

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>) as the instructions there could be more descriptive.

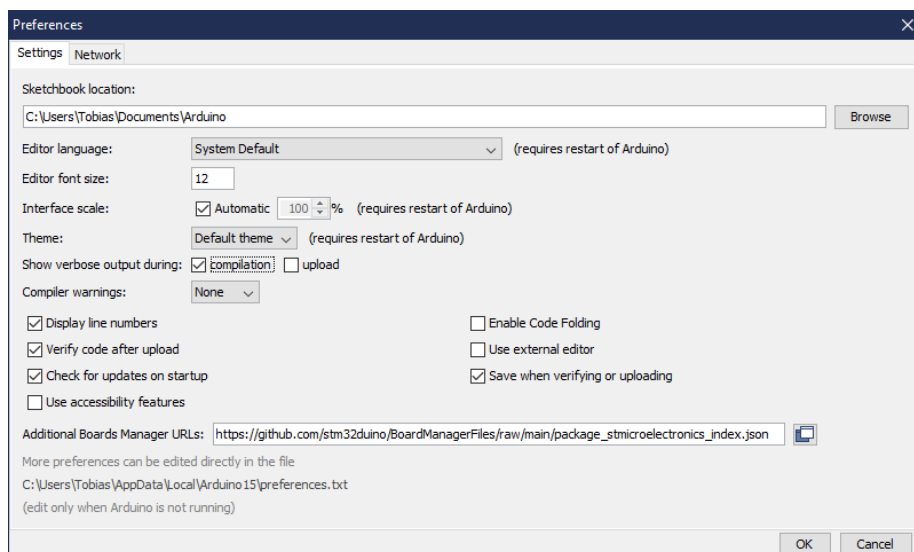
Midiklik 4x is an unusual MidiUSB interface because of its extensive number of options via sysex commands.

1 Install Arduino 1.8.19 (<https://www.arduino.cc/en/software>)

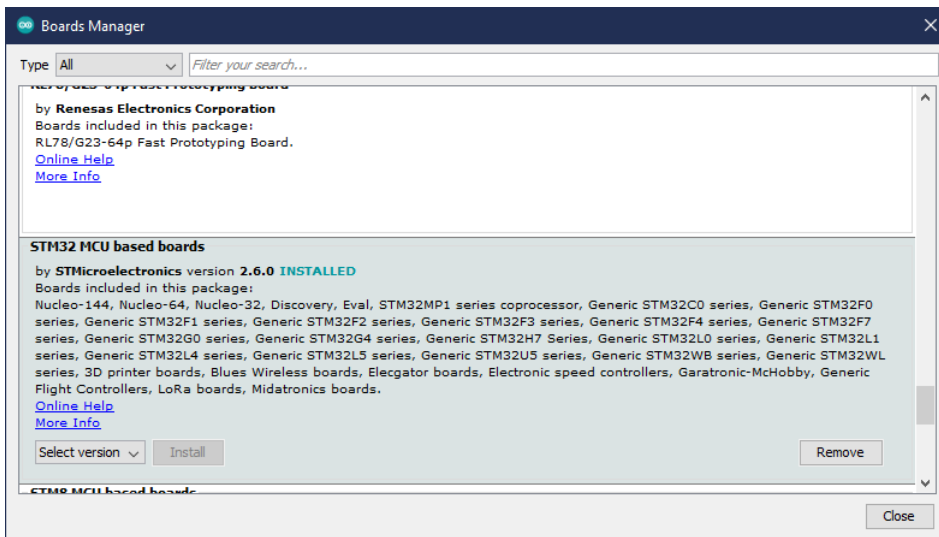
2 Download the MidiUSB4x4 repository (<https://github.com/TheKikGen/USBMidiKlik4x4>) as a zip file and unzip it underneath your My Documents/Arduino/ folder. Rename the folder as UsbMidiKlik4x4 and you can delete the bin and doc folders and the .gitignore and README.md files. Then replace three original 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. Double click on UsbMidiKlik4x4.ino to open the Arduino IDE.

3 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.

4 Install STM32Duino (https://github.com/stm32duino/Arduino_Core_STM32) as follows: Open the Arduino File->Preferences and put https://github.com/stm32duino/BoardManagerFiles/raw/main/package_stmicroelectronics_index.json in the additional boards section at the bottom – click [OK].

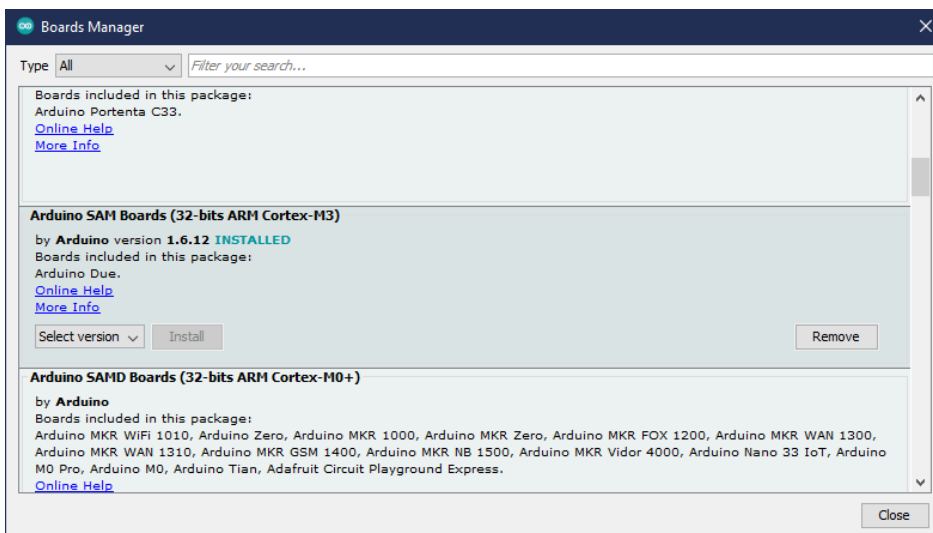


5 Click Tool->Boards->Boards Manager, scroll until STM32 MCU based boards and click [Install] and then [Close]



You do not need to do all the other steps here (https://github.com/stm32duino/Arduino_Core_STM32/wiki/Getting-Started).

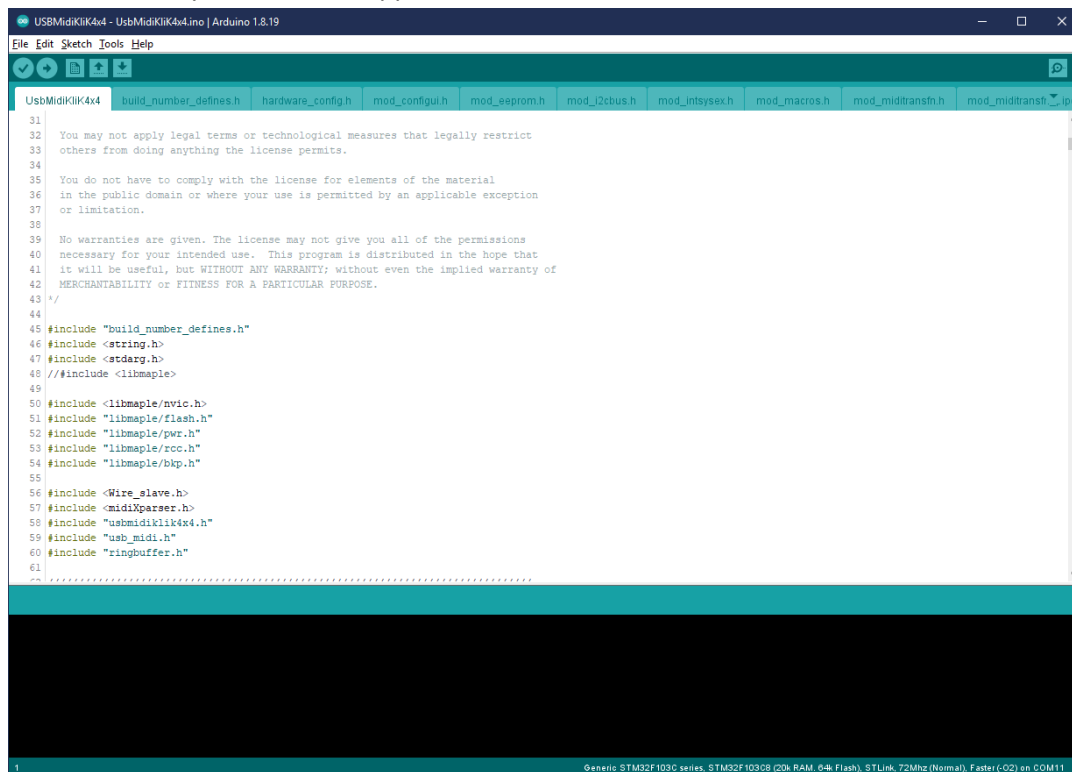
6 Install the Arduino SAM boards (Cortex-M3) board as explained here (<https://github.com/TheKikGen/USBMidiKlik4x4/wiki/Build-UsbMidiKlik4x4-from-sources>) and here (https://github.com/rogerclarkmelbourne/Arduino_STM32/wiki/Installation). Click [Install] and [Close]



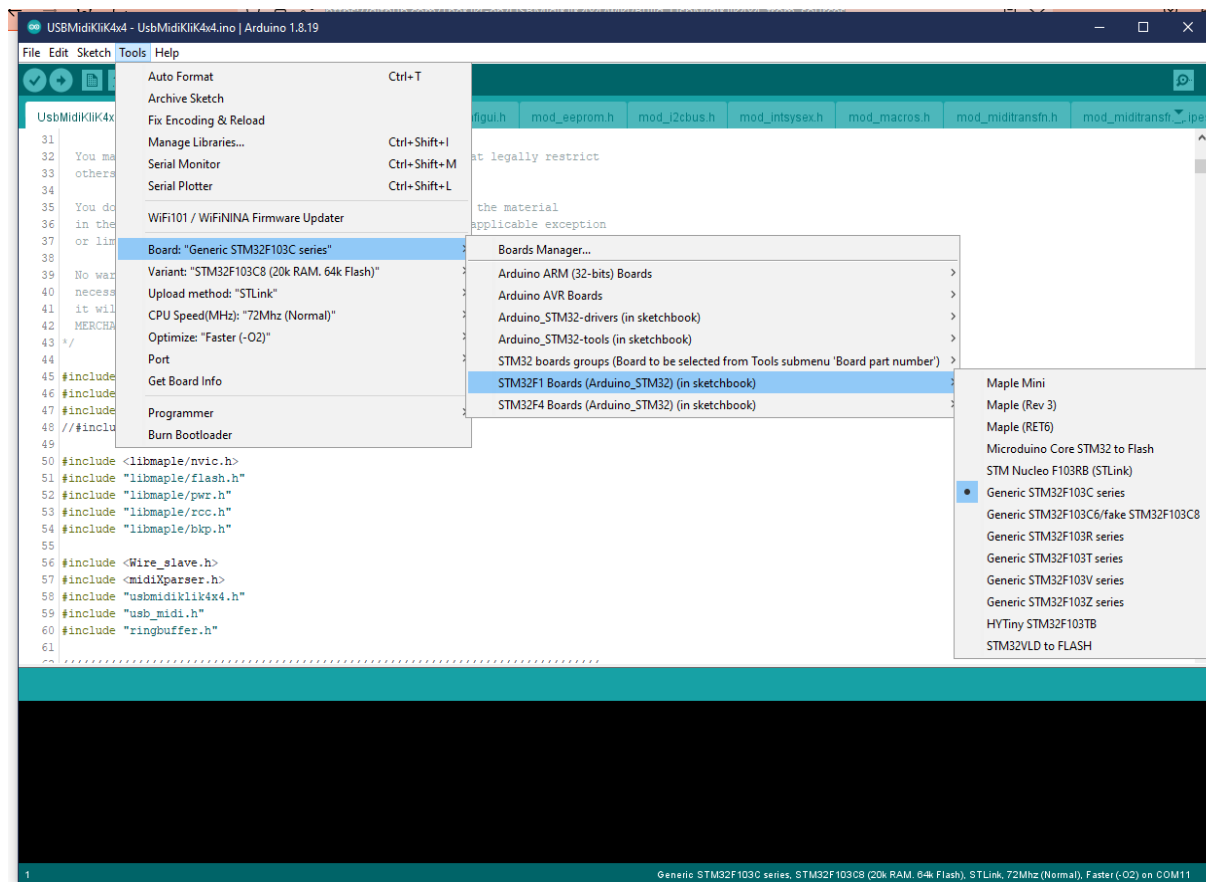
7 Download zip file containing the STM32 files from here (https://github.com/rogerclarkmelbourne/Arduino_STM32/archive/refs/heads/master.zip).

Make a hardware folder underneath your My Documents/Arduino/ folder and extract the Arduino_STM32 there. This will add the libmaple (modified) libraries original from LeafLab Maple (<https://github.com/leflabs/libmaple>),

which is used by the MidiUSB application.

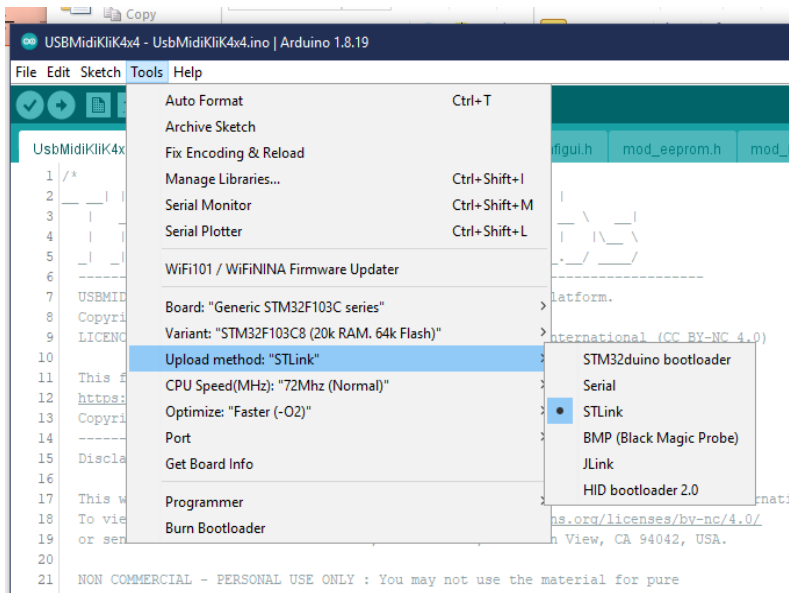


Select your board as **Generic STM32F103C series** as board type and **STM32F103C8 (20k RAM.64k Flash)** as variant – see below.



Also in the Tool menu select:

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



8 Connect the STM32F103 to the STLink adapter (4 wires), and connect only the STLink to the computer USB.

9 Click Compile on the Arduino IDE and then Upload. The application is now on the Blue Pill but it still needs a bootloader installed.

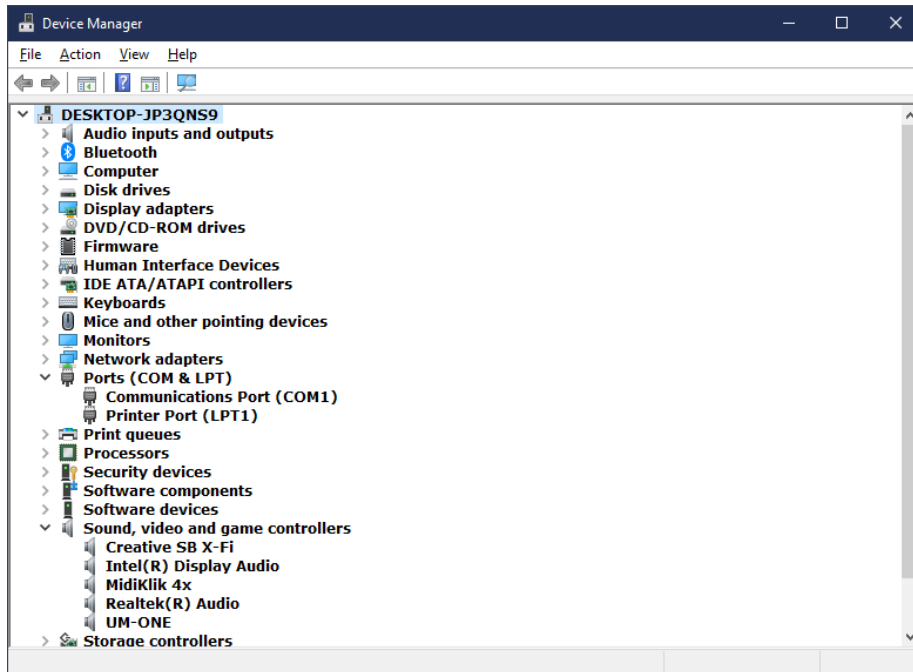
10 Download the repository (https://github.com/TheKikGen/stm32-tkg-hid-bootloader/tree/master/tools/tkg_hid_btl_uploader) and extract it as folder tkg_hid_btl_uploader underneath your My Documents/Arduino/ folder. Doubleclick on the tkg_hid_btl_uploader.ino file and comment out `// --- TARGETS ---` and `#define GENERIC_PC13`.



Click Compile on the Arduino IDE and then Upload. This should then upload the HID bootloader to the blue Pill still connected via the STLink adapter.

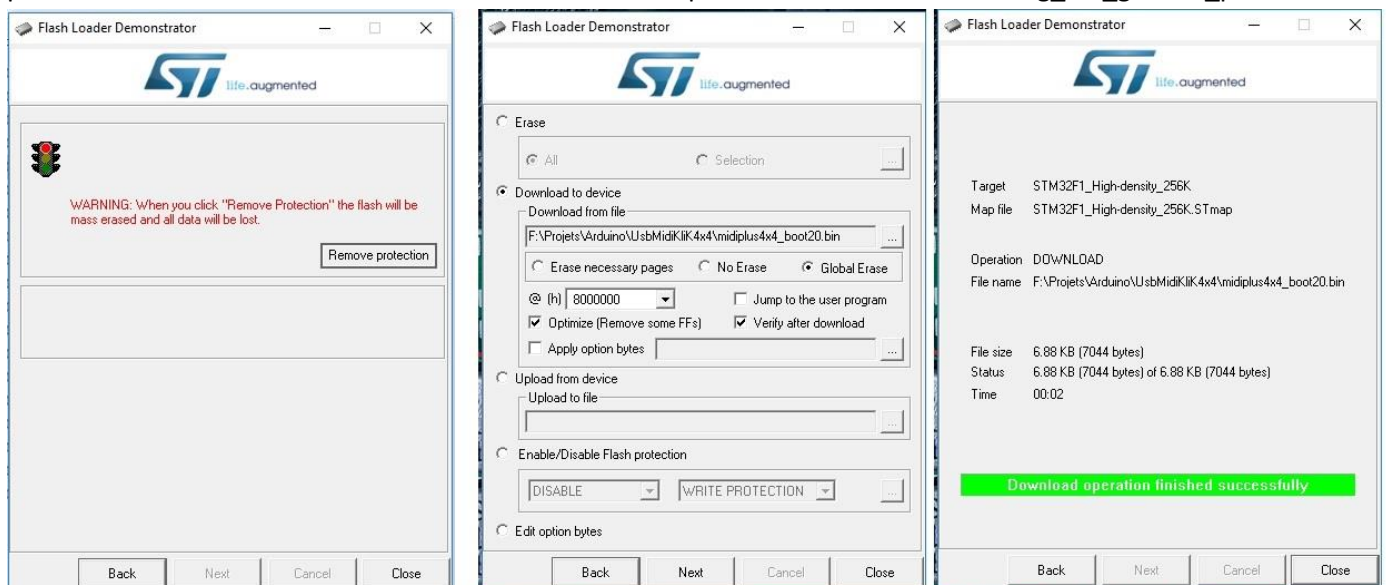
11 Close all Arduino windows and remove the STLink from the Blue Pill. Plug it into the PC USB Port and check that a new sound device named Midiklik 4x is present. If not, try to install the bootloader differently, as in the next section

by using a serial UART.



12 Download and install the STM32 Flash loader (<https://www.st.com/en/development-tools/flasher-stm32.html>)
Also download the bootloader bin tkg_hid_generic_pc13.bin from the releases page (<https://github.com/TheKikGen/USBMidiKliK4x4/releases/tag/v2.5.1>).

Connect your sTM32F103 to a USB2Serial converter using only the V+ (5v or 3v3 but connect to the corresponding pins on the Blue Pill as well), Ground and TX-RX and Rx-Tx wires. Then run the Flash loader and select the ComXX port for the USBSerial converter and then follow the setup as below – but select the tkg_hid_generic_pc13.bin file.



Plug your Blue Pill it into the PC USB Port and check that a new sound device named Midi is present. You may want to install MidiOx (<http://www.midiox.com/>) to check that all four input and four output Midi ports are available.

Monitor - Output

Timestamp

In

Port

Status

Data1

Data2

Chan

Note

Event

Opened MIDI Output

00002734

KEY

4

90

30

64

1

C

3

Note On

00002734

KEY

5

90

30

64

1

C

3

Note On

000027C3

KEY

4

80

30

40

1

C

3

Note Off

000027C3

KEY

5

80

30

40

1

C

3

Note Off

00002933

KEY

4

90

30

64

1

C

3

Note On

00002933

KEY

5

90

30

64

1

C

3

Note On

00002993

KEY

4

80

30

40

1

C

3

Note Off

00002993

KEY

5

80

30

40

1

C

3

Note Off

0000397B

KEY

4

B0

7B

00

1

CC: All Notes Off

0000397B

KEY

5

B0

7B

00

1

CC: All Notes Off

0000397C

KEY

4

B0

79

00

1

CC: Reset Cntrl

0000397C

KEY

5

B0

79

00

1

CC: Reset Cntrl

0000397C

KEY

4

B0

40

00

1

CC: Pedal (Sustain)

0000397C

KEY

5

B0

40

00

1

CC: Pedal (Sustain)

00003A7B

KEY

4

C0

00

00

1

FC: Rcc - Grand Piano

00003A7B

KEY

5

C0

00

00

1

FC: Rcc - Grand Piano

0000435B

KEY

4

90

30

64

1

C

3

Note On

0000435B

KEY

5

90

30

64

1

C

3

Note On

000043BB

KEY

4

80

30

40

1

C

3

Note Off

000043BB

KEY

5

80

30

40

1

C

3

Note Off

00004583

KEY

4

90

30

64

1

C

3

Note On

00004583

KEY

5

90

30

64

1

C

3

Note On

000045E3

KEY

4

80

30

40

1

C

3

Note Off

000045E3

KEY

5

80

30

40

1

C

3

Note Off

MIDI Devices

Presets:

OK

Cancel

MIDI Inputs:

1) UM-ONE

2) Midiklik 4x

3) MIDIIN2 (Midiklik 4x)

4) MIDIIN3 (Midiklik 4x)

5) MIDIIN4 (Midiklik 4x)

Port Mapping:

UM-ONE

Midiklik 4x

MIDI Outputs:

4) UM-ONE

5) Midiklik 4x

1) Microsoft GS Wavetable Synth

2) SB X-Fi Synth A [3FE0]

3) SB X-Fi Synth B [3FE0]

6) MIDIOUT2 (Midiklik 4x)

7) MIDIOUT3 (Midiklik 4x)

8) MIDIOUT4 (Midiklik 4x)

9) MIDI Mapper

Port Map Objects:

Channels

System

MIDI-OX Events

_MOXSYMAP1.oxm

Automatically attach Inputs to Outputs during selection.

MIDI-OX

Output Ports

UM-ONE

Midiklik 4x

2 Output Devices

No Input Device

REC

SYX

MAP

KVB

LOG