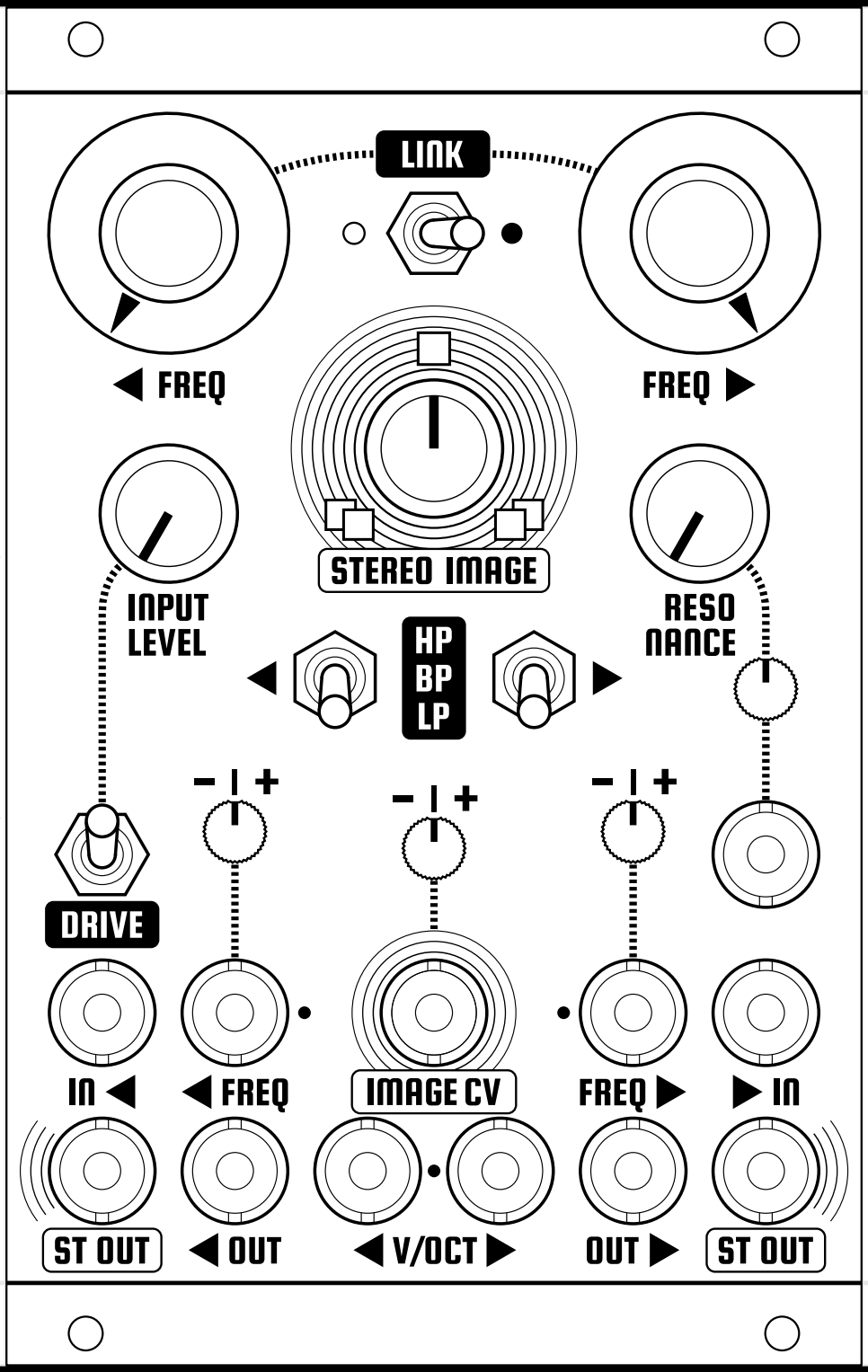
IMÁGENES

Stereo state variable filter



DIY Assembly Manual – rev 2.2

olivella modular

Thank you for purchasing one of our kits!

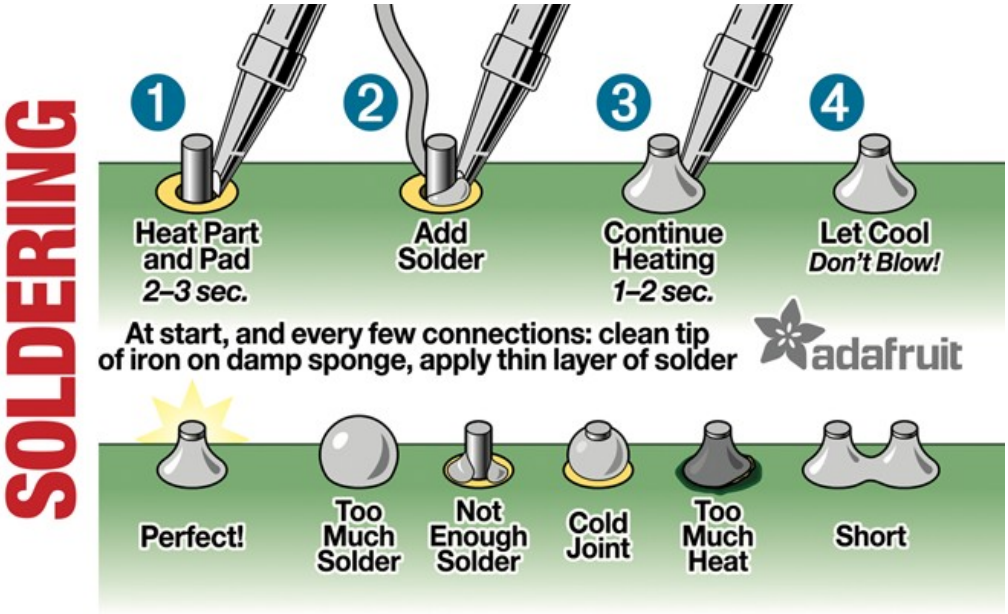
Introduction, things you will need and some tips

IMÁGENES is a pretty straight-forward build. Requiring to solder only through-hole components as it comes with **all SMD components pre-soldered**, with its simple calibration procedure (V/Oct response only) this qualifies as a **basic-medium difficulty build**.

You'll need the following tools:

- A decent **soldering station** (40W minimum with variable temperature)
- Something to clean the soldering iron's tip (**brass wool or wet sponge**)
- Solder (we recommend **fine 0.5mm solder**, it makes it a lot easier)
- A **multimeter** to double-check component values if necessary
- A **small side cutter** for trimming excess component leads after soldering
- **Nut drivers** or nose pliers covered with masking tape (to avoid damaging the panel)
- The PJ-3410 jack's nut driver is not made anymore. You can **modify a Befaco Bananut driver by filing its little protruding tabs a bit**, or go the hardcore way and use scissors (at your own risk but feel free to come up with your own method, it's DIY after all)
- A **medium Philips screwdriver** for the standoff's M3 screws
- A **tiny flat-head screwdriver** for V/Oct calibration
- A **tuner** for V/Oct calibration (any will do, hardware or software)
- **Lots of patience**

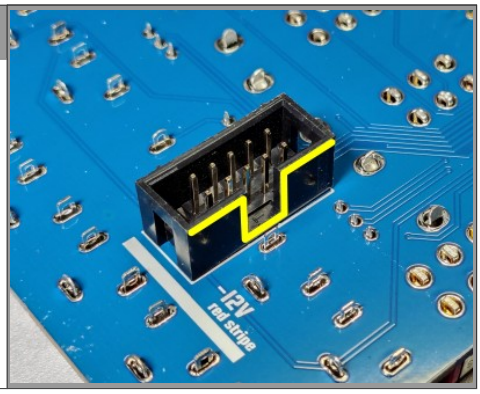
If you're new to soldering, check out Dave Jones (**EEVblog on YouTube**), he has AMAZING soldering tutorials. Just search for "eevblog soldering tutorial" and you're set.



MAIN BOARD

FILM CAPACITORS			
Qty.	**Value**	**Code, color, type**	**Designator on PCB**
4	100pF WIMA	Red, film box	C2, C4, C7, C9

CONTROL BOARD

POWER HEADER	
Orientation is vital. Make sure that the notch on the power header (yellow line in the picture) aligns with the PCB silkscreen.	

CONNECTING THE PCBS

Attach the metal spacer to the CONTROL BOARD with a screwdriver (just enough force, don't overdo it). Make sure that the screw sits on the component side (front) and the main body of the spacer is on the back side.

SPACER AND SCREWS	
Qty.	**Name – Size**
1	11mm hex spacer
2	M3 x 4mm screws

Cut the female and male header strips to the following sizes and then plug them together.

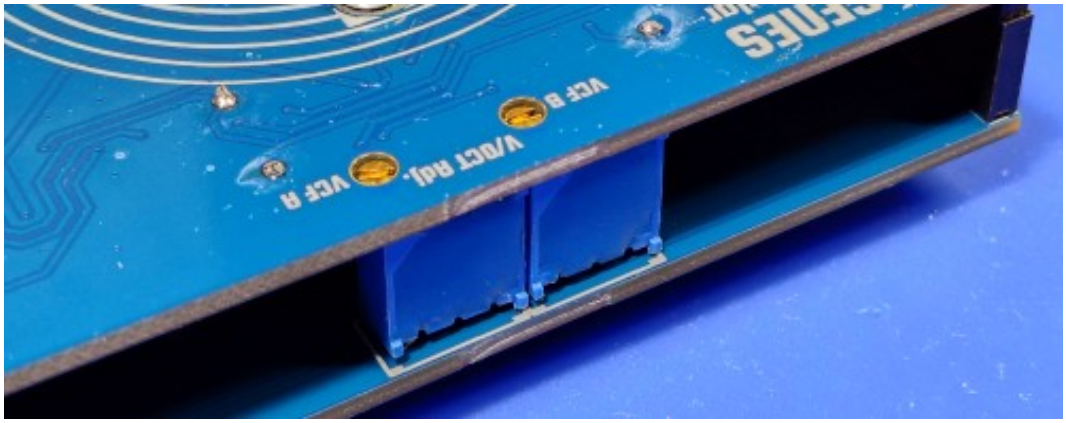
PIN HEADERS	
Qty.	**Name – Size**
2	1 x 20-pin female header
2	1 x 20-pin male header

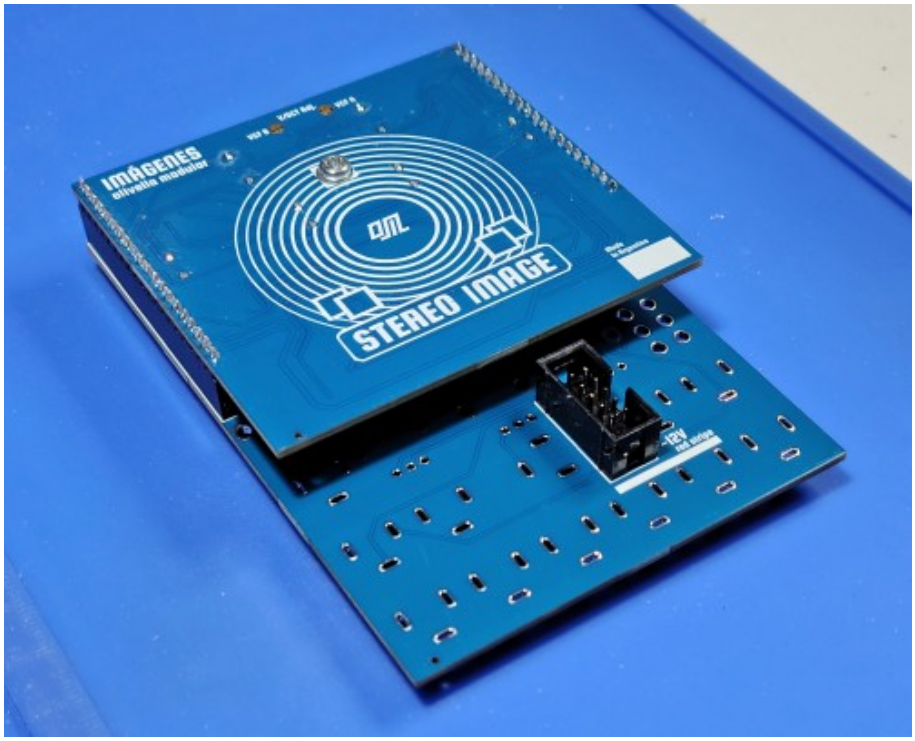
3296-type TRIMPOTS		
Qty.	**Name – Value**	**Designator on PCB**
2	100 Ω (101)	TR1, TR2 (V/OCT Adj.)

Place the Control Board with the spacer facing up. Then, **place (but not solder yet) the pin headers AND the trimpots** in their respective positions.

Now place the Main Board on top (with its back facing up), wiggling the headers and the trimpot shafts a bit until all emerge through the PCB. Secure it with the remaining screw (again, using just enough force) and proceed to solder all pins in both boards.

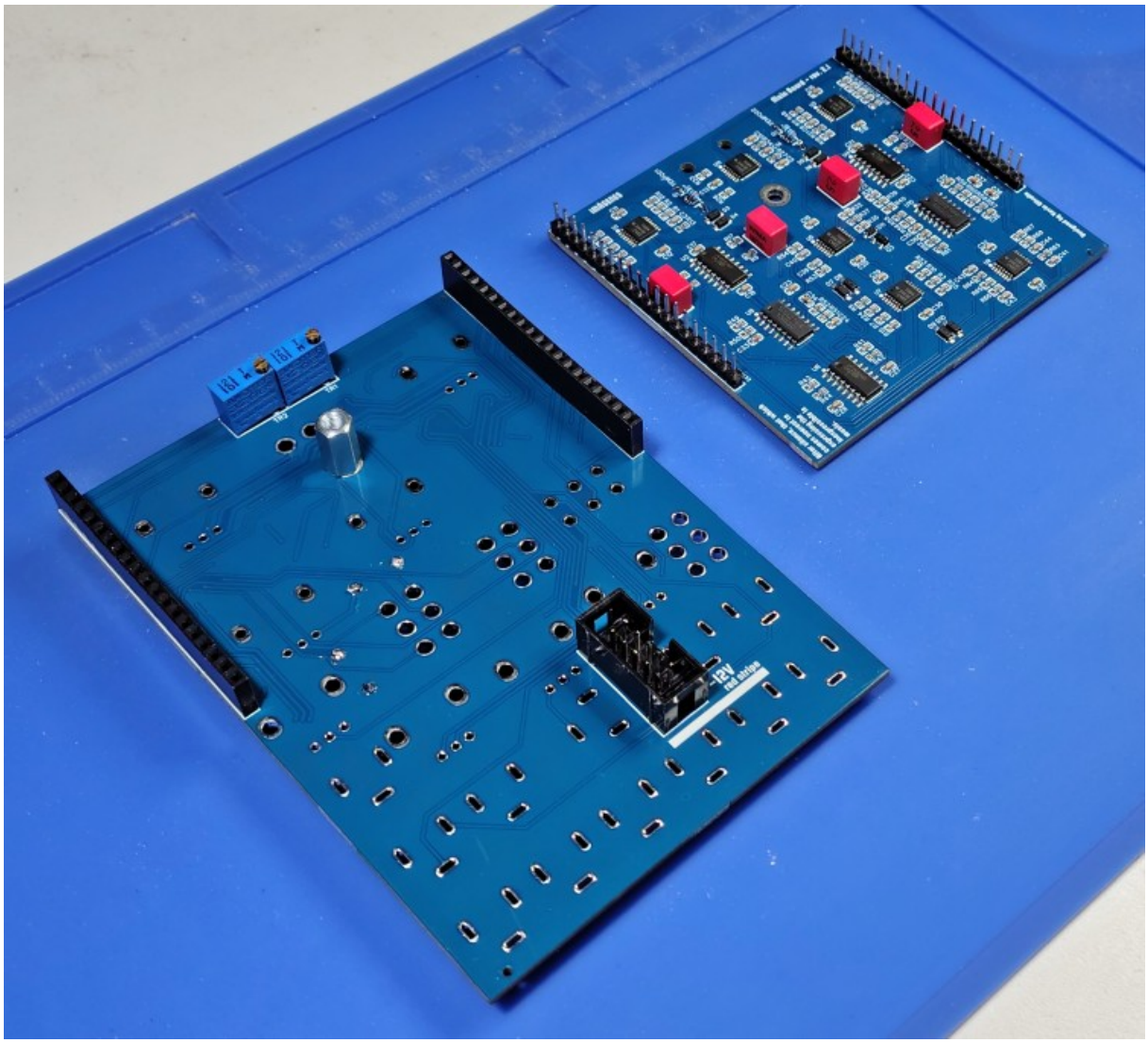
Note: when turning the PCB sandwich around to solder the trimpots, **make sure that their adjustment shafts are still emerging from the back** of the Main Board as shown:





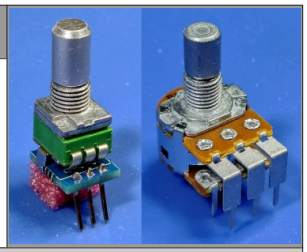
This method will ensure perfect header and trimpot alignment, helping to avoid solder-joint stress that may cause problems in the future.

After soldering the headers and trimpots, unscrew and carefully unplug the MAIN BOARD, **leaving the spacer attached to the CONTROL BOARD**.



HARDWARE AND FRONT PANEL

This part of the build is critical. Please read the following instructions carefully.
Don't solder anything until all of the following components are placed on the Control Board AND securely attached to the front panel.

METAL-SHAFT POTENTIOMETERS	
Insert all five metal-shaft pots in their positions on the PCB.	

Qty.	Name – Value	Designator on PCB
4	Alpha 9mm – B100K + adapter	Freq L 100kB, Freq R 100kB, Stereo Image 100kB, Resonance 100kB
1	Alpha 16mm – B100K stereo	IN LEVEL 100kB Stereo

TRIMMER POTENTIOMETERS

Push them into their positions (marked TRIMMER POT), checking that they're sitting flush with the PCB.

Qty.	Name – Value	Designator on PCB
4	SongHuei 9mm – B100K	TRIMMER POT

TOGGLE SWITCHES

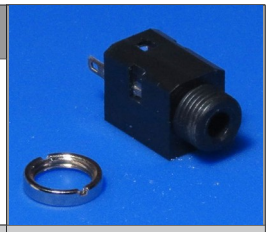
Unscrew one hex nut from all four switches and leave the remaining ones on them. After removing, **don't mix them up!** They look similar but the threadings are not the same.

These will later be used to attach the switches to the front panel while the nuts left put will push from the back of the panel, achieving a counter force and therefore reducing unwanted switch movement.

Make sure to push them all the way into the PCB.

Qty.	Type	Designator on PCB
2	ON-ON-ON (DPDT, 6-pin, three positions)	VCF_A, VCF_B (ON-ON-ON)
1	ON-ON (DPDT, 6-pin, two positions)	DRIVE (ON-ON)
1	ON-ON (SPDT, 3-pin, two positions)	LINK (ON-ON)

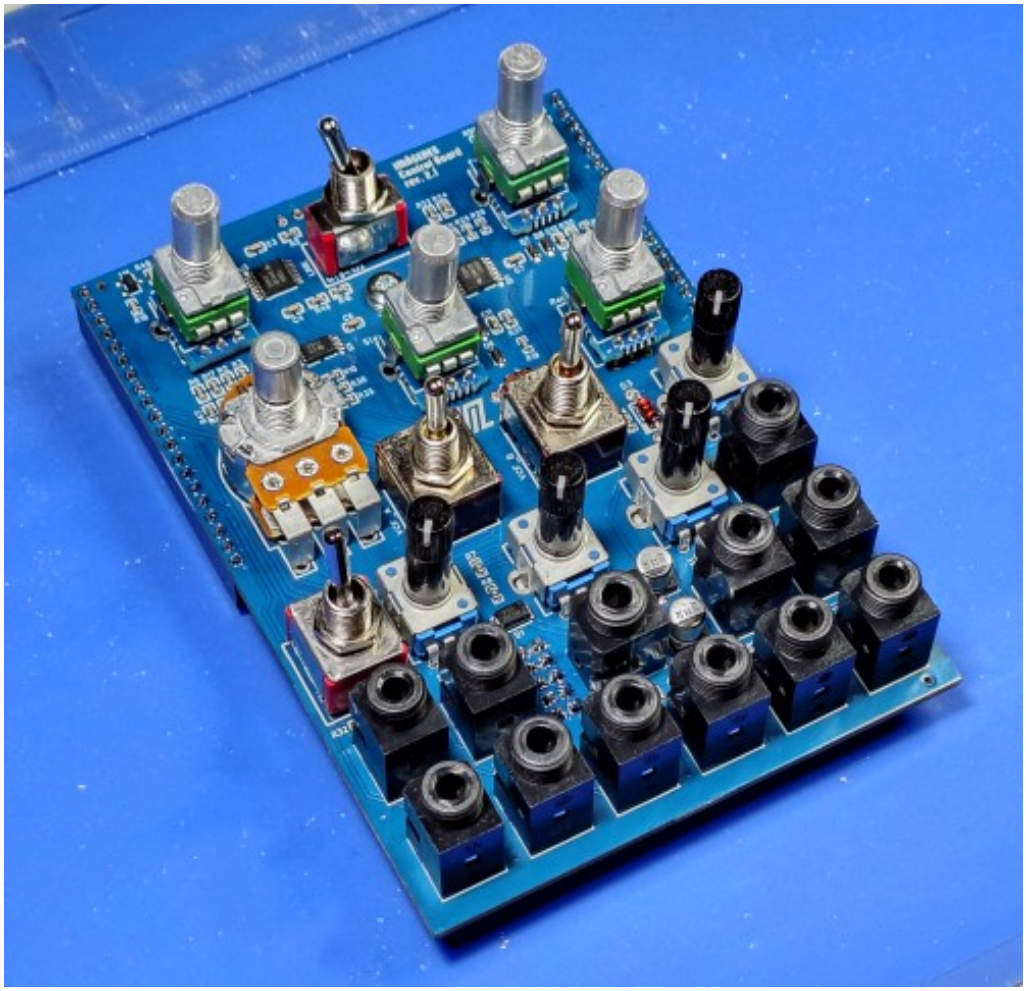
JACKS



Put them in position, checking that they're sitting flush with the PCB.

Qty.	Name – Type	Designator on PCB
12	PJ3410 - 3.5mm mini-jack	J1 to J12

Before placing in the front panel and soldering, the Control Board should look something like this (remember to leave the spacer attached!):

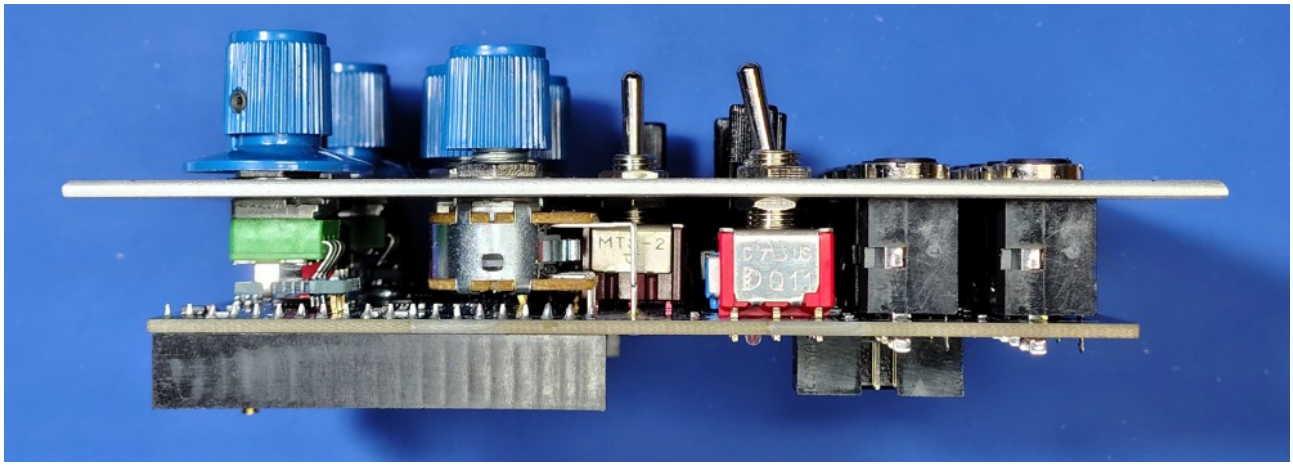


FRONT PANEL
Place the front panel and **adjust the loose components from the top until they all come through,** verifying that the **front panel sits parallel to the Control Board.** Then, attach the panel parts in this order: potentiometer nuts and washers, switches nuts (barely touching the panel) and finally the jacks' nuts. With some tweezers or other similarly thin tool, **start unscrewing the nuts that were left on the switches until they touch the front panel from behind, and then fully screw the switches' nuts from the front.** After this, check that the switches are still sitting flush with the PCB. Finally, make sure that the **trimmer potentiometers are centered and not touching the front panel** when rotated. Now you can finally solder everything in place! Be careful when soldering close to the headers.

Qty.	Name
1	2mm anodized aluminium front panel

KNOBS	
As the pot shafts are a bit short, **raise the knobs by 1-2 mm before tightening them up** to avoid clamping onto the potentiometer's thread and to prevent friction against the panel.	
Qty.	**Name**
2	Rogan RB knob – Small skirt – Blue
3	Rogan RB knob – Small – Blue
1	Allen key – Small

The finished Control Board and the front panel, from the side:



And from the top:

Now **plug in and screw the two PCBs together.** Again, make sure that the trimpots' shafts come through the back of the Main Board.

CALIBRATION

On this last step, we'll calibrate the **V/OCT tracking response** of the filters. When properly calibrated, IMÁGENES can track across a 5 octave range, so we'll be aiming for that.
You'll need some kind of **sequencer or keyboard** that can output control voltages in the 1V/OCT pitch standard.

First of all, turn your system on and let the module warm up for at least 10 minutes.
Make sure that the **LINK** switch is off (left position), that both filters are in **BP** mode (center position) and that the **RESONANCE** knob is fully CW, making the filters self-oscillate.

We'll calibrate the left filter (**VCF A**) first. Plug your sequencer/keyboard to the ◀ **V/OCT** input and connect the ◀ **OUT** to your tuner or audio interface/DAW.
Tune the filter to a base pitch with the ◀ **FREQ** knob, ideally in the low range (A2 = 110Hz for example). Then, play/program a sequence of five notes spanning 5 separate octaves (C0 to C4 for example).

Start adjusting the **VCF A trimmer** until all five notes are (and sound) as close as possible to being an octave apart from each other; that is, hitting exactly the same note on the tuner on every step of the sequence.
You may see that the initial note that you tuned the filter to changes while adjusting the trimmer; this is not a problem, you can stop playing/sequencing and retune it for better reference if needed.
For better tracking, reiterate the process starting again with a lower/higher base pitch until you're satisfied with the overall calibration.

Repeat the procedure for the right filter (**VCF B**).

Congratulations! Enjoy your new IMÁGENES!