

Darksoft STV Multi Firmware Upgrade

by Everten

These instructions are for upgrading to the firmware version that supports auto-update / bootloader so future firmware upgrades can be accomplished by simply copying a firmware file to a microSD card. It also supports auto-reset so after game selection/flashing the multi cart will auto-reset the STV board.

Prerequisites

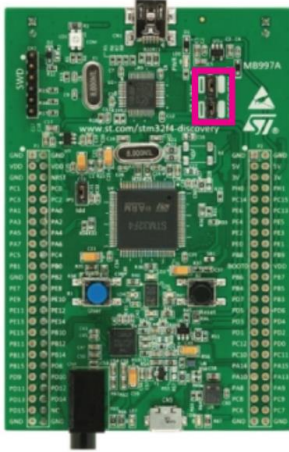
- **ST Discovery Kit**
 - I used the STM32F411 Discovery Kit (STM32F411E-DISCO) purchased from Mouser.com for \$15. Others have used STM32F4DISCOVERY, STM32F407G-DISC1, and others. The important thing is that it has the SWD port for programming.
- **Discovery Kit Drivers**
 - Download and install Discovery Kit drivers on your computer:
https://www.st.com/content/st_com/en/products/development-tools/software-development-tools/stm32-software-development-tools/stm32-utilities/stsw-link009.html
- **ST Link Utility**
 - Download and install ST Link Utility software on your computer:
<https://www.st.com/en/development-tools/stsw-link004.html>
- **STV Multi Cart Firmware**
 - Download the STV Multi firmware. The latest as of this post is:
http://www.mediafire.com/download/e56ggt7j77o7f5/STV_Ultimo_Firmware_con_Autoreset_yAutoboot.rar
 - Extract the firmware files anywhere you choose.
 - Format a microSD card as FAT32
 - Copy the flash.img file to the root of the microSD card
 - Eject microSD card and set aside for later

Confirm Discovery Kit Connection

1. Run ST-LINK Utility as Administrator found in
C:\Program Files (x86)\STMicroelectronics\STM32 ST-LINK Utility\ST-LINK Utility
2. Connect Discovery Kit to computer with USB cable.
3. In the ST-LINK Utility click Target > Connect, you should see the connection in the low status window. Confirm successful connection to the Discovery Kit.
4. Click Target > Disconnect
5. This confirms your computer is able to communicate with the Discovery Kit

Connecting the STV Multi Cart to Discovery Kit

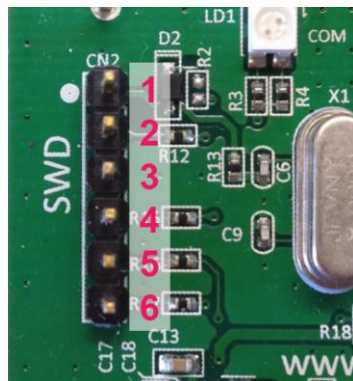
1. Disconnect the Discovery Kit from the computer
2. Remove the ST-LINK jumpers (highlighted in picture) from the Discovery Kit board



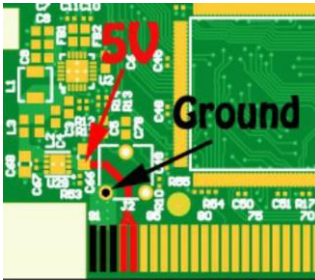
3. Connect the Discovery Kit SWD port to the STV multi cart debug port (I used dupont jumper cables) using the diagram below.

SWD Connector Pin	STV Multi Cart Debug Pin	Signal
1	2	3.3V
2	3	SWCLK
3	8	GND
4	1	SWDIO
5	5	Reset

Board Pin Layouts



4. Connect the STV Multi Cart to a good 5V power source like a computer power supply. I used a computer power supply modified to be a test bench supply. You will need to solder connections to the STV Multi Cart to supply power.



Programming the STV Multi Cart with Bootloader

1. Connect the Discovery Kit to the computer with a USB cable
2. Supply 5V power to the STV Multi
3. Open the ST Link Utility as an administrator
4. Click Target > Connect
5. You may receive an error regarding memory, Click OK to ignore.
`07:41:21 : V2J37S0`
`07:41:21 : Connected via SWD.`
`07:41:21 : SWD Frequency = 4,0 MHz.`
`07:41:21 : Connection mode : Normal.`
`07:41:21 : Debug in Low Power mode enabled.`
`07:41:21 : Device ID:0x414`
`07:41:21 : Device family :STM32F10xx High-density`
`07:41:21 : Can not read memory!`
`Disable Read Out Protection and retry.`
6. If there are other errors you will need to double check the SWD to STV Multi Cart wiring and try again.
7. Click File > Open
8. Select the sd_bootloader.hex file included in the STV Multi Cart firmware download
9. Click Target > Program
10. Click Start at the popup window. If prompted to disable read out protection click OK.
11. The software will begin programming the STV Multi cart. The status window will display the results.
`07:44:26 : [sd_bootloader.hex] opened successfully.`
`07:44:26 : [sd_bootloader.hex] checksum : 0x0018ED46`
`07:45:06 : Read out protection is activated.`
`07:45:12 : Read out protection disabled.`
`07:45:13 : Memory programmed in 1s and 47ms.`
12. Click Target > Disconnect
13. Remove power to the STV Multi Cart
14. Disconnect the Discovery Kit from the computer
15. Replace the ST-LINK jumpers on the Discovery Kit board

Updating the STV Multi Cart Firmware

1. Insert the microSD card containing the flash.img file we prepared earlier into the STV Multi Cart.
2. Insert the STV Multi Cart into your STV board and power it on.
3. The STV Multi Cart PROG light will flash rapidly and then slowly blink twice to confirm success. If it blinks 5 times then there was an error during programming and you should confirm you have the correct flash.img and your microSD is formatted properly.
4. Your STV Multi Cart is updated!