WAcouSense

PDM MIC via network (VBAN)

Overview

The MCU FW project contains also a network stack (based on LwIP).

It provides besides a web server (have access via Web Browser to MCU) and a server to control MCU via network (from Python scripts) also a VBAN UDP streamer.

VBAN (VB Audio Network) is a donationware to stream audio via network:
https://vb-audio.com/Voicemeeter/vban.htm

It has so many tools, not really clear what the minimum install is you need:
Try “Voicemeter” and/or “Voicemeter Banana” or “Voicemeter Potato”.

The network has to be configured and the streaming of the PDM MIC audio has to be enabled. This is done via the UART command line (see details below).

Network setup

You need an ETH cable between Portenta-H7 Breakout Board and Computer.

Use a direct connection from MCU board to PC (not connecting on a network, not via routers an hubs).

In order to do so, the PC has to be configured properly for this direct ETH connection, using a STATIC IP address.

The MCU has a STATIC IP address. It it possible to configure for DYNAMIC, using DHCP. More details on request.

Steps to setup network

- Start a UART terminal, e.g. TeraTerm: connect via the VCP COM port provided by the MCU (on USB-C connection). Any baudrate should be fine. See the UART command console.
- Enter command **`ipaddr`** in order to get the MCU IP address:

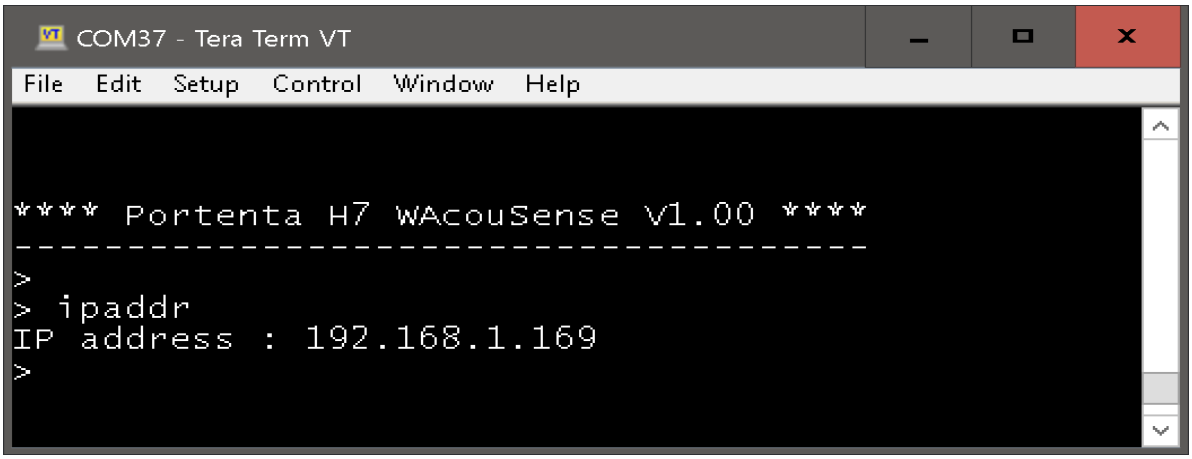

Figure 1: get the STATIC IP address of MCU

- Remember this displayed IP address (needed later again)
- Open the computer network setting and go to the Network configuration. Here details for a Windows OS:

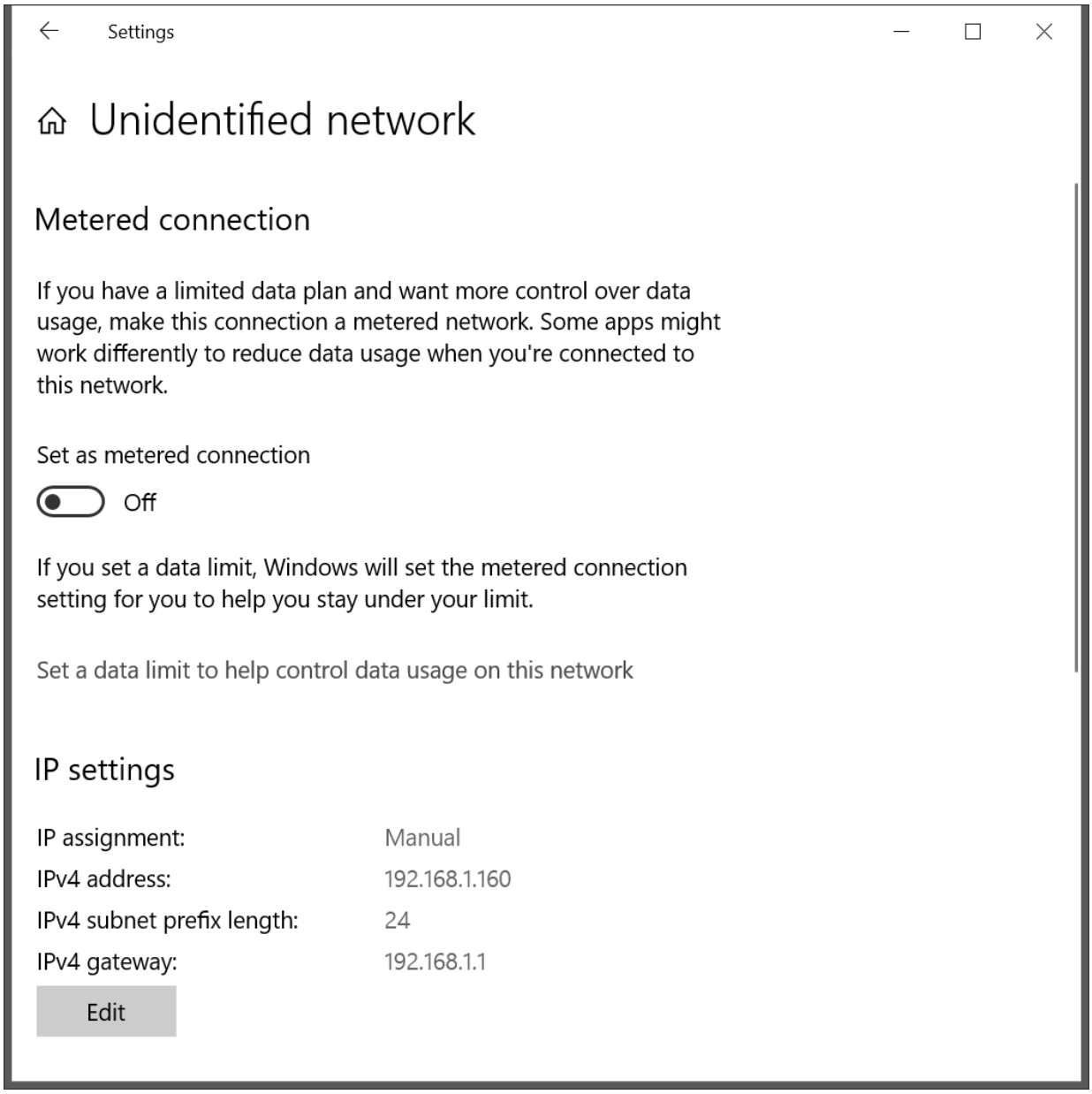

Figure 2: configure the Network, Ethernet adapter to use a STATIC IP address

- You have to set a STATIC IP address on computer for the Ethernet adapter, where the MCU is connected with the direct ETH cable

- Change the Ethernet adapter setting and give it a STATIC IP address:

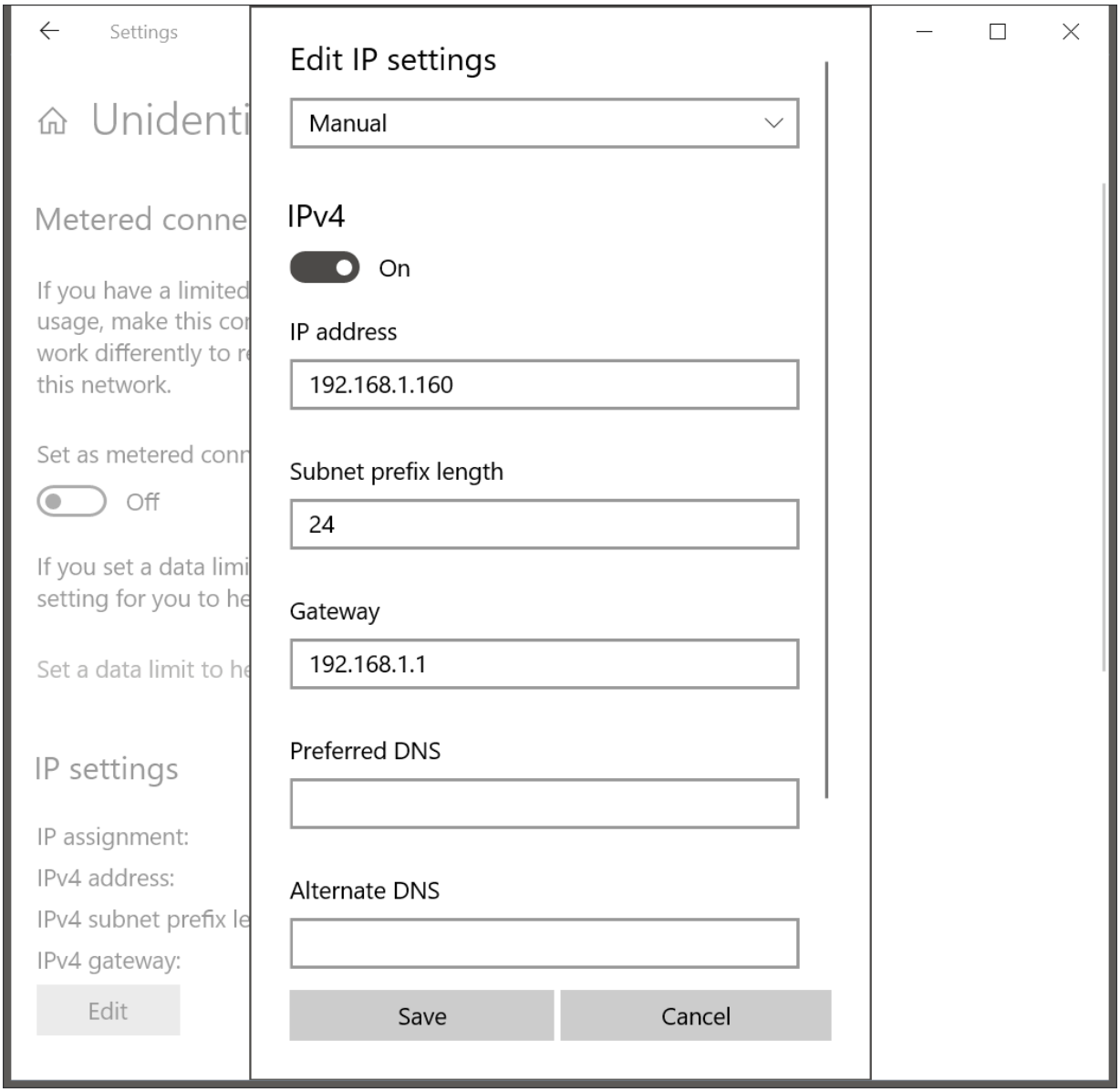

Figure 3: give the PC a STATIC IP address

- Set an IP address for the “same network”: the first three bytes are the same as the MCU IP address, here 192.168.1.XX
- The last byte is different – the PC's IP address, here .160 – so, both, MCU and PC have a different IP address, but at the same network.
  The network mask is 24bit, like 255.255.255.0 .
- Remember the IP address you have assigned to the computer.

You can test now the network connection, e.g. via “ping”. An easier way is to open a Web Browser and enter as URL the MCU IP address, here 192.168.1.169.
You should see a web page as this:

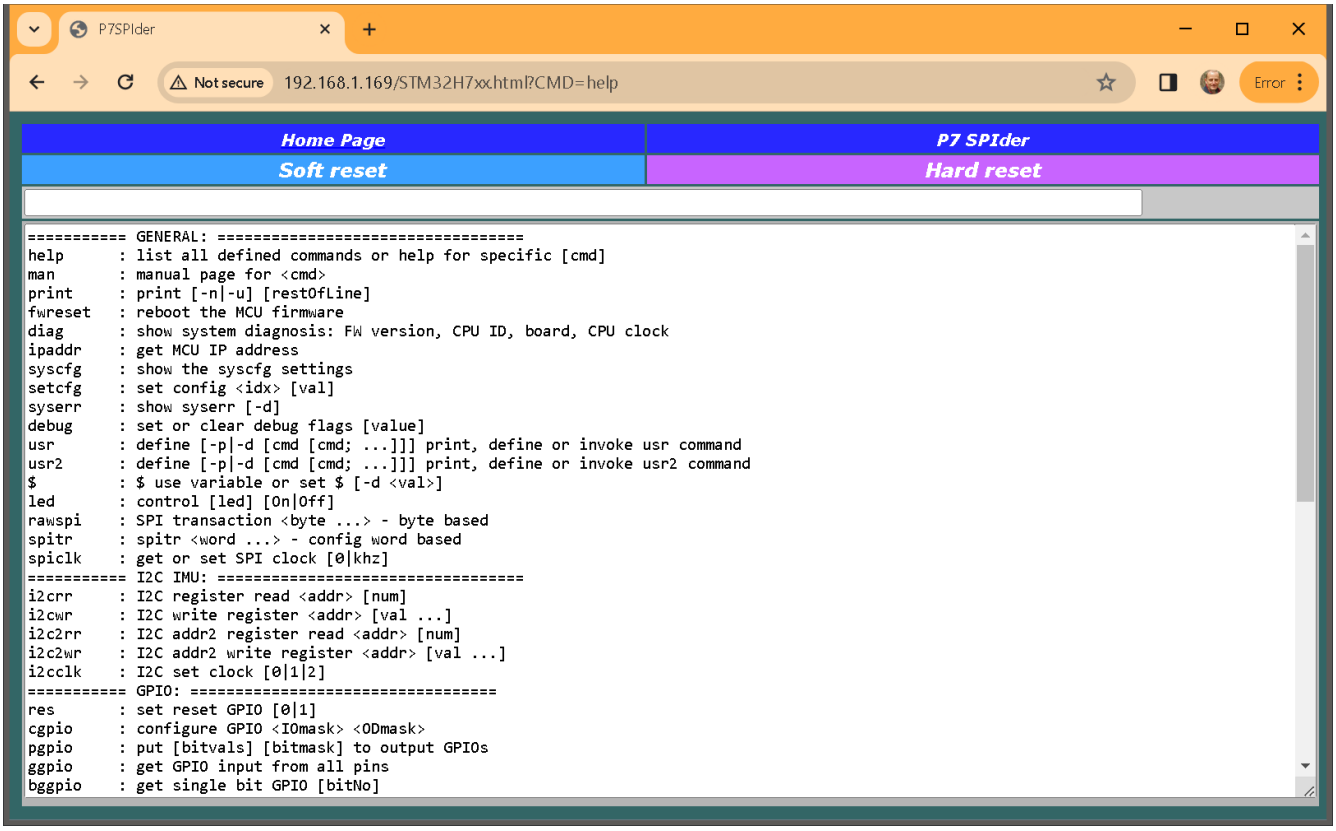

Figure 4: check the network config via web browser and access to MCU

If you see this web page, and you can enter a command, e.g. **`help`**, in the command line – the network connection works fine.

Enable PDM MIC streaming via network

The PDM MIC audio is not yet streamed via network to the PC. It has to be enabled. The MCU has to know to which PC it should stream – it needs the destination (PC) IP address.

- Enable the network streaming on MCU:
  Enter command:
  `udpip 192.168.1.160`
  with the IP address of the computer

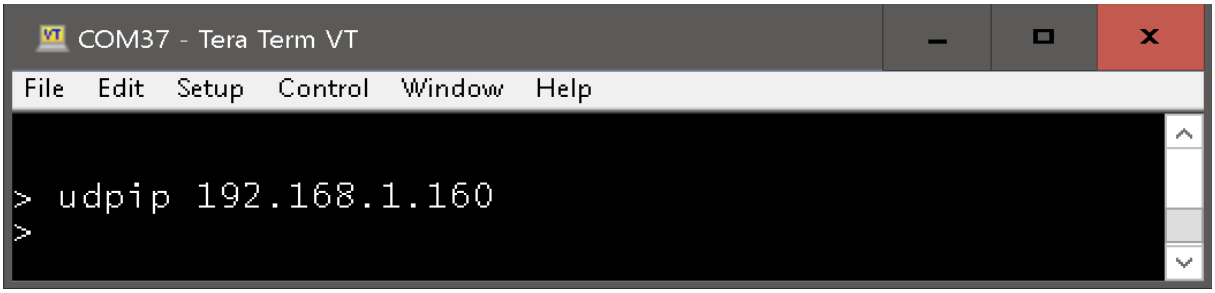

Figure 5: enable UDP streaming to host PC (IP address of the PC)

- The PDM MIC(s) have to be enabled, their amplification has to be set (default is: they are in off mode):
  Enter command:
  ```
  mic 20
  ```
  The value is the amplification in dB: 0 is off, 52 is max. Use a small value first, otherwise you can get immediately a “feedback loop”, e.g. when the MICs will get also the speaker sound.

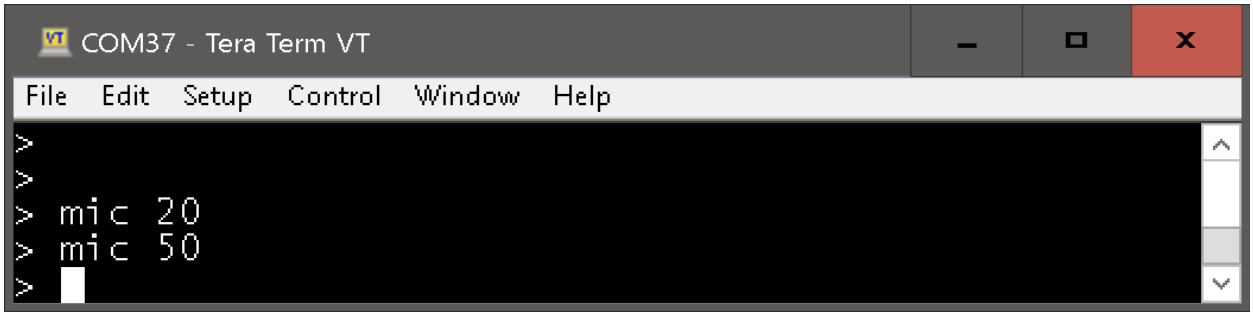

Figure 6: set the amplification (output volume) of PDM MIC

- Start the VBAN on computer, start the “Voicemeter”:

Figure 7: VBAN “Voicemeter” main GUI

- Potentially, you have to enable the VBAN via the blue button on the top right.
- If you click on it – there is setup for the incoming streams: you have to tell VBAN from which IP address – here the MCU IP address, the stream is coming:

Figure 8: VBAN network streaming setup – get the audio from the MCU IP address

- See the On and Stream1 IP address (which is the MCU IP address)

Now the PDM MIC audio should come in PC like an external microphone.

If you have the PC speaker as output – you should here the audio.
ATTENTION: adjust the speaker volume or the PDM MIC amplification factor to avoid a “feedback loop”.

Now, the PDM MIC audio should be available, e.g. for recording or to analyze, e.g. with the tool “Audacity”.

- You have to go also the Audio Setting of your PC: you had to select the “CABLE Output (VB-Audio Virtual...” as your input source.
  Usually, there is your PC microphone selected: change it to the VBAN input device.
  And check the audio meter on the VIRTUAL INPUT or HARDWARE INPUT in the main GUI of VBAN.

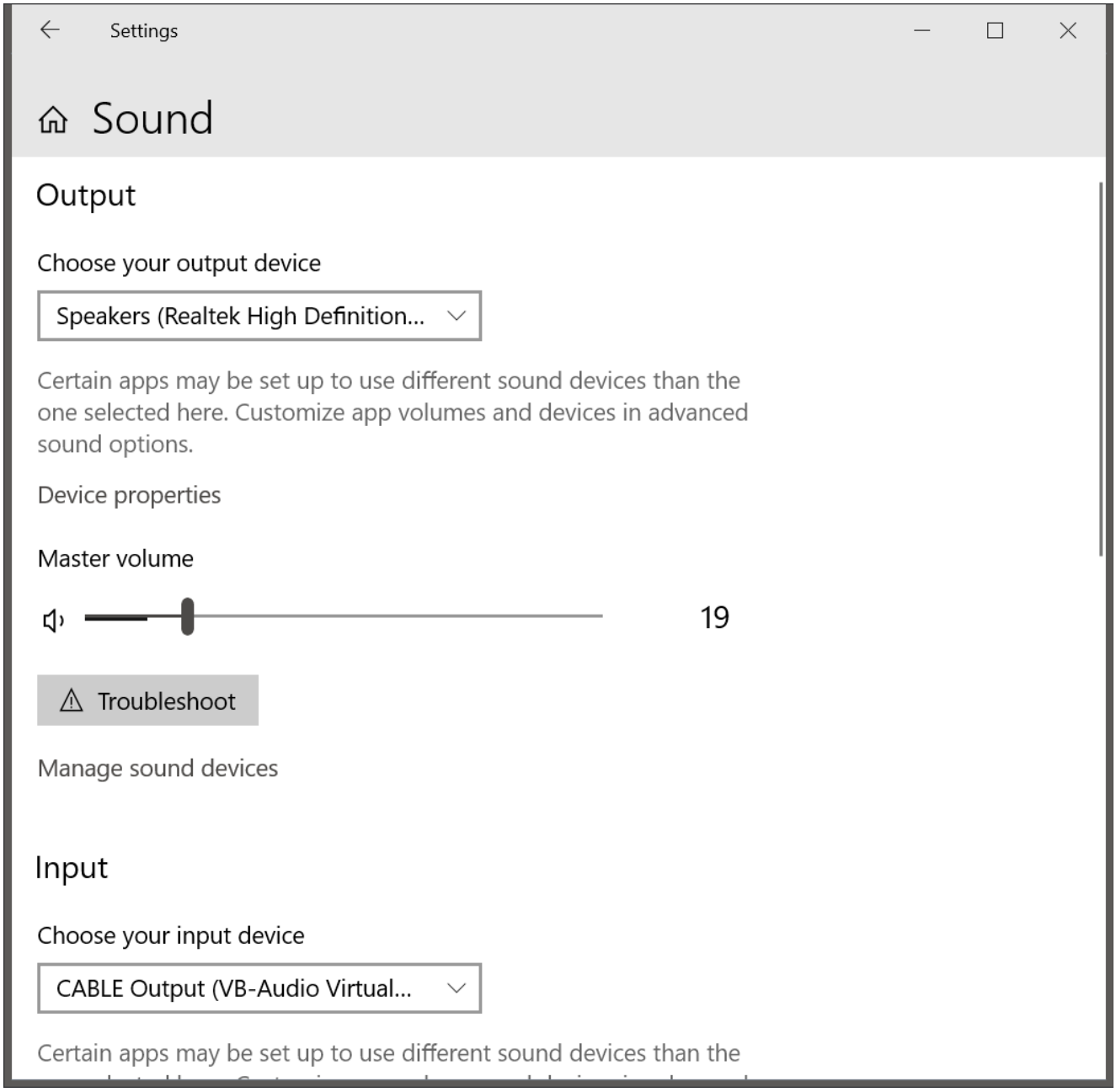

Figure 9: enable the “virtual microphone” (VBAN input) on PC sound settings

- You should get now the PDM MIC audio into the PC. It makes it possible to record, to analyze, e.g. with tool “Audacity”.

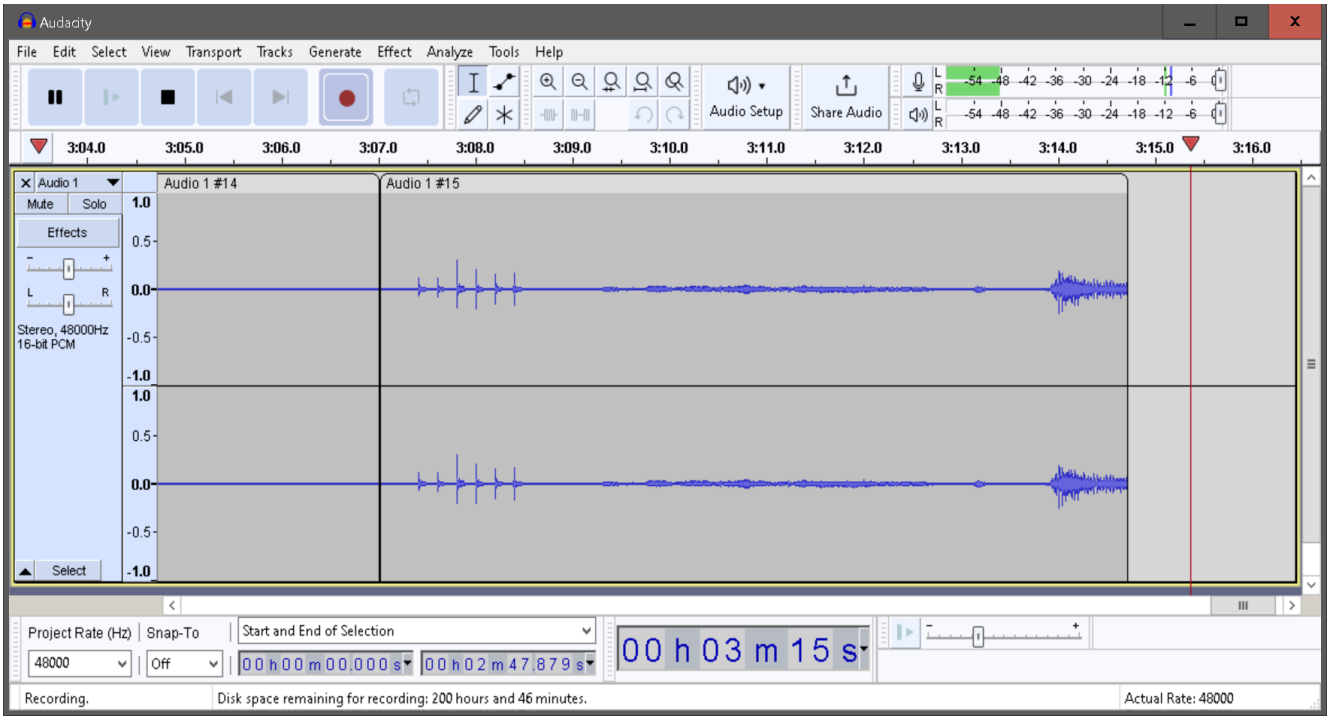

Figure 10: use tools, like “Audacity” to get the PDM MIC audio

Remark:

You have to get familiar with the VBAN tools, esp. how to use the features, how to setup. Unfortunately, more details cannot given here.

It seems to be need to stream the VBAN audio to a HARDWARE INPUT, as VB-Audio Port. This one was able for “Audacity” to grab it from there.

The audio format generated by the PDM MICs via VBAN is:

- **48 Khz**
- **16bit PCM** samples

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