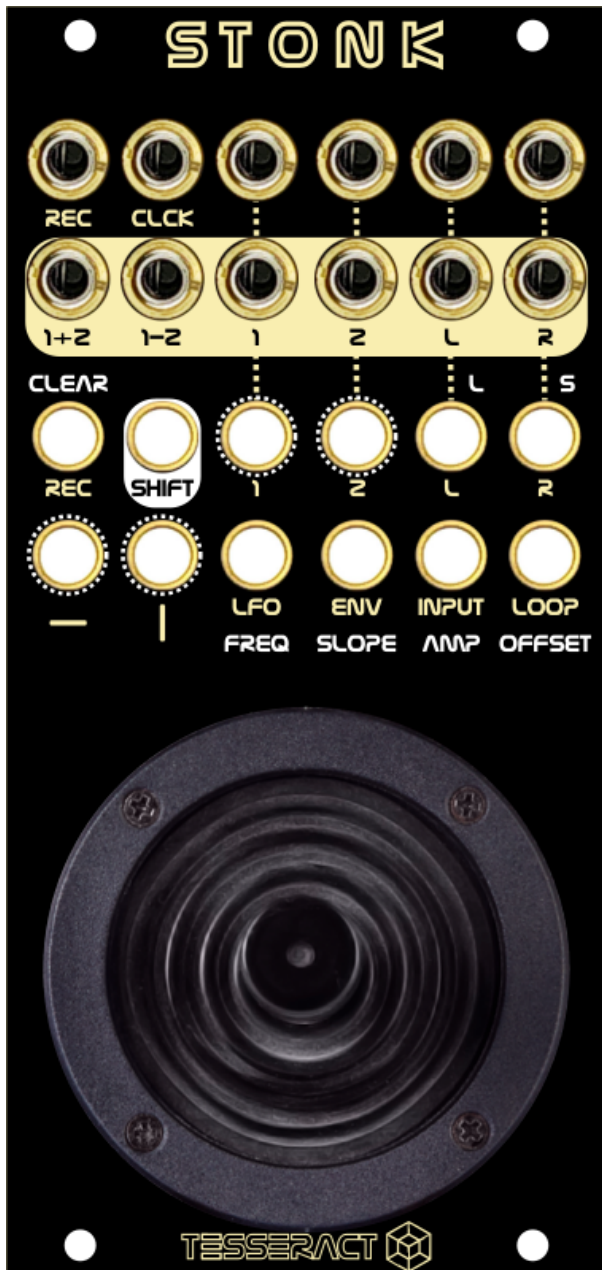


Tesseract Modular - STONK



STONK is a joystick controller and looper with 2 channels of CV and 2 of audio. It's also a CV generator & audio processor. Very hands on module which can be a sort of chaos pad or dj looper.

Features:

- 2 audio in & out (AC coupled)
- 2 CV in & out (DC coupled) $\pm 5V$
- 2 extra CV outputs $\pm 10V$
- 12 illuminated push buttons
- CV & Audio looper (2:30 per channel)
- LFO
- Euclidean envelope generator
- Multimode Filter
- Stereo Reverb
- Wavefolder
- VCA

The audio AD/DA is 24 bit, 48 KHz, the internal audio handle is 32 bit float.

The CV AD/DA is 16/12 bits, 12 KHz.

The extra CV outputs are the analog sum and difference of the CV outputs 1&2.

12 HP

Each channel has 6 modes available. By default 2 parameters are assigned to the horizontal & vertical axes but this can be easily tweaked, so it's possible to control any of them (frequency, symmetry, offset or amplitude of the LFO, for example) not only with the joystick but with the 2 CV inputs.

The polarity control & offset of every parameter can also be modified on every mode and every channel.

6 presets for store and recall not only the joystick assignment and settings but all the parameter values for all modes and channels.

Last firmware & how to update [here](#).

BUILD GUIDE is [here](#).

CHANNEL SELECTION

To select a channel click on its respective button. Several channels can be selected at a time. 1 & 2 are the CV channels, L & R are the audio ones.



CHANNEL MODES

Each channel has 6 modes to choose from. To change the behavior of the selected channels push any of the second row buttons. If the button is held (instead of just clicking) it will behave as momentary, so the release will set the previous mode on.



The available options are:

CV channels (1&2)	Audio channels (L&R)
Horizontal axis	Multimode Filter
Vertical axis	Reverb
LFO	Wave Folder with LFO
Euclidean envelopes	VCA with euclidean envelopes
CV input	Audio input
CV looper	Audio looper

Both CV and audio loopers will be available once the loop has been recorded.

LOOPER

There is **2:30 (150 seconds)** of loop time available for each of the 4 channels. Depending on if a cable is plugged or not in the REC input the looper will behave differently.

If there’s no cable detected:

- Click on the REC button to arm the loop record.
- Next clock will start recording.
- Click again to stop recording and start paying the loop.
- Next clock will do that.

If there’s a cable in the REC input the looper will need an external trigger to start and stop recording, this is how it works:

- Click on the REC button to arm the loop recording for the selected channels.
- Next trigger after being armed will start recording.
- Next trigger will stop recording and will start the loop playback.

This way the loop size will match perfectly the timing of your sequencer.

While the loop is being played any other mode can be selected, the loop will still ‘playing in background’ so when going back to it everything will still be in sync.

To **over-process the audio loop** with some of the built in effects press the LOOP button and any of the Stonk modes, that way the loop will be passed to the filter, reverb, folder or whatever.

To **clear the loop**, press SHIFT and REC buttons.

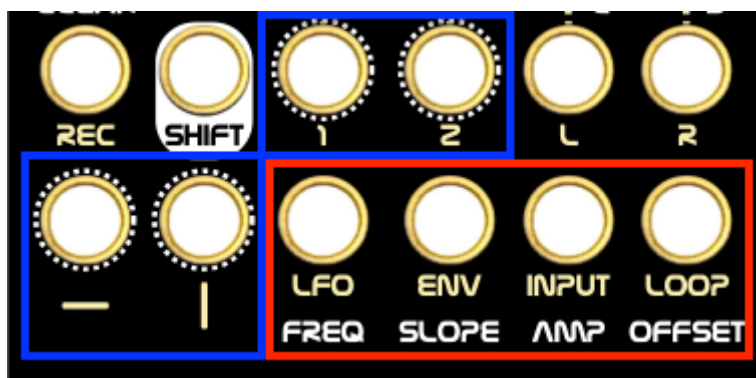
ASSIGN PARAMETERS

For each of the modes Stonk has a preassigned parameters that will be controlled by the X and Y axes, but that can be tweaked easily, CV inputs can also be assigned to control any parameter.

To assign a parameter to control:

-Press **SHIFT** any **SOURCE** to select it, available ones are the horizontal and vertical axes plus CV inputs 1 & 2. **This will display the assigned parameters to the selected source.**

-Click on a **PARAMETER** to assign/deassign it from the selected source. One source can control several parameters, and each parameter can be controlled only by one source at a time.



Parameter assignment for CV channels (1 & 2)

	FREQ	SLOPE	AMP	OFFSET
HORIZONTAL			X	
VERTICAL			Y	
LFO	frequency	symmetry	LFO amplitude	LFO offset
ENV	euclidean pattern	decay	env amplitude	env offset
INPUT			amplitude	offset
LOOP			amplitude	offset

Parameter assignment for audio channels (L & R)

	FREQ	SLOPE	AMP	OFFSET
FILTER	frequency	resonance	amplitude	LP / HP mix
REVERB	reverb time	reverb damp	amplitude	wet / dry
LFO	frequency	symmetry	LFO amplitude	LFO offset
ENV	euclidean pattern	decay	env amplitude	env offset
INPUT			amplitude	
LOOP			amplitude	

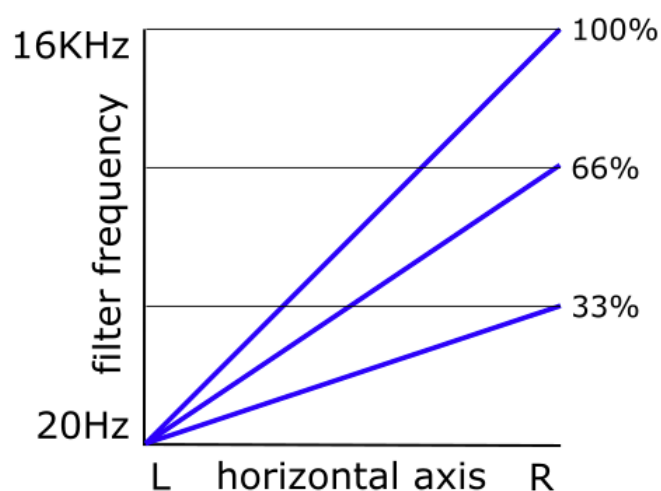
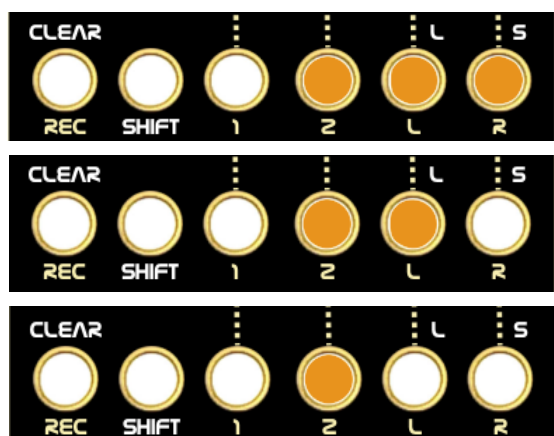
*Parameters in **bold letters** are the default assigned ones.

SET ATTENUVERTER AND OFFSET FOR A SINGLE PARAMETER

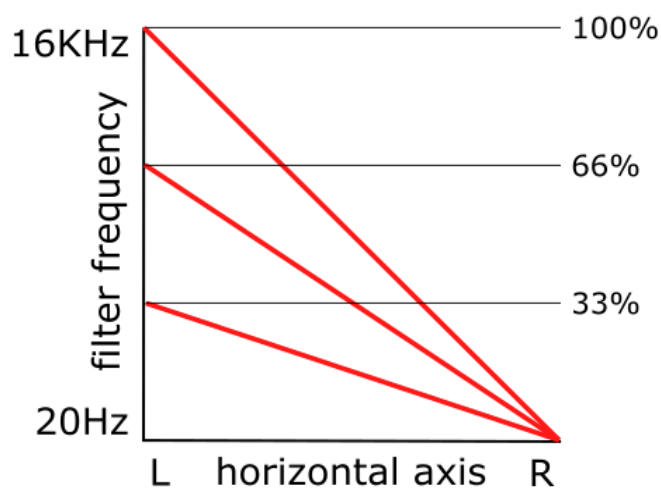
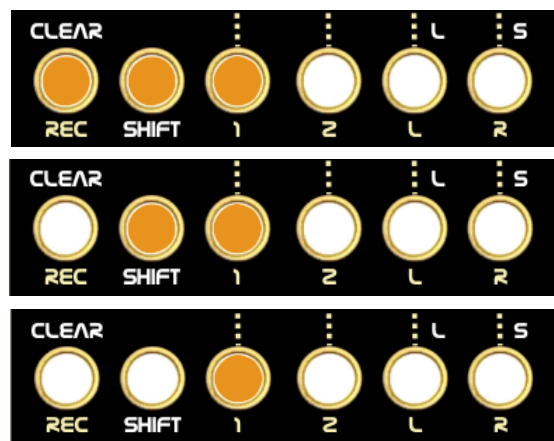
It is possible to modify the way a parameter is modulated (not only the source that will modulate it, which are, as said before, vertical and horizontal axes plus CV inputs 1 and 2).

By default the parameters are modulated +100% by the assigned source, so, for example, in a filter, the cutoff will be by default fully closed with the joystick in the most left position and fully open with the rightmost one. Now let's say that you'd like the joystick to control a not so wide frequency range, and you'd like the control to be inverted (so moving the joystick to the left opens the cutoff instead of closing it) and you also want that frequency range to be in the middle ...here's where the attenuverter and offset settings are useful.

By pressing SHIFT and any of the parameter buttons (FREQ, SLOPE, AMP, OFFSET) the modulation amount and offset for that parameter (in the selected channels) can be adjusted with the buttons. There are 6 possible amounts, which are indicated by the first row of leds: 100%, 66%, 33% and their inverted versions.



This is the response for the inverted ones:

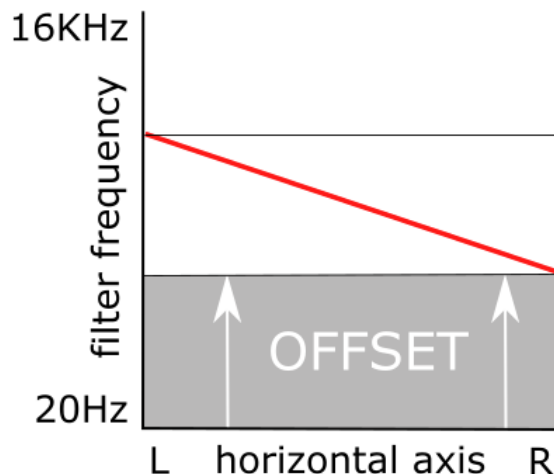
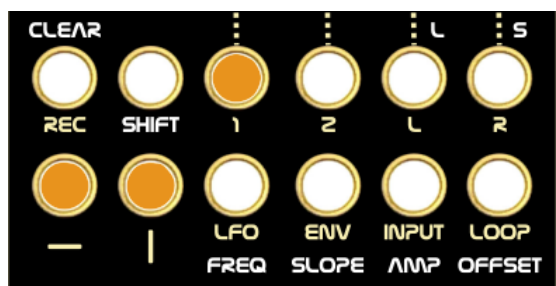


As can be observed in the images both in the normal and inverted settings only the lower part of the parameter will be accessible when set to 66% or 33%. To control another area use the offset, which will raise the minimum accessible values.

It is indicated by the lower row of leds.

Available values for the offset are 0%, 16%, 33%, 50%, 66%, 83% and 100 %.

In this example the mod amount is -33% and offset is 33%.



PRESETS

There are 6 preset slots available to store & recall all settings.

To **load a preset** press SHIFT and L, the L button light will be pulsing.

Click on any of the second row buttons to load a preset.

To **save a preset** press SHIFT and S, the S button light will be pulsing.

Click on any of the second row buttons to save a preset.

DEVICE OPTIONS

The Device Options are persistent settings that will be applied for all settings and presets. To enter the Device Options interface:

- Hold the LOOP button on start up until the init led pattern stops.
- Click on the REC button to set the **Axes mod for selected channels only** on/off.
- Click on the horizontal axis button to save the settings and exit.

At the moment only one option is available:

Axes mod for selected channels only:

This will make any parameter assigned to the horizontal or vertical axes to react to the movement of the joystick only if the channel is selected (it could be multiple channels selected too).

So when selecting a channel with a filter with the cutoff & resonance controlled by the horizontal & vertical axes (for example), moving the joystick will affect these parameters, and when selecting a different channel, these filter parameters will keep their values and now only the newly selected ones will be controlled by the joystick.

This will apply only to the vertical and horizontal axes of the joystick, parameters assigned to the CV inputs will always react to the voltage control, no matter if channels are selected or not.

FIRMWARE UPDATE

To update Stonk's firmware:

- Download the last firmware [here](#).
- Open the [Daisy web programmer](#).
- Connect the Daisy to the Computer (using the USB port on the back of the module)
- Enter the system bootloader by holding the BOOT button down, and then pressing, and releasing the RESET button.
- Click the Connect button at the top of the page.
- Select, "**DFU in FS Mode**"
- Click the Choose File button, and select the Tesseract_Stonk_1.2.bin file.
- Click Program, and wait for the progress bar to finish.
- Now, if the program does not start immediately, pressing RESET on the Daisy will cause the program to start running.

Requirements:

- An up-to-date version of Chrome, at least version 61 or newer

Firmware version history:

- 1.2 : CV2 looper bug fix & [Axes mod for selected channels only](#) device option
- 1.1 : Initial release.

BUILD GUIDE

Joystick	1	https://shop.befaco.org/potentiometers/303-joystick-controller-x1-unit.html
Thonkiconn	12	https://www.thonk.co.uk/shop/thonkiconn/
thonkiconn nuts	12	
Illuminated buttons	12	https://www.thonk.co.uk/shop/low-profile-led-buttons/
female 1x20 header	2	2,54 mm pitch
male 1x20 header	2	2,54 mm pitch
male 2x5 header	1	2,54 mm pitch
Daisy Seed	1	https://www.electro-smith.com/daisy/daisy
metal m3 screws	2	
nylon m3 screws	2	
Hex spacer m3 10mm	2	

In order to make the joystick not return to the center position the springs have to be removed, however, the rubber cover will also pull the joystick to the center so we have to modify it.



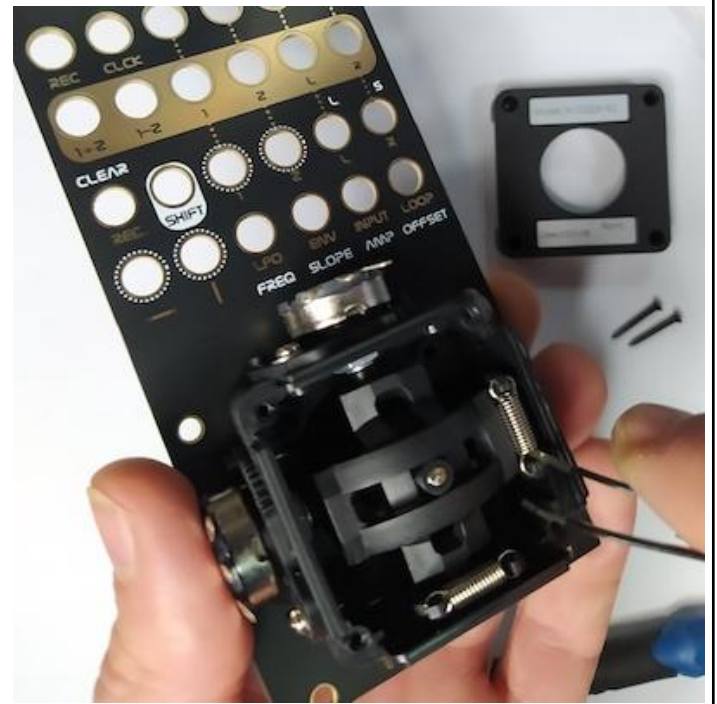
Cut the rubber cover as shown in this pic with a scalpel.



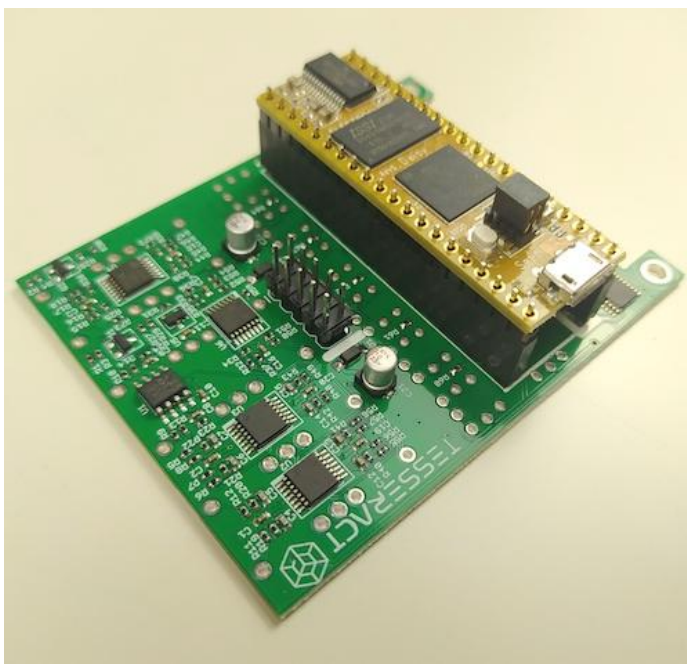
Remove the cover and make a vertical cut to the part remaining at the stick.



Place the joystick -> front panel -> rubber cover -> ring ...and screw everything.



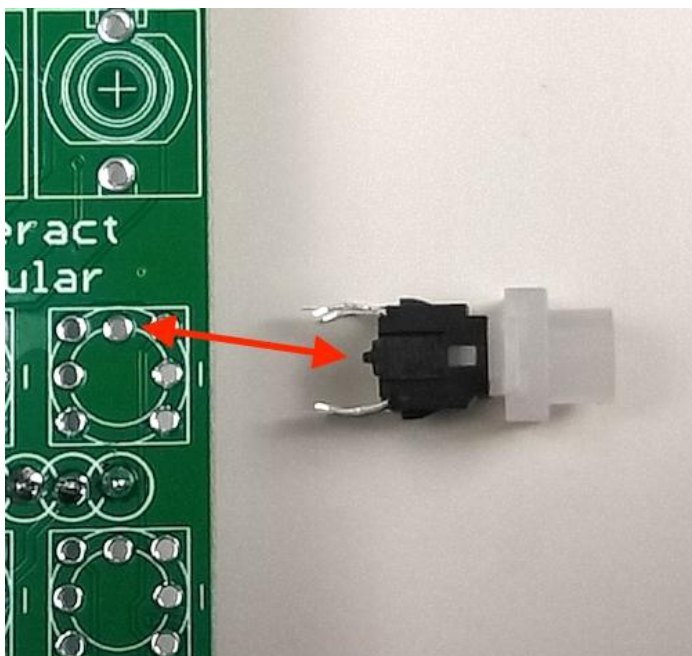
Unscrew the back panel of the joystick so springs can be removed. Once done, screw it again.



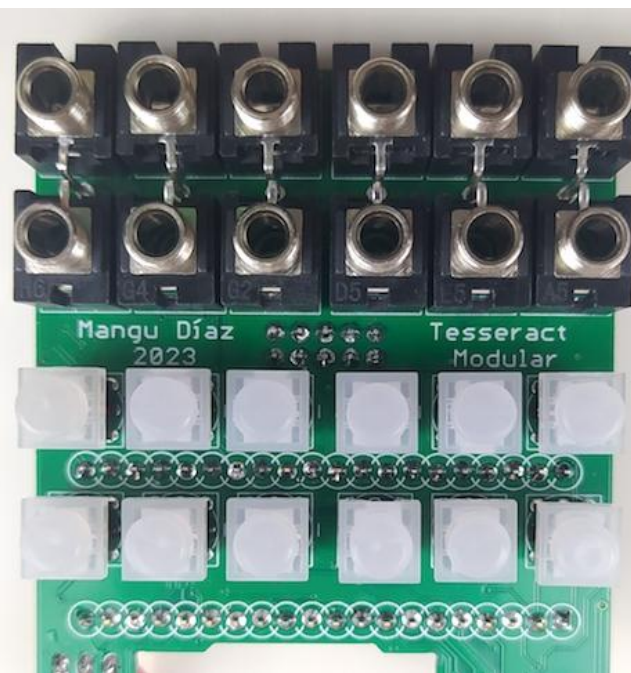
Solder all headers to the PCB (one male 2x5 and two 1x20 female). The two male 1x20 headers can be soldered at this point too, but after the Daisy (yellow board) has to be removed.



Solder the wires that connect the joystick to the PCBA like shown in the image.



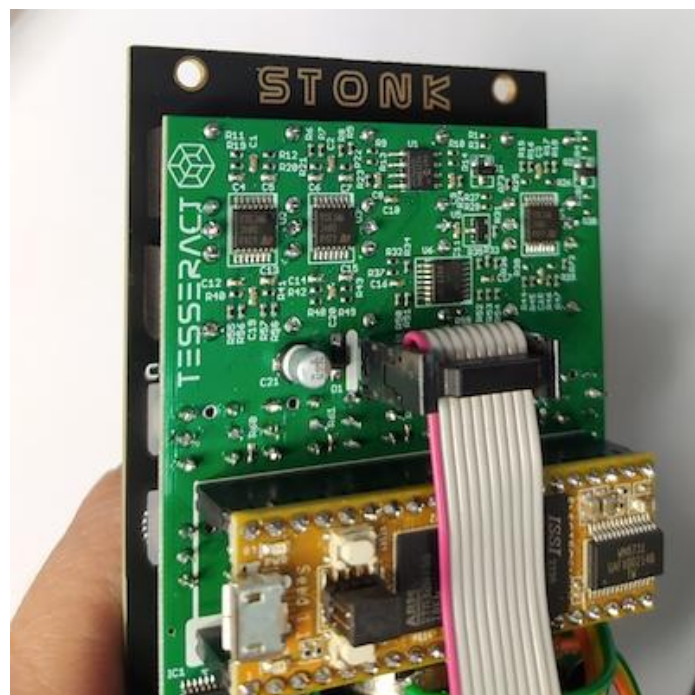
Carefully place the push buttons on the PCB. The orientation is indicated by the 'plastic leg', which goes in the top-center hole. Put special attention so all legs are correctly inserted in their respective holes before applying pressure.



Place the thonkonn jacks, both rows share the hole for the ground pin.
Place also the hex spacers with the nylon screws.



Attach the PCBA to the panel; put all nuts to the jacks and screws on the m3 spacers, also make some pressure on the buttons to check they all 'click' and are correctly inserted **before soldering**.



Place the Daisy (mind the orientation). The power cable has to be with the red stripe facing the white line near the power header.
Done!

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