DSO138: How to Upgrade Firmware

Applicable models: 13801K/03K，13802K/04K

1. Introduction

The micro-controller (STM32F103C8T6) used in DSO138 contains a built-in booloader. This is a small piece of firmware that can communicate with PC via serial port to write firmware into the flash ROM inside the chip. This article describes how to setup the connection and how to perform firmware upgrade step by step.

2. Tools You Need

In order to complete the upgrade the following tools and file are required.

1) Serial converter that connects DSO138 to PC

The serial port of DSO138 (J5) uses 3.3V LVTTL level . The PC port that we need to connect to is usually a USB port. These two ports are quite different electronically and can not be connected directly. A converter (usually called TTL-USB or Uart-USB converter) is required. There are many such converters available on market. JYE119 (sku# 11901) is one of such products that JYE Tech offers (see Fig. 1). For details about the converter please visit www.jyetech.com。
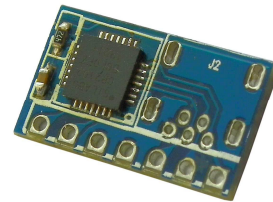

Fig. 1

2) PC software that can work with the bootloader

In order to work with the bootloader in the micro-controller a software that runs on PC is required. This software is called Flash Bootloader Demonstrator which is provided by ST. It is free software and can be downloaded at http://www.st.com/web/en/catalog/tools/PF257525#. You can also download it at JYE Tech website by the link below.

http://www.jyetech.com/Support/STM32_FlashLoaderDemonstrator_v2.7.zip

After downloading install it to your PC.

3) The firmware file (HEX file) to be written to DSO138

This file can be downloaded at

http://www.jyetech.com/Products/LcdScope/Firmwares_138.php.

Save the file to a known place on your PC for future use.

3. Connection

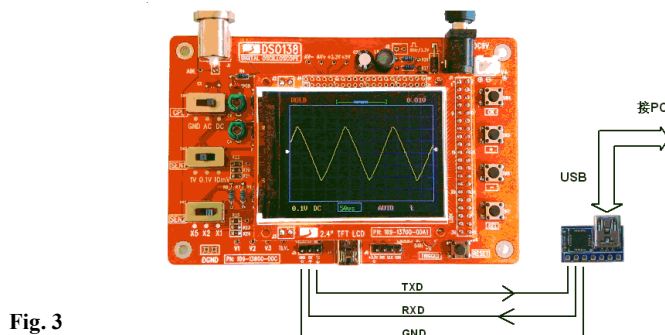Fig. 2 and Fig. 3 show the connection between DSO138 and PC.

Fig. 2

Fig. 3

The serial port of DSO138 (J5) contains three pins, TXD, RXD, and GND. TXD is an output pin (out of DSO138) and RXD is a input pin (into DSO138). GND is the common reference. Please make sure they are connected correctly if you use different Uart-USB converter.

4.   Upgrading Steps

1) Close the jumpers JP1 and JP2 (see Fig. 4) on the bottom side of DSO138 board with solder. This will make the MCU enter bootloader instead of the main firmware at next power up.

2) Connect DSO138 to a USB port on PC as described in section 3. Power up the oscilloscope.

3) Launch Flash Bootloader Demonstrator and proceed to the state as shown in Fig. 5. Here you need to setup some parameters for the serial connection. Please set the parameters to what illustrated in Fig. 5. For Port Name you need to choose the one corresponding to DSO138.
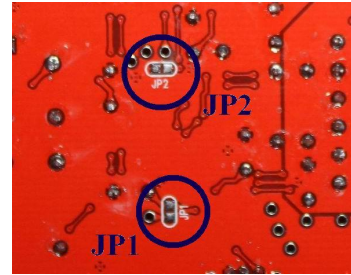

Fig. 4

Please note that many Uart-USB converters require drivers be installed on PC before they can function properly. For JYE119 converter you need install the driver for CP2102 (the converter chip). Please use the following link to download and install the driver.

http://www.silabs.com/products/mcu/pages/usbtouartbridgevcpdrivers.aspx

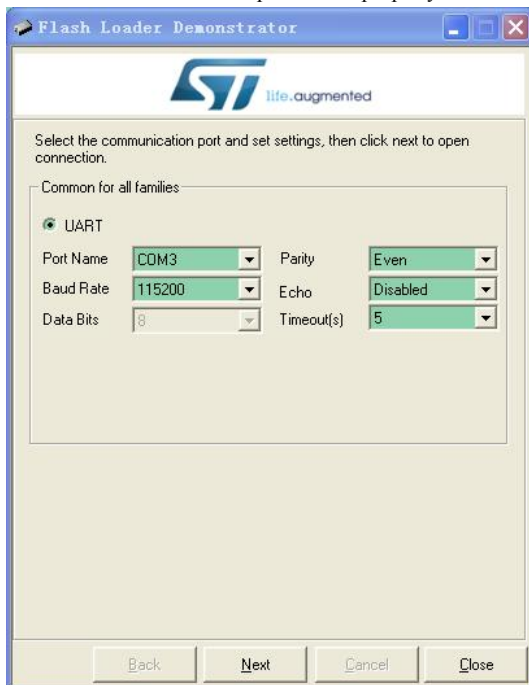After set all parameters properly click Next to continue.
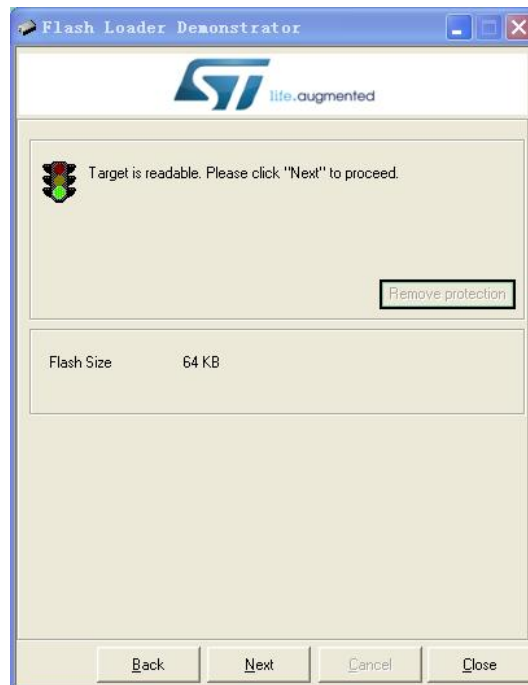

Fig. 5

Fig. 6

4) If there is no error you should see Fig. 6. This is a temporary state showing that the PC has successfully detected bootloader and the flash memory is readable or not. If you have problem to enter this state you can try reset the MCU by pressing on the Reset button on PCB and try again. If that still doesn't work check connections and JP1/JP2. Otherwise click on Next to proceed to next step as shown in Fig. 7.

5) Fig. 7 shows information about the MCU type and its flash memory. You just need to make sure the selection at Target dropdown is the same as shown in Fig. 7. Then click Next to proceed to next step.

6) In Fig. 8 select "Download to device" and open the firmware file (HEX file) which you have saved on your PC by clicking on the "…" button. Make all the rest settings the same as shown in Fig. 8. Then click on Next to start writing.

7) You should see progress bar like that in Fig. 9. When writing is done you should see Fig. 10.

8)   Power off DSO138 and disconnect the connection. **Remove the solders on JP1 and JP2**. Then apply power to the oscilloscope again. Check if the oscilloscope boots up properly. Verify if the firmware versions are correct. If everything is good the upgrading is done.
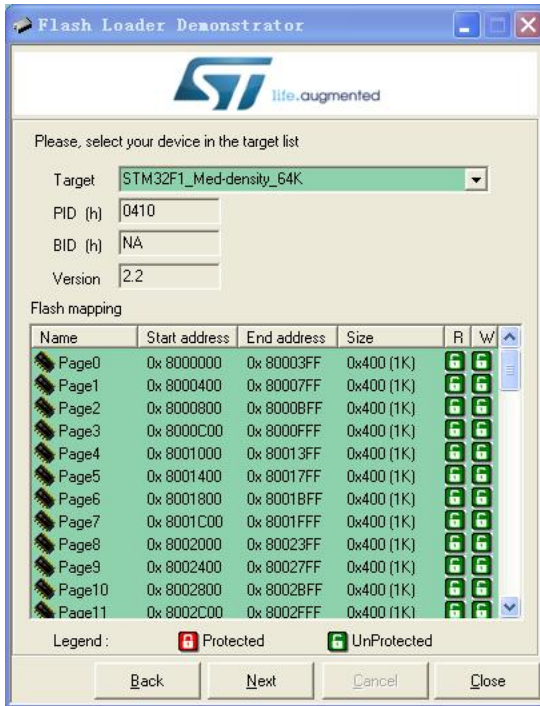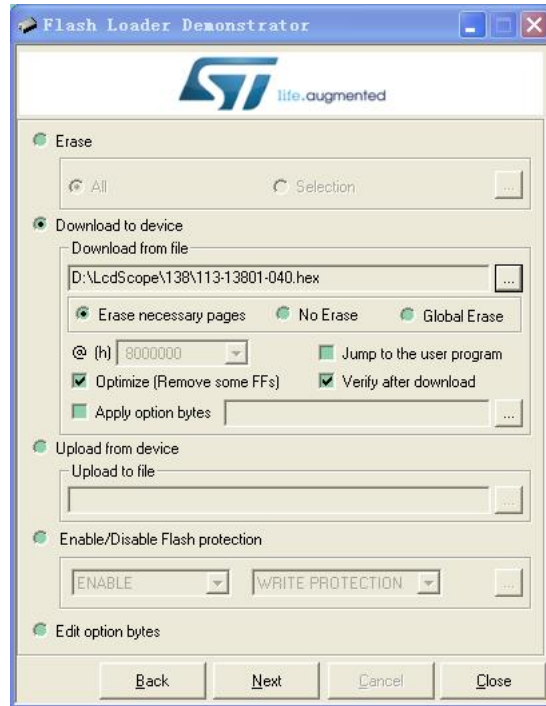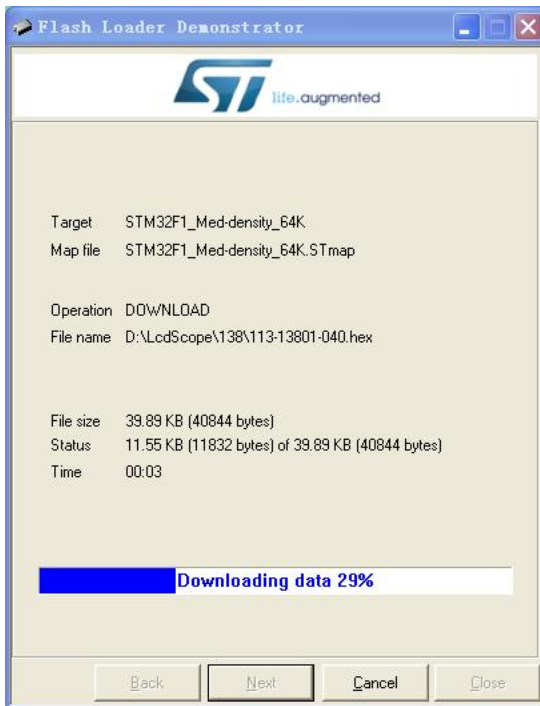

Fig. 7

Fig. 8

Fig. 9

Fig. 10

Revision History

Version	Date	Summary
v01	2016.01.09	First draft