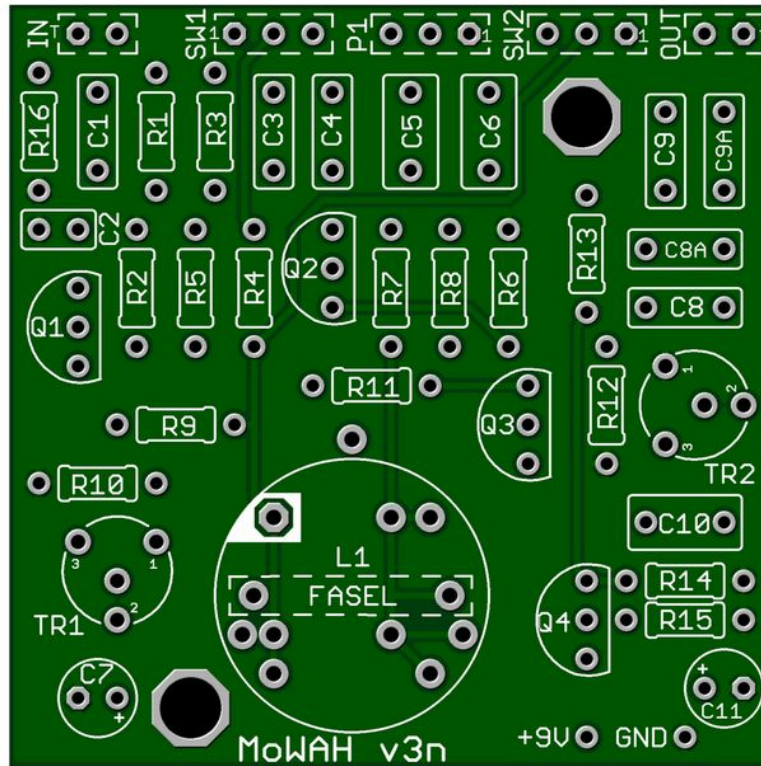


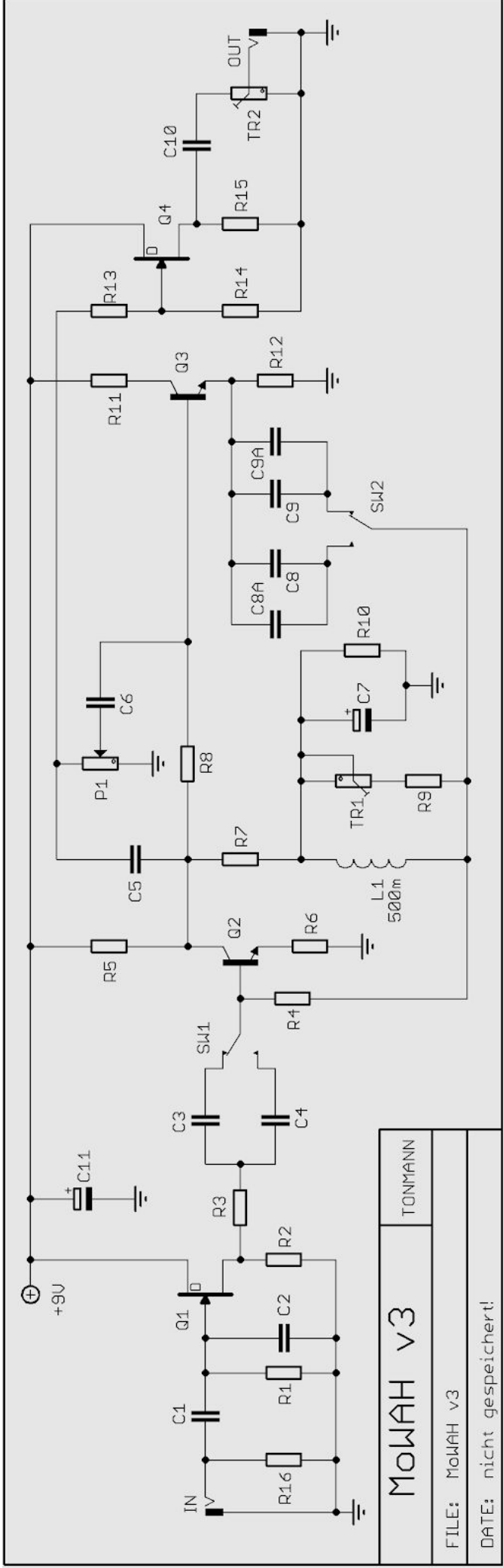
MoWAH v3

This is a modified circuit we believe enhances capabilities beyond that of the usual suspects. There are many mods that can be added as you see fit (pick and choose), however we believe just the basic circuit itself is still a vast improvement. This board will accept most any Fasel.



Board Dimensions (W x H) 2.05" x 1.95" ca. 52.1mm x 49.6mm

R1	1M	R14	1M	C1	10n	63V	Q1	J113
R2	10k	R15	10k	C2	22p		Q2	2N5088
R3	33k	R16	1M	C3	10n	63V	Q3	2N5088
R4	1k5			C4	100n	66V	Q4	J113
R5	22k			C5	220n	63V		
R6	220R			C6	220n	63V	L1	500mH
R7	470k			C7	4 μ 7	16V		
R8	470k			C8	6n8	63V	P1	100k C
R9	22k			C8A	*	63V	TR1	50k
R10	100k			C9	33n	63V	TR2	100k
R11	1k			C9A	*	63V		
R12	10k			C10	220n	63V	SW1	SPDT On-On
R13	10k			C11	47 μ	16V	SW2	SPDT On-On



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Before looking at mods, tweaks and part substitution it is worth considering the inductor, L1.

There has been a lot written and a lot of discussion on various forums as to what inductor is the best for Wah circuits. Most of what is written is personal opinion unsupported by any technical evidence – so here are my thoughts, unsupported by technical evidence.

For a simple coil of wire there are many more electromagnetic parameters to consider than just the inductance and DC resistance of an inductor; these two parameters alone do not determine how good a Wah pedal sounds.

“Inductor X sounds better, fuller, smoother than inductor Y”, is a personal opinion that may be true or may be not. The inductor alone does not determine the sound of the Wah pedal. Without tweaking the values of other components any Red Fasel, Yellow Fasel, Whipple, “Stack of Dimes”, Halo etc may “sound” better, worse or just as good as any other.

I would suggest choosing an inductor that your pocket can afford, tweaking the values of the following components and if you are not satisfied then consider changing the inductor.

TWEAKS & MODS

Q1 & Q4. A J113 or Genuine MPF102 (hard to find) will work best or substitute 2N5459 or 2N5458.

R3. Lowering the value from the original 68k to 33k will produce more signal output from Q2.

SW1, C3 & C4. SW1 is a Bass Boost switch which allows you to select between the original 10nF capacitor and a 100nF capacitor. I find the most Wah circuits suffer from a lack of bass frequencies sounding quite nasal. Increasing the capacitance adds bass frequencies. If you don't wish to make C3 & C4 switchable, don't install C4, put a jumper between pads 1 & 2 of SW1 and socket C3; try values between up to 100nF to add some bass response.

Q2 & Q3. I would suggest either 2N5088s or MSPA18s.

L1. As discussed above, the choice of inductor is one of taste. If you are completely undecided, a Dunlop Red Fasel is a good place to start. Some inductors come in 4 or 5 pin packages. The inductor itself is only connected to two of these pins. Use a DMM to measure the resistance between the pins, your reading should be around 10Ω – 100Ω. Orientate the inductor so that one of the pins is connected to the top left pad marked in white and the other pin is connected to one of the pads to the left hand set of pads. Some inductors (Whipple) have a fifth mounting pad located at the 12 o'clock position of the inductor, this will orientate the inductor correctly without the need to measure the resistance. Most two pin inductors will fit to the pads marked “Fasel”, the orientation is not important.

TR1 & R9. These two components replace the original fixed resistor which was valued at around 33kΩ (depending on the Wah pedal). Often referred to as the “Q” resistor, this controls the sharpness (and amplitude) of the filter. With TR1 and R9 omitted from the circuit the filter will be at maximum amplitude with a high Q factor – in plain speak very sharp. Adding resistance across the leads of the inductor will reduce the maximum amplitude and Q factor of the filter (not so sharp). As the resistance is made smaller the maximum amplitude and Q factor of the filter also reduces.

I would suggest trying the circuit first without TR1 and R9, if you find the filter too sharp, install TR1 and R9 and set the trim pot to taste.

If you want to make the trim pot an external control, wire a 50kΩ C (anti-log) pot to the pads. You can also use a more obtainable 50kΩ A (log) pot; wire lug 2 of the pot to pad 2 of TR1 and wire lug 1 of the pot to pad 3 of TR1.

SW2, C8 – C9. These four capacitors replace the original single 10nF capacitor. The function of the capacitor(s) is to set the range of frequency sweep of the filter. A small value capacitor will start to sweep at a higher frequency than a larger value.

From a previously modified Wah circuit I measured a frequency sweep of about 400Hz (heel down) to about 2.8 kHz (toe down) when the capacitance was 6n8F and a sweep of about 200HZ – 1.3 kHz when the capacitance was 32nF.

Although the above values and sweep ranges will depend on the inductor you use, it is more important to tune the range to your own preference. Reports on tests of the MoWah v3 prototype suggest values larger than 6n8F and values smaller than 32nF – a matter of taste for the individual prototype tester.

To make the MoWah v3 as flexible as possible SW2 allows you to select between two sweep ranges; C8 and C8A control an upper sweep range with C9 and C9A controlling a lower sweep range.

To get the most out of the MoWah I would strongly suggest socketing all four capacitors and having a bunch of different value capacitors to hand – as many values between 1nF and 22nF as possible.

Start off with C8 at 6n8F, if you find the filter is sweeping at too high a frequency either replace C8 with the next larger value capacitor available or insert a smaller value capacitor in C8A. The total capacitance is then C8 + C8A.

Repeat the above procedure for C9 starting with a 22nF capacitor.

Once you have fine-tuned both sweep ranges you can remove the sockets and permanently install the capacitors if you wish.

If you decide that you don't want an external switch and require just one frequency range, don't install sockets for C9 and C9A and place a jumper between pads 2 & 3 of SW2. This will leave you C8 and C8A to fine tune the frequency sweep of the filter.

P1. Using a 250kΩ C pot instead of a 100kΩ C pot will not make a great difference to the circuit – none that my ears could detect and a marginal difference when measuring with an oscilloscope and tone generator.

This is the one component for which I would pay a bit extra for as it is the most likely the first component that will give you problems, especially if you use the MoWah a lot. Cheaper pots not only wear out quicker than expensive ones but if they are not sealed properly dust or dirt could find its way into the pot causing “scratchy pot” problems. As with anything in life, you get what you pay for.

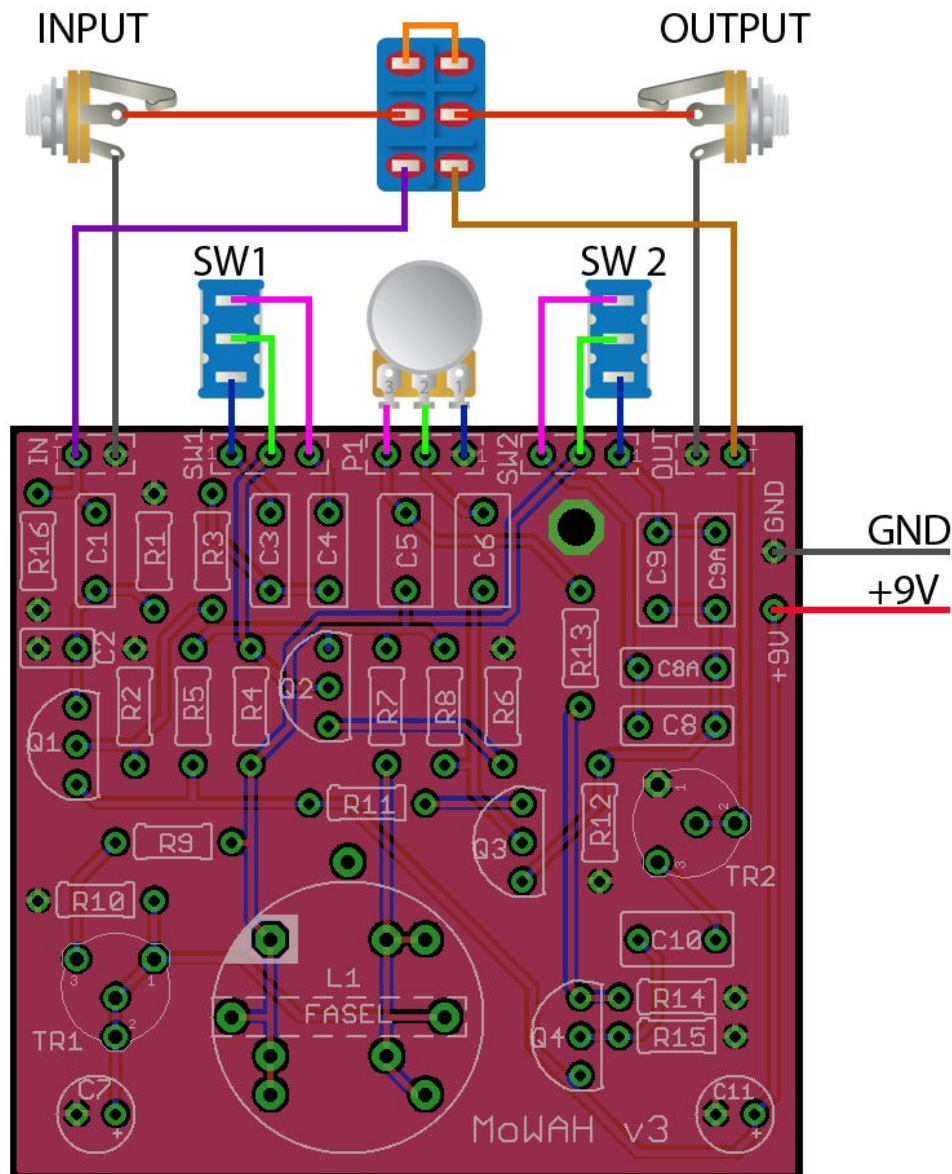
TR2. The MoWah has a gain of about 10 (20dB) – the actual measurement on my last modified Wah was 8.5 – so it is handy to be able to set the output signal level via TR2. If you wish to make this an external volume control, simply wire a 100kΩ Log pot to the pads of TR2.

Bypass Switch. A 3PDT footswitch can be used instead of a DPDT footswitch; in this case you would ignore one column of lugs on the 3PDT.

Heel Clicking: If you hear a slight clicking noise in the heel end with your particular Fasel you need to adjust the TR1 till the clicking goes away. This will still leave you play room for the Mod itself. Then simply adjust to taste. Also many Wahs come with a felt pad to prevent full heel rotation. One could simply use a similar sticky felt pad or even a rubber pedal foot type device to serve a similar purpose.

All inductors are slightly different so you could either raise R9 to a slightly higher value to accommodate or simply turn TR1 up till it's gone. That is one reason we have a trimmer in there. Fortunately ours is designed to be modded to suit any Fasel and any taste.

WIRING



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