

THE LIQUID HIGH HAT V1.1

DESIGNED BY RYK JOHN MILLER THEKREATOR
PCB IMPLEMENTATION AND INSTRUCTIONS BY HEX INVERTER

The Liquid High Hat is a voltage controlled noise source. It can be used for high hats or producing other awesome sounds!

You can build it one of two ways - stock, or the "Bentley" version. The Bentley version is basically the most insanely customizable high-hat module evarr! It takes all of the functions in the base version and makes them patchable.

This is Ryks description from the thread over at electro-music.com (until a proper one is written):

[For quite some time I had been wishing for a hi-hat sound in which I were able to change it's pitch as well as other aspects of it's sound. Reading through copies of the old Synapse magazine on a site last year, I found the Voltage Controlled Clock circuit.](#)

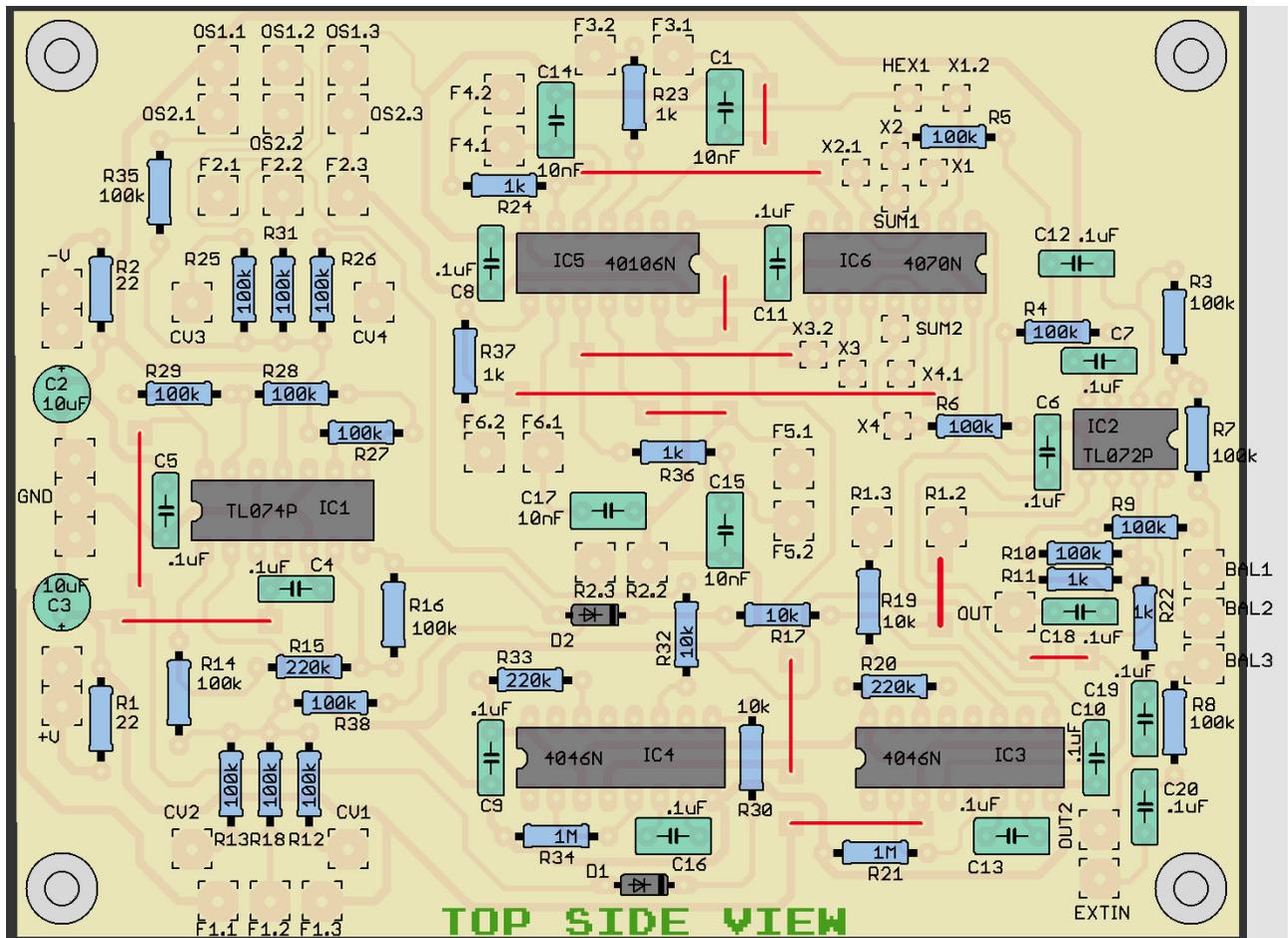
[It occurred to me that in combining a couple of those circuits with the circuit that produces metallic sounds, found in Ken Stone's Cynare Drum Simulator circuit, I could possibly have, exactly what I wanted.](#)

ASSEMBLY TIPS:

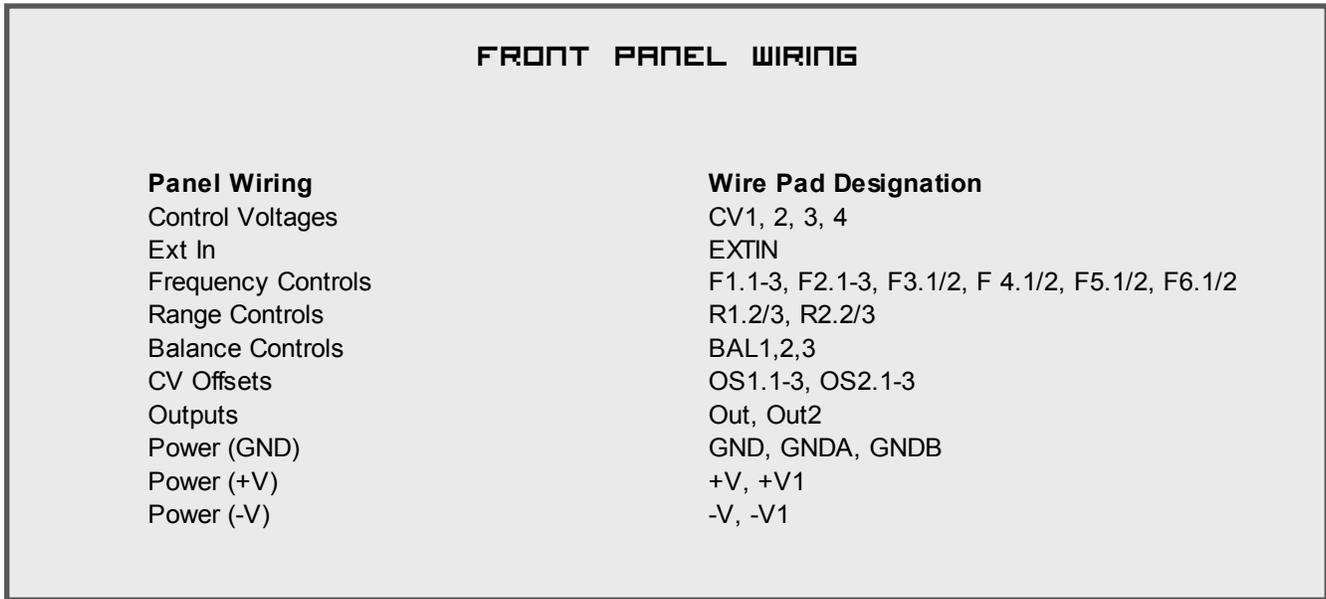
- Do yourself a favour and avoid any possibility of headaches by checking over the board for manufacturing faults! :) Chances are that it is just fine, but it is always best to assume the worst and check before wasting time trying to diagnose what should be a non-issue later down the road. I'm probably preaching to the choir here but I figured I would mention it.
- Square pads are jumpers. All jumpers are straight lines and have been arranged so you can not mix them up with eachother. Pick a square pad and look around for another square pad in a straight line from it, and that should be a jumper. I use 20awg solid copper wire for my jumpers.
- Pay very careful attention to IC direction. It is not the same for every one on the board!
- Pads that correspond to potentiometers are numbered according to the pot pin that they attach to. For example, you would read wire pad F1.3 as "Frequency One - Potentiometer Leg 3". If you did not know, the 3rd leg is the rightmost leg when looking at the pot wiper shaft facing you, with the leads down.
- There are extra pads on the board for the Bentley Mods - this is the most extravagant way of constructing the module. It uses extra parts not listed in the parts list (more diodes, 100k resistors and patch hardware). I have documented the mods to the best of my ability using information given to me by Ryk! If you run into problems let me know and I'll be delighted to help!

BILL OF MATERIALS:

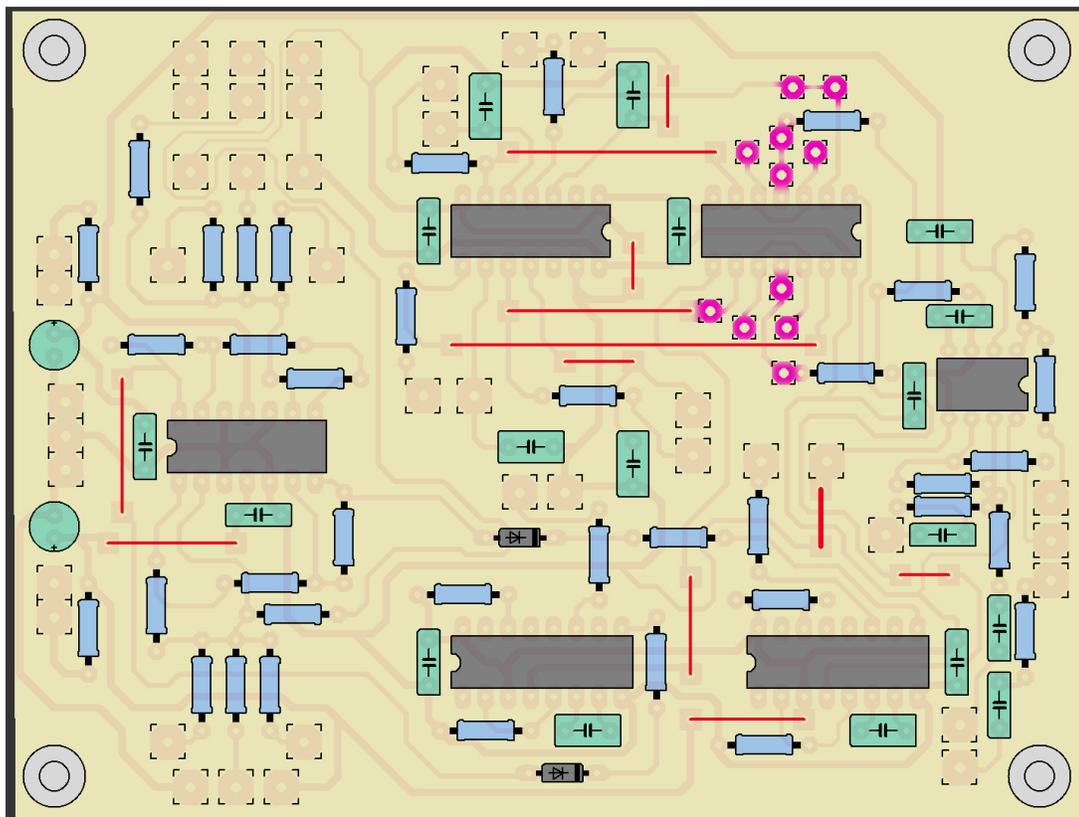
Part	Qty	Location
10nF Film Capacitor	4	C1,14,15,17
.1uF Ceramic Capacitor	11	C4,5,6,7,8,9,10,11,12,13,16,18,19,20
10uF Electrolytic Capacitor	2	C2, C3
TL074 Quad Op Amp	1	IC1
TL072 Dual Op Amp	1	IC2
CD4046 Phase Locked Loop	2	IC3, IC4
CD40106 Hex Inverter	1	IC5
CD4070 Quad XOR Gate	1	IC6
1N914 Diode	2	D1, D2
22ohm Resistor	2	R1, R2
100k Resistor	21	R3,4,5,6,7,8,9,10,12,13,14,16,18,25,26,27,28,29,31,35,38
220k Resistor	3	R15,20,33
1k Resistor	6	R11,22,23,24,36,37
10k Resistor	4	R17,19,30,32
1M Resistor	2	R21, R34
100k Potentiometer	5	Frequency 1 + 2, Balance, CV Offset 1+2
1M Potentiometer	6	Range 1 + 2, Frequency 3, 4, 5, 6
1/4" Jack (or whatever you use)	6	



Using this guide below, wire up all of the panel wiring. You can omit the Range controls, as they don't do THAT much (according to Ryk), but you must replace them with resistors of appropriate value for the frequency range you want. You will have to experiment until Ryk lets us know a good value :)



Completely ignore these pads unless you are doing the Bentley Mods!



PROCEED FURTHER FOR BENTLEY MOD INSTRUCTIONS!!!

Note: this is not for the faint of heart! You will be cutting traces on the board as well as doing a bit of kludging. That being said, I think it will provide a fair bit of enjoyment when done! I have taken the time to make this lovely diagram for you to follow. Please ignore the pad names as per the above base diagram - they are not accurate. Use my colour codes, or figure it out for yourself :)

Basically, build it as usual, except cut the traces and omit jumpers where I have indicated. Solder in wires in the jumpers holes or extra pad holes made especially for the Bentley mods! There is ONE area of kludge where I somehow missed adding an extra pad for feedback. (Damn...I'll get that on the next board revision then.) This is highlighted on the board diagram below. You will have to solder a wire directly onto the PCB trace if you want the option of feedback.

Also, it is important that you add some panel kludge:

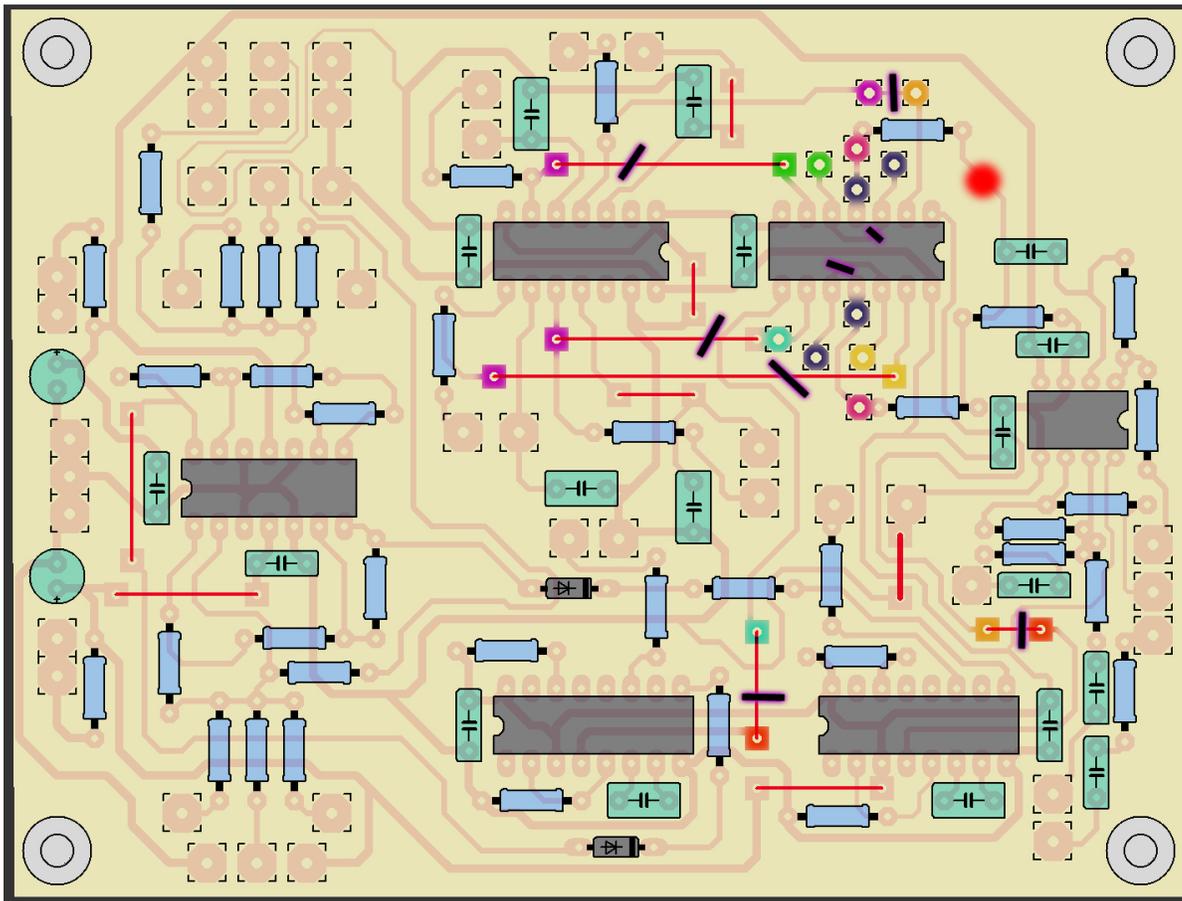
- 1.) tie a 100k pull-down resistor off all of the XOR gate INPUTS (ie: X-in #1) to ground, for each XOR input
- 2.) In addition to the pull-down resistor on each XOR gate INPUT, a diode must be added. The diode should be forward biased from ground to input, in parallel with the 100k pull-down resistor, for each XOR gate INPUT!
- 3.) Each Hex Inverter Oscillator output should have a 1k resistor in series with its output. So, I'd recommend soldering a 1k resistor to each of the panel patch points for the 4 "hex osc. outputs", and connecting the wires from the board to these resistors before the panel patch points.

Now, this guide was generated from me carefully going through the schematic given to me by Ryk, and figuring it out for myself. I have been extremely careful but it may not be without mistakes - so PLEASE when someone builds this, let me know your results and whether the guide was correct :)

[Diagram on next page]

LIQUID HIGH HAT BENTLEY MODS

A black slash indicates scoring/removing trace or wire jumper underneath it!



LEGEND

- noise
- voices
- summing inputs
- hex osc. outputs
- xor outs
- X-in #1
- X-in #2
- X-in #3
- X-in #4
- feedback