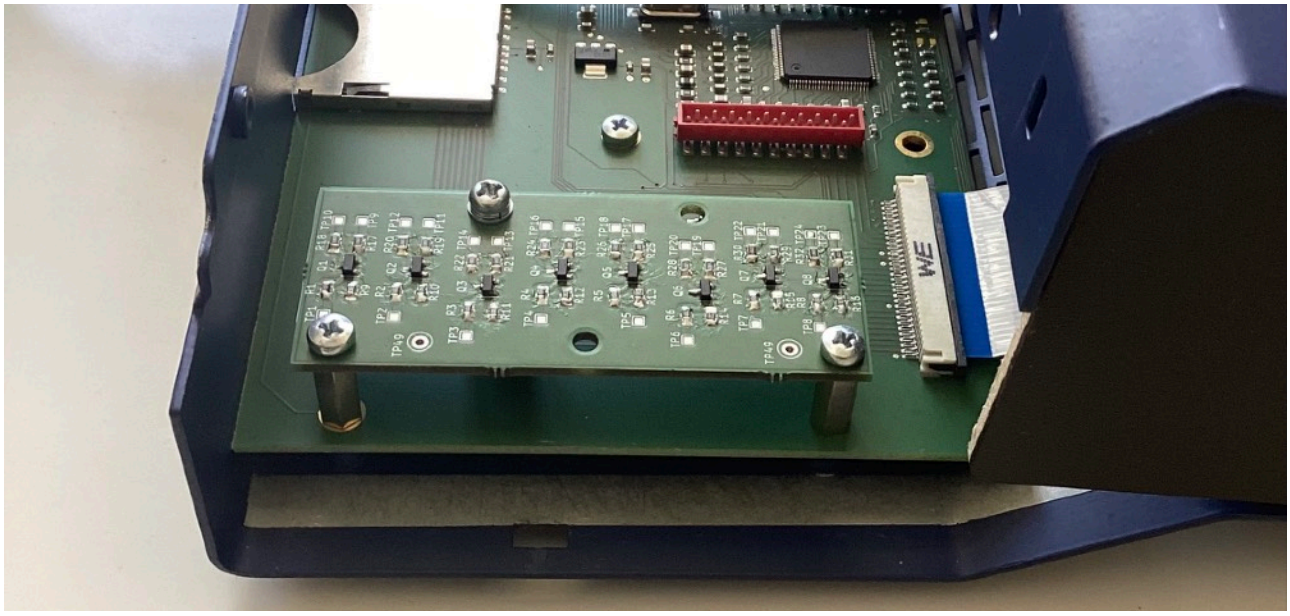
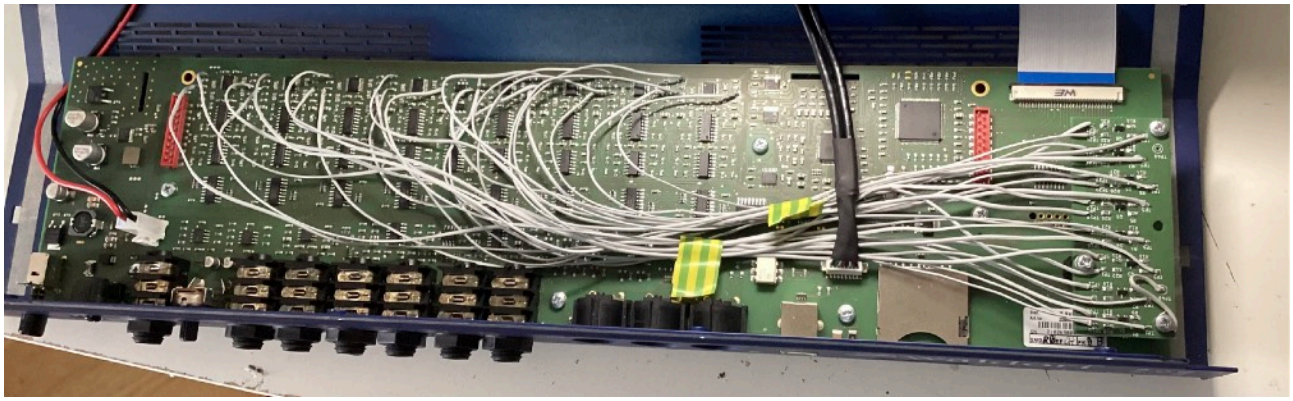
Waldorf M QCOMP BOARD

Installation Instructions
maffez (15 May) 2024

Preliminaries: This board is a DIY extension to be installed at your own risk. I designed this to the best of my knowledge as a non-destructive add-on to the Waldorf M SSI2144 filter circuit that increases the input level of the filter in proportion to resonance CV. You do not need to replace any components on the voice boards themselves but simply solder on three (3) wires per voice, which then lead to the added QCOMP PCB. The PCB itself can be mounted with 12mm PCB spacers nearby the SD card slot inside the M. A further plastic spacer screwed onto this sub PCB ads mechanical stability.

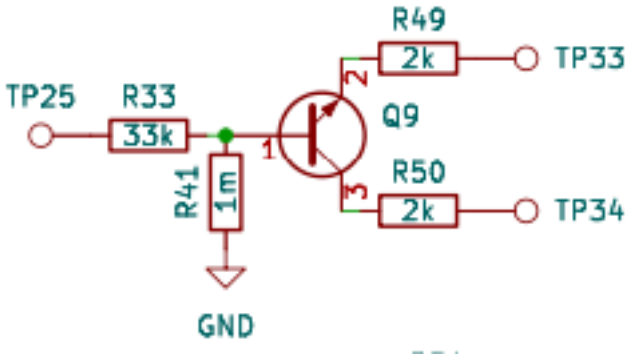


Voices are then individually connected to the sub PCB by means of AWG28 (or similar) wires. You will not need to supply this extra PCB with power as the transistors on it are driven by the resonance CV signal from the M synthesiser. The only added connection you need is to ground, which can be any of the metal spacers you use for placing this very same PCB.



Note that with this modification QCOMP is *always* on. Adding switches only complicates the sub circuit and requires you to drill holes into the chassis, and moreover, like the tonal flavours you get by this modification, so I *want* this to be on. If you find this attitude arrogant or insane, no worries, and apologies for eating your time**.**

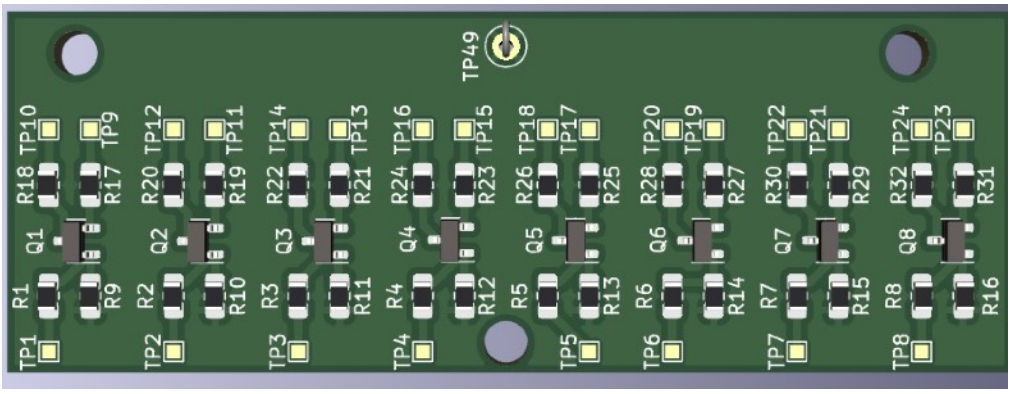
The circuit: Here you see the QCOMP modification for one voice of the M. TP 25 connects to the resonance CV signal on the respective voice on the M, while R49 and R50 are wired to both terminals of the filter input attenuating resistor. When resonance CV increases, Q9 opens and lets the filter input signal (across R49 and R50) flow in parallel to the existing input attenuation. The more signal through the parallel resistors, the higher in filter input level.



While this modification is unlike the suggested SSI QCOMP schemes, it uses quite fewer components and is also far less intrusive to the existing circuitry. Any connections are made by point to point wiring, which looks spaghetti first but has the benefit that you can undo this, if desired, 100% later on.

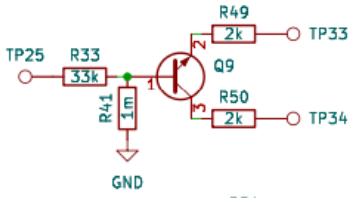
Populating the board: The PCB is double sided, with QCOMP circuits for 8 voices on each side. Which side you use is up to you - if your M has 8 voices, just use 8 of these circuits. Per voice you need the following components:

Per voice:	**per 8 voices:**	**per 16 voices:**
1x BC847 NPN transistor SOT23	08x	16x
1x 1M resistor (size 0805)	08x	16x
2x 2.2k resistor (size 0805)	16x	32x
1x 33k resistor (size 0805)	08x	16x
enough AWG28 wire for connecting everything.		

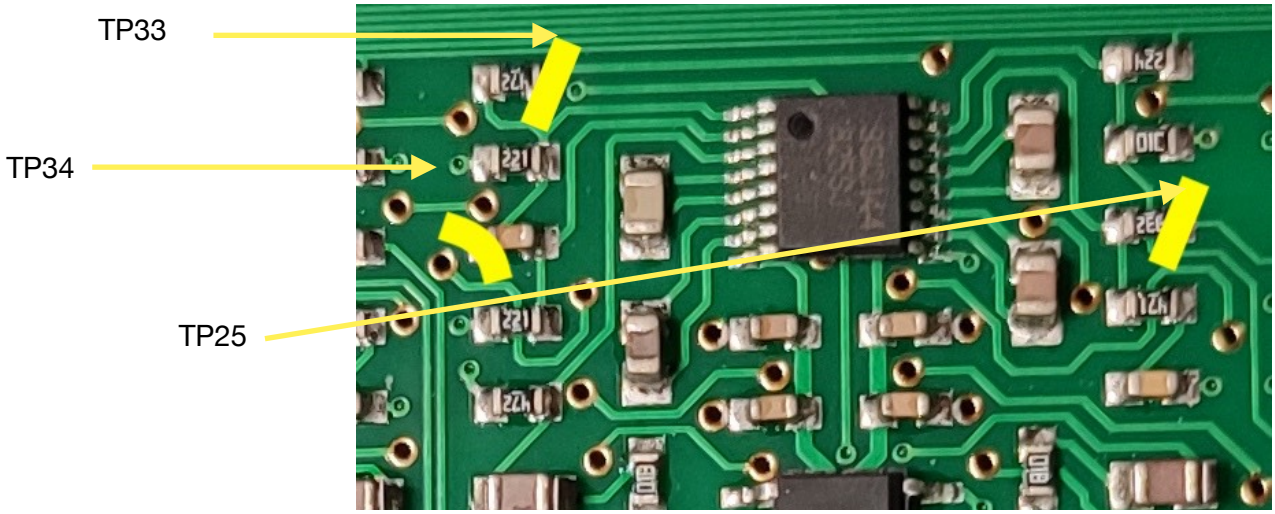


TP49 does not need any component (pin) but is simply wired to ground on the M. For fitting the PCB you need two 12mm M3 metal standoffs and a 12mm M3 plastic spacer and a single M3 screw for attaching the plastic spacer. If need be cut the spacer to size.

Wiring everything up: Fit the populated PCB first, then attach long enough wires to the points indicated above at every voice of the M. Then connect these wired to the corresponding points on the sub PCB. Before you fire your M on again, test all connections with a multimeter and check for solder blobs or unwanted connections to ground.



Connections to each filter: Taking the above circuit as a template, wire TP33 to the oscillator output of the 4,7k resistor that sits at the filter input. TP34 goes to the other terminal of that same 4.7k resistor. Note that for some of these resistors, there are unrelated through vias very close to the resistor terminals. Since the filter input side of the 4.7k resistor connects to another resistor and a capacitor nearby, you can alternatively use these for attaching wire (see image below). Finally, TP25 goes to the input side of the 33k resonance CV attenuating resistor.

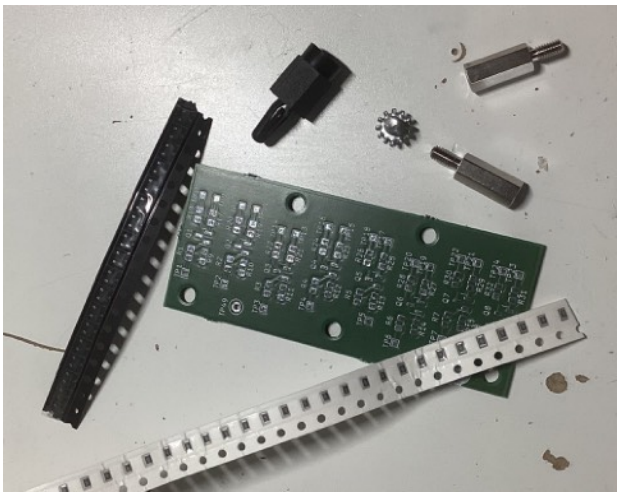


Best way of attaching wire: use a fine solder tip and put some solder on the end of your wire first; cut wire end to shape, if need be; also put a little solder on the respective “target” resistor terminals on the voice boards; finally attach the wire to the “target” resistor terminals (ideally 90 degrees/vertically, so that the wire stands a little bit up from the PCB; then wire the other ends of your wires to the respective TPs on the QCOMP PCB. I do this voice by voice, double checking if I get the collector and emitter ends of my CQOMP circuit to the correct sides of the 4.7k resistor.

Once done, visually check for cold solder joints and unwanted connections. If you have a multi meter, beep your connections and verify correct assembly. The DACS on the M have some output protection, so there’s some reassurance that stuff won’t go keel up in the worst case, but the filter audio input pin should not be accidentally connected to +/- supply voltage (unlikely, but still). Then close up your M, and go! :)

Calibrating: when all is set and done and your M plays cheerfully, do a filter tuning routine after some 25 minutes. This should settle that. Test the following: cutoff fully up, resonance fully up, all OSCs level down except for OSC1 - OSC 1 tracking off, then play a couple of notes in succession. The M plays voices round robin, so after 8/16 notes you arrive at the first voice again - all notes note should be at the same volume.

Troubleshooting: If your voices do have different levels, calibrate cutoff again as this can have an effect. If there is still variance, set cutoff and reso both to ca 50%. If your impression is that the reso sounds same-ish for all voices but only levels are different, test the per-voice VCA settings in the systems menu. If you think the reso quality is also different, you need to check your hardware modification for continuity trouble/cold solder joints etc. Best disconnect the wire at the transistor collector side on the QCOMP PCB (avoid de/soldering too often on the actual voice PCB).



All good? Congrats, you got some awesome synth! Rather not do this mod? Also congrats, you got some awesome synth! :)