

mh21 Triple Vactrol Resonators (Eurorack DIY)



Introduction

Here we go again. This is the latest iteration of my version of the PS3100 Resonators. The fonitronik mh21 Triple Vactrol Resonator prototype module has been transformed from SMT to through hole, suitable especially for Eurorack DIY. But what is it actually? Basically the module incorporates three voltage controlled band pass filters with fixed bandwidth (resonators), using the Dual-Vactrol-based core from the PS3100, and a simple triangle core LFO. By setting the BPFs to different center frequencies and modulating them, we get these nice resonating sounds. Depending on the source waveform and the modulation it might even resemble the human voice. The original purpose, however, was to make string patches sounding more vivid.

Features

Three Band Pass Filters each with

- single input
- CV input + attenuator potentiometer
- initial frequency potentiometer
- LED
- single output

One summed output

One common Audioinput (normalled to single inputs)

One LFO with

- reset (sync) input
- range switch (slow, fast)
- rate potentiometer
- output

The LFO is normalled to the 3 CV inputs, however, for the 3rd CV input the LFO signal can be inverted.

Specifications

The frontpanel measures: 20HP (Eurorack)

Mounting depth behind frontpanel incl. power plug: 40mm

Power consumption: TBA

BTW this is not meant as a beginners project. I do not provide step-by-step building instructions. I just assume that you already build quite a few projects and know how to read the BOM and schematics.

General mounting instructions

This project uses two PCBs, one board with the actual circuitry and an additional adapter PCB carrying the front panel components. The adapter PCB is used to mount the PCBs to the front panel.

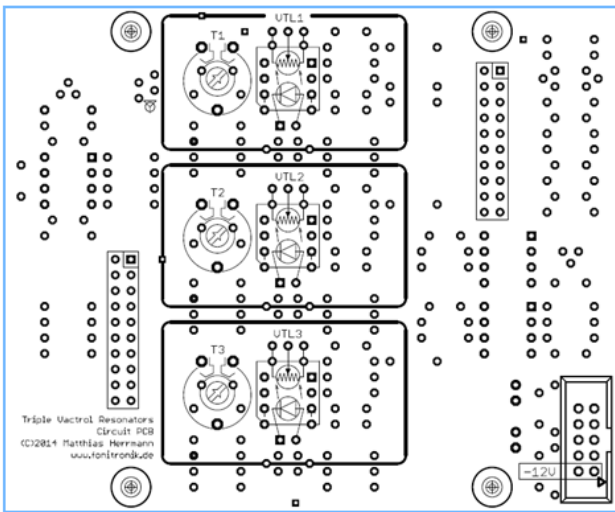
The PCBs are connected using two 2x10 headers/receptables with 2,54mm pitch (.1in). For stability use four 12mm threaded distance sleeves (M3).

Look out for something like this:

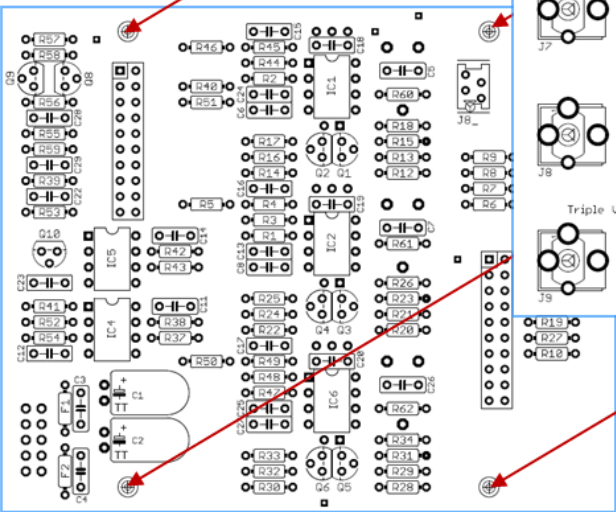


Note...

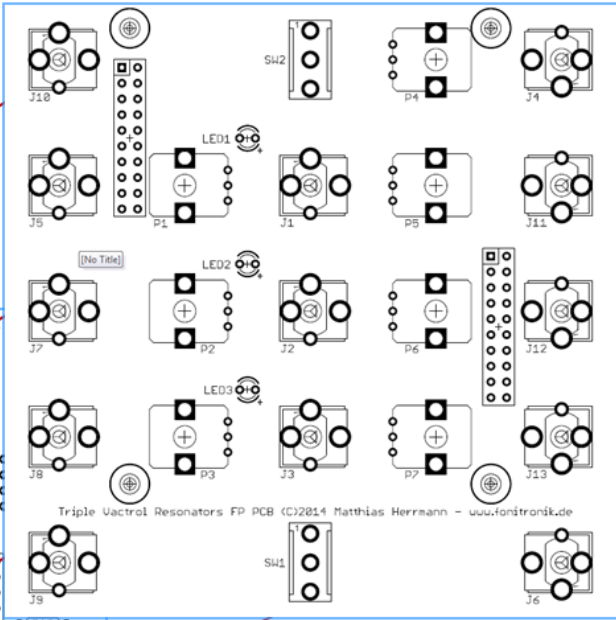
... that the Vactrols and the trimmers are mounted on the rear of the main board, just as the power header.
Please, be aware that you have to mount the following parts BEFORE you mount the Vactrols and trimmers:
IC1, IC2, IC6, C18, C19, C20,
C5, C6, C26, R60, R61, R62



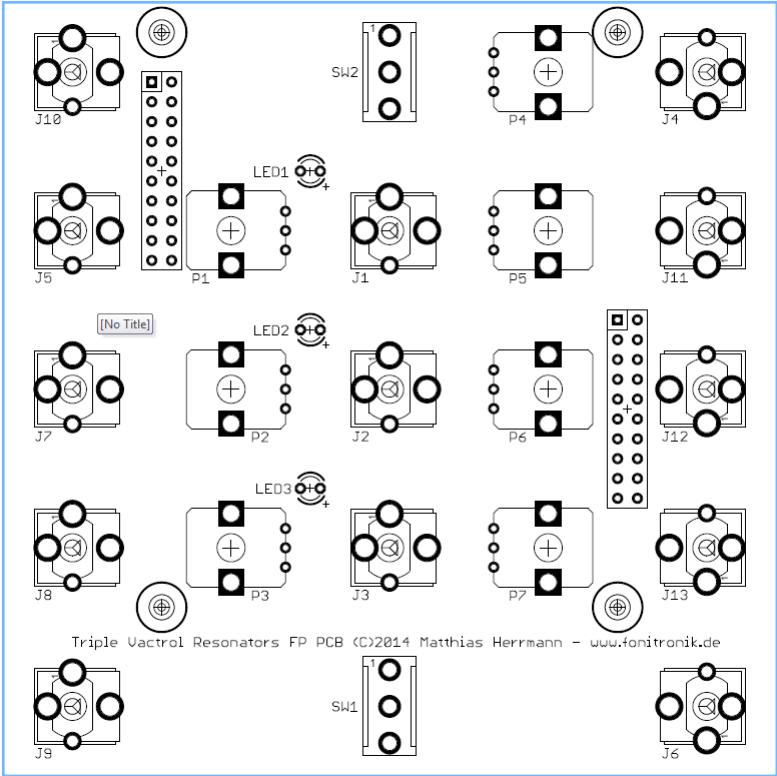
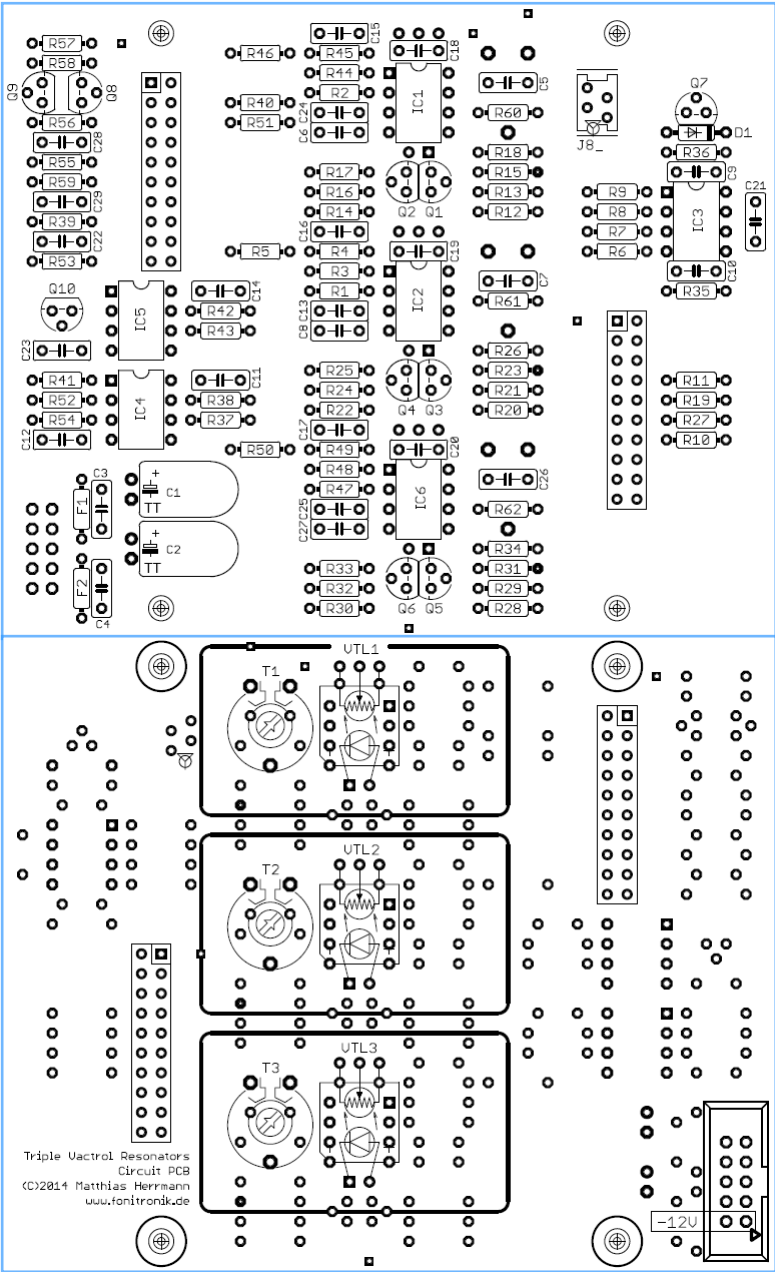
Rear



Front (headed to front panel PCB)



Overlays



Triple Vactrol Resonators
Circuit PCB
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Triple Vactrol Resonators FP PCB (C)2014 Matthias Herrmann - www.fonitronik.de

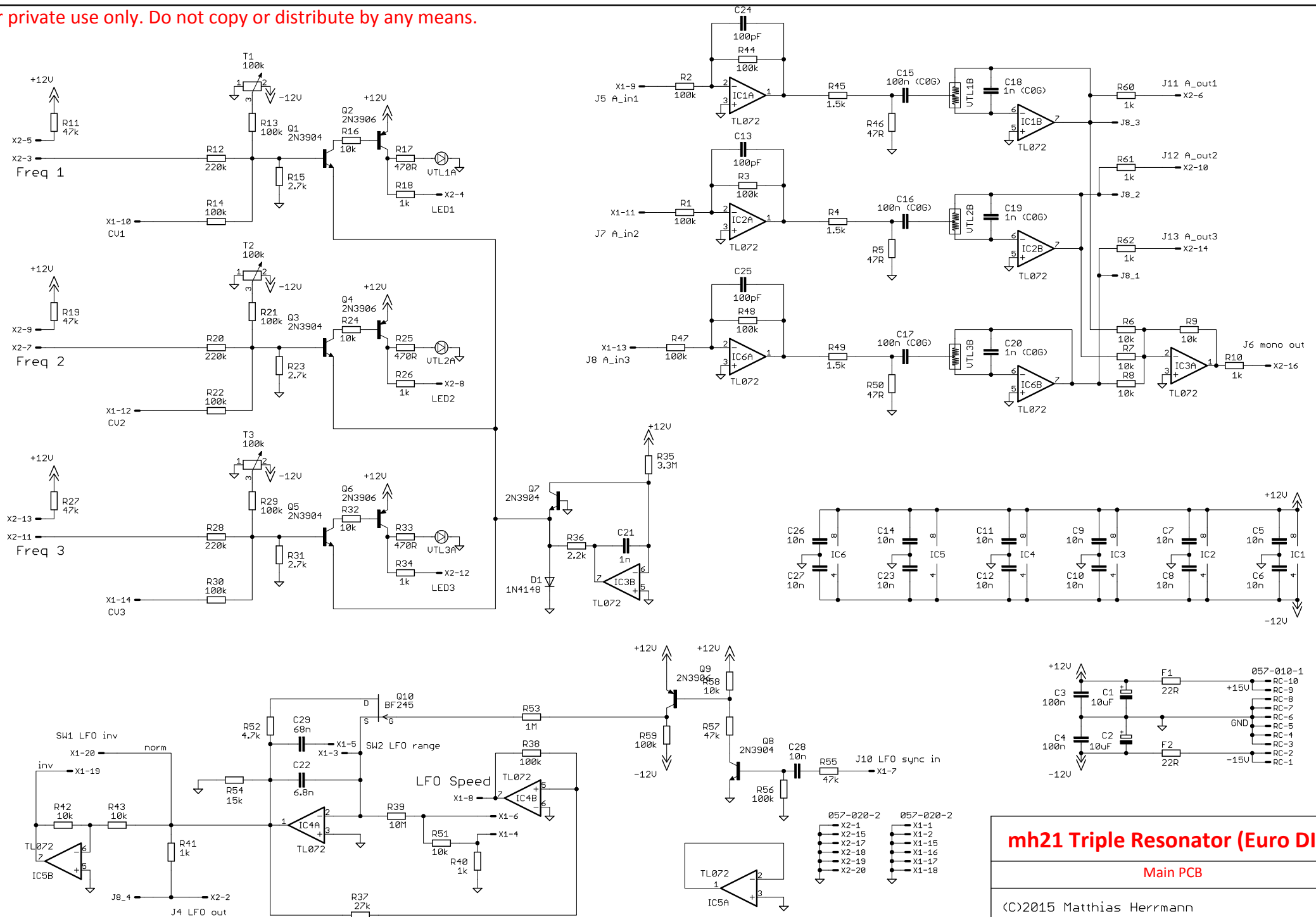
Qty	Value	Parts	Description
MAIN PCB			
Resistors			
2	10R	F1, F2	or ferrite beads
3	47R	R5, R46, R50	
3	470R	R17, R25, R33	
9	1k	R10, R18, R26, R34, R40, R41, R60, R61, R62	
3	1.5k	R4, R45, R49	
1	2.2k	R36	
3	2.7k	R15, R23, R31	
1	4.7k	R52	
11	10k	R6, R7, R8, R9, R16, R24, R32, R42, R43, R51, R58	
1	15k	R54	
1	27k	R37	
5	47k	R11, R19, R27, R55, R57	
15	100k	R1, R2, R3, R13, R14, R21, R22, R29, R30, R38, R44, R47, R48, R56, R59	
3	220k	R12, R20, R28	
1	1M	R53	
1	3.3M	R35	
1	10M	R39	
3	100k	T1, T2, T3 (Trimmer)	PT-10 package (mounted on rear)
Capacitors			
3	100pF	C13, C24, C25	
1	1n	C21	
3	1n (COG)	C18, C19, C20	or film
1	6.8n	C22	
1	68n	C29	
13	10n	C5, C6, C7, C8, C9, C10, C11, C12, C14, C23, C26, C27, C28	
2	100n	C3, C4	
3	100n (COG)	C15, C16, C17	or film
2	10uF, 35V	C1, C2	

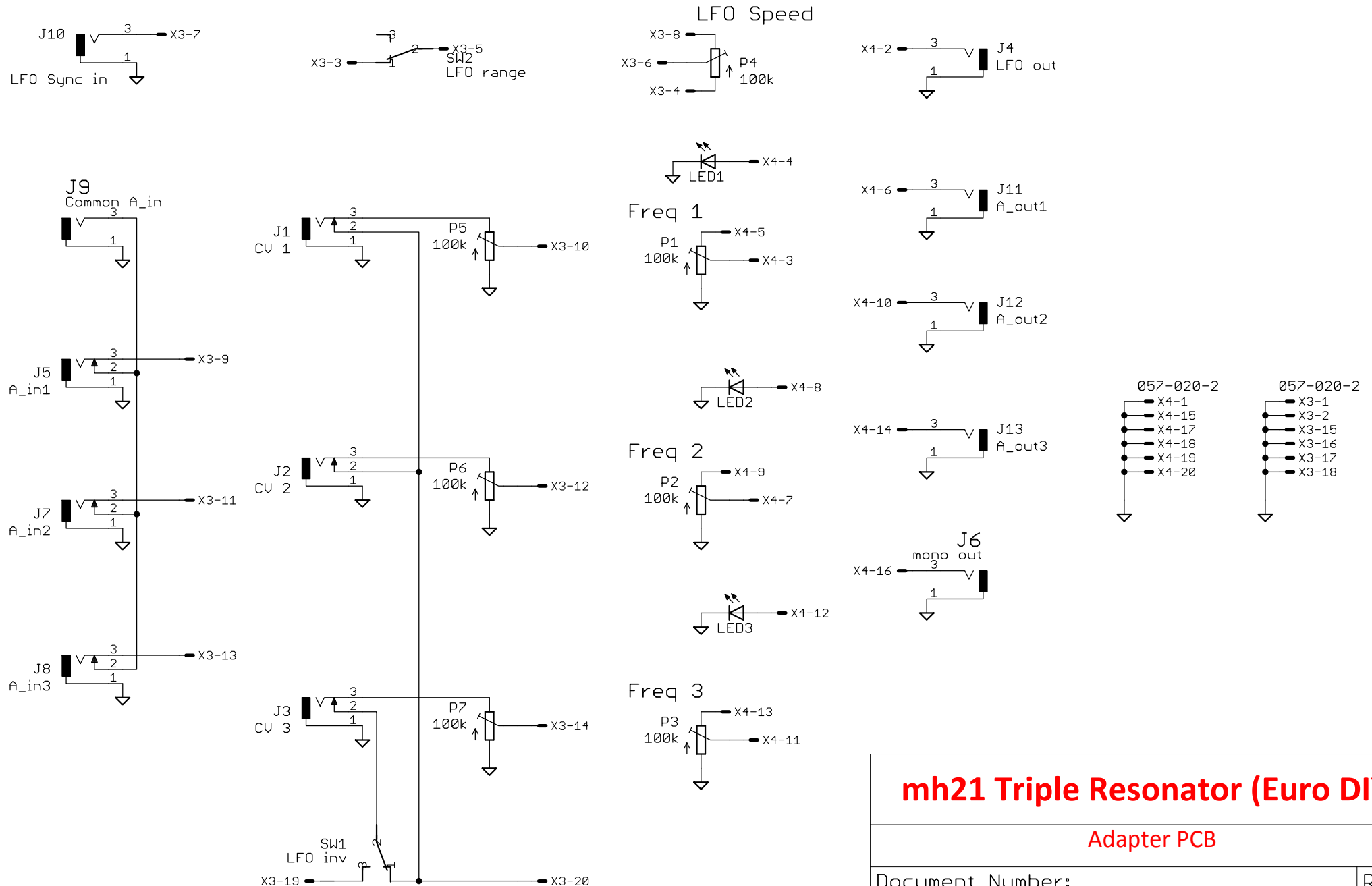
Qty	Value	Parts	Description
MAIN PCB			
Semi's			
1	1N4148	D1	
5	2N3904	Q1, Q3, Q5, Q7, Q8	
4	2N3906	Q2, Q4, Q6, Q9	
1	BF245	Q10	substitute: J111 (see below)
6	TL072	IC1, IC2, IC3, IC4, IC5, IC6	or compatible
3	VTL5C3/2	VTL1, VTL2, VTL3	Dual Vactrol (mounted on rear)
Connectors			
1	Header 2x5	RC	Euro Powerheader
2	Header 2x10	X1, X2	female
Optional (connector on the rear, carrying single outputs and the LFO)			
1	MICROMATCH 04	J8	Tyco Micro Match Connector

ADAPTER PCB			
2	Header 2x10	X3, X4	male
13	PJ301-B sockets	J1 - J13	
7	100k (lin)	Alpha 9mm pot (vertical)	
3	LED	20mA low current (YMMV)	
2	SPDT Switch	on-on (PCB terminals)	pitch .185 (4,7)

BF245: this N-Channel JFET has become obsolete and can be considered a hard to get item. The application is not critical, so it could easily be substituted with a J111.

Just be aware that the pinout of the J111 is just the other way around than the BF245, so one has to mount it rotated by 180deg, compared to the footprint.





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Adapter PCB

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