

# MrCART Batch 1 and 2 Update Instructions

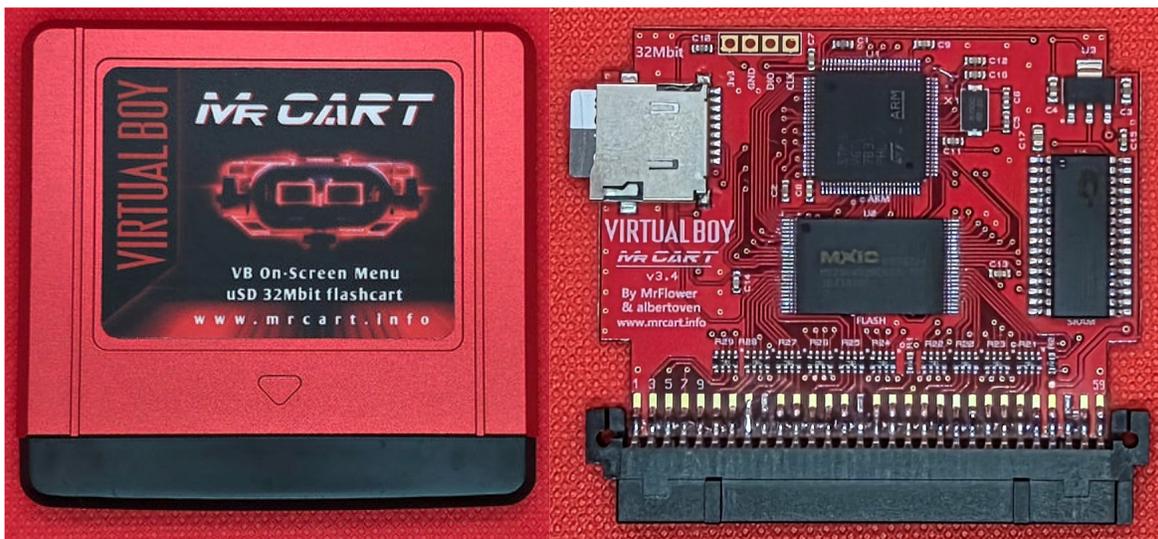


Figure 1: MrCART Virtual Boy Flashcart

## Purpose

Virtual Boy MrCART flash carts from the original MrFlower run, RetroOnyx batch 1, and RetroOnyx batch 2 can be updated to fix ROM issues with 32Mbit files (Hyper Fighting) and save issues with games like 3D Tetris and Bound High (High score patched version). Batch 3 does **NOT** need these fixes and already includes them. In the Discord forums this is often referred to as the Hyper Fighting and 3D Tetris mods.

## Equipment Needed

In order to perform the update yourself, you will need an STM32 programmer, soldering iron, solder, some thin rework wire, exacto knife for a trace cut, and tools to open your MrCART case. If you have a plastic MrCART case, you need the 3.8mm Nintendo security tool that can be found on Amazon. If you have an aluminum case, you either need a small Phillips screwdriver or a 0.05" Allen wrench. I only list links for the specialty tools below.

STM32 programmer needed: <https://www.digikey.com/en/products/detail/stmicroelectronics/ST-LINK-V2/2214535>

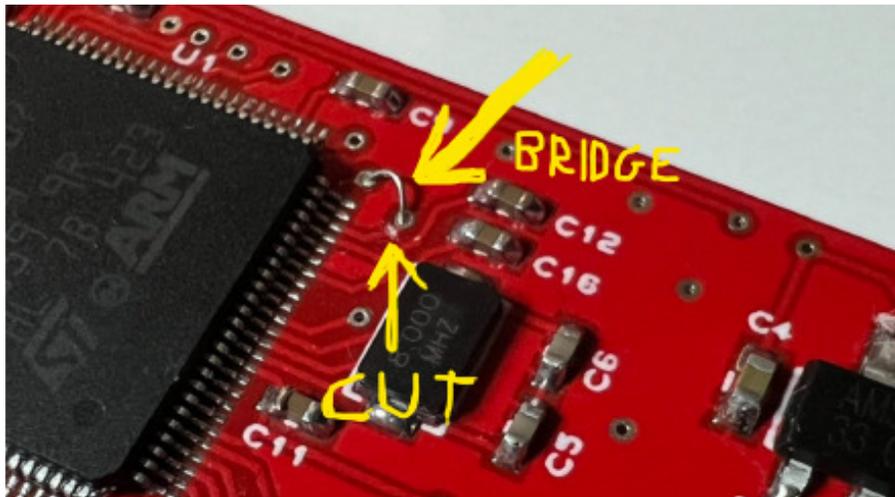
Nintendo Security Screw (3.8mm): <https://www.amazon.com/Screwdriver-Nintendo-Security-Gamebit-Driver/s?k=Screwdriver+Nintendo+Security+Gamebit+Driver>

0.05" Allen wrench: [https://www.amazon.com/s?k=0.05+allen+wrench&ref=nb\\_sb\\_noss](https://www.amazon.com/s?k=0.05+allen+wrench&ref=nb_sb_noss)

You will also need a way to power up the MrCART through the normal VB cart connector. I use a RetroOnyx VB programmer to do that. A cable consisting of jumper wires will also be needed to go from the STM32 programmer to the 4 pin 0.1" male header on the MrCART PCB.

## MrCART PCB Modification

The first step is to perform the trace cut and jumper on the MrCART PCB. After opening up your MrCART, look for the trace in the upper right of the microcontroller as shown in Figure 2. Figure 2 shows where the trace cut is located and where to bridge it. You can cut a section out of the trace to be 100% sure it is removed. Cut into the trace and flick the trace to the side with the blade edge. It will peel off the PCB.



**Figure 2: MrCART Trace Cut and Bridge**

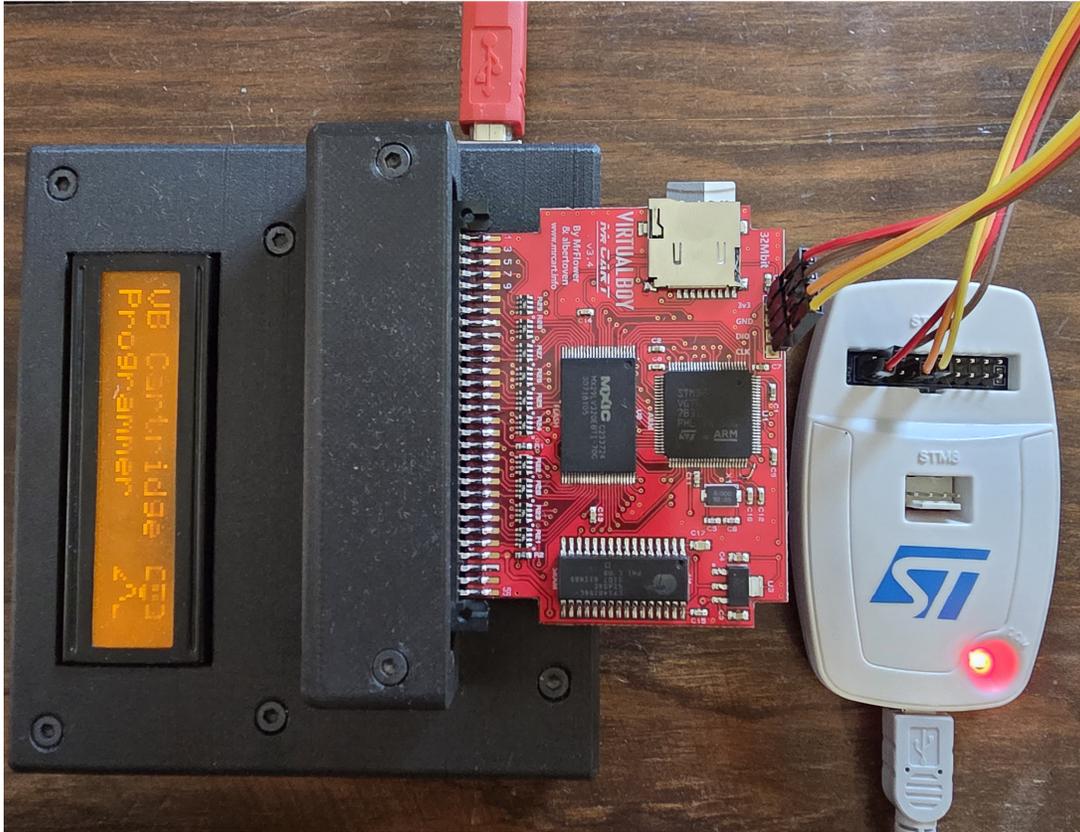
1. Cut the wire coming from pin 23 of the microcontroller just before it enters the via.
2. Solder a jumper from via to via next to pin 25 of the microcontroller. See Figure 2.

After this hardware mod, you will need to update the cart firmware to version v28, which includes this OE line update and a firmware fix for 32Mbit ROM files like Hyper Fighting.

## Firmware Update Hardware Setup

To update the firmware, you will need to connect the STM32 programmer to the MrCART PCB while it is powered through the VB cart connector. 5V needs to be coming into the cart connector to power up the MrCART PCB. A RetroOnyx programmer is used for that purpose in Figure 3 below. Slight pressure on the 0.1" male header into the MrCART PCB is enough to make contact during programming. Do not let it dangle loose during programming.

Pictures of an STM32 programmer and a RetroOnyx VB cart programmer used to power up the MrCART PCB are shown below. It is important to note the orientation of the header wires via their colors when connecting to the MrCART PCB.



**Figure 3: RetroOnyx VB Cart Programmer, MrCART, and STM32 Programmer**

I would advise to mimic the jumper wire colors shown in Figure 3 so that it matches this documentation. Potential damage is possible if these wires are not connected properly. The programming pins on the MrCART PCB are marked as shown in Table 1. The MrCART PCB has the pin names written on the PCB.

**Table 1: MrCART Programming Header Pinout**

MrCART Programming Pin	Cable Color
3.3V	RED
Ground	BROWN
DIO	ORANGE
Clock	YELLOW

The detailed view of the STM32 programmer pinout and its associated table with cable colors is shown below in Figure 4 and Table 2.



**Figure 4: STM32 Programmer Pinout Details**

Table 2 shows the pin numbers and color coding of the cabling used in this document.

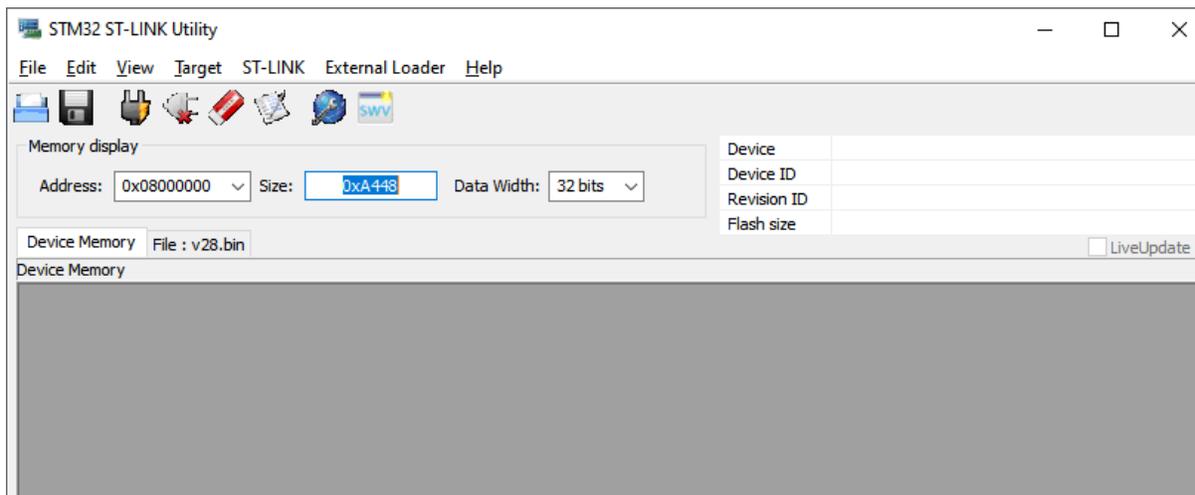
**Table 2: STM32 Programmer Pinout**

STM32 Programming Pin	Pin #	Cable Color
VCC	1	RED
GND	4	BROWN
SWDIO/TMS	7	ORANGE
SWCLK/TCLK	9	YELLOW

## Firmware Update Software Steps

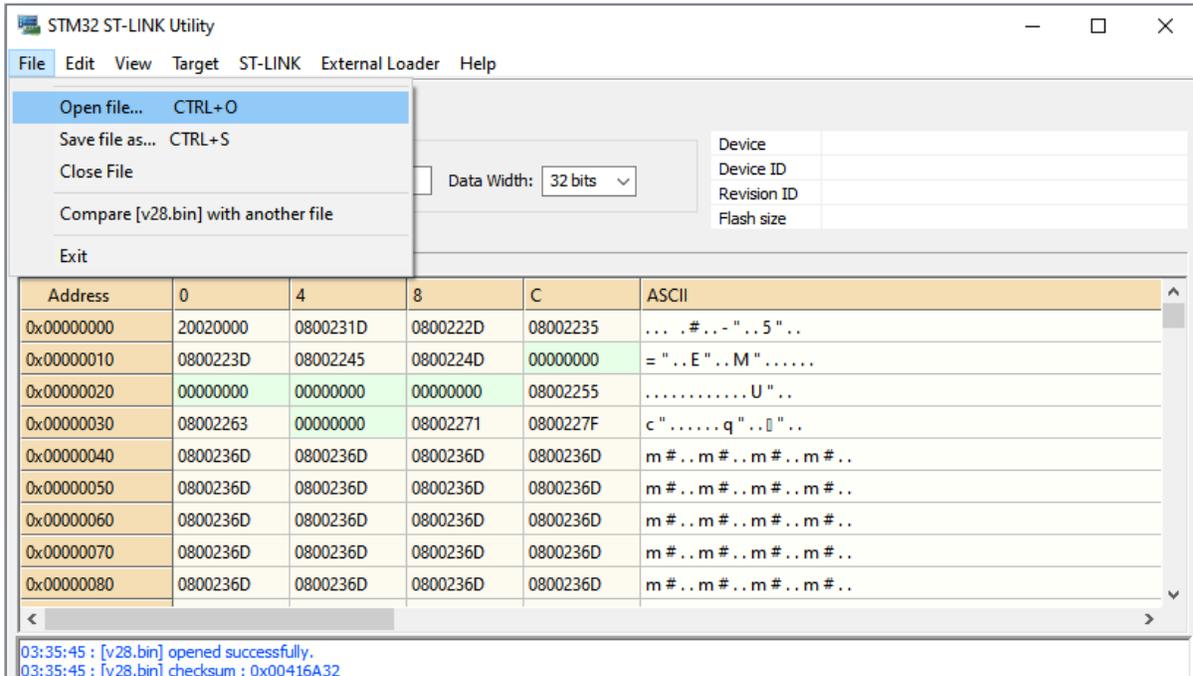
You will need to install the STM32 ST-Link Utility to run the STM32 programmer. It can be found here: <https://www.st.com/en/development-tools/stsw-link004.html>

When it launches, you should see the menu as shown in Figure 5. Now we will load the firmware file and program the MrCART PCB with the update.



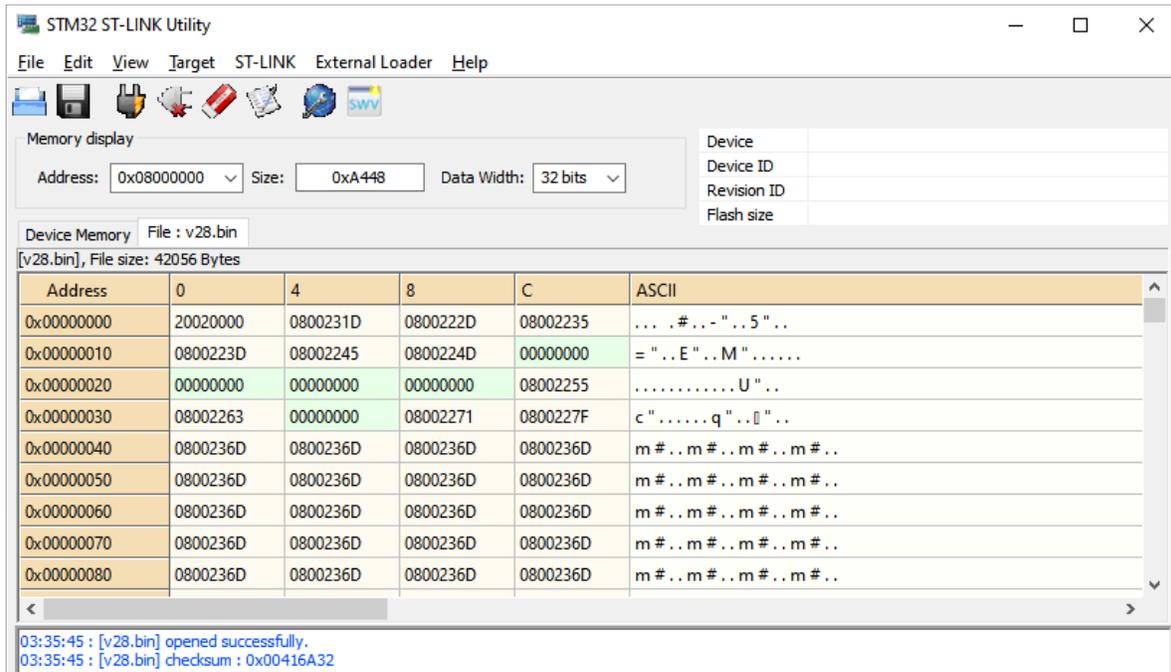
**Figure 5: STM32 ST-LINK Utility Launch Panel**

1. Select File → Open File and select the v28.bin file needed for this update.



**Figure 6: Open File**

2. You should see something like Figure 7 below after selecting the v28.bin file and clicking Open.



**Figure 7: v28 File is Loaded and Ready**

### 3. Select Target → Program & Verify

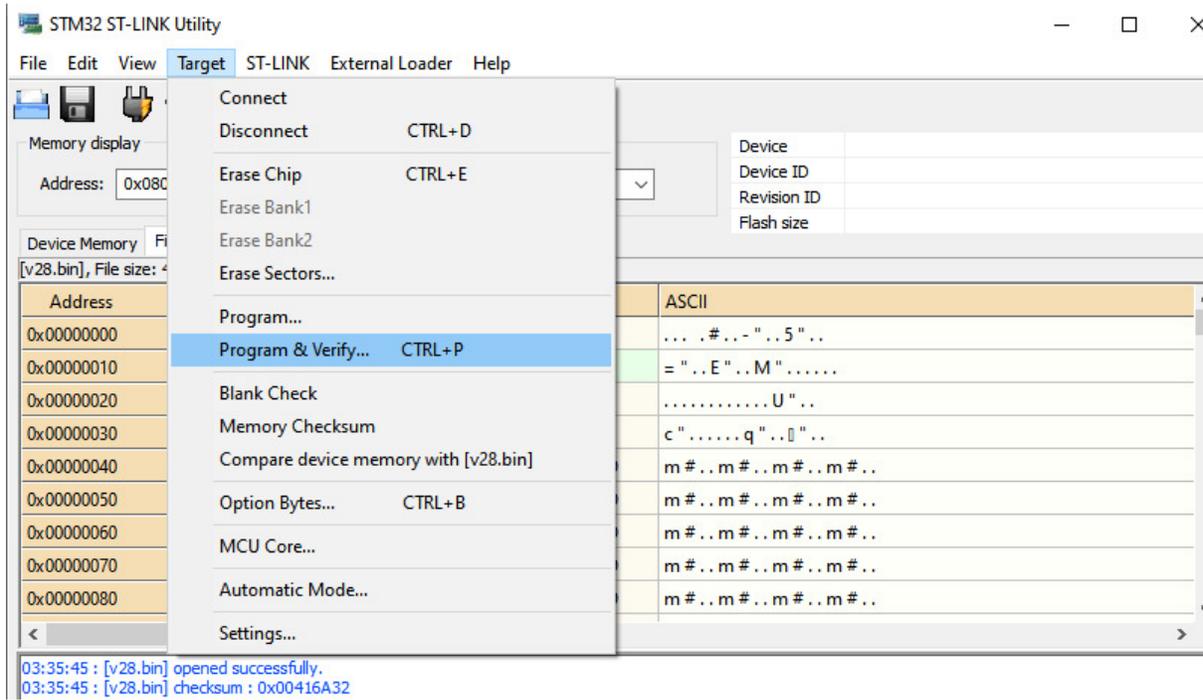


Figure 8: Program & Verify

Then click the Start button while applying slight sideways pressure on the 0.1" male header pins.

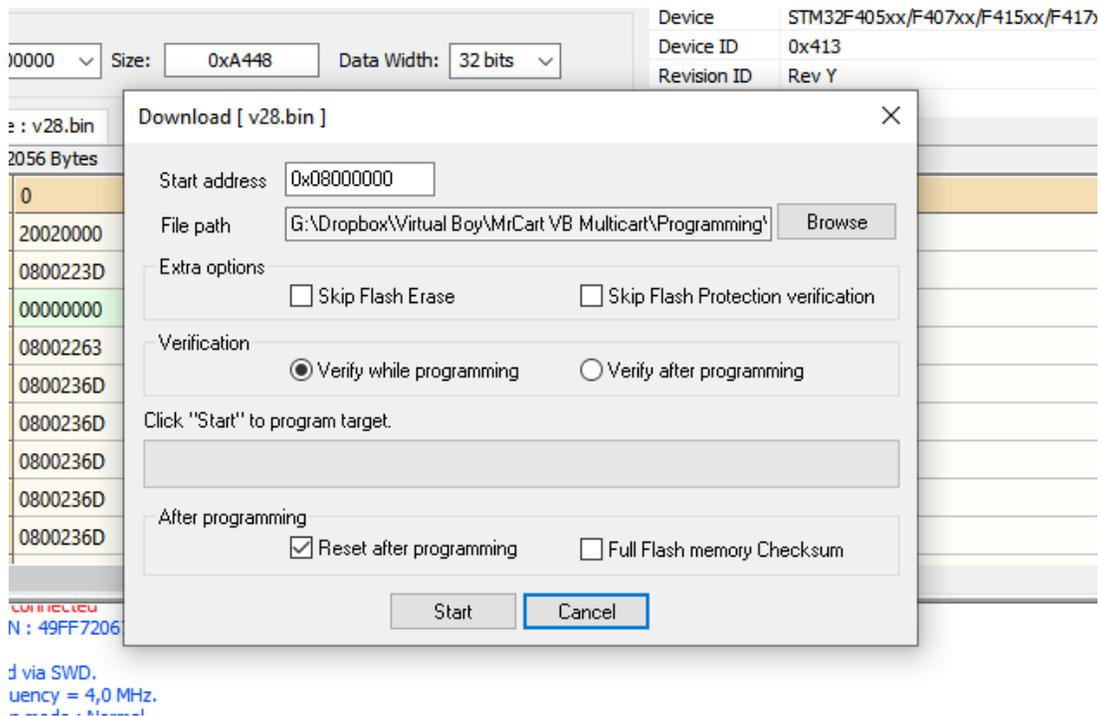


Figure 9: Download Panel. Click Start to Program

When the programming is complete, you should see a message like below in Figure 10. You want to see the purple “Programmed memory Checksum: XXXXX” message to confirm its done, as shown in Figure 10.

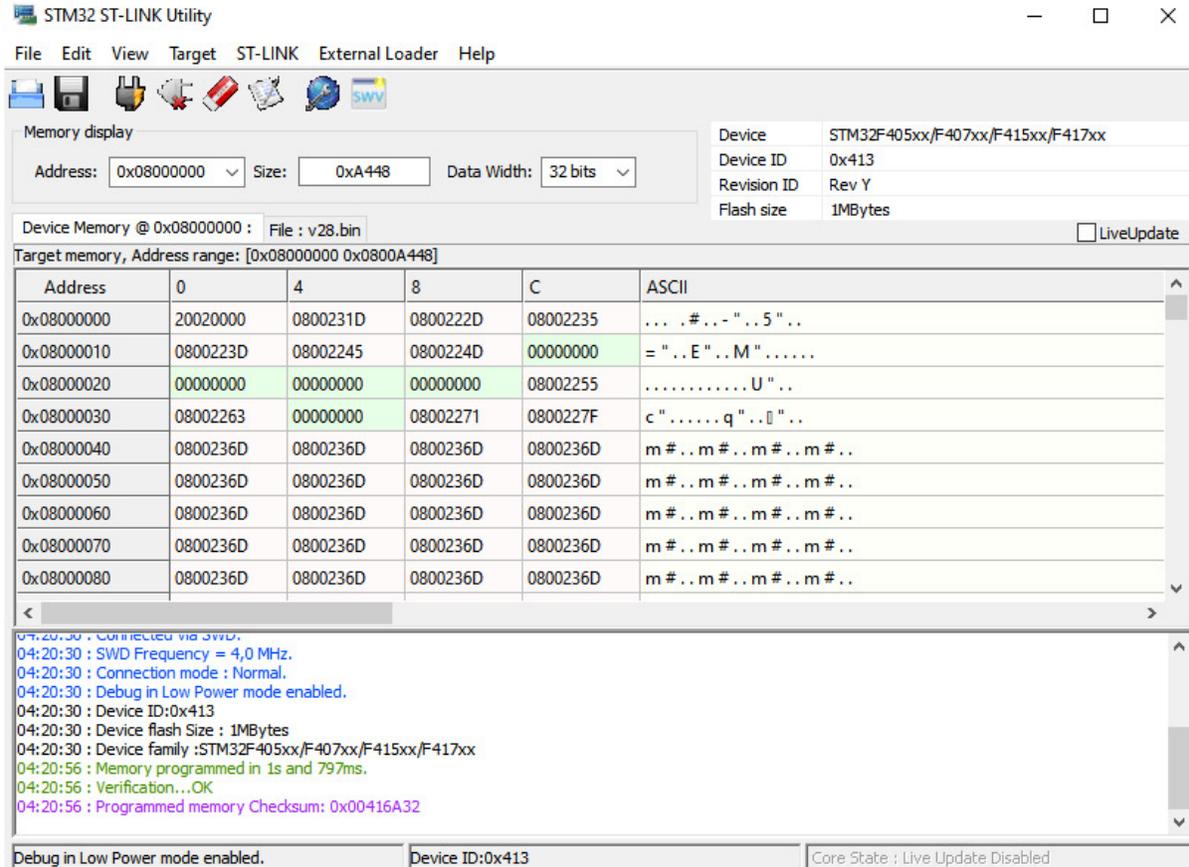


Figure 10: Checksum message at end of console after programming completes

Now your firmware is updated and you can re-assemble your MrCART unit back into its housing. The fixes/mods are now completed. Enjoy!