

HYPERC + HYPO

DUAL PASSIVE HPF/LPF

BUILD GUIDE

V1 - MAY 2024

HERZLICH

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INTRODUCTION

Thank you for choosing a HYPEROXIA + HYPEROXIA KIT. This guide will help you in your endeavor to successfully build your kit. We recommend you read the build guide before starting to assemble everything in the bags they came in until you are confident about them. Mostly because there are small parts that could be lost forever. Yes, forever. The HYPEROXIA + HYPEROXIA KIT can avoid potential pitfalls by following and familiarizing yourself with it before starting.

SAFETY

Building electronics is a fun and rewarding hobby. However, some procedures while cooking, so should you practice safety in your workshop. Below are some recommendations on how to stay safe.

- **Your soldering iron is dangerously hot.** When using a soldering iron, make sure it is on a heat-resistant surface where it will not fall or roll away, and when not in use, place it in a safe place and making it fall on something, or yourself.
- **Be mindful of toxic chemicals and fumes.** When using solder, working in a well-ventilated area to dissipate fumes. When using solder, be sure to wash your hands after soldering and clean your work area.
- **Wear adequate eye-protection.** A good pair of safety glasses, with side vision, will be comfortable to wear for extended periods of time. More than €9 and will, most importantly, protect your eyes. When using a soldering iron and trimmed leads can turn into projectiles and cause serious damage to your eyes. Make it a habit to wear safety glasses.

You are responsible for your own safety while working. While working, you decided squinting your eyes while trimming LED strips. If you wear a pair of safety glasses and end up in the emergency room, you are responsible. If you take precautions, you can look forward to practicing your hobby safely.

EQUIPMENT

You will need some basic hand tools and, ideally, successfully complete this project. If you need to task, I recommend buying the best quality tools you can afford in the long run, and you will not have to continuously upgrade as your needs prove insufficient.

I have added some tool suggestions in parentheses. I have no particular interest in recommending one tool over another, but I know that if they will be happy to use for years to come. You may find some of the following tools useful:

- A temperature-controlled soldering iron
- Needle-nosed pliers (Engineer PS-01)
- Low-profile side cutter (Knipex 78 71 125 B)
- Good quality lead-free solder
- Safety glasses (Bollé Silpsi)
- Cyanoacrylate glue

The following tools are not strictly necessary, but they may be useful:

- Knurled nut driver (~~Xicon 382-0006~~ **Herzlic**)
- Socket wrenches (Bahco SL25)
- A decent multimeter
- Anti-static tweezers
- Reverse ceramic tweezers
- Solder braid and liquid flux
- Desoldering pump (Engineer SS-02)

These tools will all prove useful in countless other projects. If you have any of the tools above, try reaching out to friends or colleagues who may be happy to lend you the tools. Alternatively, you can buy them if you need, especially if you think you will build more projects in the future.

**The Xicon driver was discontinued, but fortunately, several alternatives exist, including one I designed myself.*

DESIGN NOTES

Ever needed to cut some low end before passing to a mixer, or tame the highs on a hissy digital oscillator, or make a filter to filter your drums before they hit the mix?

That all sounds great, except your super high end is not every-parameter, 28hp, multi-pole-output, styrofoam, currently occupied sweeping a square wave instead of a sine wave where you can't free up a filter to do some basic filtering. It isn't enough "rackspace" or "money" to buy a new rack for these purposes.

Having designed 0hp "utility" filters in the past (and well these struggles, and sought to solve them, but the finger-unfriendly designs demanded a touch-up. I was not but also not quite prepared to force it upon the users. It was effectively 1U, but easily converted to 0hp for those with rackspace).

The lovely thing about the Hyperoxia + Hypoxia filter is that it has independent filters – a HPF and a LPF – or, through a single switch. Simply plug your signal into the HPF input and out of the LPF happens, and you now have a wonderful passive filter.

Anyway, enough chit-chat, warm up the soldering iron.

BOM

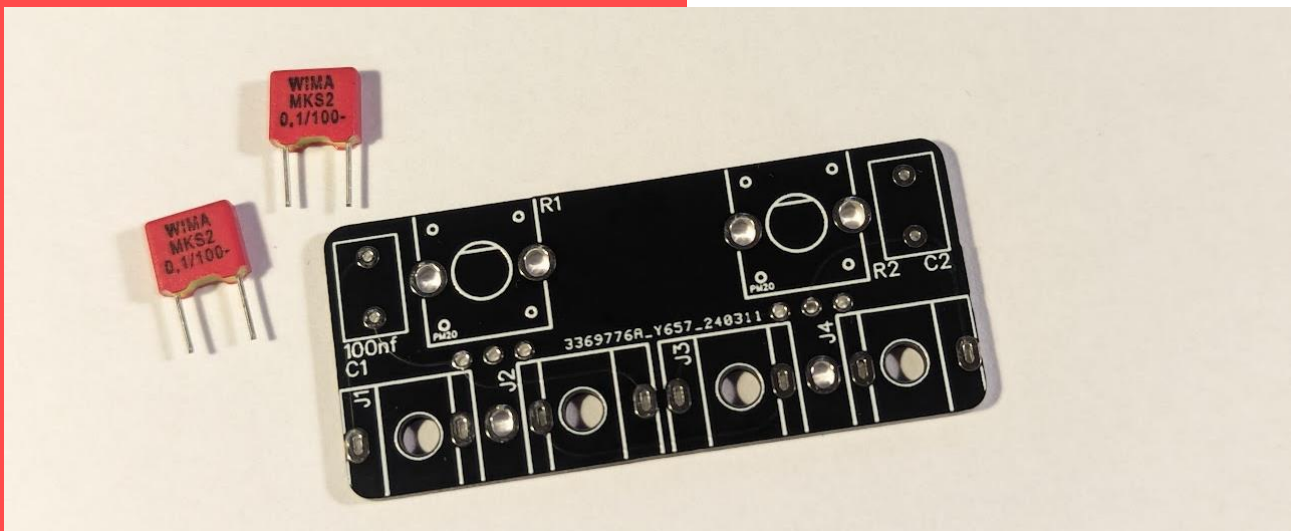
Component	Qty
50kA pot	2
3,5mm jack	4
0,1uF film capacitor (WIMA)	2
M3 brass bolt	2
M3 brass insert	2

BUILD GUIDE

Let's build – don't worry, it's not difficult at all, I promise. I will warn you about pitfalls to come, but it's not a difficult project. I will guide briefly before beginning, so you are familiar with the components.

STEP 1: Populating the PCB

It is good practice to always populate your circuit with passive components first. In this case, the lowest clearance components are the capacitors, right in on the side of the board with the silkscreened rectangular outline of the capacitors.



By bending the leads slightly once inserted, you can ensure a good solder joint and solder the legs in place easily. Once they are in place, check that the capacitors are nice and flush against the board. If something isn't flush reheat the solder joint and push the capacitor against the board as you let the joint cool. This project is a DIY, so keep it in mind as you go!



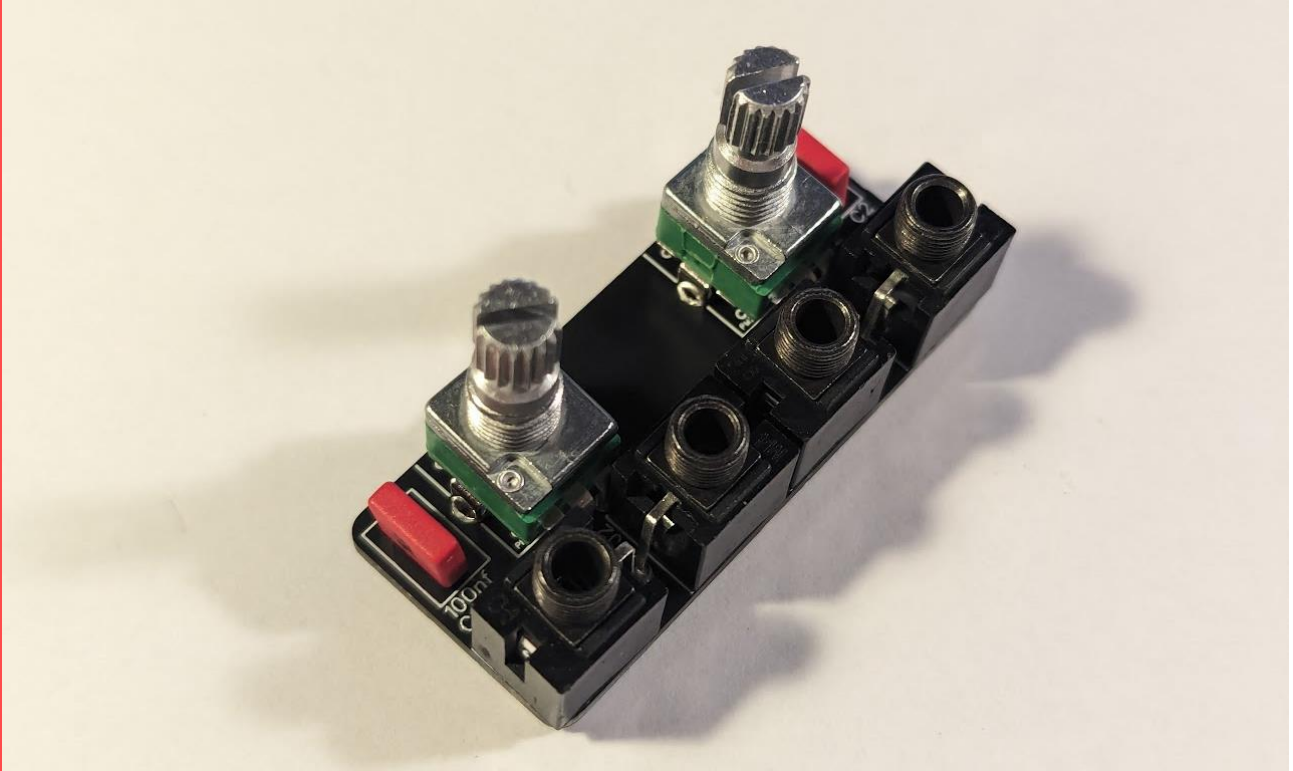
Next, install the 3,5mm jacks. Pay close attention they share ground pins (the exposed pin) in pairs like this before soldering, because it's going to be You have been warned.

When soldering the jacks, it is good practice to so turning over the board and checking that everything to solder the rest of the pins, otherwise, use the t right.



Finally, insert the potentiometers – you may have to wiggle them a bit to get them in, so, and it may take a bit of pressure to go in, although it should be a snug fit. Make sure that everything is inserted correctly before proceeding.

With that, you are done soldering, and can pat yourself on the back.



STEP 2: Mechanical assembly

As you may have noticed, this device is capable of operating as a 0hp in-line unit. To keep the device a 1U unit

Assembly is fortunately both simple and straightforward. Simply place the module over the components – if you have assembled the components correctly. Now, slip the knurled nuts over the jacks and tighten them. Tighten one before tightening the rest – it is better to tighten



As for the potentiometers, there are nuts included that you can install them if this is an exercise you think you want to do. The front panel is already very securely connected to the PCB.

Finally, press the knobs over the potentiometers. Before you align the knob at the 0% or 100% position, make sure to turn it either fully CW or CCW before you do. It is normal for the knob to be a bit loose, but if you need to use a huge amount of force to reseat it to get a better fit.

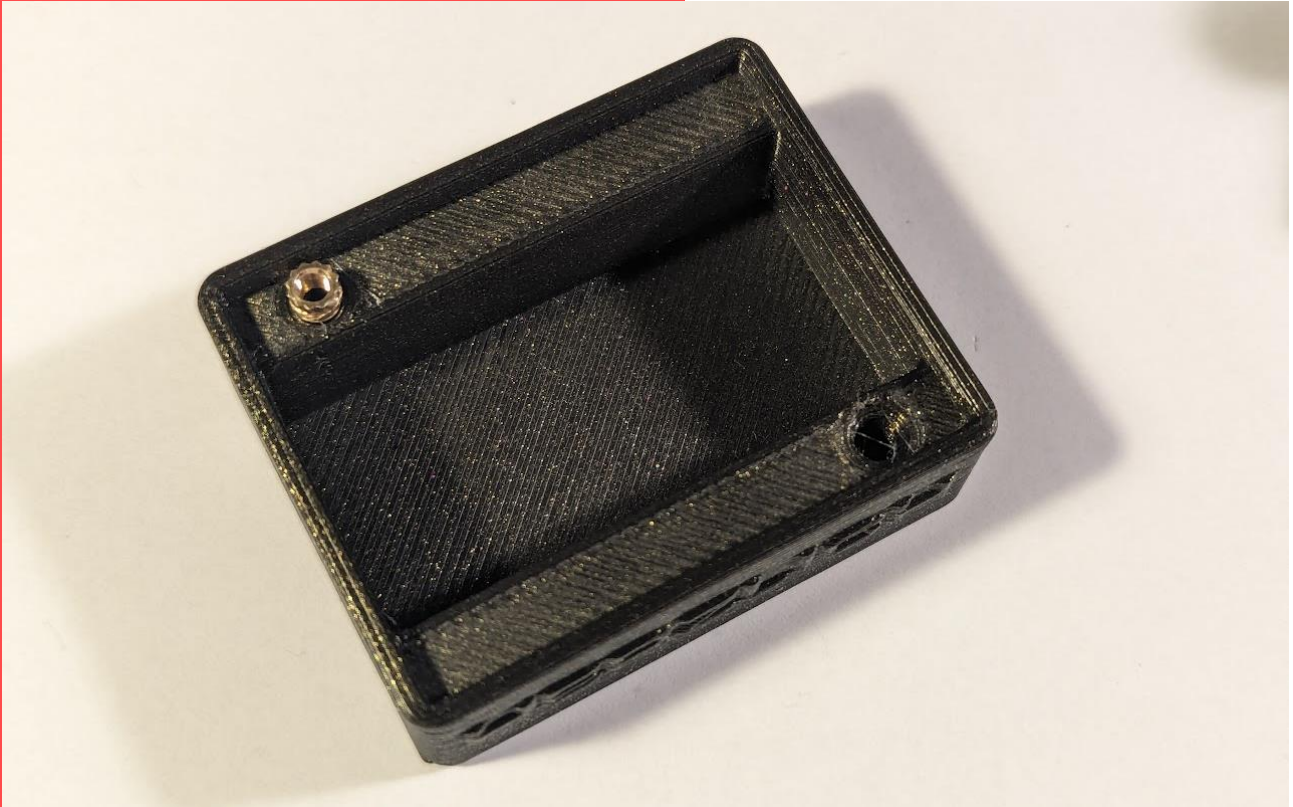


To test the device, simply patch in a harmonically rich signal to either the HPF or LPF input, and listen to either the HPF or LPF output. If something is not working as expected, try reflowing the components.

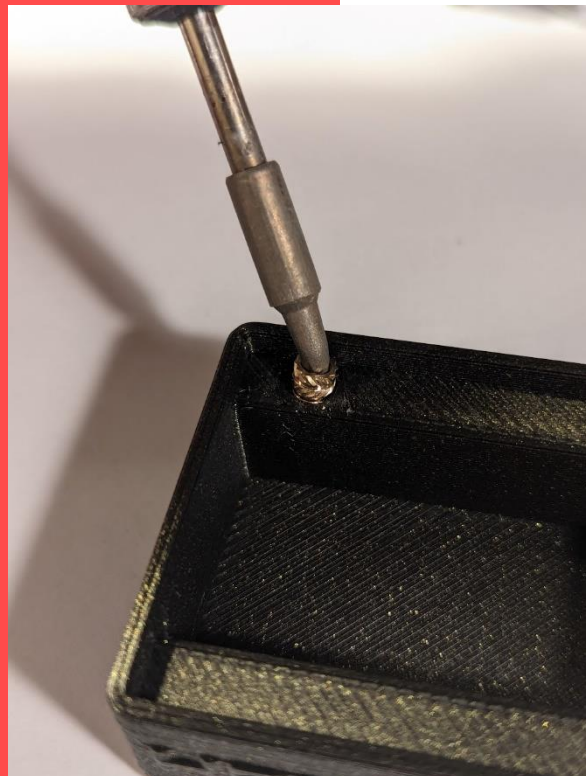
The device is now ready to use in 1U format. Congratulations!

STEP 3: Ohp assembly

Not content with using your 1U rail? Maybe you'd like to have this thing Ohp right away. Take the 3D printed enclosure and the knurled brass inserts. Like a weird magic trick, you can snap them into the holes in the enclosure.

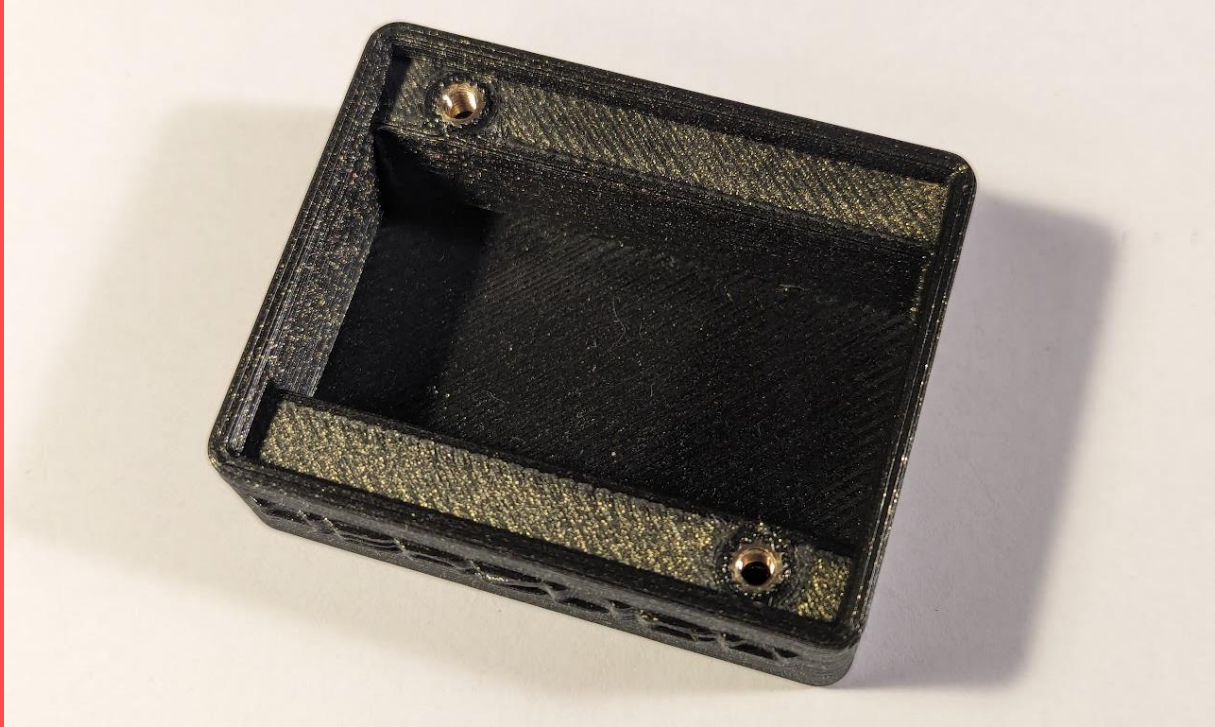


Using a hammer may seem tempting, but you have your soldering iron. Place one of the nuts over the hole. Now, heat your soldering iron to the tip to gently press the insert into the plastic.



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The heat from your soldering iron will disperse in the plastic. Do *not* use more than a slight amount of heat, merely guiding the nut into the hole, not pressing down on the surface, give your iron a little twist and release the nut should stay in place as the plastic hardens around it.



Repeat this process for both inserts, and finally place the inserts in the enclosure. The inserts will make it easy for the bolts to secure it in place.



SUPPORT

Sometimes things go wrong - that's OK! If you have a problem with your module, and you can't seem to get yourself out of it, please email lb@herzlich.technology for assistance. Please send me your PCBs to help me investigate and identify the problem.

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