Mutant Clap

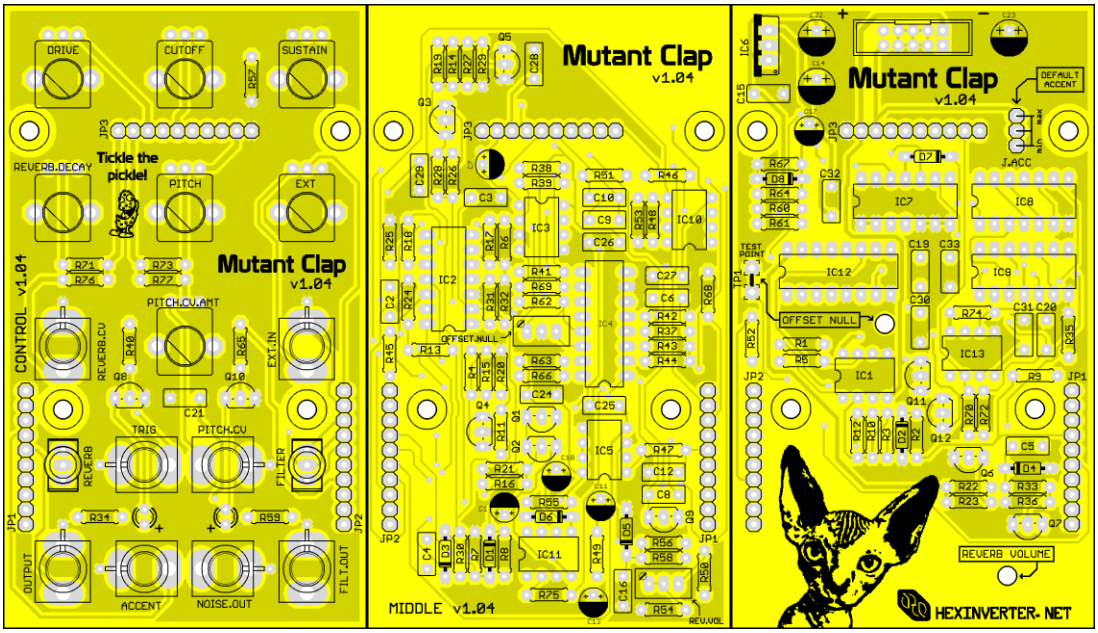
eurorack analogue handclap DIY assembly tips v1.04 HEXINVERTER.NET

This guide should help you on the quest to build yourself a hexinverter.net Mutant Clap eurorack module from a PCB/faceplate set. **It is not a full step-by-step guide like with hexinverter full kit products** and assumes you have successfully built some easier projects before from full kits (such as Orbitals, Galilean Moons, etc.)

FINDING PARTS

As with all hexinverter DIY projects, **you should NOT blindly trust the Mouser Project Cart provided**. It is meant to save you the pain of searching for every common part (resistors, capacitors, ICs) on Mouser, but, *that doesn't mean you don't still have to go through the BoM line by line and make sure you've sourced each part for your build!* I promise you will **not** be happy if you blindly order the cart, expecting to receive 100% of the components you need for the build – unfortunately one cannot acquire all the parts you need from Mouser alone! So make sure to read the Google Docs hosted bill of materials for the project. I suggest printing it out and checking each item off line by line to make sure you've accounted for it in your parts orders. Sources are listed in the BoM when available and even provide handy comments to help you find parts easier. And if you can't find something, pop by the **Muffwiggler Music Tech DIY Forum** thread for the project and someone (perhaps myself) will help you out there so others can benefit from the answer to your problem as well.

STEP 1: Board-level components

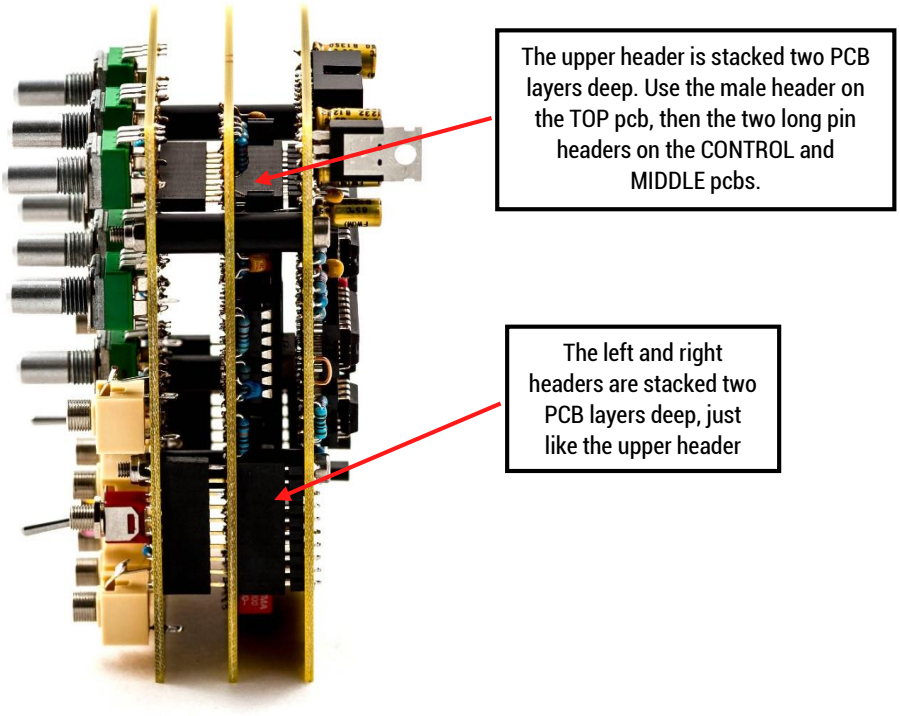


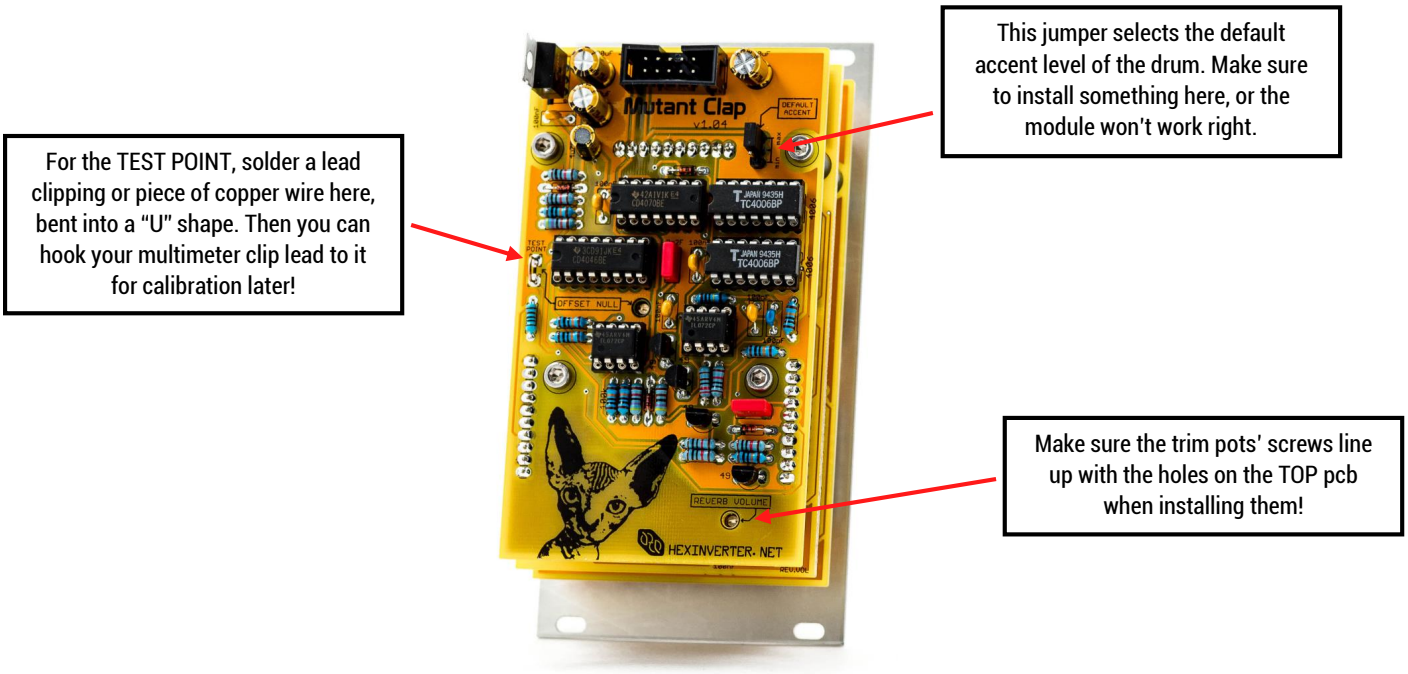
Let's get started! I recommend stuffing all the PCBs with everything **except the control surface components and headers that connect the boards together.** Once all the board level stuff (resistors, capacitors, ICs, etc.) are installed, we'll do the parts that stick through the panel (pots, switches, jacks, LEDs, etc).
Stuff the PCBs with their components from shortest to tallest standing off the circuit boards. That's so you can flip the board over for soldering and the parts will hold themselves in. I recommend something like this order...

1. **Diodes**
2. **Resistors**
3. **IC Sockets**
4. **Small Capacitors**
5. **Vactrols**
6. **Power Header/large capacitors**

STEP 2: Assemble the PCB stack

Once all the small parts are soldered into the board and you're certain you haven't made any mistakes, I recommend putting the PCB stack together with the headers. There are **three PCBs** in the Clap build and you should be very careful to assemble them the right way. Don't solder anything until you're certain that the headers are all correct and your stack matches the way it is supposed to be assembled in the following images. I like to put the boards together with the headers fitted but not soldered. I then tack one leg of each header so I can adjust them until it all sits straight before soldering all the pins. Only once I know for sure everything is lined up right do I solder all the pins of the headers. **If you're having trouble, installing the screws/standoffs to hold the stack together will help hold it all in place while you solder.**





STEP 3: Control surface assembly

Putting together the control surface is arguably the most challenging part of this project so I recommend taking your time. If you have been working for awhile, put down the soldering iron and go take a break and clear your mind. I recommend this order of assembly:

1. **Take the control PCB off of the PCB stack in order to work on it alone**
2. **Cut the little metal tab off each potentiometer (this depends on the type of pot you use)**
3. **Put everything loosely in place on the control PCB (don't solder yet)**
4. **Place some washers/spacers on the pots and adjust the nuts on the switches to match the panel height**
5. **Remove the protective film on the panel and place it on the components**
6. **Finger tighten all of the nuts onto the panel. The jacks should be *flat against the panel so they raise off the PCB a bit.***
7. **Solder one leg of each pot and then reheat, pushing the pots flat against the PCB**
8. **Solder one leg of each jack and then reheat, pushing the jack flat against the panel**
9. **Solder one leg of each part and reheat, adjusting them to their final position on the panel**
10. **Once you are happy with the position of everything, solder everything!**
11. **Take a piece of component leg and use it to make a ground lead for each of the 3.5mm jacks. Solder them in place.**

Use a washer on each pot to help match to the height of everything else

Adjust these nuts to sit flat against the panel when it's placed on the potentiometers

DON'T FORGET TO MAKE THE GROUND LEADS FOR THE JACKS!

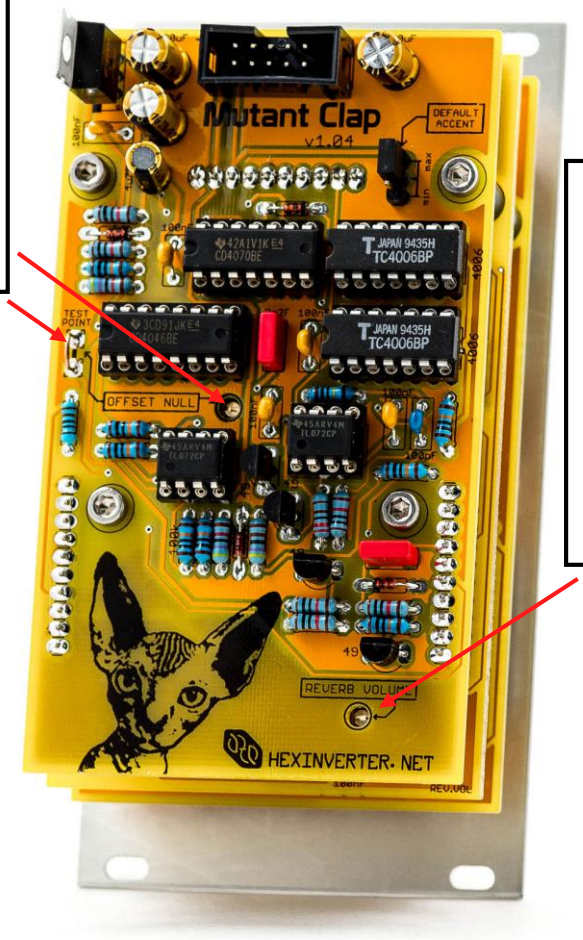
The 3.5mm jacks should be raised off of the PCB surface a bit

STEP 4: Test and calibrate!

I recommend testing the module *before putting it all together.* It takes awhile to take everything apart so you want to correct any mistakes now before finalizing the whole build by putting on knobs and screwing the PCB stack together. Plug the other PCBs into the control PCB for testing but don't install the screws and spacers yet. You should be able to test everything with it just loosely assembled on your bench.

STEP 1: CALIBRATING THE OFFSET NULL

This trim zeros out the REV DEC envelope. Clip a multimeter or oscilloscope lead to the TEST POINT and turn the REV DEC panel control *all the way up*. Adjust the trim with a screwdriver until the multimeter/'scope reads -100mV (ie: about 100mV **LESS THAN ZERO**)



STEP 2: CALIBRATING THE REVERB VOLUME

Adjust this trim with the REV DEC panel control turned about halfway and the SUSTAIN turned all the way down. This way you can hear only the reverb effect. Adjust it until it's not distorting, then, turn up the SUSTAIN so the clap sound is heard. Adjust the trim again to set the volume of reverb you want.

Once you're confident everything works properly, assemble the PCB stack with the screws and spacers. Then install the panel onto the PCB stack and tighten down all the control surface parts! This is what the finished product looks like...

Tau says: good job! :D