MidiVolts Modular SysEx Guide

The purpose of this guide is to help make adjustments to your device by sending the proper SysEx message. All SysEx messages are available on the following github page.

www.github.com/spacebraincircuits/midivoltsmodular

Click the **Code** button. Choose *Download ZIP.* Next, you will need to **extract** the Zip file. You should be able to right click and choose *Extract All* in windows and *double click* in Mac OS.

Sending Messages

SysEx messaging allow for the user to make parameter changes to your device. By installing a SysEx software on your computer, you will be able to assign the following parameters, as listed below. There are many SysEx applications available on the web that are free to download. Any of these should work. I use **SysEx Librarian** which is available for Mac OS.

After the software is up and running, attach a midi cable from your midi interface to your MidiVolts Desktop, so you can begin making changes to your device.

Midi Channel: Midi Channel is assignable by running the appropriate channel file located in the Channel folder. Midi Channels **1-16** are available to assign. By default, the MidiVolts Desktop is assigned to **Channel 1**.

Pitch Bend: The number of Pitch Bend semitones may be assignable in both the **Up** and **Down** directions. For instance, you could assign a pitch bend of 2 semitones when bending up, and 12 semitones (Octave) when bending down. This is assignable to sending the appropriate files located in the Pitch Bend folder. By default. Pitch Bend Up and Down are both assigned to **2**.

Continuous Control: CC1, CC2, and **CC3** are adjustable by sending the appropriate CC file that is located in the CC folder. See **User Manual** for more info on which modes listen to the respective CC# value. For example, CC2 may be assigned to 23 by sending the 23___CC2.syx file. By default, CC1, CC2, and CC3 are assigned to 1(Mod wheel), 71, and 74, respectively.
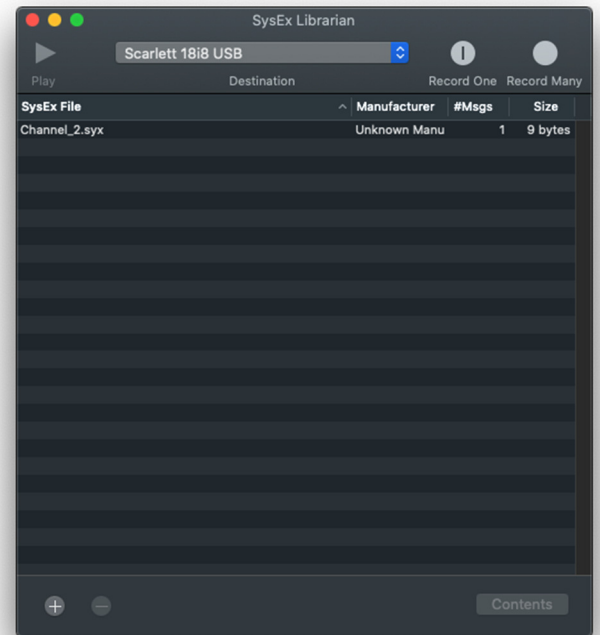
CV Calibration: Your MidiVolts Desktop is **calibrated** before it is shipped. However, over time the voltages may **change** and can notes may slip out of tune as you play in different ranges of the keyboard. If this is true, you can recalibrate any CV output by sending the **Gain** and **Offset** files located in the folder named **V0**, **V1**, **V2**, or **V3**. For more information on how to calibrate your CV output, proceed to **Pitch CV Re-calibration** documentation located on **page 2**.

Lowest Midi Note: Assign Midi note start range. (36)

Clock Or Gate: Switch Clock to act as Or logic gate. Any note(s) pressed will result in this gate returning On.

Please email spacebraincircuits@gmail.com for any questions or issues! I am more than happy to help!

Pitch CV Re-calibration

Are your oscillators slightly out of tune at different ranges on the keyboard? If so, then you may need to recalibrate the oscillators. Pitch CV increments 0.083 Volts per note. The MCP4728 has very accurate voltage scaling, however, there are discrepancies due to internal opamps. This is called **Offset** and **Gain** error. These values can be adjusted to properly calibrate the Pitch CV scaling by slightly adjusting these values with **SysEx** messages. Make sure you have a multimeter before continuing. This is necessary to accurately read the voltages coming from each CV output.

First Step: Gain Error Adjustments

Begin by switching your device to the **UNISON** Mode. Using a multimeter, measure the voltages of the CV Voice in question by playing each of the midi notes to the right. Compare your voltages to the data as shown in the **Ideal Voltages** table. Your voltages should be very close! Note, absolute perfect calibration is very difficult to achieve. However, a voltage within the range of **+/- 5 mV** of target voltage should be close enough! For example: a voltage reading of 3.004 is close enough to 3 and should be considered calibrated.

Note: Due to the Midi notes 36 and 96 being so close to the voltage min and max of device. These values should not be measured while recalibration.

If the values are **creeping upward**, as shown on the **Gain Error** table, the CV needs to be adjusted by Gain Error. Try compensating for this error by sending **SysEx** message of **0.996**. If the voltages are creeping downward, try sending a **SysEx** message of **1.004**. Repeat steps above and sending different **SysEx** messages until the Voltages do not increase or decrease but stay consistent across all voltages. It is okay if the voltage is not exactly 1.00 or 2.00, etc. This will be accommodated by sending **Offset Error** messages.

Second Step: Offset Error Adjustments

After have completed the Gain adjustments, you may also need to adjust the **Offset Error** if your measurements are not exactly on 1.00, 2.00, etc. If the values are off by 5 mV, then send Offset Error **SysEx** message of **–0.005** to accommodate for the error. If the values are 0.995, 1.995, etc, then send a **SysEx** message of **+0.005** to compensate. Repeat steps, until you have achieved near perfect calibration. Remember this is an iterative process, and it will take some trial and error if you want near perfect results!

Note: Because the Gain and Offset adjustments are affecting the internal calculations, you may see some pitch discrepancies at Midi Values of 36 (0V) and 96 (5V) since this is the min and max voltages of the internal DAC. This is normal!

Ideal Voltages

MIDI #	VOLTAGE
36	0.000
48	1.000
60	2.000
72	3.000
84	4.000
96	5.000

Gain Error

MIDI #	VOLTAGE
48	1.001
60	2.002
72	3.003
84	4.004

Offset Error

MIDI #	VOLTAGE
48	1.005
60	2.005
72	3.005
84	4.005

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