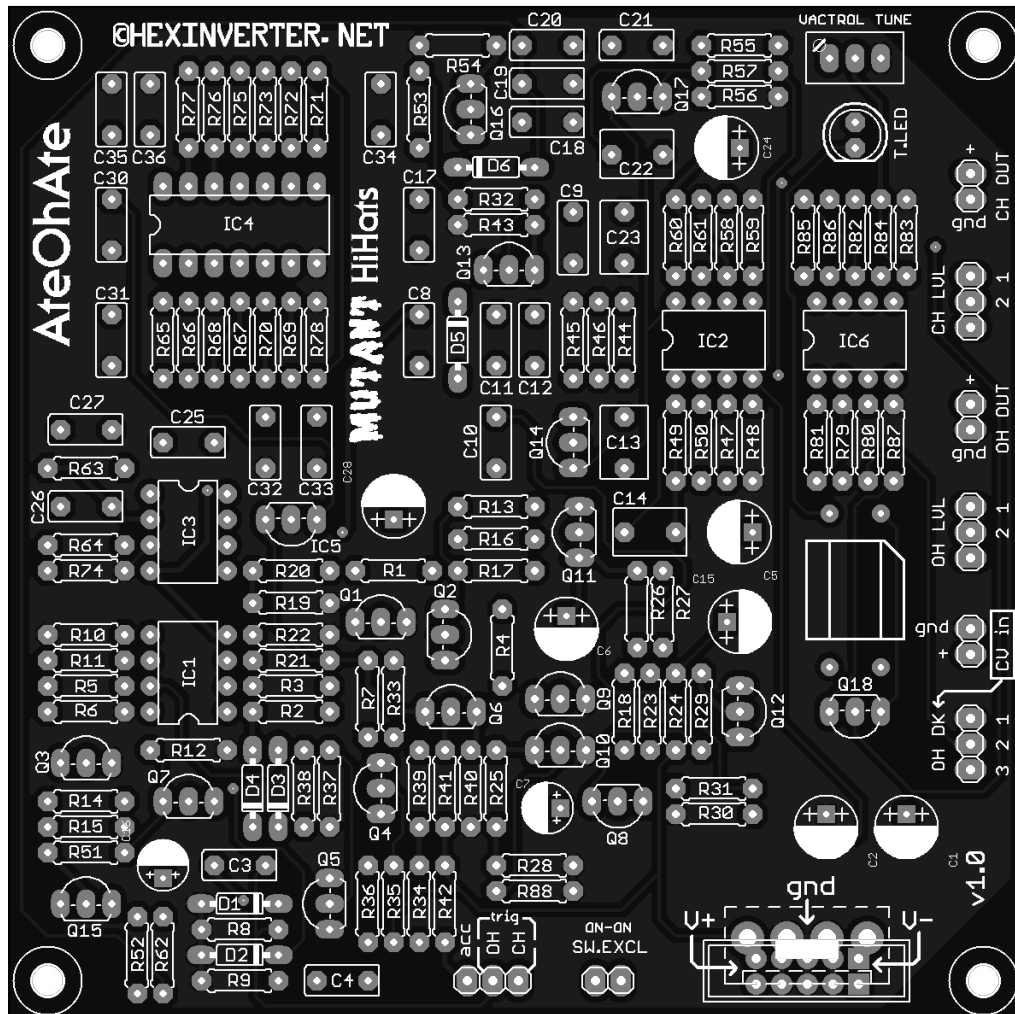# HEXINVERTER. NET

presents:

AteOhAte: MUTANT HiHats

a dual analogue hihat module based on the circuitry of the TR-808

ASSEMBLY MANUAL v1.0

Introduction

This manual exists to aid DIYers in creating their own AteOhAte: Mutant HiHats module from a bare PCB acquired at hexinverter.net

Please note that this is an advanced project and a lot of mechanical and electronics ability is taken for granted. If not purchasing a dotNET 4U format panel from me (coming soon), you will have to craft your own panel and of course decide how to mount the PCB to the panel when you are done.

You will need to figure out how to mechanically construct your module. I have made a video demonstrating how I make brackets from sheet metal to mount PCBs to front panels. Find it at the hexinverter.net DIY FAQ by clicking **(HERE).** Should you have any further questions, please ask the Muffwiggler synthDIY forum! Someone there will be happy to help you!

Technical Notes

The AteOhAte: Mutant HiHats circuit is based on the analogue circuitry of the legendary TR-808 drum machine. Functionally, it can create sounds virtually identical to the 808, however, a number of features and enhancements have been added that can transform the sounds created into something different! Most notably, voltage control over the decay parameter for the open hihat has been added. This effect is achieved using a VTL5C3 analogue optocoupler (aka: "vactrol"):

A control voltage at the CV input is summed with the initial decay amount from the potentiometer by opamp summer IC6A. This voltage is inverted and differentially amplified with an offset voltage created by trim potentiometer T1 by opamp IC6B. This voltage level is converted to a current by PNP transistor Q18 and associated components and is allowed to flow through the indicator LED (T.LED) and vactrol (LDR2 on the schematic).

Simplified, this circuit turns a control voltage into a resistance at the vactrol's output terminals. **A higher voltage at the input of the circuit produces a higher resistance at the vactrol's output.** This higher resistance results in a longer decay time.

The response of the decay time to the input control voltage is **not exactly linear or perfect.** Some careful tuning of trim pot T1 will be necessary to get the response you want, and, the input is quite sensitive to CV. This is a good thing in my opinion and simply means you may have to dial down more "hot" modulation voltages with an attenuator!

The indicator T.LED should be used as a tuning aid to dial in the proper offset voltage for the vactrol driver circuit. If you use a red, orange or yellow LED like I suggested in the Bill of Materials, T.LED should serve as a status indicator for the vactrol's internal LED. T**o tune the circuit, follow these easy steps:**

- Remove any decay CV you might have plugged in
- Turn the decay control all the way up (clockwise)
- Adjust trim pot T1 while watching indicator T.LED
- T.LED should **just begin to light** when you turn the decay control back down
- Try some input CV sources and see how you like it. Adjust T1 to to get the response you want!

Notes About Parts/Substitutions

Vactrols aren't sold by most large electronics distributors, but many small shops still sell them. Look around and you will find some! You can get singles on eBay, even. If you cannot find anything from a shop, post in the Muffwiggler DIY forum and I am sure someone will have one to sell you. I do not have any to sell so please do not ask!

You should change R87 to about 590R if you're using 15V.

You can substitute different transistors for the BC549/559 without any perceived changes, but make sure the pinout matches by comparing the datasheets!

Every other part is pretty common and you should be able to find them at all retailers. I do not recommend substituting other component values. Because this design uses resistors, capacitors and transistors to create the hihat sounds from scratch, different component values will alter the sound.

PCB Overlay
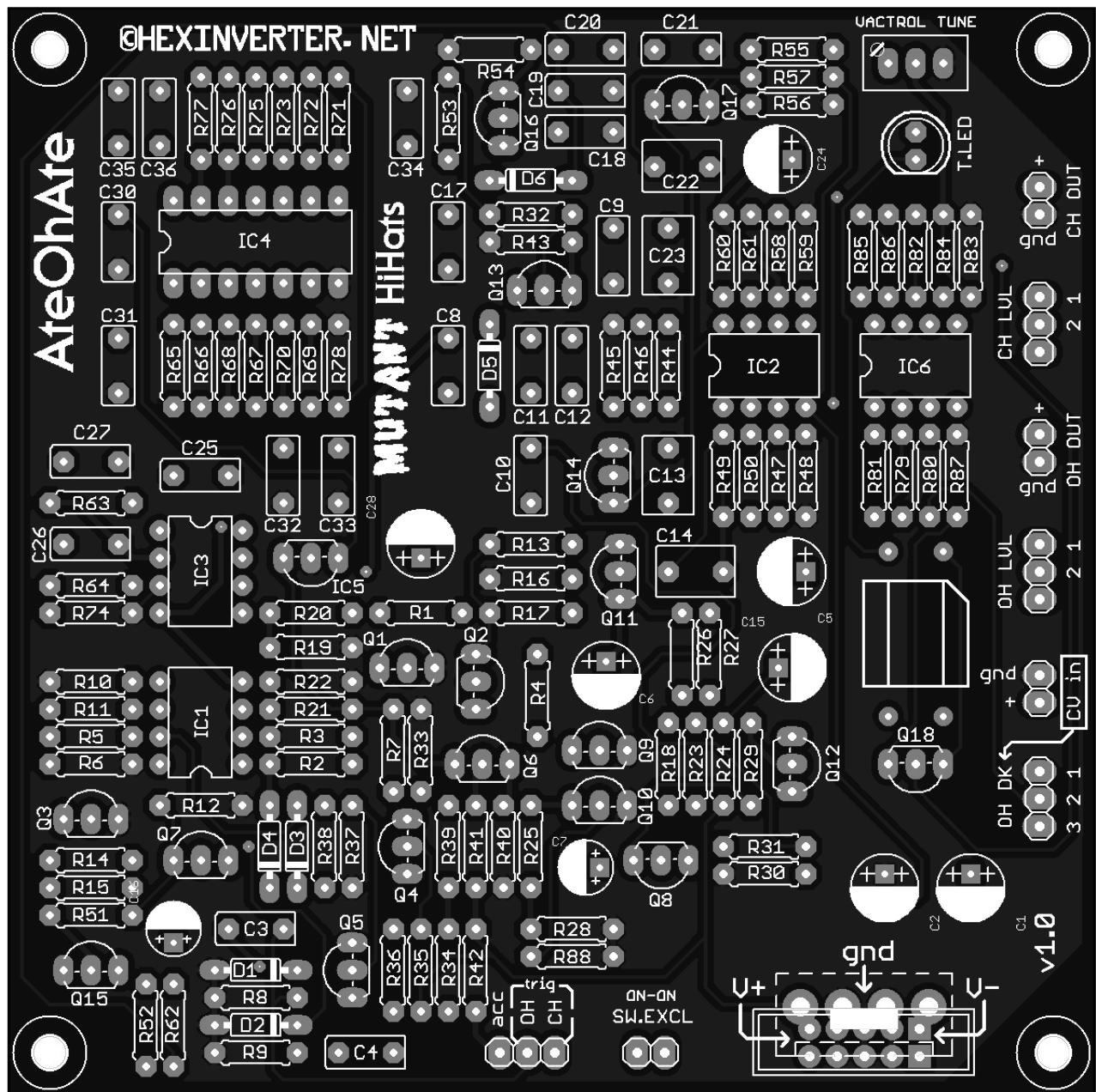
Wiring Diagram

POTENTIOMETERS VIEWED FROM FRONT