

Description

York Pico is a versatile and compact solution designed to facilitate high-quality audio output and input, as well as device control via a PC. Compatible with MacOS, Linux, and Windows 10/11, module supports up to 8-channel audio output and 2-channel audio input. It provides user device control through I2C/GPIO interfaces, making it ideal for managing DSPs and other peripherals.

Key features include a bootloader for remote firmware updates, flexible device configuration, an HID interface, and multiple audio input/output options. It is available in USB-C and USB-B versions.

Features

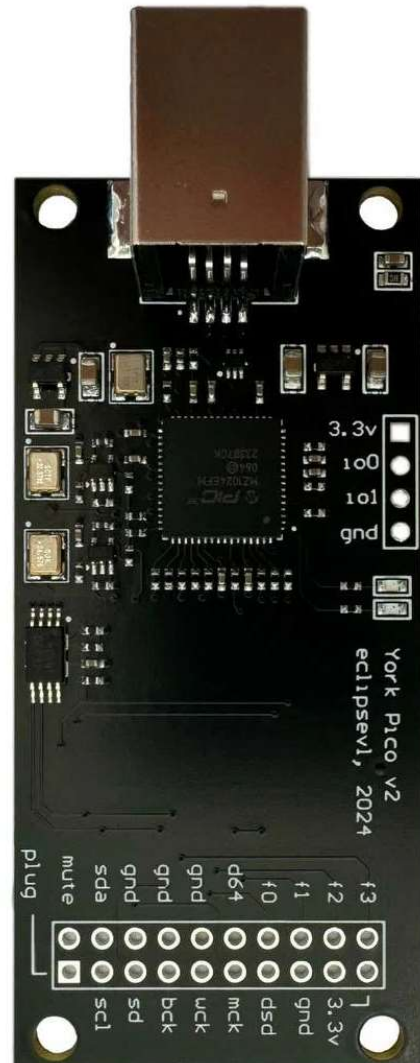
1. **Bootloader:** Enables firmware updates via USB without needing a programmer.
2. **Flexible Configuration:** Device settings and firmware updates can be managed through a dedicated PC utility.
3. **HID Interface:** Facilitates transmission of service information and device configuration.
4. **Optional Serial Interface (virtual COM port):** Can be enabled if needed.
5. **Multiple Audio Output Options:** Supports I2S, S/PDIF, TDM and interfaces for NOS DACs (e.g., AD1862, PCM1702 etc).
6. **Various Clocking Options:** Includes module oscillators, external clock (slave mode), and internal PLL clocking.
7. **I2C Integration with SigmaStudio:** Allows simultaneous audio input/output and ADAU DSP programming.

Audio Interface Capabilities:

- Input: Up to 2 PCM channels, up to 192kHz (384kHz with external clocking).
- Output: Up to 8 PCM/TDM channels, up to 192kHz (384kHz with external clocking).

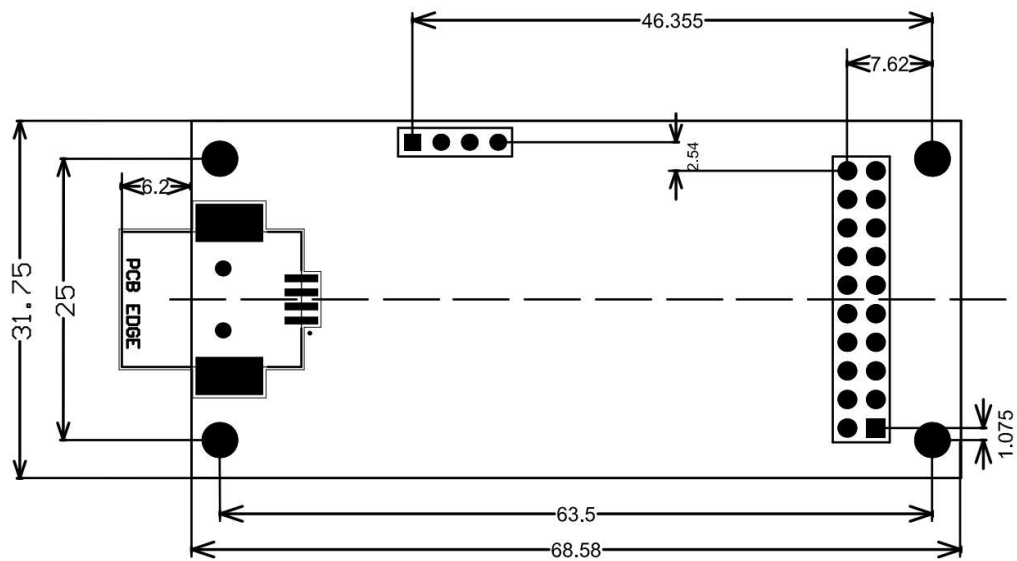
Connectivity:

- **4-Pin Connector:** Configurable as I2C/UART/GPIO, also used for bootloader access.
- **Versions:** USB-C and USB-B.

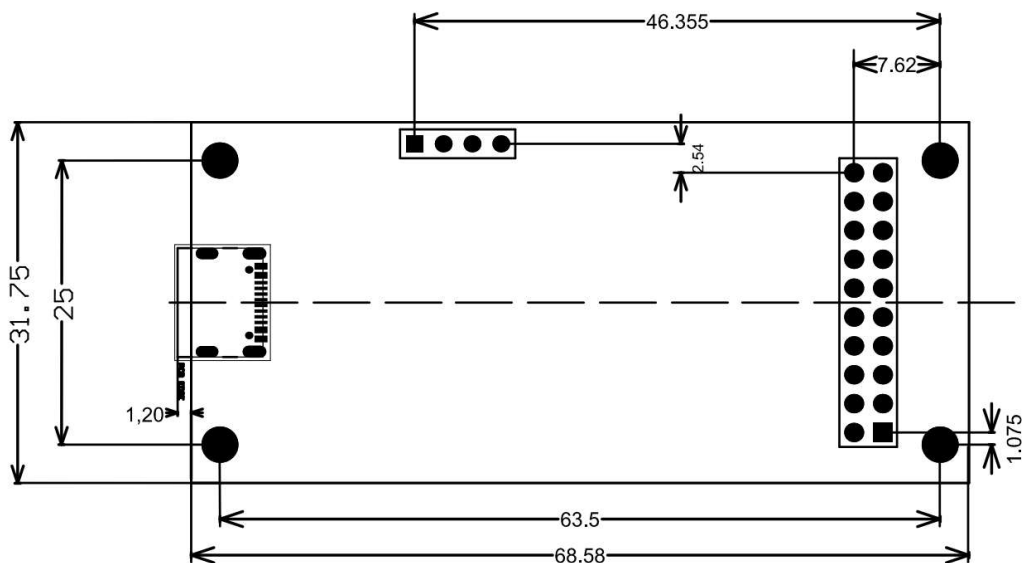


Dimensions

USB-B version



USB-C version



Audio interface Configurations

List of supported audio interface configurations:

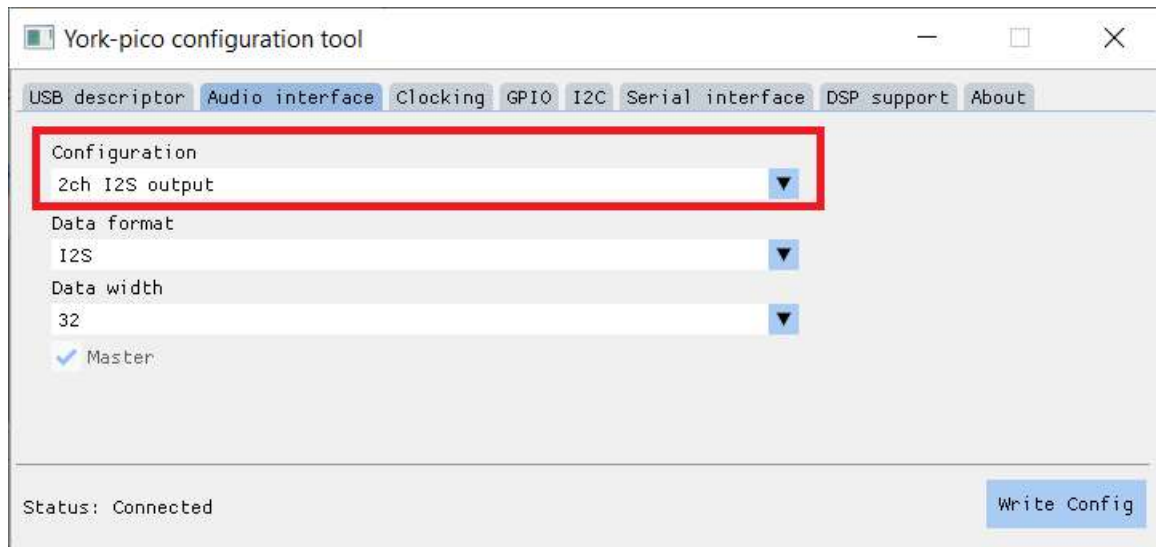
Name	Description	Max Fs (512fs mclk)	Max Fs (1024fs mclk)
2ch I2S output	Default configuration to output stereo I2S audio stream	192	384
2ch I2S input	Configuration for stereo audio input	192	384
2ch I2S input + 2ch I2S output	Combination of stereo audio input and output. Streams must be of the same sampling frequency.	192	384
2ch I2S output + 2ch I2S output	Module configured as 2 channel output interface but uses 2 I2S ports for stereo or mono streams.	192	384
2ch I2S output + SPDIF output	Combination of I2S and S/PDIF outputs	96	192
8ch TDM output	Output of 8 audio channels as TDM stream	48	96
8ch TDM output + 2ch I2S input	Output of 8 audio channels as TDM stream + 2 channel input	48	96
8ch 4xI2S output	Configuration to output 8 audio channels as I2S stream	192	384
2ch NOS dac output	For direct connection of old DACs (NOS mode)	384	384
4ch 2xI2S output	Configuration to output 4 audio channels as I2S stream	192	384
4ch 2xI2S output + 2ch I2S input	Configuration to output 4 audio channels as I2S stream+ 2 channel input	192	384

Details of each mode listed in next sections.

1. Audio interface configuration

1.1. General information

On the audio interface configuration user can select of the available configurations from the list:



Depending on selected configuration list of additional settings and input/output pins of the module can change.

1.2. Available audio configurations

1.2.1. 2ch I2S output

Default configuration for stereo streaming from the host.

Use case: Stereo DACs

Available data formats: I2S, RJ, LJ

Data width: 32, 24, 16 bit

Pin map:

Module pin name	Signal name	Direction	Comment
mclk	Master clock	Output/Input	See 'clocking' section
bck	I2S bit clock	Output	
wck	I2S word sync	Output	
sd	I2S serial data	Output	

1.2.2. 4ch I2S output

Streaming of 4 audio channels from the host
Use case: Bi amp setups, DSP applications

Available data formats: I2S, RJ, LJ
Data width: 32, 24, 16 bit

Pin map:

Module pin name	Signal name	Direction	Comment
mclk	Master clock	Output/Input	See 'clocking' section
bck	I2S bit clock	Output	
wck	I2S word sync	Output	
sd	I2S serial data0	Output	
f2	I2S serial data1	Output	

1.2.3. 8ch I2S output

Streaming of 8 audio channels from the host
Use case: Bi amp setups, DSP applications

Available data formats: I2S, RJ, LJ
Data width: 32, 24, 16 bit

Pin map:

Module pin name	Signal name	Direction	Comment
mclk	Master clock	Output/Input	See 'clocking' section
Bck / f3	I2S bit clock	Output	
f1	I2S word sync	Output	
sd	I2S serial data0	Output	Channels 1-2
wck	I2S serial data1	Output	Channels 3-4
f0	I2S serial data2	Output	Channels 5-6
f2	I2S serial data3	Output	Channels 7-8

1.2.4. 2ch I2S input

Configuration for stereo streaming to the host.

Use case: stereo ADC

Available data formats: I2S, RJ, LJ

Data width: 32 bit

Pin map:

Module pin name	Signal name	Direction	Comment
mclk	Master clock	Output/Input	See 'clocking' section
f3	I2S bit clock	Input	
f1	I2S word sync	Input	
f0	I2S serial data	Input	

1.2.5. 2ch I2S input + 2ch I2S output

Configuration for simultaneous stereo streaming from the host and to the host.

Available data formats: I2S

Data width: 32 bit

Pin map:

Module pin name	Signal name	Direction	Comment
mclk	Master clock	Output/Input	See 'clocking' section
bck	I2S out bit clock	Output	
wck	I2S out word sync	Output	
sd	I2S out serial data	Output	
f3	I2S in bit clock	Input	
f1	I2S in word sync	Input	
f0	I2S in serial data	Input	

1.2.6. 4ch I2S output + 2ch I2S input

Configuration for multichannel/DSP applications

Available data formats: I2S

Data width: 32 bit

Pin map:

Module pin name	Signal name	Direction	Comment
mclk	Master clock	Output/Input	See 'clocking' section
bck	I2S out bit clock	Output	
wck	I2S out word sync	Output	
sd	I2S out serial data	Output	Channels 1-2
f2	I2S out serial data	Output	Channels 3-4
f3	I2S in bit clock	Input	
f1	I2S in word sync	Input	
f0	I2S in serial data	Input	

1.2.7. 2 Channel NOS output

Configuration for direct connection to NOS DAC ICs (AD1862/AD1865, PCM56, PCM63, PCM1702, TDA1541 etc)

Available data formats: I2S

Data width: 16/18/20/24/32 bits

Pin map:

Module pin name	Signal name	Direction	Comment
mclk	Master clock	Output/Input	See 'clocking' section
bck	Bit clock	Output	Shared for both channels
wck	Serial data out	Output	Channel 2
sd	Serial data out	Output	Channel 1
f0	Data latch signal	Output	Shared for both channels

2. Clocking

There are 3 available clocking option for the device:

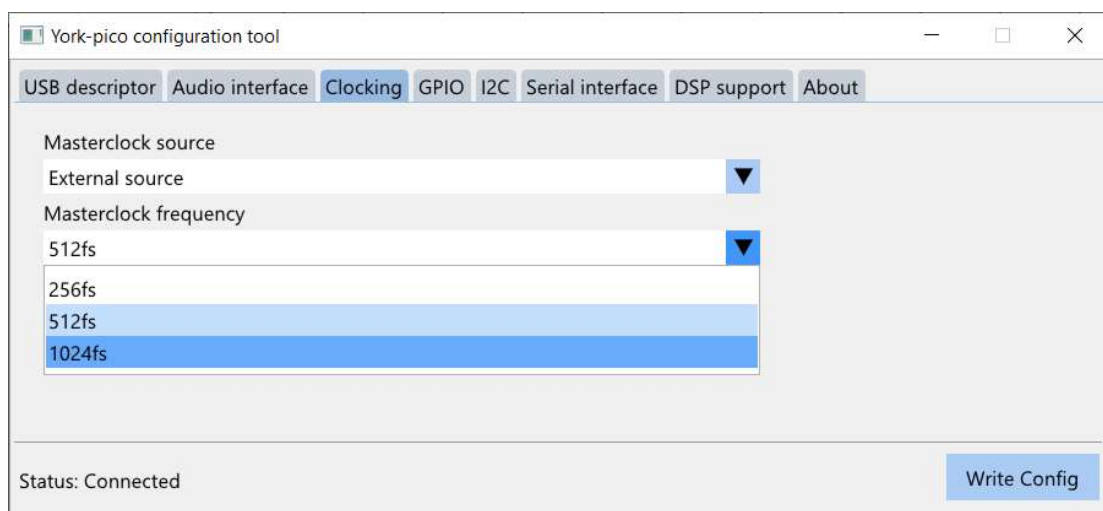
1. On board oscillators
2. External clock
3. PLL

By default the module is configured to use 512fs on-board oscillators:



Based on the selected sampling frequency, MCU enables 44.1kHz or 48kHz grid oscillator and configures internal dividers to generate appropriate BCK and WCK signals. In this mode the mclk pin of module acts as output.

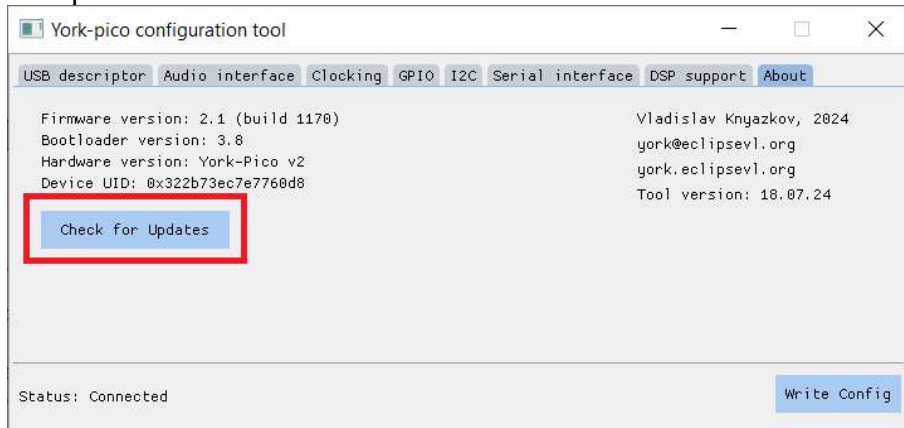
In 'external clock' option the on-board oscillators will be shut down and mclk pin of the module becomes an input. In order to calculate correct clock division settings the MCU need to know frequency of the external clock. It should be set in the configuration tool in 'clocking' section:



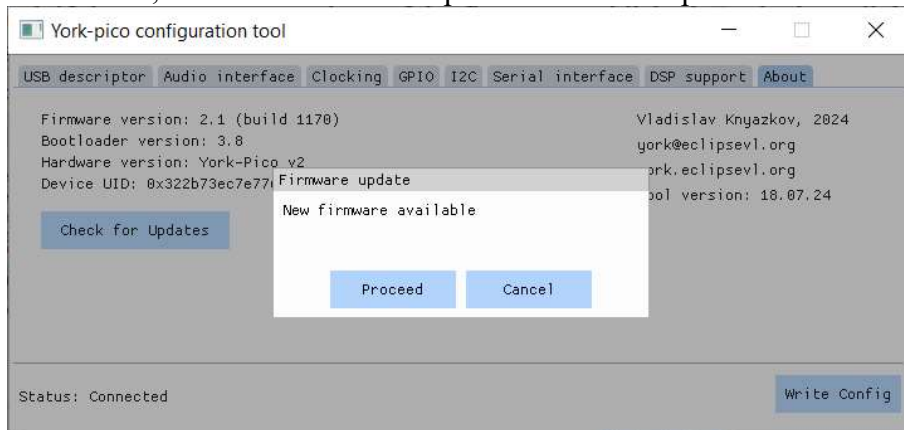
PLL mode does not need external clock, the mclk pin will be in high-Z mode. All clocks needed will be generated from MCU's PLL.

3. Firmware update

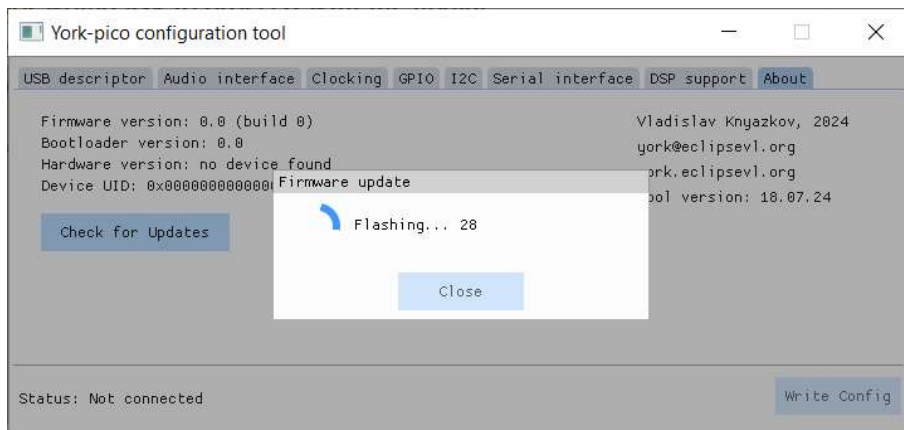
Configuration tool can check if there are newer versions of the firmware published. To do that, click on the “Check for updates” button on the “About” tab:



If there is a newer version, the tool would ask to proceed with the update:



After clicking “Proceed” the tool would switch the device into bootloader mode and flash new firmware:



Flashing red LED indicates that the module is in bootloader mode. When the process is successful, the device will be rebooted and detected by the tool. Previously written device configuration will not be erased or overwritten.

In case of failures during firmware update it is possible to hardware force module to enter into bootloader mode using following procedure:

1. While the module is powered down, connect both io0 and io1 pins to GND.

2. Power up the device by plugging in the USB cable. Blue led should turn on.
3. While the blue led is on (around 1 second), disconnect io1 from the GND

If successful, the device would be in bootloader mode (indicated by flashing red led)

Now it is possible to repeat firmware update procedure same way as described above. The tool would not detect the device (Status: Not connected) but it is expected because it is in bootloader mode.