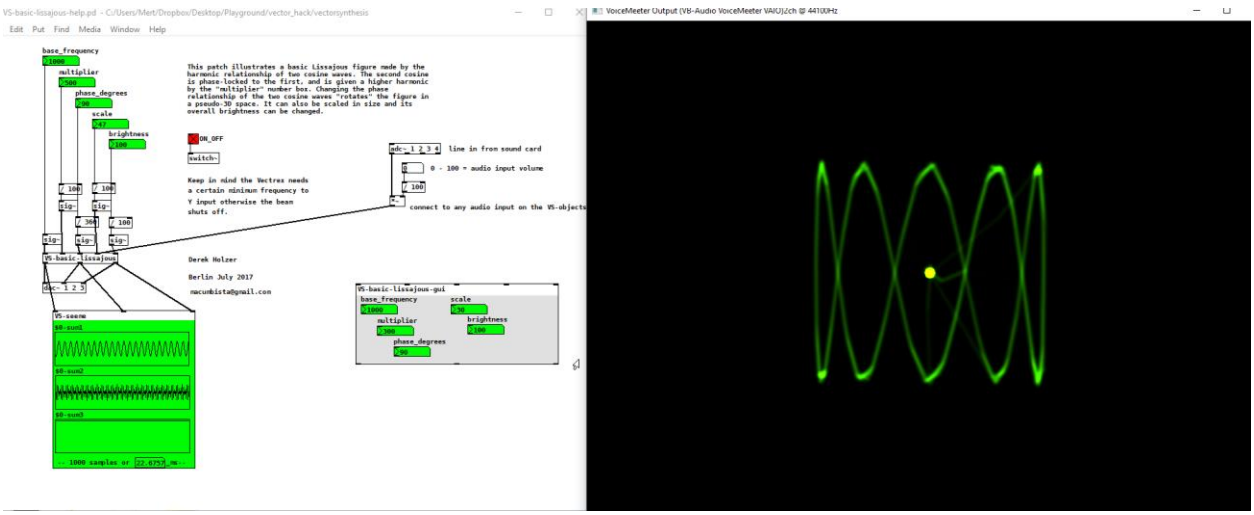
# TUTORIAL: USING HANSI RABER'S OSCILLOSCOPE to PREVIEW VECTOR SYNTHESIS on WINDOWS

This tutorial extends Derek Holzer's tutorial on using Hansi Raber's Oscilloscope app to preview Lissajous type graphics to Windows operating system. It shows how to use VoiceMeter (Windows alternative for SoundFlower) and Hansi Raber's Oscilloscope app to visualize X, Y without a hardware oscilloscope or DC coupled soundcard.



1) First, download and install the following:

*https://github.com/kritzikratzi/Oscilloscope/releases/tag/1.0.9*
*https://www.vb-audio.com/Voicemeeter/*

Plus, the Vector Synthesis library patches at:

*https://github.com/macumbista/vectorsynthesis*

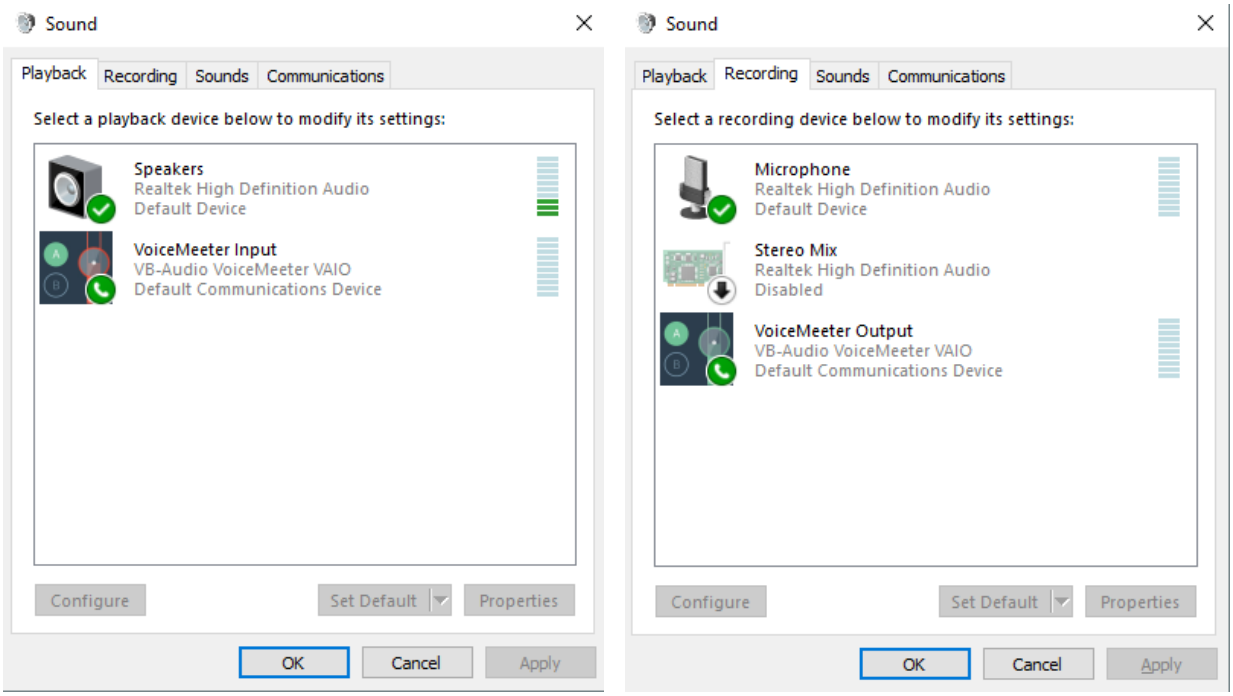
And of course, Pure Data if you have not already installed it (get the 32-bit version if you plan to use the Gem graphics externals required by Derek's scan processing patches):

*https://puredata.info/downloads/pure-data*

(Optional) Install Processing and Ted Davis' XYScope library (in Processing, *Sketch -> Import Library -> Add Library…*):

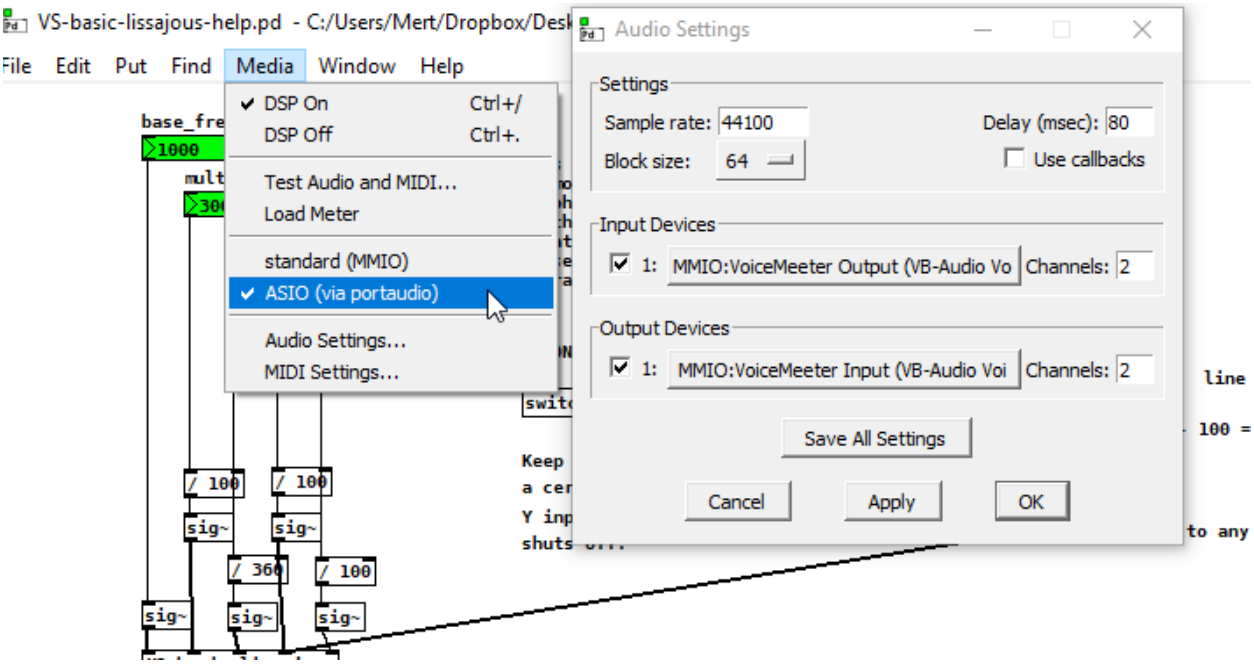
*https://processing.org/download/*

2) Next, we need to route audio from PureData (or Processing) to Oscilloscope app using VoiceMeter. The software should automatically install audio devices (VoiceMeter Input, and VoiceMeter Output) to your system. **If you experience audio related issues with other apps while you are not using the Oscilloscope, simply *disable* the VoiceMeter Input and Output from the Sound control panel (you can always enable them).**




Start the VoiceMeter app, it will automatically initialize server.

3) Start Pd and choose VoiceMeter Output and Input for the devices. Choose ***ASIO (via portaudio)*** from the Media settings and turn ***DSP On***. Since this application only allows routing 2 channels, we are not going to be able to control brightness on Windows.

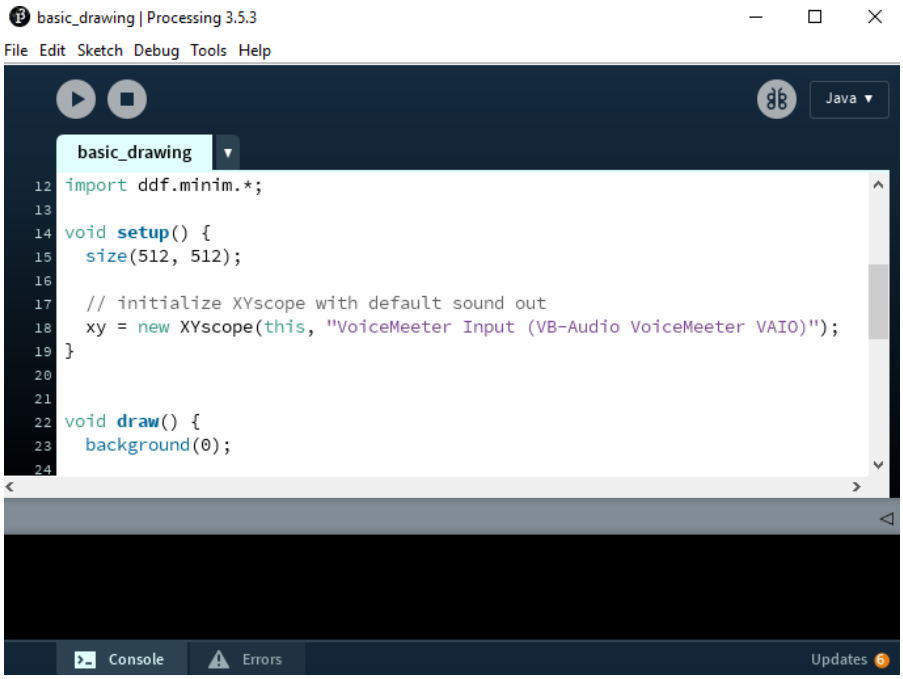



(Optional) Start Processing and run one of the example sketches of XYScope Library. In *setup* function, change the initialization of *xy* object from

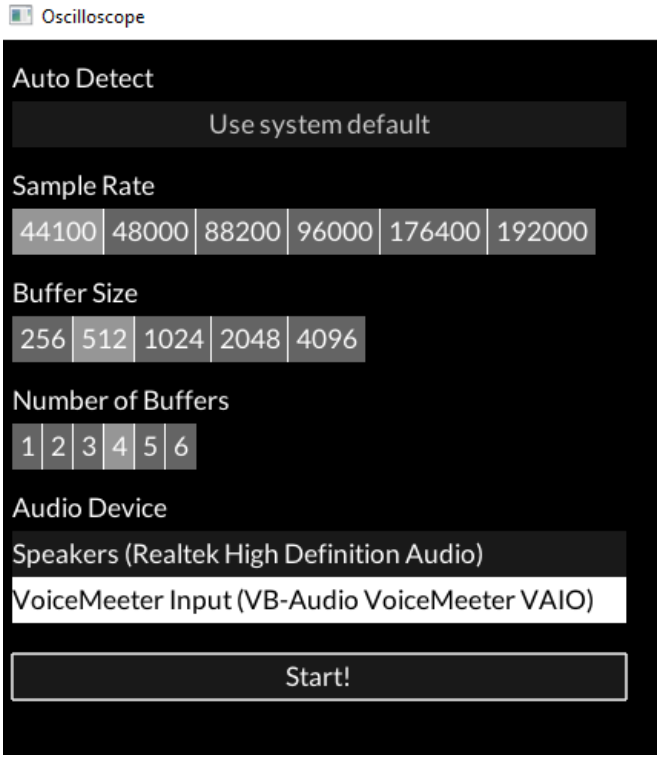
```
xy = new XYscope(this);
```

to

```
xy = new XYscope(this, "VoiceMeeter Input (VB-Audio VoiceMeeter VAIO)");
```

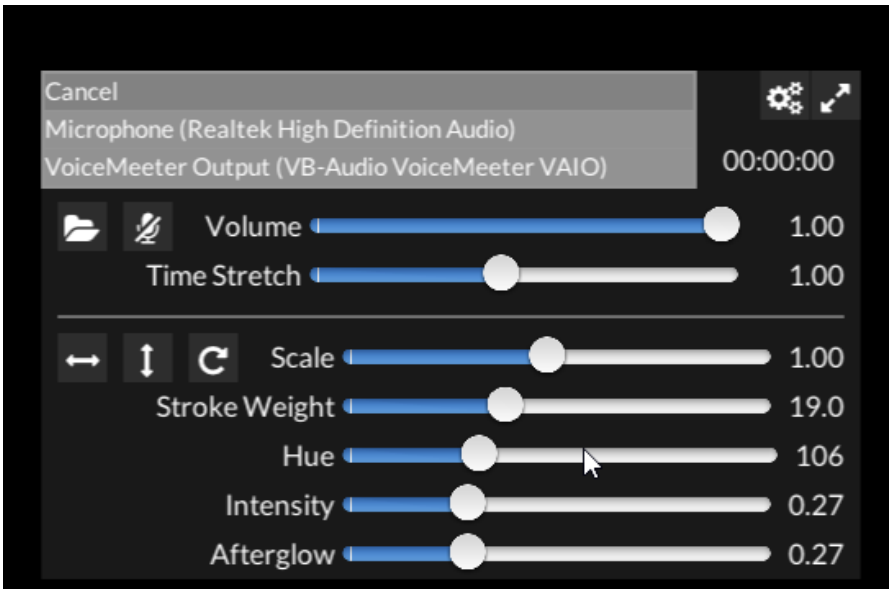


4) Start Oscilloscope and in settings choose “VoiceMeeter Input (VB-Audio VoiceMeeter VAIO)” as the audio device.




5) Click "Start!" button in Oscilloscope. In the next screen, click the microphone icon. Then hold down the SHIFT key and click the " VoiceMeeter Output (VB-Audio VoiceMeeter VAIO)" as input. Once you’ve done this, you should see a dot in the middle of the Oscilloscope app. Once you create audio from Pd (or Processing), you should be able to see them in the app.

TIP: Now you can close the menu with the TAB key, or press SPACE to enable auto-hide, which hides the menu if you don’t move your cursor for a couple of seconds.



Please do not bug Hansi with bug reports on this application, it is a pre-release specifically for us to play around with. It may sometimes crash if you do weird things to it.

[Adapted from Derek Holzer’s tutorial]

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