malletStation Learn Mode Tools v2

**Contents**

What's in this application?

This application contains multiple different Max tools used for Learn Mode investigations. This includes:

1. The Main app that launches on startup (f.k.a The Gain Offset Adjuster). This is where you can go through the Learn Mode algorithm process, as well as manually set bar parameters.
2. The Tare / Low / High Visualizer. This subpatcher plots the low strike velocities, high strike velocities, and tares of all bars. This is a good way to how much dynamic range each bar has.
3. The Velocity Visualizer. This allows you to visualize Raw Velocity (sent out when the device is in Learn mode) and MIDI velocity. This is helpful in assessing how well the Learn Mode algorithm performed on calibrated bars.
4. The Crosstalk Flags Visualizer. This subpatch allows you to view which bars are being flagged as crosstalk in Darren's crosstalk algorithms. It requires the device to be in Normal Mode, and loaded with a special firmware that includes these debug flag messages. There's some worry that these debug messages could increase the amount of cooking time, and misrepresent the current firmwares playability, so as of now, it should not be used when testing the device for dropped notes in chord playing. With the firmware loaded, crosstalk flags are sent from the malletsStation as CC messages.

To access the sub-patchers, double click them from the Subpatchers menu in the main view.
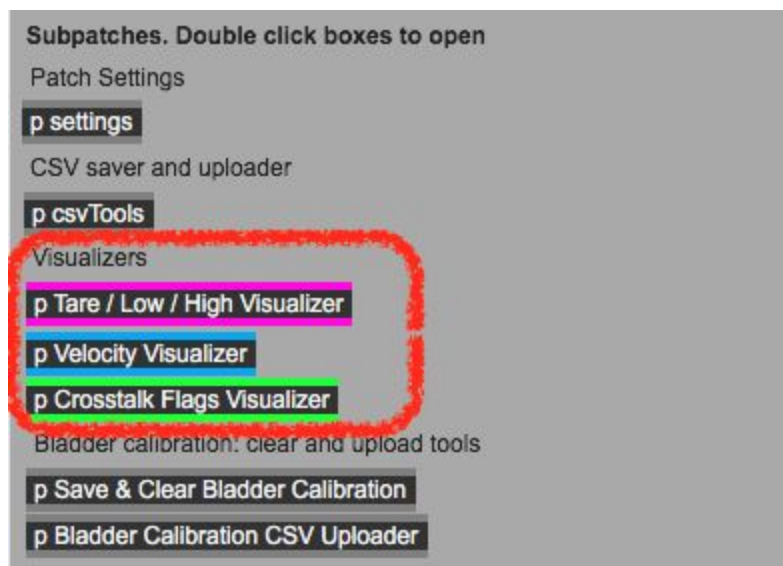
Startup

1. With the malletStation plugged in, open the LearnModeTools_v2 app
   a. If you are prohibited from opening the app by the OS, try right clicking (or control + click) the app, and clicking Open from the dropdown.
   https://support.apple.com/kb/ph25088?locale=en_US
2. Every time you open the app, switch out malletStations, execute the 4 steps in the "Start-up Steps"
   a. If only power cycling device, without closing app, you may skip the first 3 steps and just execute Step 4 (Request data currently on malletStation) to pull new tare values.
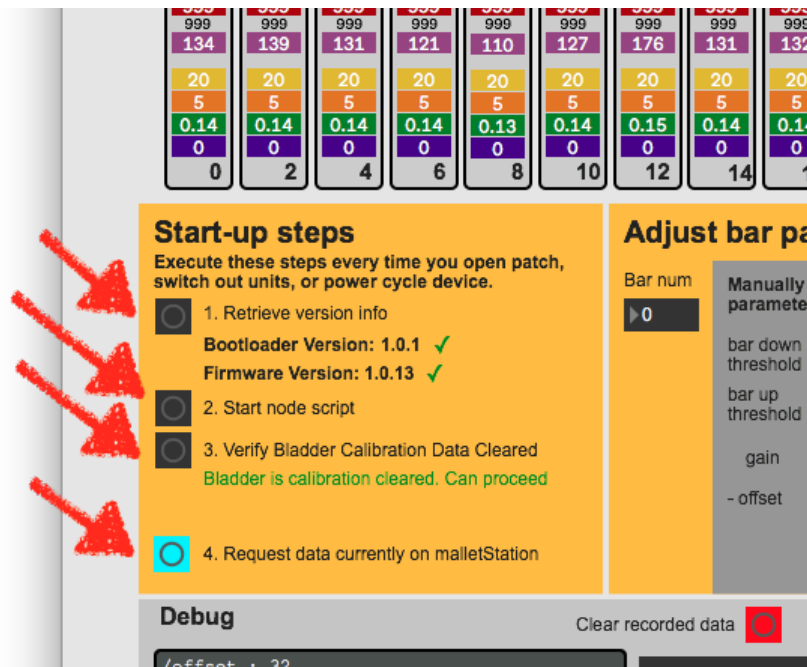
If you get an error saying "Bladder calibration data on device not cleared," follow the steps in this guide under the section entitled "Save bladder data to CSV, then clear from device"

After completing the Start-up steps, the visualizer should look something like this
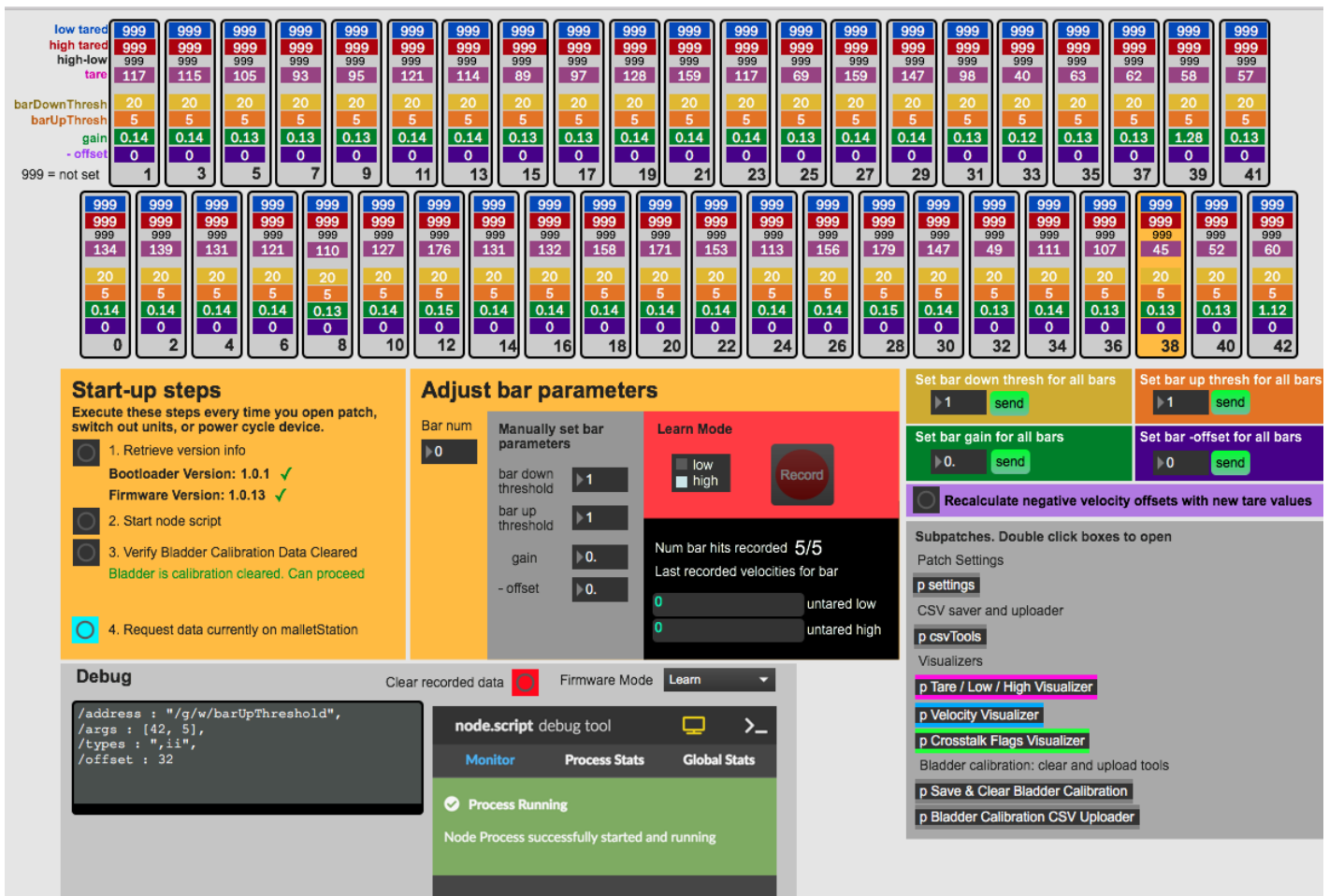
(the only 999 values should be in the low and high tared boxes, firmware and bootloader should have a checkmark next to them, bladder calibration should display success message, and node.script debug tool should display "Process Running")

Calibrating with Learn Mode

1. Click on the bar you wish to calibrate. (Or, enable "Select with bar hit" from the Settings (double click p settings) window to select the bar by striking it).
2. Record 5 "low" hits and 5 "high" hits. By default, the algorithm tunes the output such that a "low" hit corresponds to a MIDI velocity of 5, and a high hit corresponds roughly to a MIDI velocity of 127. After you're finished recording, you should see a new gain and negative velocity offset for the bar.

Troubleshooting

1. If you are having trouble triggering the bar while Recording,
    a. try lowering the *bar down threshold* via the "Manually set bar parameters" section
    b. In the Settings window (p settings), increase the "Recording gain value" (this is a temporary gain value sent to the bar during Recording).
2. If device is not responding to changes in bar down/up thresholds, gain, or -offset:
    a. Try re-initializing the patch by re-clicking the buttons in the start up section
    b. Force-quit the application, power cycle the device, then re-open the application

Save bladder data to CSV, then clear from device

This only needs to be done if the Bladder Calibration Data was not cleared on device.
In order to generate appropriate gain and negative velocity offset values for the learn mode algorithm, you'll need to clear the bladder calibration data on the device. These steps walk you through saving the current bladder calibration data to a CSV, and then clearing the bladder data on device (setting all bars to unity gain).

1. Click the bang next to "1. Start parsing incoming sysex", then click *p Save & Clear Bladder Calibration*

2. Follow the instructions in the window that pops up:

The CSV created after step 2 should look something like this →
The "Global Calibration Gain" should be recorded at the bottom of the CSV

Do not click the button labeled "bang to erase calibration data on device" if the CSV was not created properly (this CSV is necessary to restore the bladder calibration on the device)

	A	B
1	bladder calibration data	
2	147	
3	150	
4	130	
5	200	
6	123	
7	164	
8	109	
9	90	
10	124	
11	124	
12	128	
13	192	
14	128	
15	178	
16	134	
17	145	
18	122	
19	80	
20	87	
21	190	
22	200	
23	130	
24	120	
25	210	
26	123	
27	142	
28	130	

calibration__2019_7_3

Sheet 1 of 1

Reupload bladder calibration data to device

These optional steps go over restoring the original bladder calibration on the device, using a CSV created in "Save bladder data to CSV, then clear from device"

1. Click the bang next to "1. Start parsing incoming sysex (if you have not yet started the node script) then double click *p Bladder Calibration CSV Uploader*

2. Follow instructions in pop-up window. Upload the CSV that was made via the *p Save & Clear Bladder Calibration*… they are already in the correct format for this tool.

malletStation calibration CSV uploader

Use this patch to upload CSVs of calibration data to the malletStation
Format of the CSV should be:

title row (can be any string)	
8bit calibration value for bar 0	
8bit calibration value for bar 1	
...	
8bit calibration value for bar 42	
8bit Global Calibration value	

○   Step 1: Click to start node script and set unit to Calibrate mode

□   Step 2: Click to upload calibration CSV,   ⬤ upload progress
and wait until loading complete.

Step 3: Once complete, verify data below corresponds to values in CSV

array: **10 11 12 13 14 15 16 17 18 19 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42**
Global Calibration Gain: -0.5

Note: after you have restored the calibration values, you will need to re-erase (set all bars to unity gain) them using the *p Save & Clear Bladder Calibration* window next time you wish to run learn mode