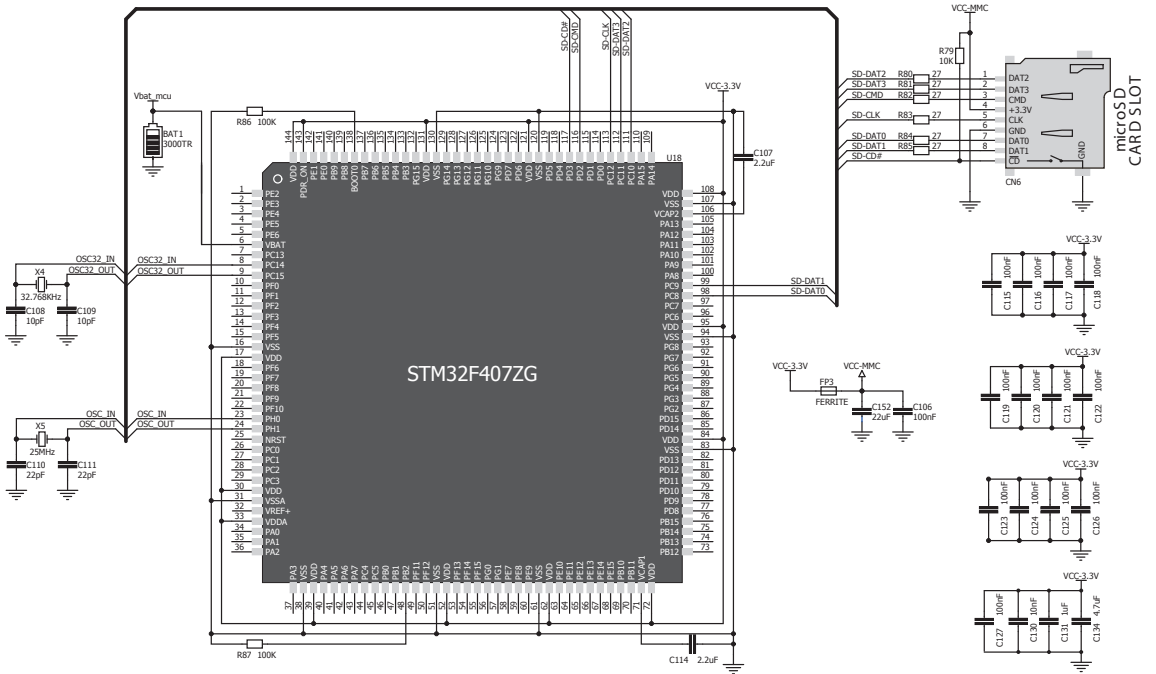


Figure 6-2: microSD Card Slot module connection schematic

7. Touch Screen

The development system features a **4.3" TFT 480x272 display** covered with a **resistive** touch panel. Together they form a functional unit called a **touch screen**, **Figure 7-1.** It enables data to be entered and displayed at the same time. The TFT display is capable of showing graphics in **256K** different **colors**.

Figure 7-1: Touch Screen

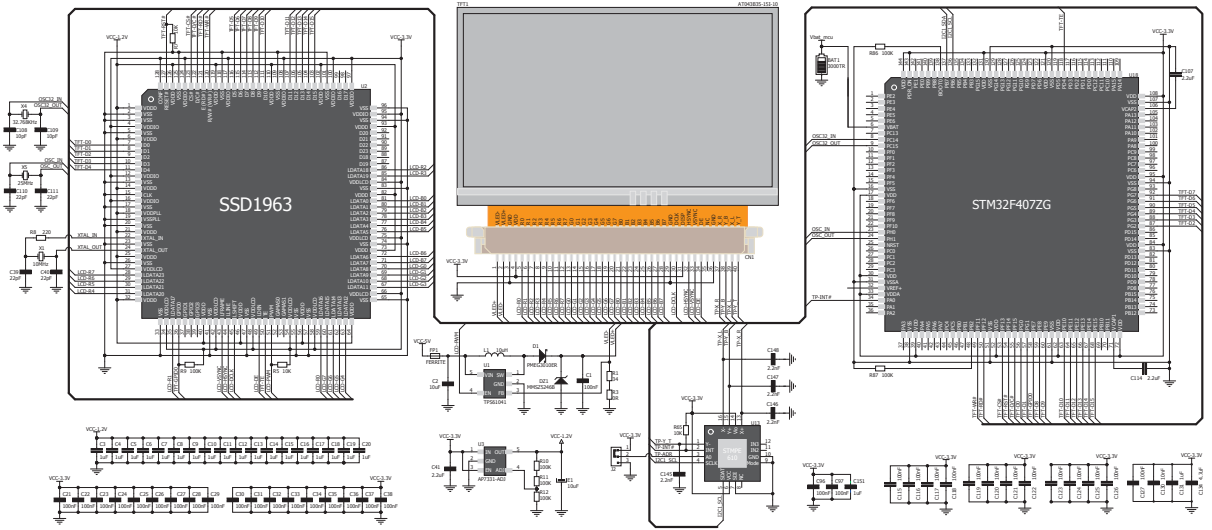


Figure 7-2: Touch Screen connection schematic