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.



2) <u>PC software that can work with the bootloader</u>

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.

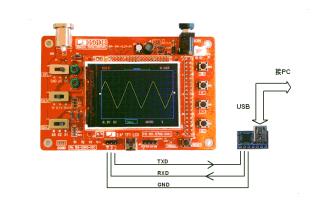
3. Connection

Fig. 3

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







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

- 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.

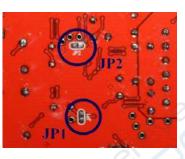


Fig. 4

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.

Flash Loader Demonstrator		🕹 Flash Loader Demonstrator
Select the communication port and set settings, then click next to op connection. Common for all families UART Port Name COM3 Parity Even Baud Rate 115200 Echo Disabled Data Bits Timeout(s) 5		Target is readable. Please click "Next" to proceed. Remove protection Flash Size 64 KB
Back Next Qancel	Close	Back Next Cancel Close
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.

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life.augmented	Life.augmented
ase, select your device in the target list	@ Erase
Target STM32F1_Med-density_64K	C All C Selection
PID (h) 0410	
BID (h) NA	Download to device
	Download from file
Version 2.2	D:\LcdScope\138\113-13801-040.hex
sh mapping	🌾 Erase necessary pages 🔎 No Erase 🤎 Global Erase
ame Start address End address Size R W 🛧 Page0 0x 8000000 0x 80003FF 0x400 (1K) 🕤 🖬	@ (h) 8000000 🚽 🔲 Jump to the user program
Page1 0x 8000000 0x 80003FF 0x400 (TK)	🔽 Optimize (Remove some FFs) 🖉 Verify after download
Page2 0x 8000800 0x 8000BFF 0x400 (1K) 🛅 🔂	Apply option bytes
Page3 0x 8000C00 0x 8000FFF 0x400 (1K) 🕞 🕤 Page4 0x 8001000 0x 80013FF 0x400 (1K) 🕤 🕤	Upload from device
x Page4 0x 8001000 0x 80013FF 0x400 (1K)	Upload to file
Page6 0x 8001800 0x 80018FF 0x400 (1K) 📑 📑	
Page7 0x 8001C00 0x 8001FFF 0x400 (1K) € 🕤 • Page8 0x 8002000 0x 80023FF 0x400 (1K) 🕤 🖬	Enable/Disable Flash protection
⊧Page8 0x 8002000 0x 80023FF 0x400 (1K) 🖬 🖬 ⊧Page9 0x 8002400 0x 80027FF 0x400 (1K) 🖬 🖬	
Page10 0x 8002800 0x 80028FF 0x400 (1K) 🖸 🖯 🔤	ENABLE VIENTE PROTECTION I
• Page11 0x 8002C00 0x 8002FFF 0x400 (1K) 🖪 🖻 🞽	Edit option bytes
Legend : 🚹 Protected 💽 UnProtected	
Back Next Cancel Close	Back Next Cancel Close
Fig. 7	Fig. 8
Fig. 7	Fig. 8
	Fig. 8
Lash Loader Demonstrator Image: STM32F1_Med-density_64K Map file STM32F1_Med-density_64K.STmap Operation D0W/NLOAD File name D:LcdScope\138\113-13801-040.hex	Fig. 8 Flash Loader Demonstrator Flash Load
Lash Loader Demonstrator Image: STM32F1_Med-density_64K Map file STM32F1_Med-density_64K.STmap Operation DOW/NLOAD File name D:\LcdScope\138\113.13801.040.hex File size 33.89 KB (40844 bytes)	Fig. 8 Flash Loader Demonstrator Flash Loader Demonstrator Flash Loader Demonstrator File STM32F1_Med-density_64K Map file STM32F1_Med-density_64K.STmap Operation DOWNLOAD File name D:\LcdScope\138\113-13801-040.hex File size 39.89 KB (40844 bytes)
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Fig. 9

Fig. 10

Revision History

Version	Date	Summary
v01	2016.01.09	First draft