



[PREVIEW]

step by step

**The ultimate guide to build
an authentic tube opto
compressor**



attention | disclaimer

this project is presented as artwork, and is solely intended as such.

build at your own risk

although this e-paper can help you to build a (legendary) functioning tube
opto compressor - due to the high voltages and possibilities of human error ,

analogvibes | martin zobel

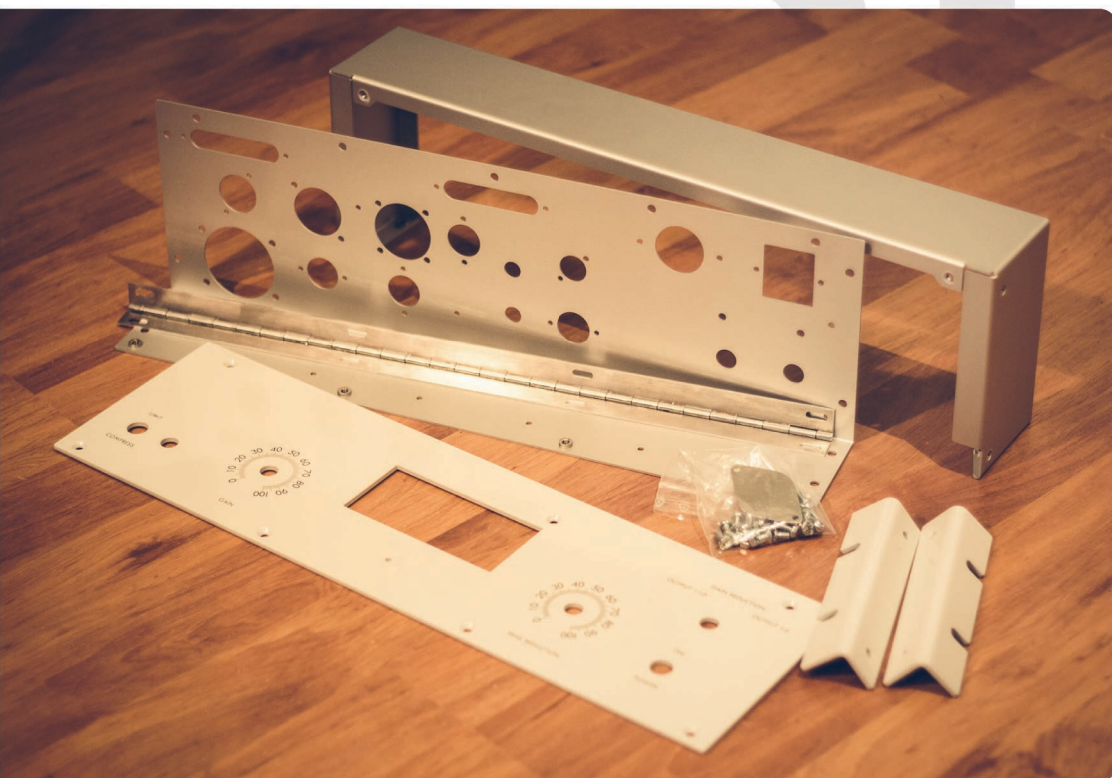
hereby assumes no liability for injury/damage/loss
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this pdf is for information purposes only

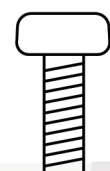
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What's in the box

THE TUBE OPTO COMPRESSOR CHASSIS KIT



M4 x 6
17 pcs.



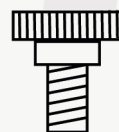
M4 x 10
4 pcs.



M4 x 8
5 pcs.



M4
5 pcs.



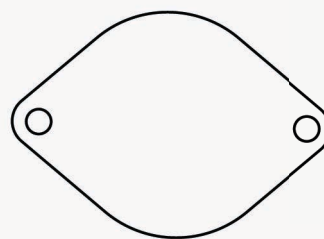
thumbscrew M4 x 8
2 pcs.

Whether you are new to the DIY world or you already have a couple of successful builds in your pocket, using the analogvibes chassis kits - in terms of ease of use and authenticity should take your project to the next level.

This here is all about building a faithful re-creation of a legendary tube opto compressor from back in the days.

If you received your kit alright, all hardware and parts pictured on this page should be part of the package.

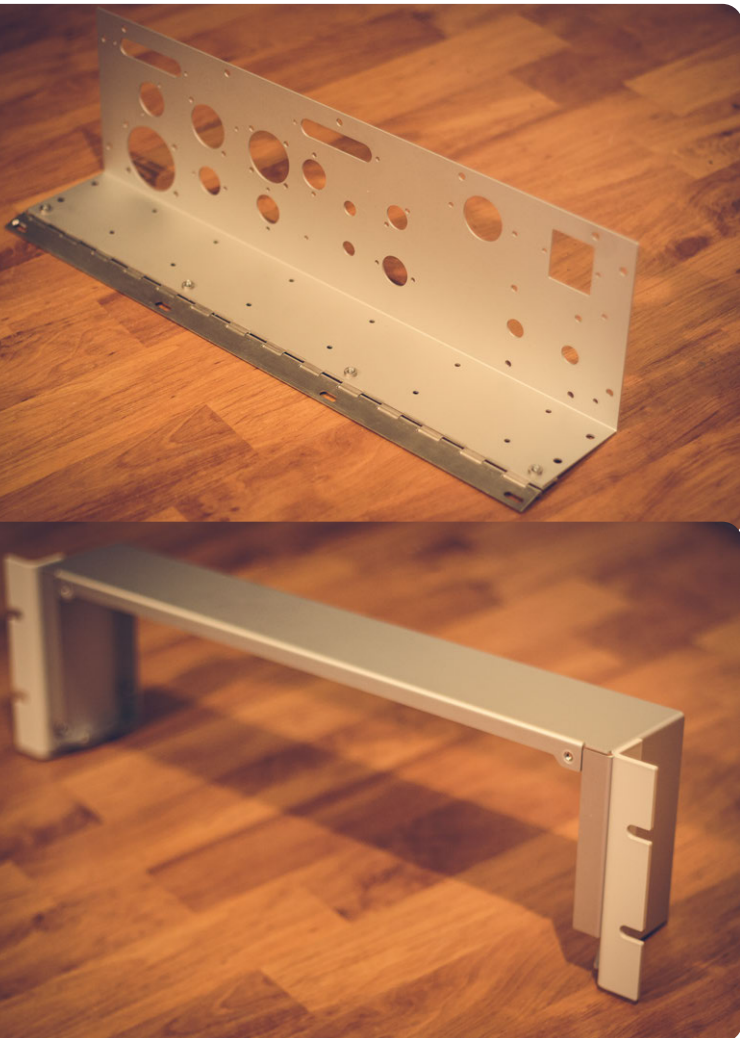
Additional parts included in the kit:



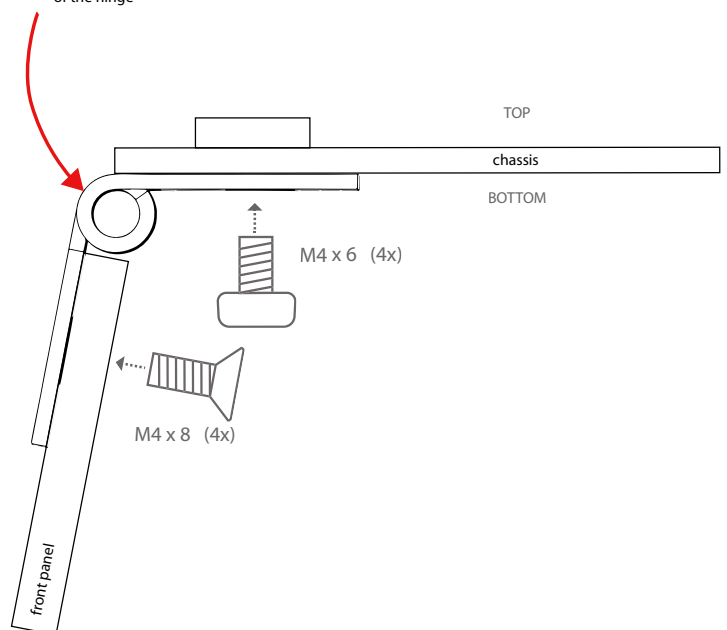
cover plate for can cap cutout
1 pcs.

ASSEMBLING THE KIT

mounting the hinge & ears



check correct orientation
of the hinge



Just to make sure...

...I know from the past everytime I started a new build and had the chassis, front panel & knobs etc. together, the first thing I wanted to see and I was most excited about:

How will this thing look like when finished.

Am I right??

So mostly I put all the major chassis parts together to have the unit right in front of me which often led to getting even more excited. Right?? :D

From this point of perspective I totally feel ya, BUT to be honest we all know it makes no sense to put it all together just to disassemble everything shortly after in order to start the build.

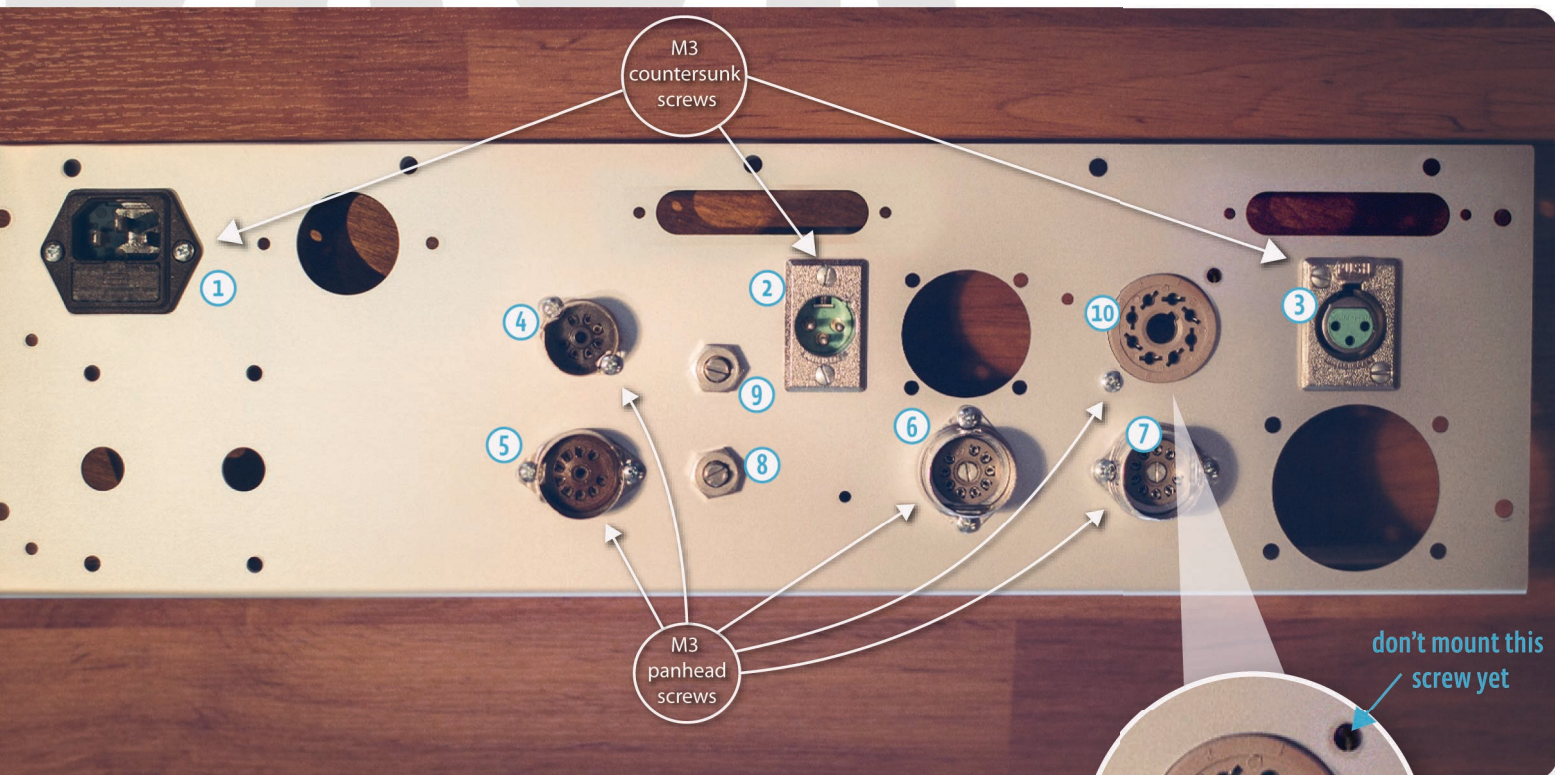
With the tube opto compressor in particular your work will be much easier if you don't assemble the chassis at all.

If you want, you can of course either mount the hinge to the main back chassis or to the front panel but make sure to mount it correctly as shown in the drawing above.

You can also mount the ears to the lid part of the chassis.

MOUNTING THE HARDWARE PART I: BACK PANEL

Mounting the first pieces of hardware, connectors & sockets is not a big deal, but it makes sense to do it all in a certain order. That's why below I not only pictured what goes where, but also in which order:



What else you need

As I'm located in Germany, I live in a metric world. So most screws here are stated as M3 or M4. However, if you live in the States, you might as well use **UNC 4-40 screws & nuts** instead of M3 and **UNC 8-32** instead of M4.

As stated on the previous page all screws to assemble the chassis are included of course - but here's a little list of screws & nuts you'll need to mount all the parts such as tube sockets, connectors, turret boards etc.

The grey number in square brackets is the amount of screws, nuts and washers needed if using vintage UTC transformers. The number in round brackets is the length of the screws in inch.

Additionally, in case you're using vintage iron, make sure you have the correct mounting screws at hand:

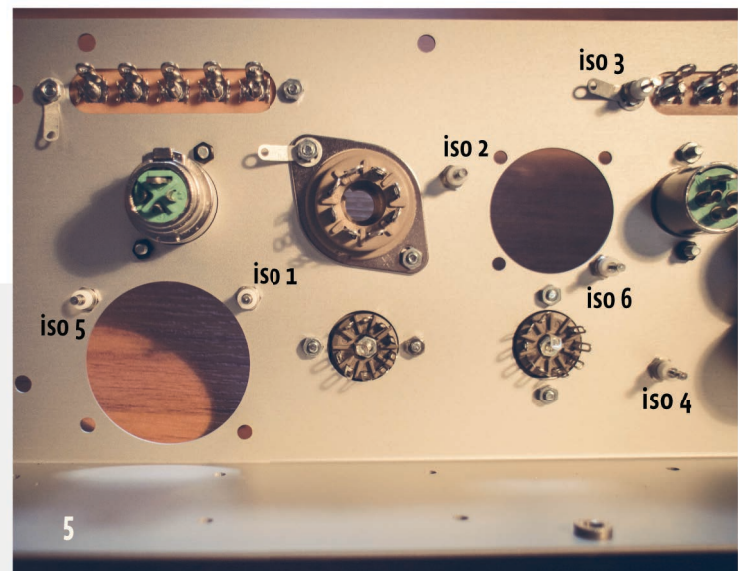
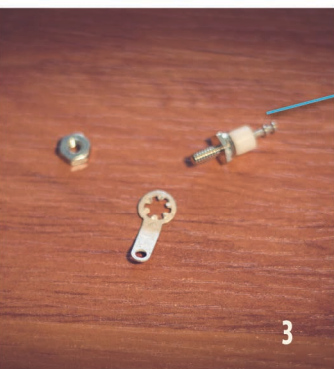
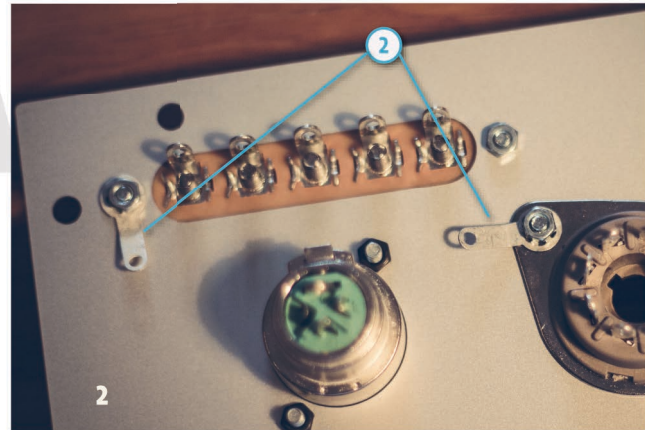
UTC A-10 & A24: 4-40 screws **UTC HA-100x:** 6-32 screws

From your local hardware store:

- 31x [23x] M3 x 8mm panhead screws (5/16")
- 2x M3x 12mm panhead screws (15/32")
- 6x M3 x 6mm countersunk screws (15/64")
- 39x [31x] M3 nuts
- 3x M4 x 10mm panhead screws (25/64")
- 1x M4 x 6mm panhead screw (15/64")
- 3x [7x] lock washers for M4
- 36x [24x] lock washers for M3

MOUNTING THE HARDWARE PART II: TERMINALS

Several terminal strips and individual terminals are spread across the chassis



To ground or not to ground

First we mount both of the 5 position

input and output terminal strips. Viewed from the back, mount them to the chassis using their left mounting hole only. Then flip the panel around to access the inside. As you can see in [pic 2](#) we need to add a solder lug to the second mounting hole of the input terminal before fastening the nut, as well as to the 2nd mounting hole of the T4 socket.

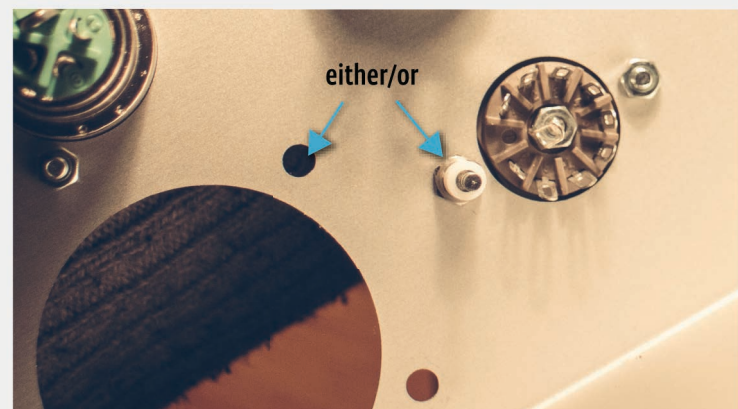
And almost the same goes for the output terminal ([pic 4](#)), but here we not only have to add a solder lug, but also an isolated single turret ([iso 3](#)) as shown in [pic 3](#). These single turrets have a 4-40 thread, so make sure to use one of the 4-40 nuts from the BOM to mount it.

Then we can go on and mount [iso turret 1, 2 & 4](#). Be aware, [iso turrets 5 & 6](#) are only necessary when using Sowter transformers.

And in that case iso turrets no. 1, 5 & 6 will also hold the adapter plates, so you might either mount the adapters now or if you're not sure how, wait with mounting the particular iso turrets until we get to mounting the input transformers.

If you're lucky enough to have some vintage UTC transformers at hand, you can either use [iso turret no. 6](#) to mount the input transformer (be aware if you use the HA-100x input transformer you'll need an iso turret with 6-32 thread as mentioned in the BOM)

Or you can use [iso turret no. 6](#) to mount the V1 tube socket (as pictured on the right)



MOUNTING THE HARDWARE PART III: PSU BOARD

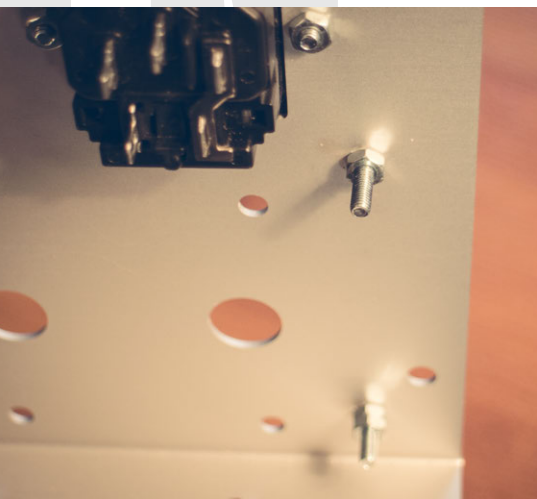
Next to the power transformer there's another mini turret board to connect the PSU primaries

Coming up next we can mount the PSU turret board. This little board allows for wiring up the power transformer primaries for either 120V (US) or 240V (EU).

This way, if your opto compressor should ever be traveling from one region to the other, changing the primaries can be done within a couple of minutes.

Now, if you take a look at that little turret board, you can see that the terminals go through the board, so if we mounted it straight to the chassis, we would connect the mains directly to the chassis which would be kind of not cool...at least when touching the chassis while the unit is connected to the mains...but maybe you like that...uhm...

...anyway let's agree to not short the terminals to the chassis for now :)



So we need to add some spacers here.

The practical reason for this beyond not getting an electric shock everytime you touch the chassis is, we need to raise that turret boards about $\frac{3}{16}$ inch (4.5mm) off the chassis in order for the lid to fit later.

Here's how we do it:

Use 12mm M3 screws (or a $\frac{15}{32}$ 440 screws) and feed them through the mounting holes from the back and fasten them with a nut.

Then add a second nut on top as shown on the left.

Now place the turret board and fasten it with nuts & washers.



**There was still
some space,
so I wrote
something.**

MOUNTING THE HARDWARE PART IV: PSU CAPS

Actually at this point its not about mounting the caps themselves, but what we need, to mount them later on. Now theres two ways how to do it: With modern components, or the way it was done in vintage units...

MODERN

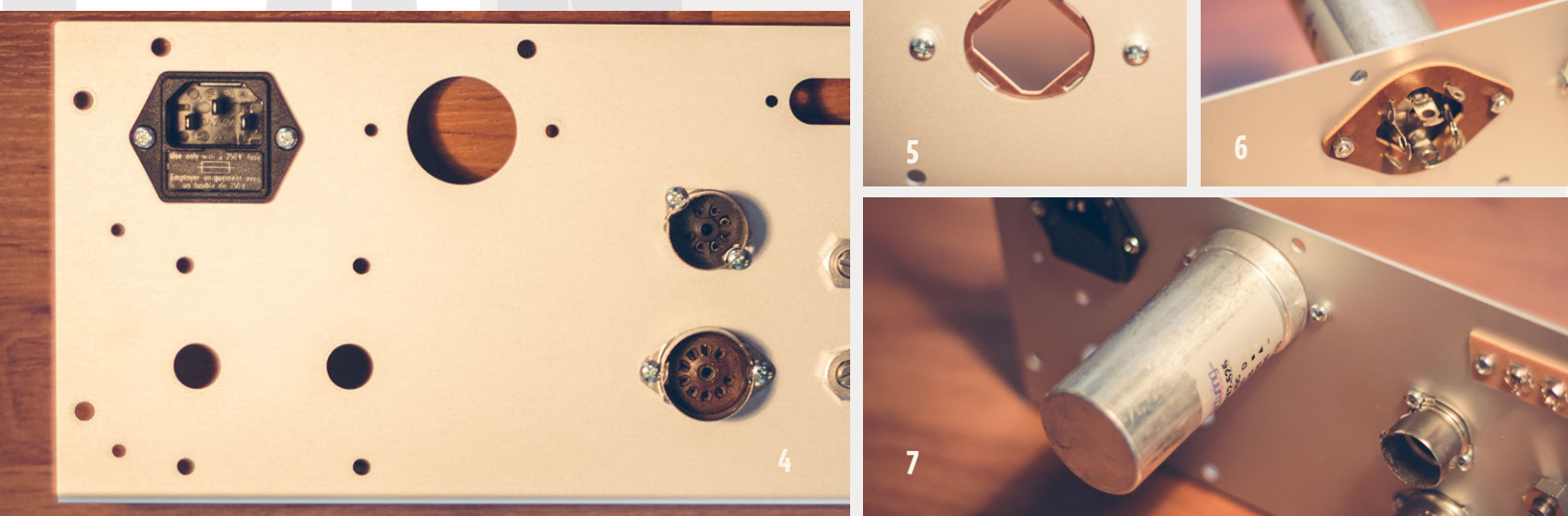


There s several reasons to go the modern route here:

1. Its not affecting the sound. 2. It s much much cheaper without sacrificing build quality and 3. the well known reissues use the same method. **Pic.1 shows what you need here.** The blinding plate will cover the large cutout in the chassis for the can cap and at the same time mounting screws are used to hold the terminal strips we ll use to mount the electrolytic caps later on. Please note it s important to do it in the following order:

1. feed screw through blinding plate and chassis from the back. 2. add washers 3. add terminal strip 4. fasten with nuts.

VINTAGE (optional)

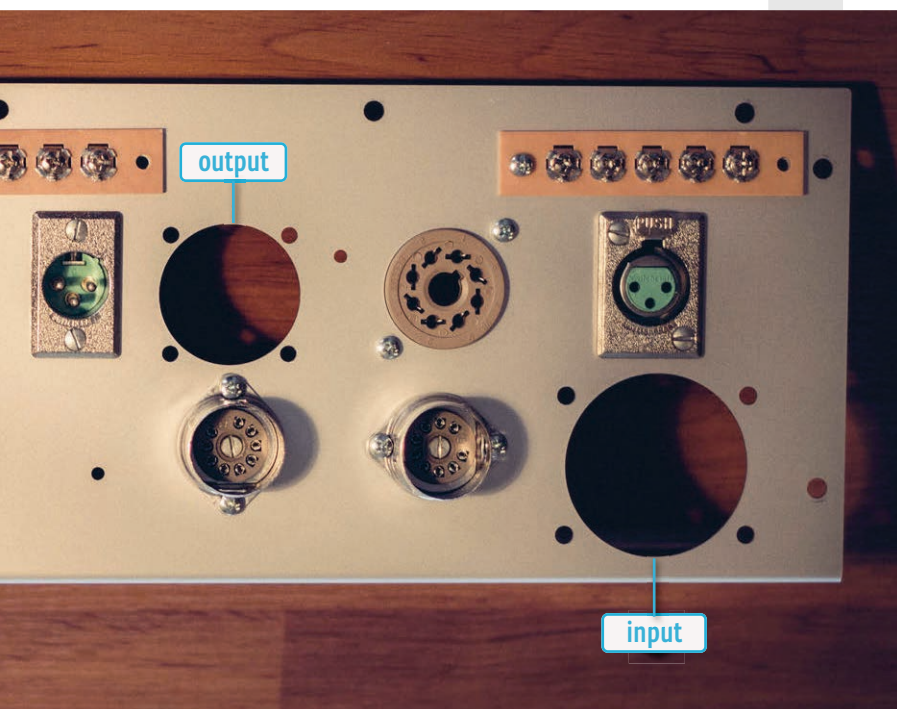


The main reason for using a classic can cap in this spot is **authenticity in terms of looks**. If you go this route, place the mounting plate against the chassis from inside and mount it with two M3 (or 4 40) screws from the back. The pics above show how it looks like with can cap in place.

MOUNTING THE HARDWARE

PART V: TRANSFORMERS

No we can finally mount the audio transformers. On the following pages I'll show you how to mount either vintage iron or modern substitutes...



JUST IN CASE...

you wanna use original UTC transformers for your build, the chassis is designed for the use of the UTC HA100x input and UTC A24 output transformer both used in vintage LA2As.

However as you know, I have adapter plates available for using either the UTC A10 input transformer (also used in many vintage LA2As) or UK made Sowter transformers for both input and output. Sowter makes very high quality substitute transformers for many vintage pieces of gear.

In case you use vintage UTC iron, see the pics on how to mount them.

If you wanna go with the Sowters read more on the next page

This is what the chassis looks like with an original UTC HA 100X input and UTC A24 output transformer in place



Back then when I built my first tube **opto compressor**, vintage UTC iron was not even half the price of what many sellers on eBay etc. ask nowadays, so I did indeed build some units with original iron.

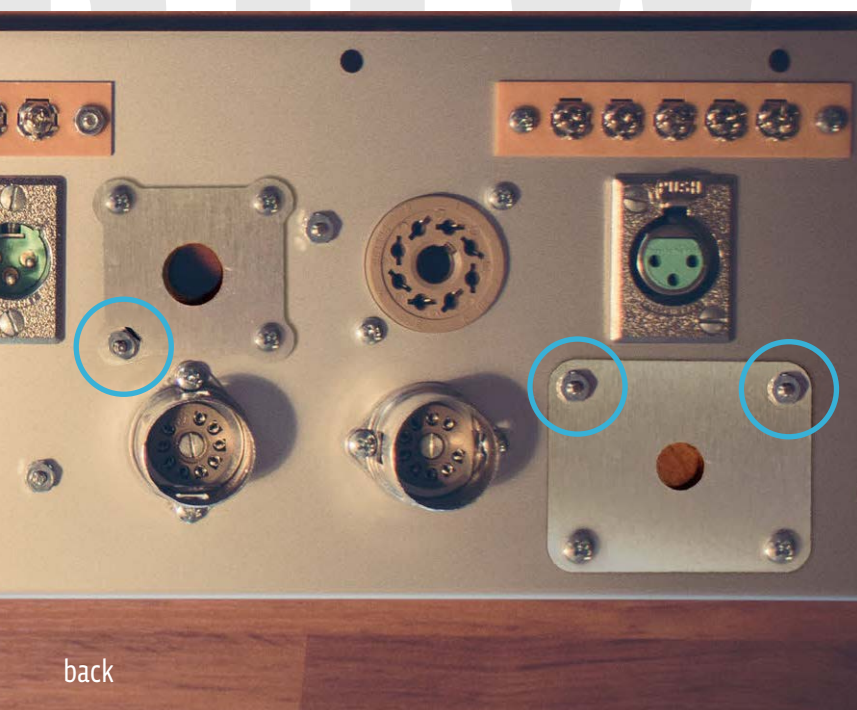
And obviously they do sound great! But the madness that's been going on lately in terms of asking prices is simply ridiculous!

I've seen vintage UTC HA 100X going for more than \$ 600.00 USD!!!

Luckily there's some very good alternatives! And one of the best options in my opinion are Sowter transformers.

They have some specifically designed and built to spec for the LA2A that's the ones we need here :)

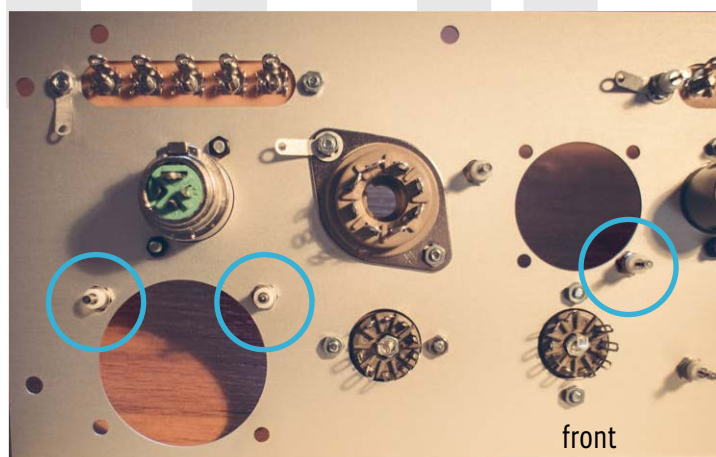
SOWTER TRANSFORMERS



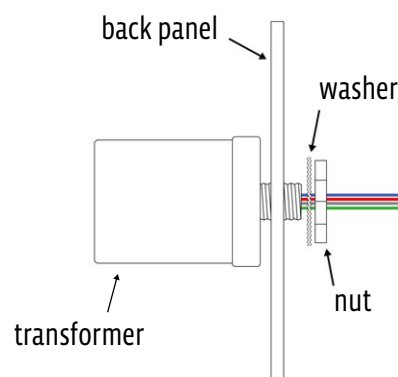
back

Please check the BOM to find out which models you need. Sowter offers them with several mounting options, so it's **important you buy the ones with threaded grommet** mostly referred to as the 'e' version in their catalog.

The pic above shows how to mount the adapter plates. Please be aware the screws in blue circles are some of our iso single turrets mounted from the inside and fastened with a 4 40 nut from the back of the unit.



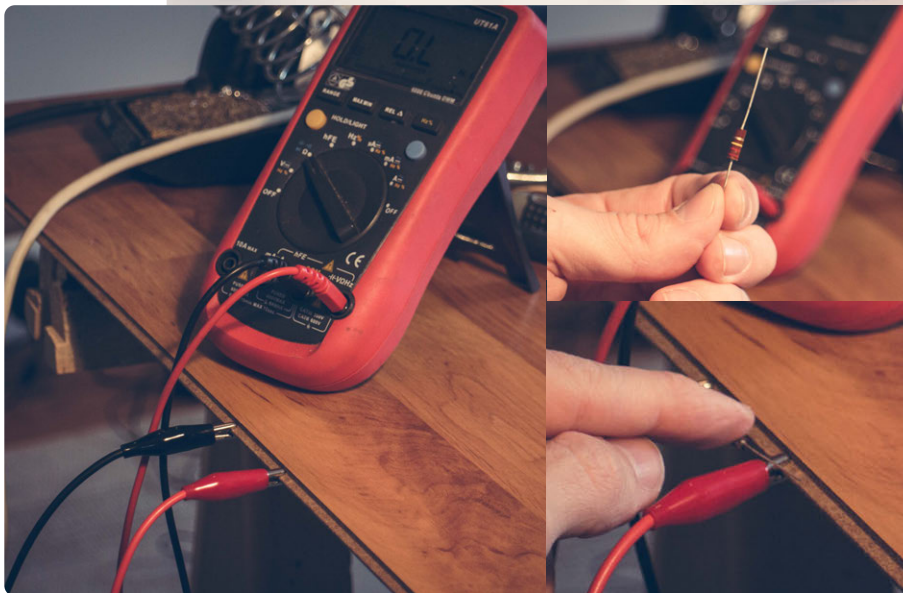
front



The drawing above shows how exactly to mount the transformers.

GETTING READY

Before we finally start soldering the first components here's a what you need:



The image above shows the most important tools you'll need to complete this build. Of course a soldering iron, solder, pliers and a multimeter.

I would always recommend to check every single component you use with the multimeter (DMM) to make sure it's actually OK and it's the correct value. It can happen the supplier you got the parts from mislabeled the bag e.g. the resistors are marked as 47K ohm when they are actually 47 ohm.

It doesn't happen a lot, but if you install a wrong value component and the unit doesn't work in the end or behaves strangely troubleshooting and hunting for a possibly wrong component can be a huge PITA. Check the pics on the upper right how you can set up your DMM to quickly check components for P2P builds:

Most DMMs include an adapter to check components, but it involves bending the leads which is not necessarily desired for P2P builds.

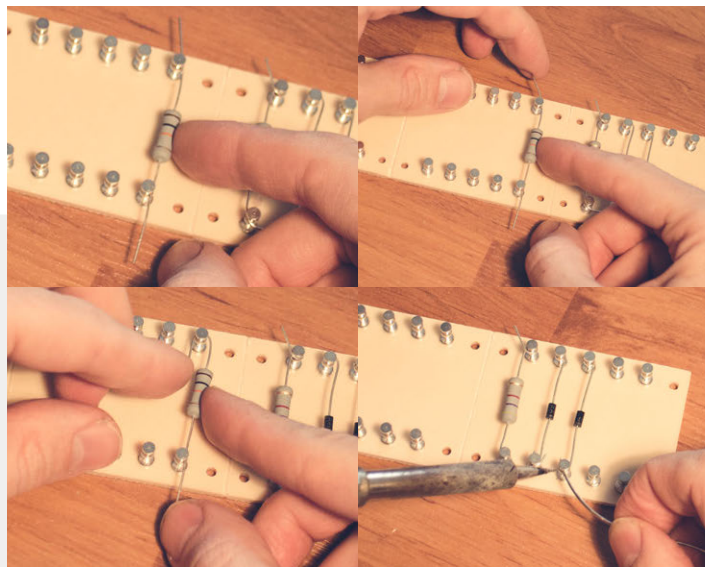
Buying some alligator clips and placing them somewhere as shown above easily lets you check the values of your components.

NEVER WORKED A TURRET-BOARD?

Before I started my first P2P build I always thought it would be much more difficult than building something PCB based.

And yes a PCB can make it easier to see which component goes where on the board because they are mostly labeled with component values etc.

But that's why I made this step by step guide and apart from that, working point to point is actually much easier and also much more fun! And it can also be let's say more forgiving. For example, if you soldered a wrong component to the pcb...removing it can be a huge drag and even ruin your entire pcb.



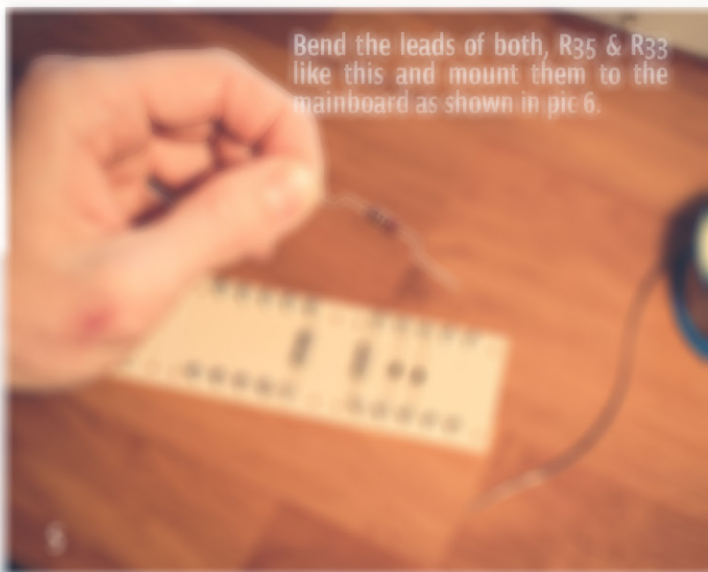
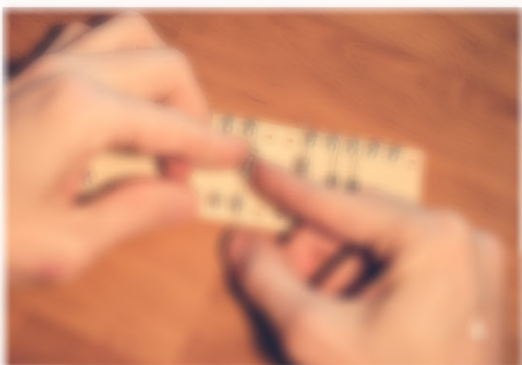
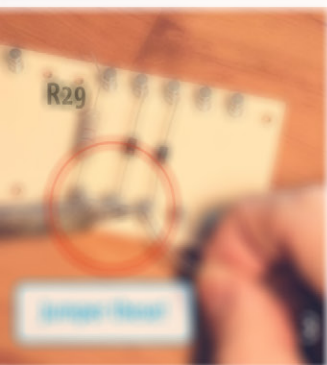
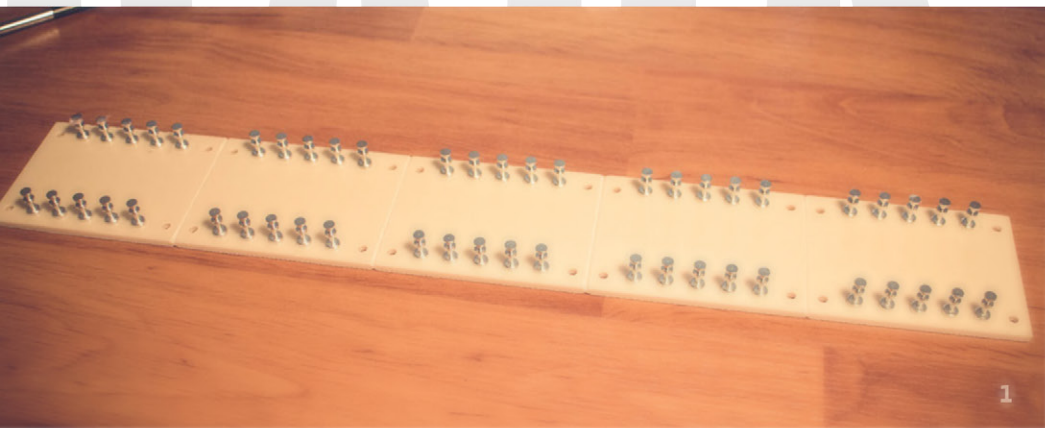
step 1: place the component; **step 2&3:** bend the lead around the turret; **step 4:** carefully put a little bit of solder from two sides of each turret and then remain with the iron until the entire solder melts and you end up with a solid connection all around the turret (you'll notice); **step 5:** clip lead ends if necessary

(SOLDER) IRON MAN

PART I: THE MAINBOARD

Ok, now we're getting serious! Let's start stuffing the main board, beginning with the two little 1N4007 diodes on the right, followed by the resistors...

PREVIEW



Resistors and diodes first

After soldering the diodes (CR1 & CR2) to the mainboard, you can now start with the resistors. Start by soldering the two 1N4007 diodes to the mainboard. The diodes are marked with a silver band on the cathode side. The anode side is marked with a black band. The cathode side is marked with a black band. The anode side is marked with a black band.

Next, solder the resistors (R1, R2, R3, R4, R5, R6, R7, R8, R9, R10, R11, R12, R13, R14, R15, R16, R17, R18, R19, R20, R21, R22, R23, R24, R25, R26, R27, R28, R29, R30, R31, R32, R33, R34, R35, R36, R37, R38, R39, R40, R41, R42, R43, R44, R45, R46, R47, R48, R49, R50, R51, R52, R53, R54, R55, R56, R57, R58, R59, R60, R61, R62, R63, R64, R65, R66, R67, R68, R69, R70, R71, R72, R73, R74, R75, R76, R77, R78, R79, R80, R81, R82, R83, R84, R85, R86, R87, R88, R89, R90, R91, R92, R93, R94, R95, R96, R97, R98, R99, R100) to the mainboard.

After soldering the resistors, you can now start with the other components. The other components are marked with a silver band on the cathode side. The anode side is marked with a black band. The cathode side is marked with a black band. The anode side is marked with a black band.

