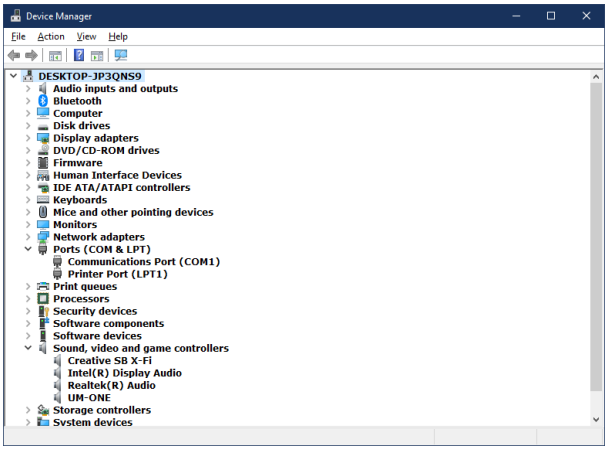
STM32F103 Midi USB Interface

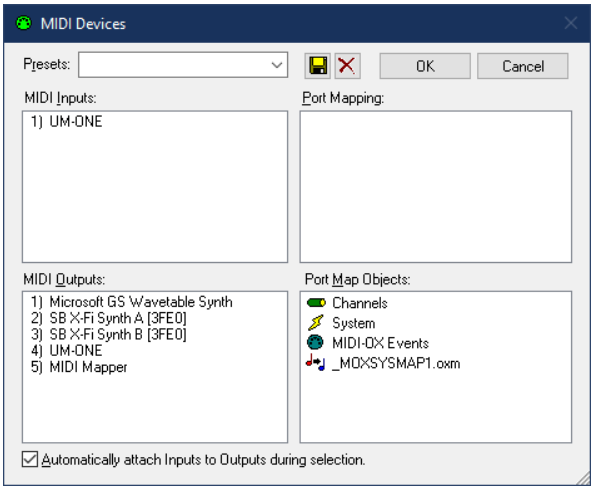
This is a detailed description of how to compile and program an STM32F103C8T6 with the code from TheKikGen USBMidiKliK4x4 (https://github.com/TheKikGen/USBMidiKliK4x4) without having to touch the Boot jumpers on the STM32F103 board.

Midiklik 4x is an unusual MidiUSB interface because of the extensive number of options changeable via sysex commands. In the future it will replace an analog 4x4 Midi Crosspoint switch which was built in the early 1990's - probably with the addition of a touch LCD control surface.

01 Install the STM32CubeProgrammer from here (https://www.st.com/en/development-tools/stm32cubeprog.html) – you will have to supply an email to do so. You may want to inspect your sound devices and com ports present before the next steps. If necessary install MidiOX (http://www.midiox.com/) for more detailed information about your sound midi and synth devices.

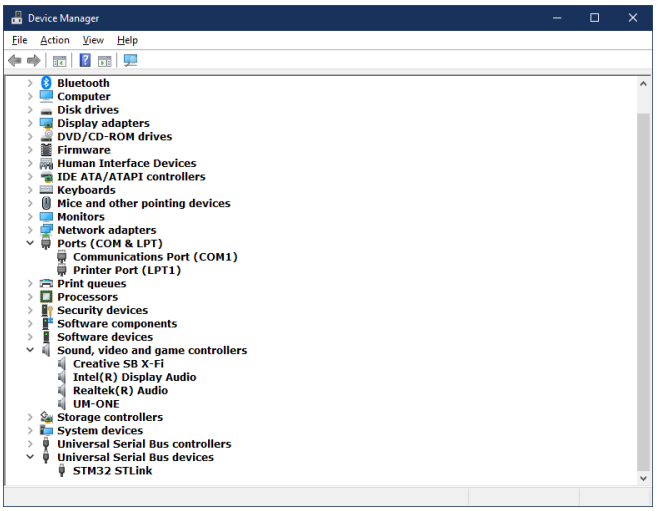


Devices before STM32F103C8T6 bootloader or Midi program

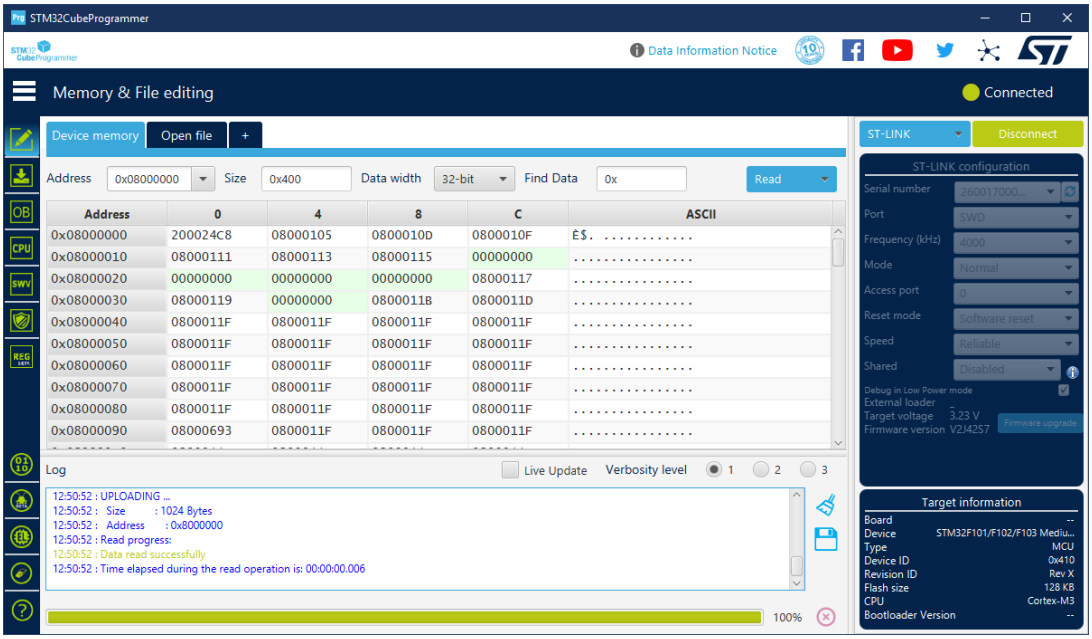


MidiOx Midi-devices before STM32F103C8T6 bootloader or Midi program

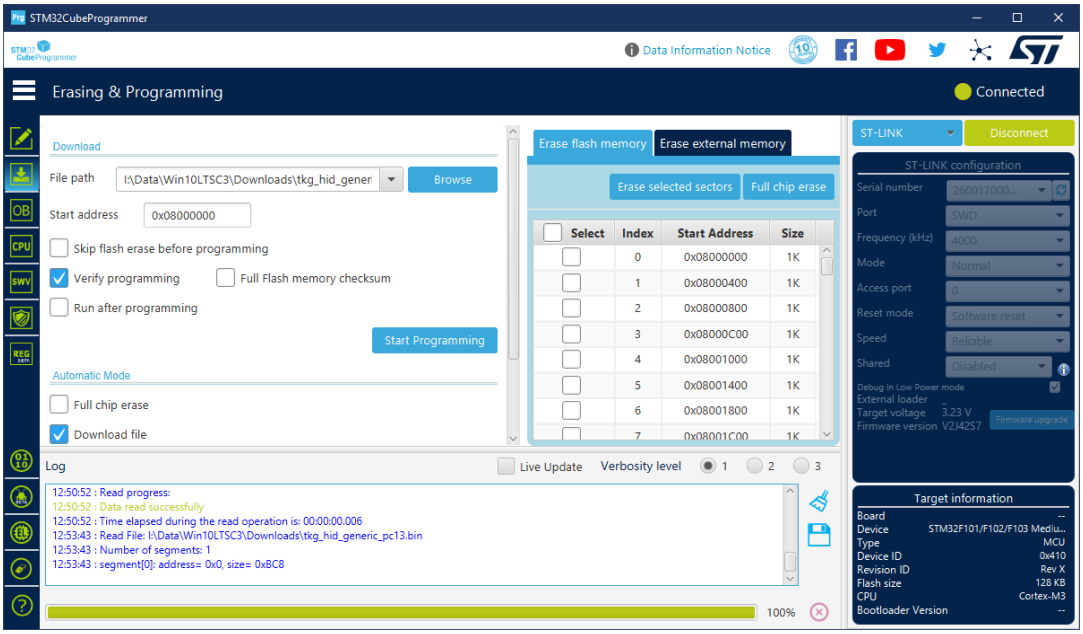
02 Connect the STM32F103 board to the J-Link and plug the J-Link into a USB port.



03 Open the STM32CubeProgrammer and click connect:



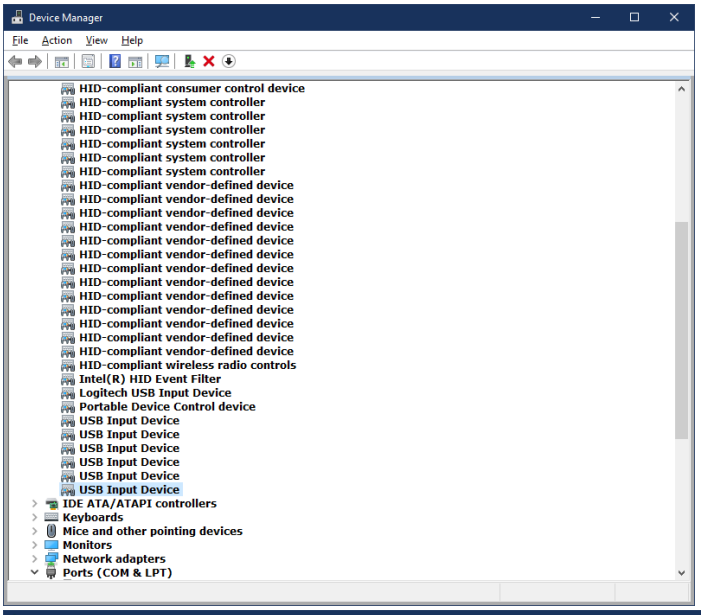
04 Then click green down-arrow and Open file then select hid bootloader file: tkg_hid_generic_pc13.bin

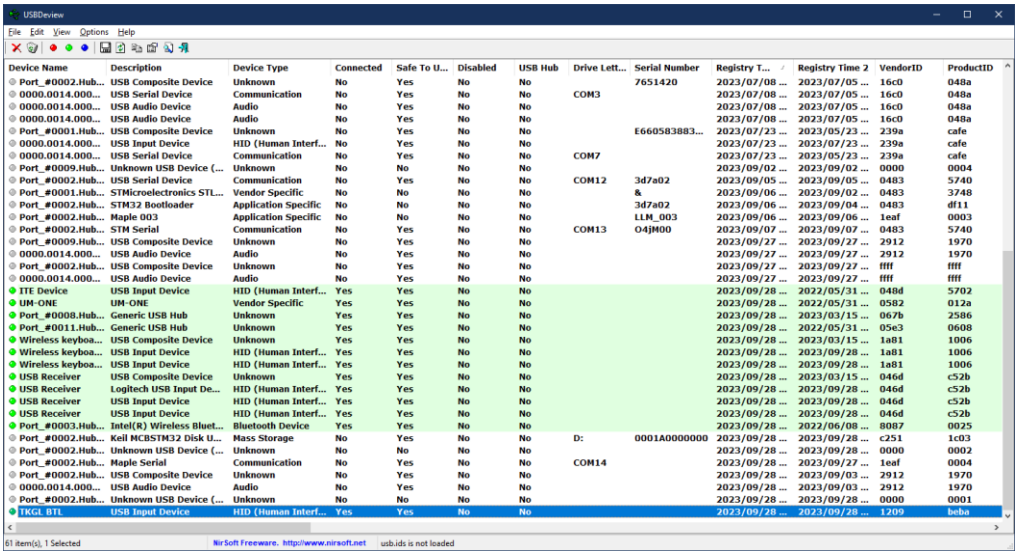


05 Click Start Programming and then clock ok twice. Then click Disconnect and close the STM32CubeProgrammer.

06 Disconnect the J-Link from the USB port and then disconnect it from the STM32F103 board.

07 Plug the STM32F103 board into a USB port:





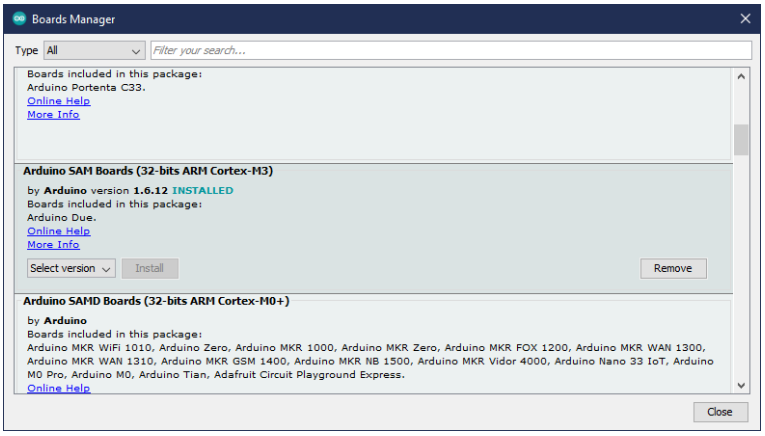
TKGL BTL USB Input Device HID (Human Interface Device) Yes Yes No No 2023/09/28 13:05:46
2023/09/28 12:27:06 1209 beba 3.10 03 00 00 DESKTOP-JP3QNS9
7&39c0ec5d&1 HidUsb @input.inf,%HID.SvcDesc%;Microsoft HID Class Driver hidusb.sys (Standard system devices)
100 mA 1.10 USB Input Device 10.0.17763.3650 HID_Inst.NT input.inf USB\VID_1209&PID_BEBA\6&14d85440&0&2
Removable, SurpriseRemovalOK 2023/09/28 12:27:06 2023/09/28 12:27:06 2023/09/28 13:05:46

08 Install Arduino 1.8.19 (https://www.arduino.cc/en/software). To upload through STLink SWD, Serial or DFU, STM32CubeProgrammer (https://www.st.com/en/development-tools/stm32cubeprog.html) also has to be installed.

09 Download the MidiUSB4x4 repository (https://github.com/TheKikGen/USBMidiKliK4x4) as a zip file and unzip it underneath your My Documents/Arduino/ folder. Rename the folder as UsbMidiKliK4x4 and you can then delete the bin and doc folders, and the .gitignore and README.md files. Replace three of the original files with the ones I have edited (usb_midi_device.h, hardware_config.h, UsbMidiKliK4x4.ino) - or do your own editing on the original files.

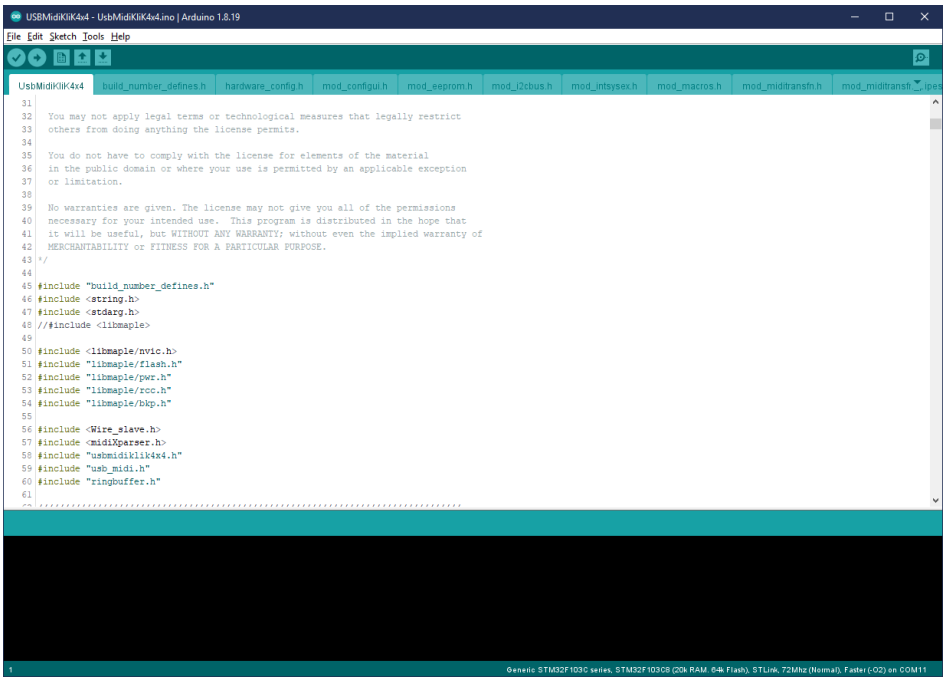
10 Download the two repositories midiXparser (https://github.com/TheKikGen/midiXparser) and Pulseout (https://github.com/TheKikGen/PulseOut) as zip files and extract them underneath your My Documents/Arduino/libraries/ folder as midiXparser and Pulseout folders. Double click on UsbMidiKliK4x4.ino to open the Arduino IDE.

11 Install the Arduino SAM boards (Cortex-M3) board as explained here (https://github.com/TheKikGen/USBMidiKliK4x4/wiki/Build-UsbMidiKlik4x4-from-sources) and here (https://github.com/rogerclarkmelbourne/Arduino_STM32/wiki/Installation). Click [Install] and [Close]

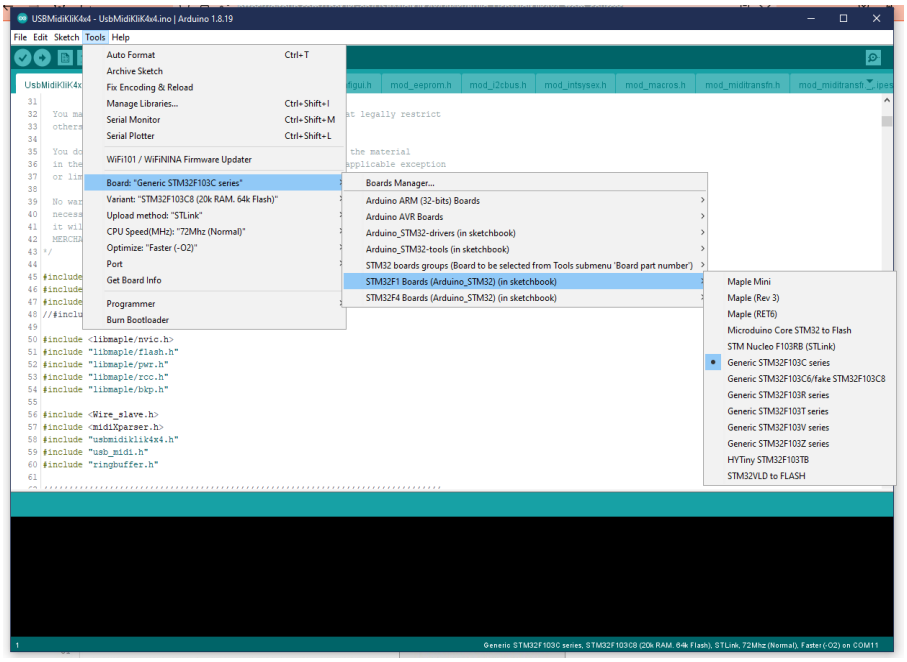


12 Download zip file containing the STM32 files from here (https://github.com/rogerclarkmelbourne/Arduino_STM32/archive/refs/heads/master.zip).

Make a folder named hardware underneath My Documents/Arduino/ and extract the Arduino_STM32 zip file there. This will add the libmaple (modified) libraries original from Leaflab Maple (https://github.com/leaflabs/libmaple), which is used by the MidiUSB application.

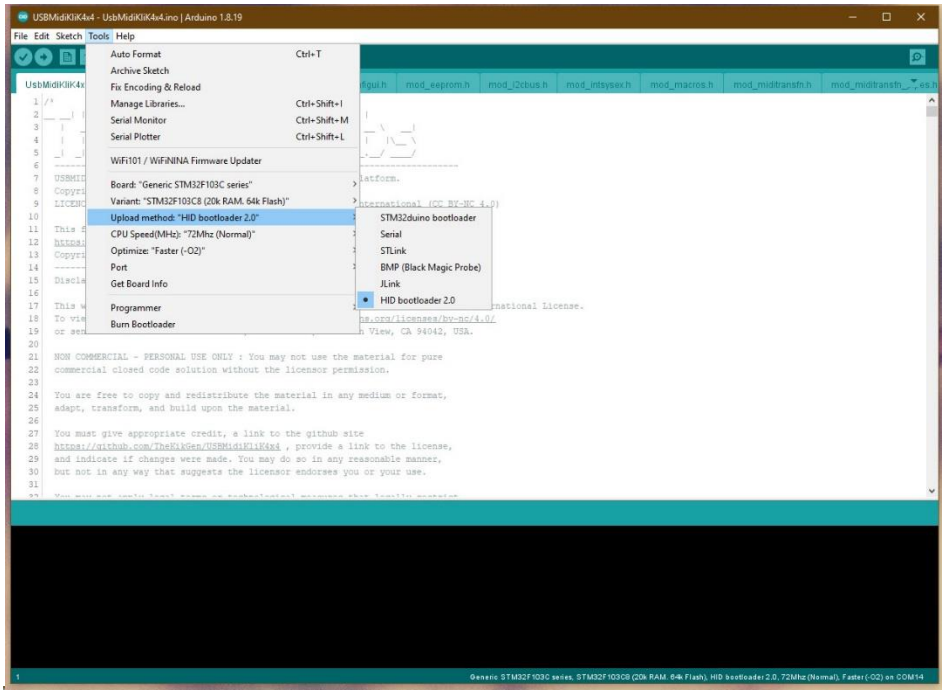


13 Select your board as a Generic STM32F103C series as board type and as an STM32F103C8 (20k RAM.64k Flash) as variant - see below.

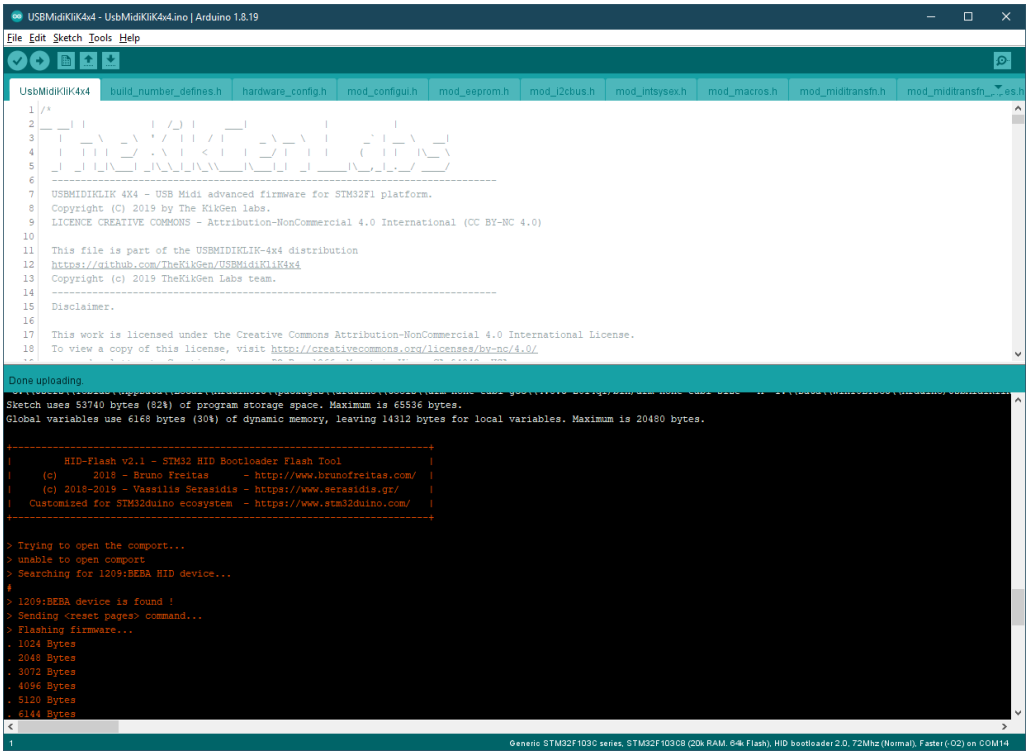


14 Also in the Tool menu select:

. "Faster -O2" as optimize option
. "72 Mhz" as CPU speed
. "HID bootloader" as upload method



15 Press Compile then press the reset button on the board twice and then press upload:

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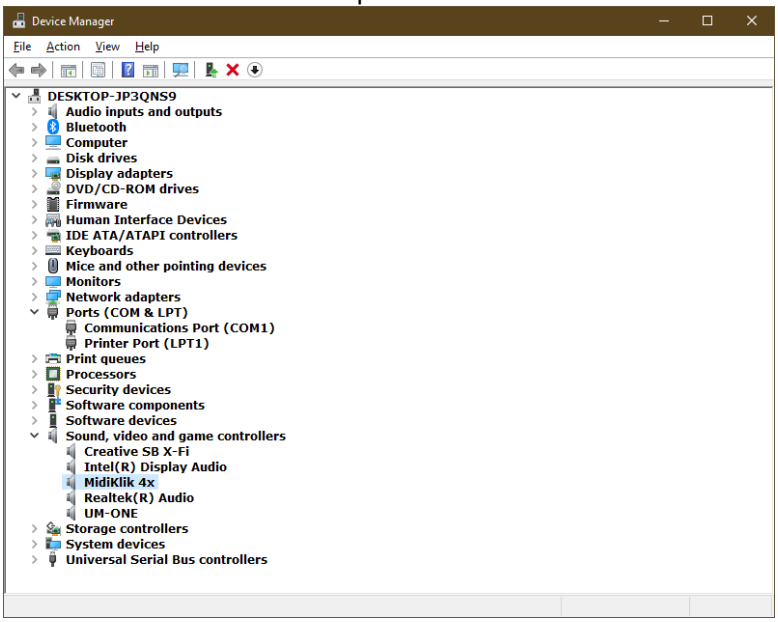
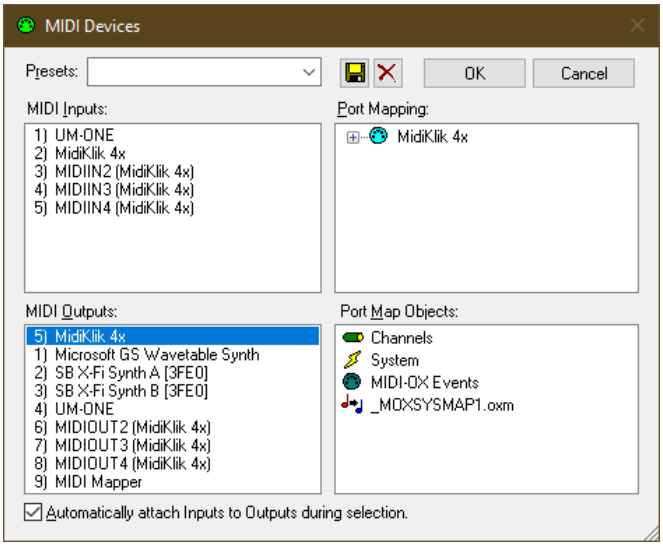
+------------------------------------------------------------------------+
|          HID-Flash v2.1 - STM32 HID Bootloader Flash Tool              |
|      (c)       2018 - Bruno Freitas       - http://www.brunofreitas.com/  |
|      (c) 2018-2019 - Vassilis Serasidis - https://www.serasidis.gr/      |
|   Customized for STM32duino ecosystem  - https://www.stm32duino.com/    |
+------------------------------------------------------------------------+

> Trying to open the comport...
> unable to open comport
> Searching for 1209:BEBA HID device...
#
> 1209:BEBA device is found !
> Sending <reset pages> command...
> Flashing firmware...
. 1024 Bytes
. 2048 Bytes
. 3072 Bytes
.....
. 52224 Bytes
. 53248 Bytes
. 54272 Bytes

> Done!
> Sending <reboot mcu> command...
```

16 Close the Arduino IDE and press the reset button on the board once:





MidiOx Midi-devices after STM32F103C8T6 Midi programmed