WAcouSense

Flashing Portenta-H7 MCU FW

Overview

There are two options to flash the MCU FW in the Portenta-H7 MCU module:

- use the **Arduino bootloader**, programmed in MCU flash (starting at address 0x08000000), and flash a FW BIN file via this bootloader
- connect an **ST-LINK debugger** dongle on the Breakout Board debug header (see picture below), and use the STM32CubeProgrammer or the STM32CubeIDE to flash the MCU

Flash with Arduino bootloader and tool

If the MCU is programmed with the Arduino bootloader in MCU flash (default, when purchased a new board), the Arduino command line tool "dfu-util.exe" can be used to flash a new BIN file to MCU.

- Have the Arduino Windows PC tool "dfu-util.exe"
- It comes usually with the install of Arduino IDE and tools/libraries for Portenta-H7. Otherwise find the tool to download or get it from a user having it already on his PC.
  There is nothing to install, just to have the EXE file.

Make sure, you have a BIN file generated intended to be flashed via the Arduino bootloader. It requires that the user BIN file is created to start the MCU flash address 0x08040000 (see the linker script).

Have such a BIN file (e.g. find in GitHub folder "bin") or create it by compiling the MCU FW with STM32CubeIDE. Find the file in the "Debug" directory of the project.

Steps to flash FW with Arduino tool

- Best: copy the BIN file into same location as the "dft-util.exe"
- open a Windows CMD window (command line) and navigate into directory with "dft-util.exe"
- press the Reset button on Portenta-H7 **quickly twice** (at least twice very quickly):
  You should see a green blinking **LED with fading**.
  If not: a quick unplug and plug-in (power cycle) might be needed. The LED should show a fading blinking pattern.
- Fire this command line in the CMD window:
  ```
  dfu-util -a 0 -d 2341:035b --dfuse-address=0x08040000:leave -D PortentaH7_WAcouSense_CM7.bin
  ```
- You should see the progress on erasing and flashing the FW.

Afterwards the FW should be running.

You can open a VCP UART COM port (see via Device Manager which COM port is a VCP COM).

Start a UART terminal and select the VCP COM port. The baud rate can be any (it is USB VCP).

Hit enter and you should see a command prompt.

Enter command **help** to see all commands available.

The command **diag** displays the MCU FW version.

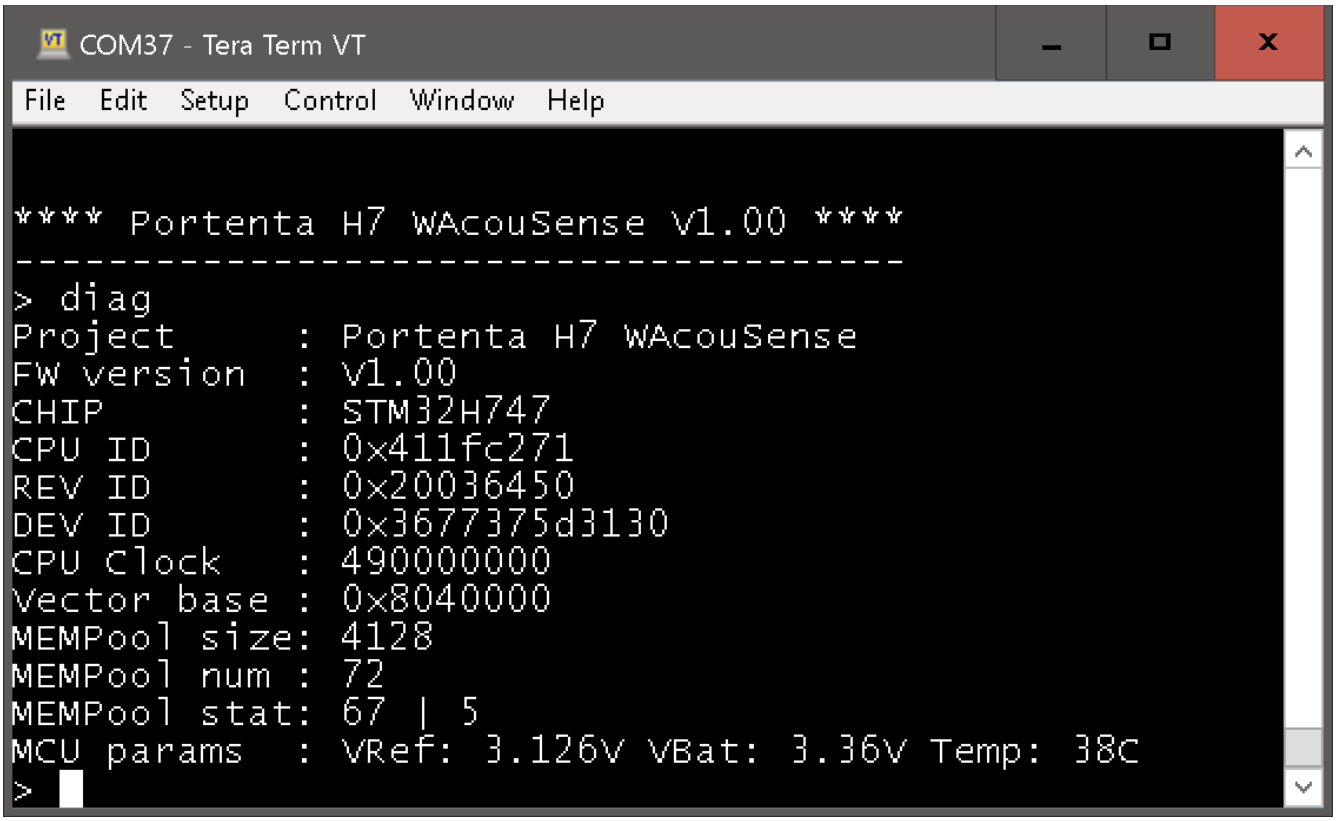

Figure 1: VCP UART terminal, **diag** to see MCU FW version

Flash with ST-LINK

Have the external ST-LINK USB dongle and connect it to the Portenta-H7 Breakout Board (see picture).

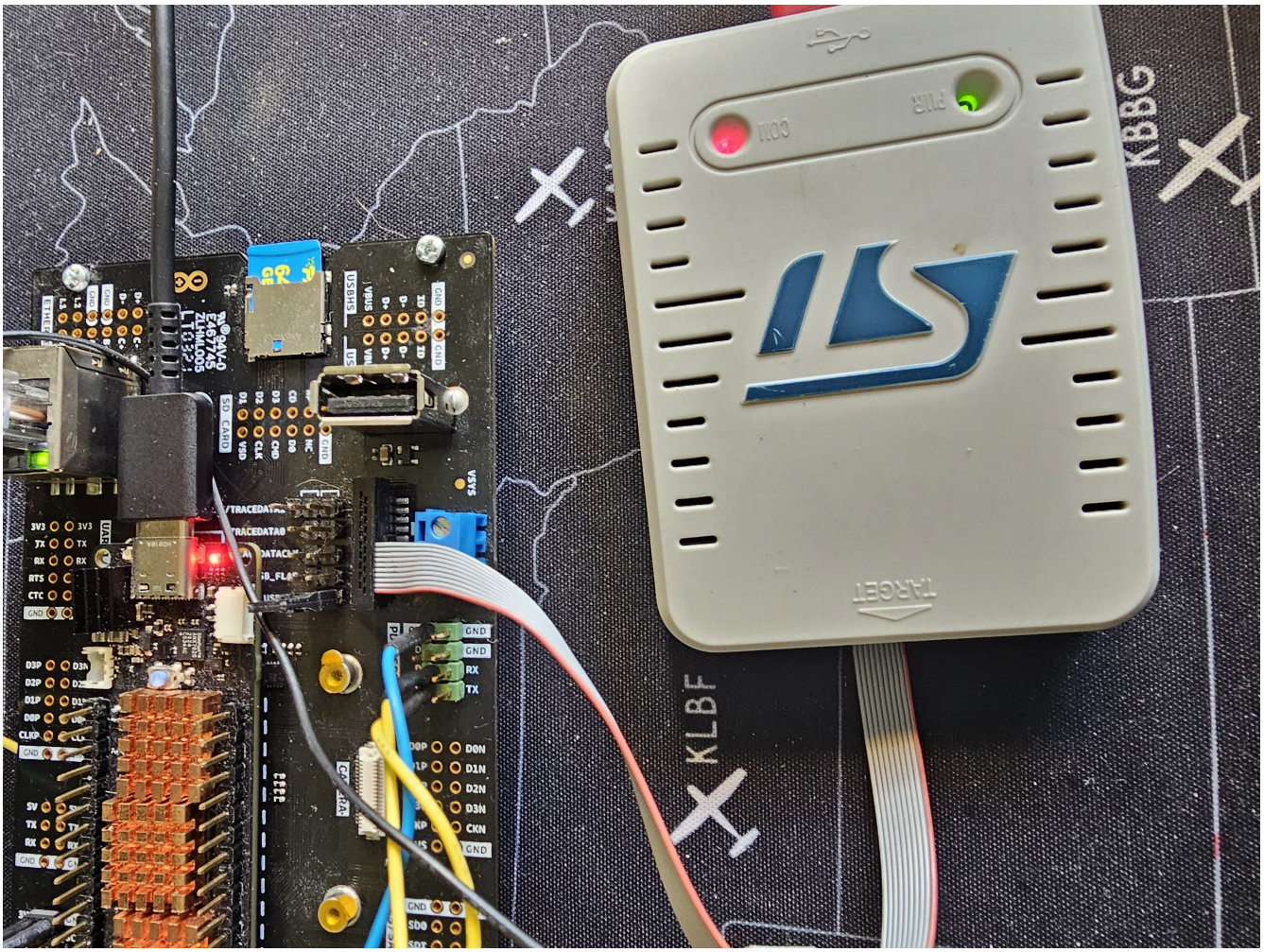

Figure 2: connect ST-LINK debugger on Breakout Board

Use the STM32CubeProgrammer tool in order to flash the MCU FW.

The ST-LINK, best as V3SET, can be purchased here:
https://www.st.com/en/development-tools/stlink-v3set.html

It comes with the right cable to connect it to Portenta-H7 Breakout Board.

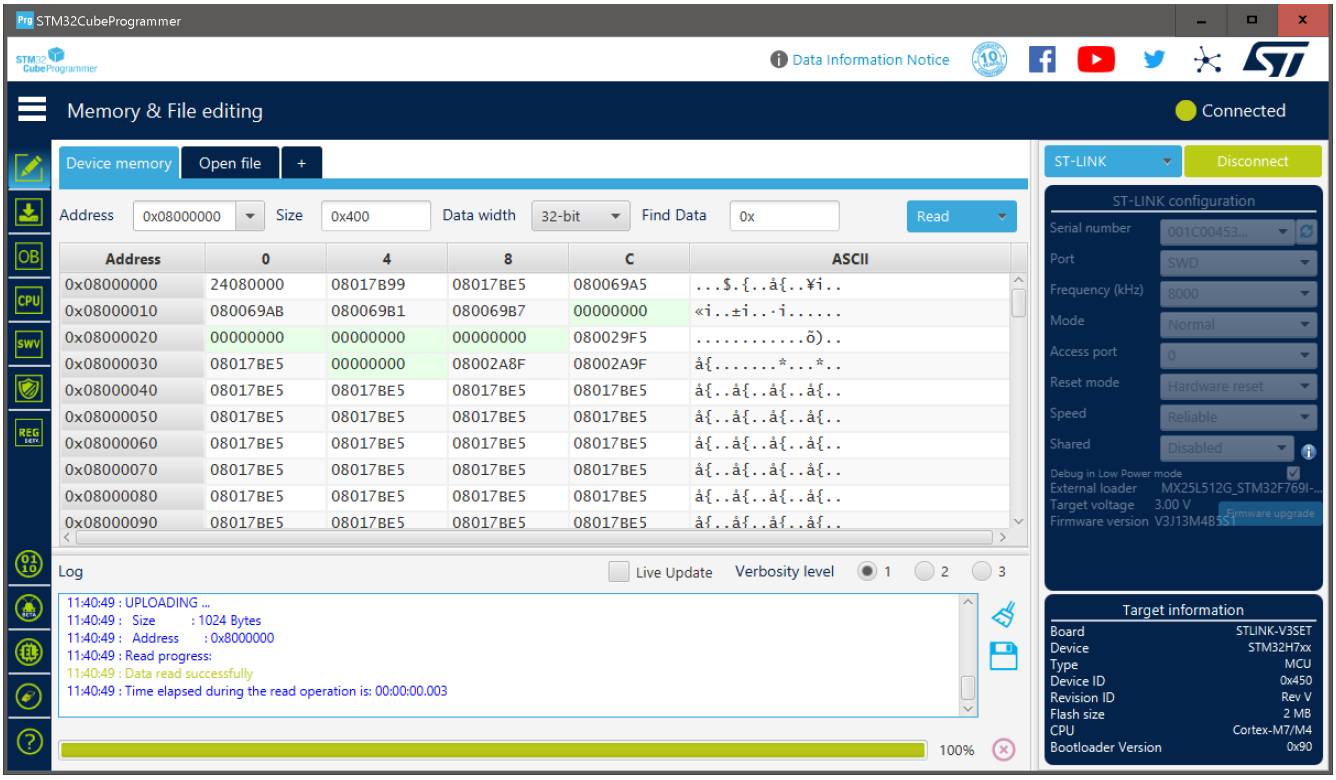

Figure 3: STM32CubeProgrammer connected to Portenta-H7 MCU

Remarks

ATTENTION: with the ST-LINK you can also generate a BIN file starting at MCU address 0x08000000. If you flash it with ST-LINK – it will rip out the Arduino bootloader.

Afterwards you can only flash MCU via ST-LINK (the Arduino "dfu-util.exe" will not work anymore). But the Arduino bootloader can be re-flashed with ST-LINK.

So, best is: to keep going with a BIN file generated for using bootloader, start address 0x08040000. Do not overwrite the bootloader.

The suggestion is:
Keep the bootloader in place. It makes it possible to update the MCU FW later without a need for the ST-LINK (e.g. other users, updates in field).

But the **ST-LINK is needed to debug the MCU FW code**, e.g. with breakpoints. Debugging with Arduino IDE is NOT possible.

Just if the full size of internal MCU flash size is needed – you can generate a BIN file utilizing also the space allocated by the bootloader, starting at address 0x08000000.

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