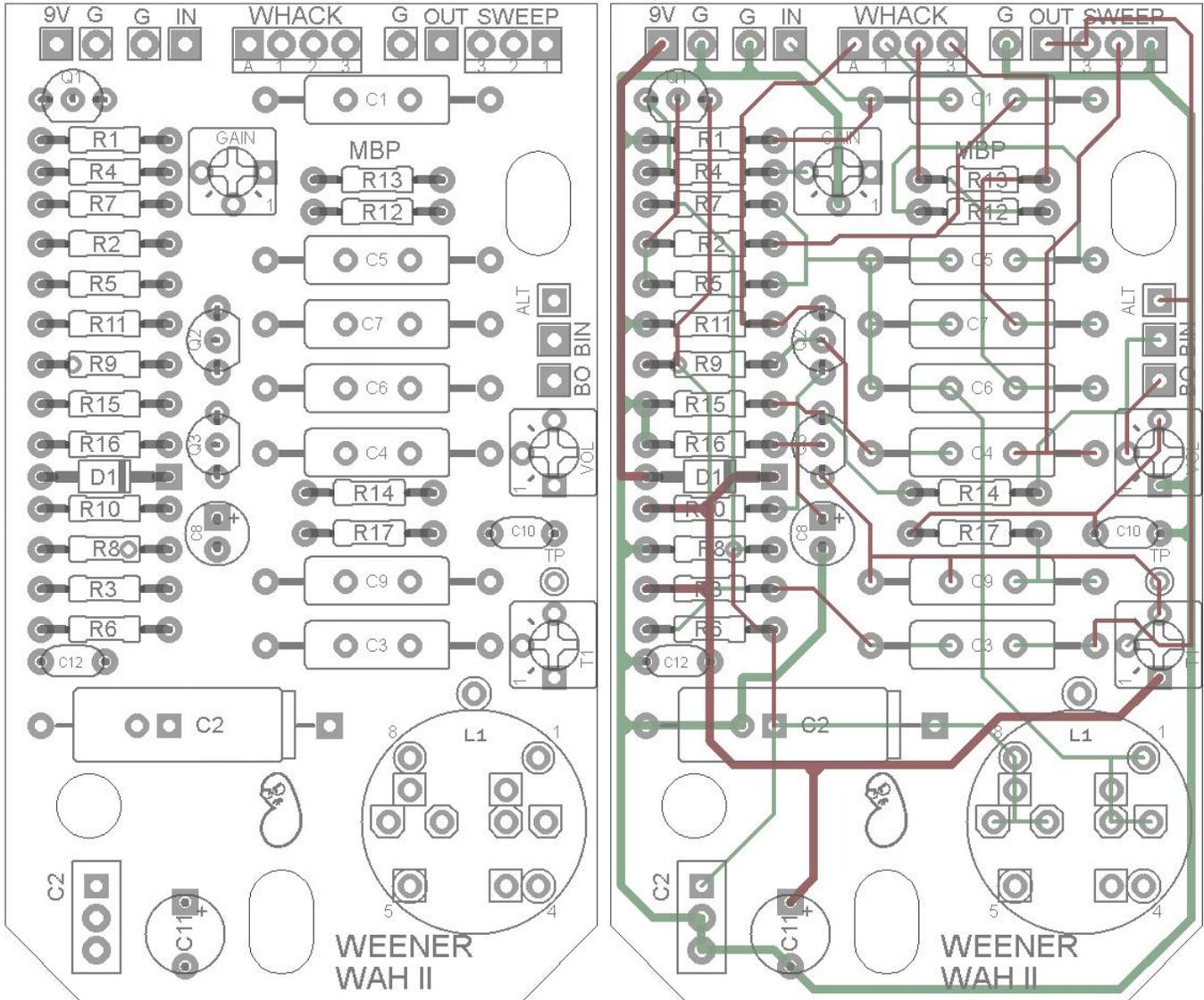


WEENER WAH II

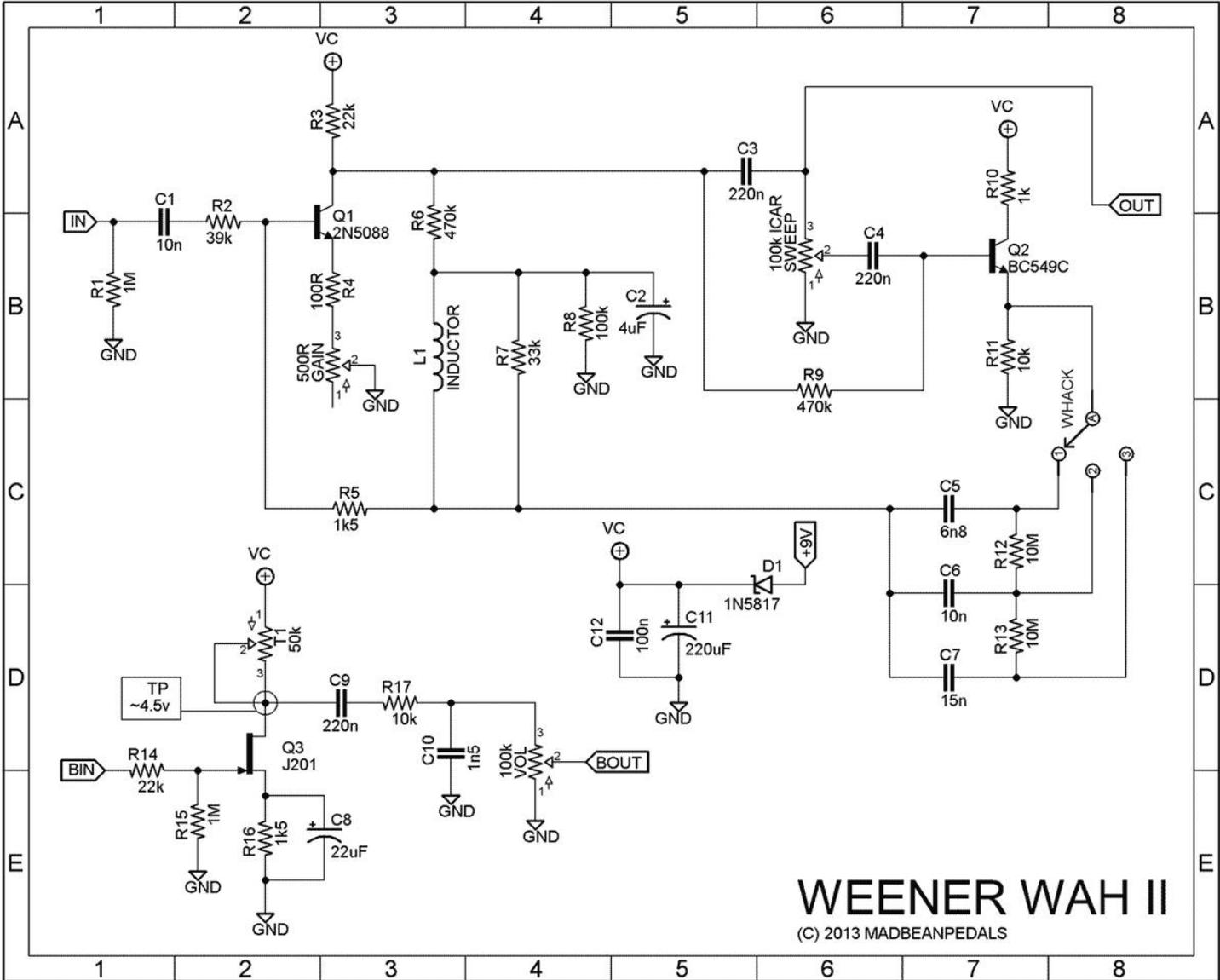
FX Type: Wah

© 2013 madbeanpedals

1.84" W x 3.11" H



Weener Wah II PCBs purchased from madbeanpedals, or etched from the included artwork, may be used for small amounts of commercial building without prior consent. Keep in mind that quantity discounts are not offered on PCBs. Additionally, the use of these PCBs for resale or "kits" is expressly forbidden.



WEENER WAH II
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B.O.M.					
Resistors		Caps		Diodes	
R1	1M	C1	10n	D1	1N5817
R2	39k	C2	4uF	Transistors	
R3	22k	C3	220n	Q1	2N5088
R4	100R	C4	220n	Q2	BC549C
R5	1k5	C5	6n8	Q3	J201
R6	470k	C6	10n	Inductor	
R7	33k	C7	15n	L1	see notes
R8	100k	C8	22uF	Switch	
R9	470k	C9	220n	WHACK	see notes
R10	1k	C10	1n5	Boost	DPDT (On/On)
R11	10k	C11	220uF	Trimpots	
R12	10M	C12	100n	T1	50k
R13	10M			GAIN	500R
R14	22k			VOL	100k
R15	1M			Pot	
R16	1k5			SWEEP	100k ICAR
R17	10k				

Shopping List			
Values	QTY	Type	Spacing
1M	2	Carbon/Metal Film	10mm
100k	1	Carbon/Metal Film	10mm
100R	1	Carbon/Metal Film	10mm
10k	2	Carbon/Metal Film	10mm
10M	2	Carbon/Metal Film	10mm
1k	1	Carbon/Metal Film	10mm
1k5	2	Carbon/Metal Film	10mm
22k	2	Carbon/Metal Film	10mm
33k	1	Carbon/Metal Film	10mm
39k	1	Carbon/Metal Film	10mm
470k	2	Carbon/Metal Film	10mm
100n	1	Film	5mm
10n	2	Film	5mm / 18mm
15n	1	Film	5mm / 18mm
1n5	1	Film	5mm
220n	3	Film	5mm / 18mm
6n8	1	Film	5mm / 18mm
220uF	1	Electrolytic	5mm
22uF	1	Electrolytic	2.5mm
4uF	1	Electrolytic	2.5mm / 23mm
2N5088	1	or other BJT	
BC549C	1	or other BJT	
J201	1		
1N5817	1	1W Zener	10mm
50k	1	Bourns 3362P	
500R	1	Bourns 3362P	
100k	1	Bourns 3362P	
100k ICAR	1		
Optional components			
1P12T	1		Whack control
DPDT	1	On/On/On	Whack control
DPDT	1	On/On	Boost switch

Overview

The **Weener Wah II** is a classic wah in the spirit of the Clyde McCoy with accoutrements to meet the needs of modern players. This includes true bypass operation, filter selection as well as an optional boost output. It also accommodates several inductor types for further customization.

The Weener Wah II has several changes from ver.1 in direct response to customer feedback.

Changelog

Removed the Peak trimmer.

Changed the Filter control to three fixed frequency caps, selectable via a rotary or DPDT.

Added a Gain trimmer to adjust the output of Q1.

Changed the optional output buffer to an optional JFET-based boost.

Tweaked the power supply design.

Controls

- Sweep: This specialized pot controls the range of the Wah filter and is operated with your foot via the wah treadle.
- Gain: This trimmer sets the overall output of Q1. Clockwise adjustment increases the gain.
- Whack: These are the switchable filter caps which adjust the frequency emphasis of the wah. Higher value caps produce a deeper or darker sound. Small caps yield thinner and more resonant filters.
- Vol: This trimmer sets the output volume of the optional boost section. It can also be a regular potentiometer (recommended).

Notes

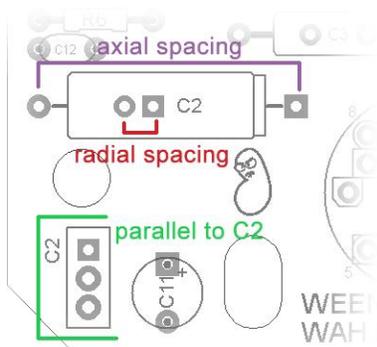
The vintage Clyde wah uses a 68k for R2. It is indicated as 39k on the Weener schematic. The smaller value yields a slightly hotter input signal to Q1, which is preferred by many Wah players. You can play with this value up or down for customization.

R7 is listed as 33k on the schematic. This produces a slightly sharper “Q” in the Wah. Make this 100k for Clyde McCoy specs.

C2 is listed as 4uF. This is not a typical value for modern components, and most commercially available Wahs use 4u7. You can purchase a (somewhat spendy) 4uF axial cap from Mouser if you want the mojo factor.

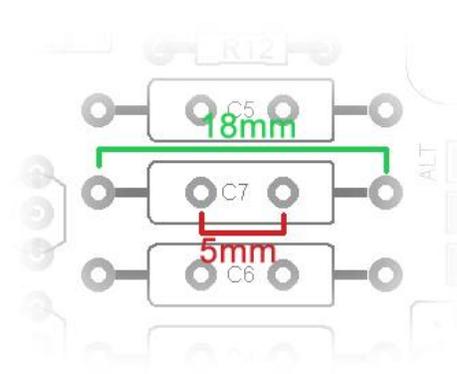
4uF Sprague Cap: <http://www.mouser.com/ProductDetail/Vishay-Sprague/TE13021-E3/?qs=sGAEpiMZZMtZ1n0r9vR22beeiJol0EpCZfexeJLBHFY%3d>

If you are using a 4u7 cap instead, you can either axial or radial as shown in the diagram.

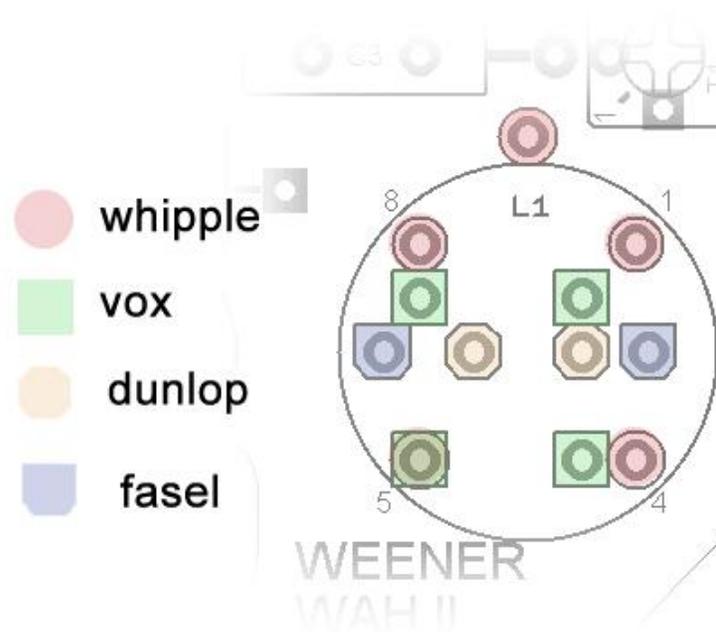


Lastly, you can use two caps in parallel to approximate the 4uF value. For instance, you could use a 3u3 cap in the top C2 spot, and a 1uF cap in the “parallel to C2” spot to get about 4u3 (tolerances will affect the resultant value). Note that there are three pads there on the bottom. This means you can use a 1uF electrolytic (top two pads) or a film cap with 5mm spacing.

The Weener Wah II also lets you use either axial or radial film caps for some components. These are C1, C5, C7, C6, C4, C9 and C3. The spacing for radial caps is 5mm (box caps or low voltage poly film). The axial spacing for these caps is 18mm.



You can choose from a variety of inductors. There are pads on the PCB to use the following types:



The Whipple inductor can be found on eBay. Note that the Vox and Dunlop arrangements we taken from two inductors I had from older models. Different or newer models may have different spacing. The Fasel spacing is standard, AFAIK.

The Sweep pot is listed as 100k ICAR taper. This is not the only type that can be used. Some pots offer different resistance values (150k or 200k) and/or slightly modified tapers. This is your choice. Any of them will work with the Weener Wah II, but I have only tested it with the standard 100k ICAR.

Setup

The Gain trimmer should be set at about 1/3 up clockwise nominally. This will give approximately 470 Ohms of resistance off the emitter of Q1. Adjust the Gain trimmer clockwise for additional gain.

T1 sets the bias for Q3. Using your DMM, connect the black lead to ground and the red lead to the pad marked TP. Adjust T1 until you read 4.5vDC on the DMM.

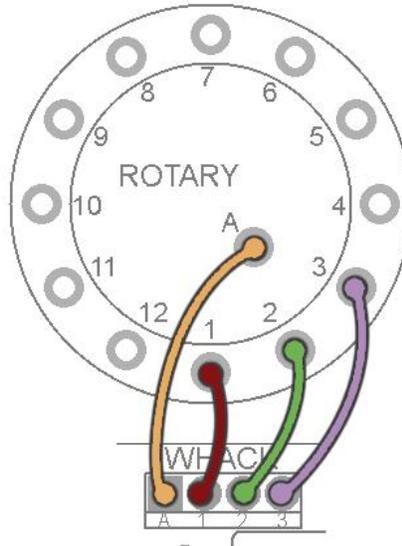
The Whack control lets you choose three different filter caps for the Wah. I have listed the values as 6n8, 10n and 15n on the B.O.M. These produce a nice range of filters, but are not the only ones you can use. Feel free to mix it up a bit. You probably do not want to go lower than 5n6 or higher than 22n.

You can wire the Whack control with either a rotary switch or an On/On/On DPDT. Both types of switches will fit in a wah enclosure, so it is only a matter of personal preference.

Rotary Switch: <http://www.smallbearelec.com/servlet/Detail?no=477>

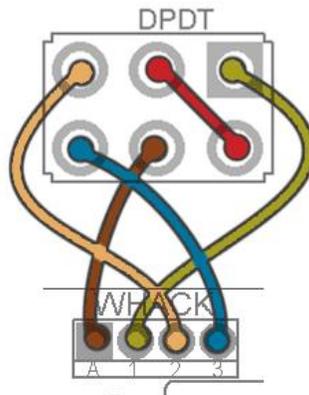
On/On/On DPDT: <http://www.smallbearelec.com/servlet/Detail?no=900>

Rotary Switch Wiring



You don't have to use a 1P12T rotary. You could use a 2P4T, or 4P3T...just wire one set of poles and terminals!

On/On/On DPDT Wiring

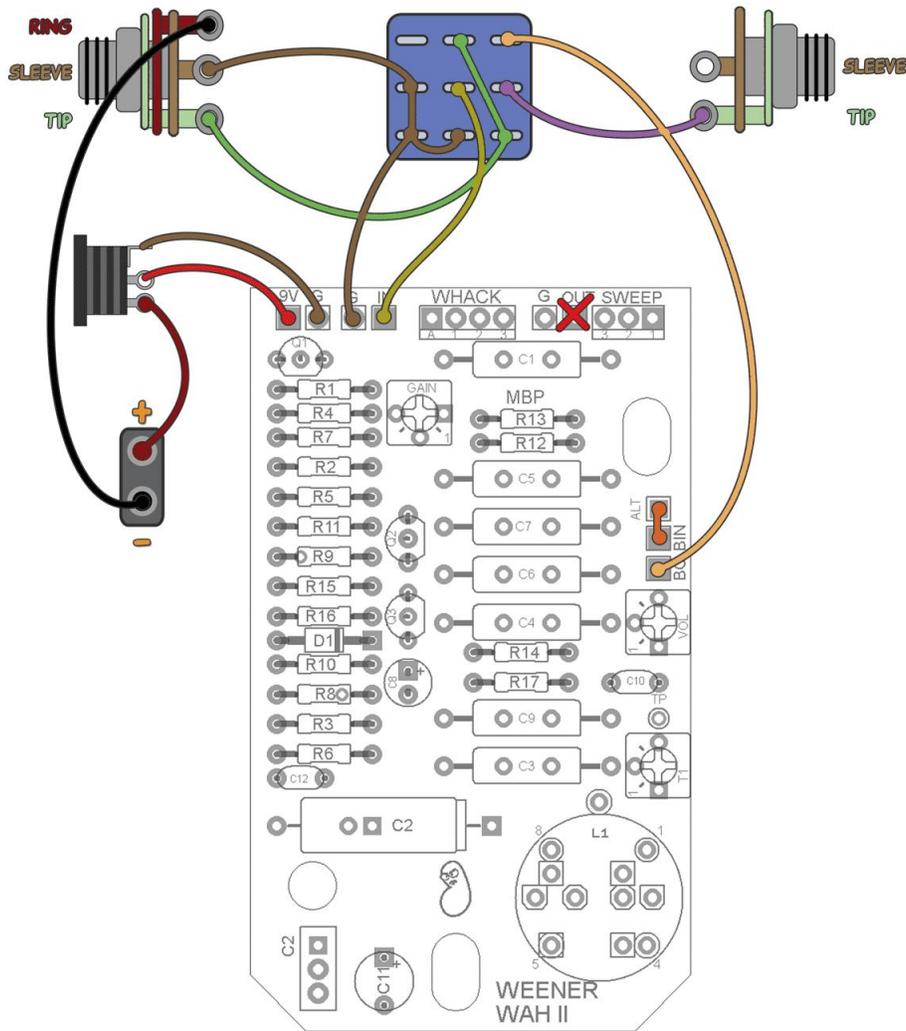


With this wiring, C6 is selected in the middle position. C7 and C5 are selected in the two outer positions.

The Weener Wah II has an independent JFET-based boost circuit that you can use. You can wire the boost section as bypass-able or hardwired to the output of the Wah circuit (not recommended). The boost circuit has a fair amount of gain on its own. It can also drive the front end of an overdrive at high settings of the Vol control. Lower settings of the Vol control produce little gain and close to unity output. The advantage of the low Vol setting is that it has a low impedance output that will work in front of fuzz pedal (a very common problem with traditional Wahs).

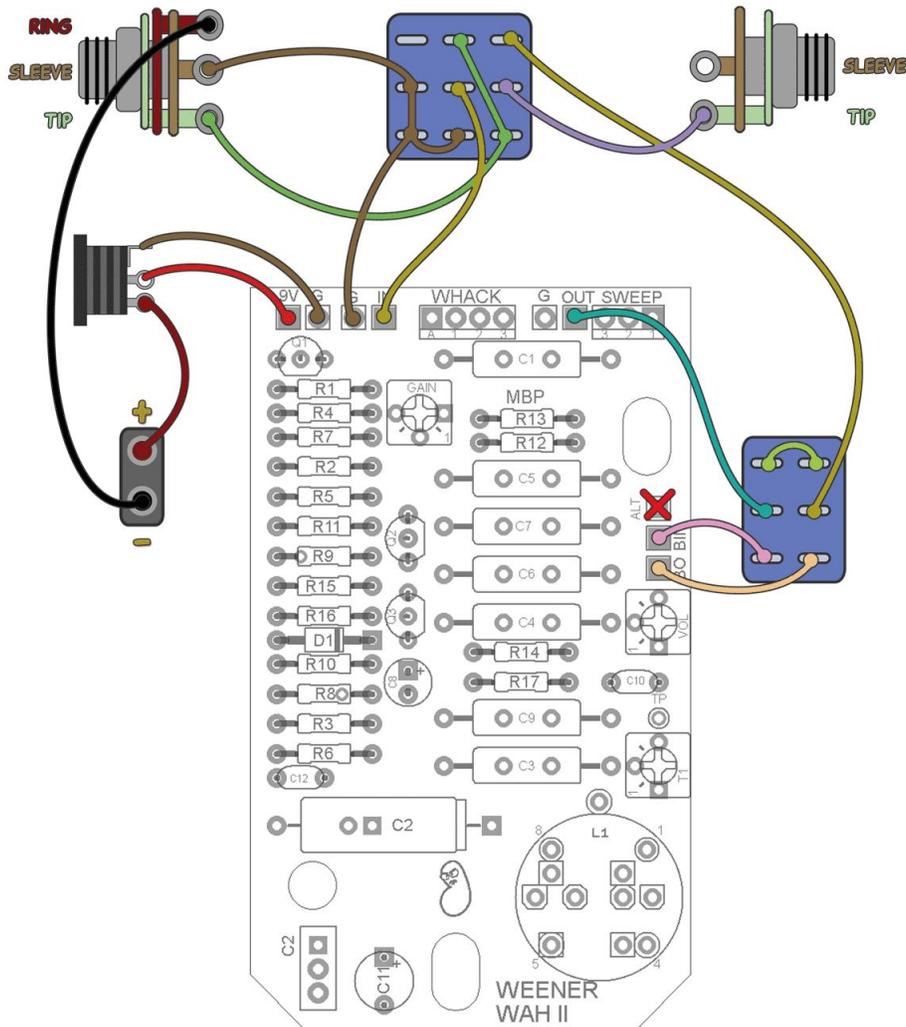
If you are going to use the boost, I recommend wiring an actual 100kA pot instead of a trimmer for the Vol control. If you do not wish to use the boost function, simply omit all the parts between BIN and BOUT on the schematic: it is completely independent of the Wah circuit.

Hardwire the Boost (always on – not recommended)



In this case, the OUT pad on the PCB is left unconnected, and the ALT and BIN pads are jumpered. This connects the output of the Wah to the input of the boost. The boost out is then connected to the 3PDT.

Bypass-able Boost (recommended)



In this example, the OUT pad is wired to the center of a DPDT (On/On) toggle switch. When the switch is “up”, the boost is bypassed. When the switch is “down” the OUT connects to the boost input, and boost output connects to the 3PDT. Note that the ALT pad is omitted.

Other considerations

If you are building a Wah, you are going to have to have a wah shell, obviously! Smallbear does offer blank shells at a decent price. You can typically find cheap wah on eBay or Craigslist which you can re-purpose for the **Weener**. An old, cheap Crybaby is a good candidate. You may even be able to get a decent inductor off it, too.

There are three mounting holes on the PCB; one round and two slotted. Note that there are a variety of shells out there, and not all are standardized so there may be some variance in screw or hole placement. I measured the mounting holes using two older Crybaby shells, so it should cover *most* needs.

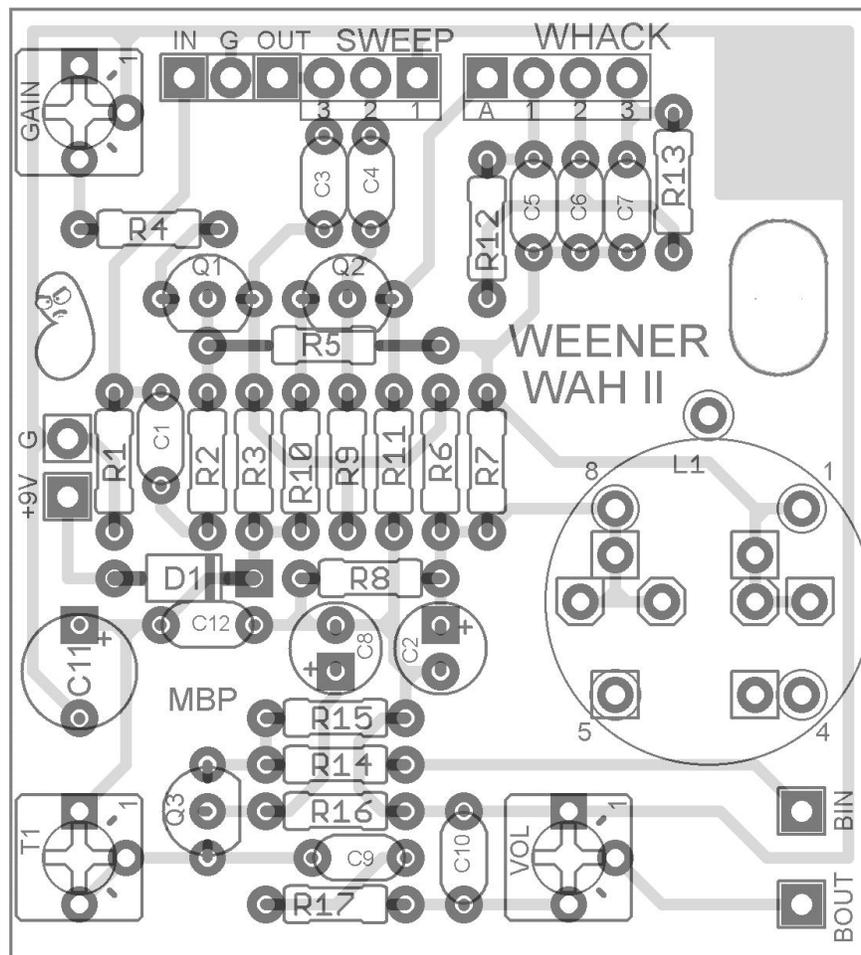
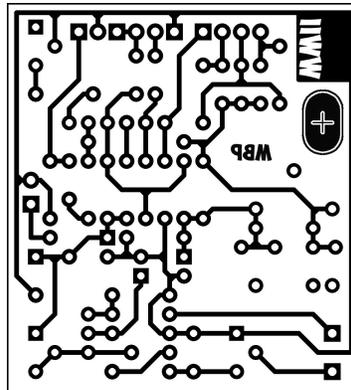
Wah shells are pretty tough. They are thicker than the average Hammond type enclosure. Make sure you use a fairly new bit if you are going to drill any extra holes. You can also apply some oil to your bit to facilitate drilling.

If you are going to use a 3PDT switch for bypassing for the purposes of applying an LED indicator, please note that the actuator shaft of the 3PDT is a bit short compared to a DPDT or the older SPDTs. However, I found that if you remove the bottom nut of a 3PDT and mount the base directly to the enclosure, then use the locking washer and nut on the top side of the shell, the actuator is just the right height for the wah plate to engage it.

Lastly, you need to grease your **Weener**. Rather, you need to grease the rack and pinion where the pot and shell connect. There are a number of greases you can use. I use lithium grease purchased from an auto-parts store that cost about \$3. There's enough in the container to build probably 100 wahs.

Single Sided Layout

1.85" W x 2.05"H



The single sided layout is exactly the same circuit, but does not have the option for axial caps.