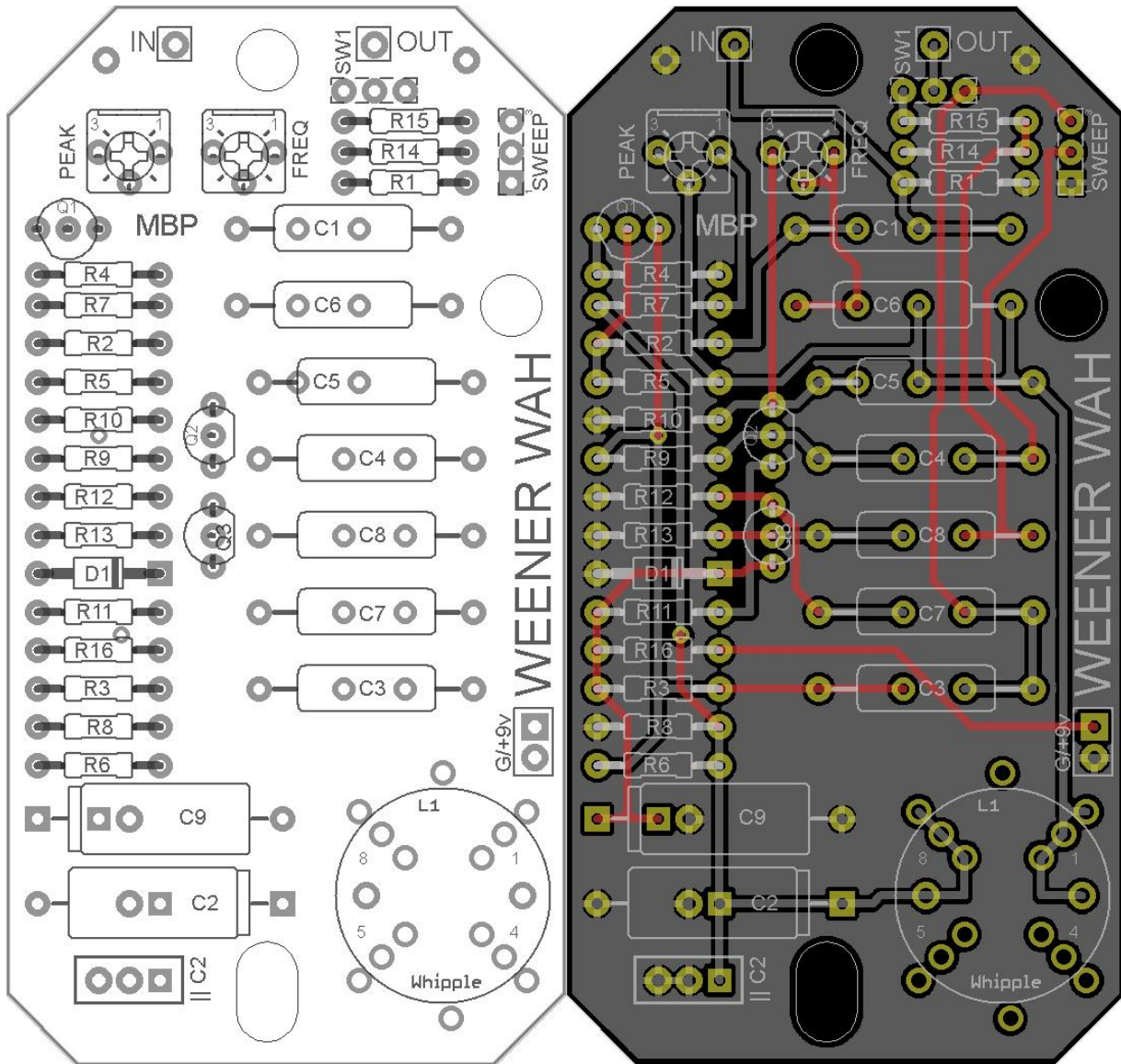
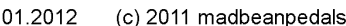


# WEENER WAH

01.2012 madbeanpedals  
PCB Dimensions: 1.825" W x 2.85" H





Resistors		Caps		Diodes	
R1	1M	C1	100n	D1	1n4001
R2	68k	C2	4uF	Transistors	
R3	22k	C3	220n	Q1	2n3565
R4	390R	C4	220n	Q2	BC549C
R5	2k2	C5	3n9	Q3	2N5457
R6	470k	C6	100n	Inductor	
R7	33k	C7	47n	L1	Whipple
R8	100k	C8	220n	Switch	
R9	470k	C9	47uF	SW1	SPDT
R10	10k			Trimpots	
R11	1k			PEAK	100k
R12	1M			FREQ	100k
R13	10K			Pots	
R14	10k			SWEEP	100k ICAR
R15	1k				
R16	1k				

## What Is It?

The **Weener Wah** has roots in the classic Clyde McCoy but with some useful and more modern features to meet the demands of today's sophisticated guitar player....or something.

One of the biggest complaints in older Wah Wahs is the incredible tone sucking they exhibit. This was a consequence of the in input of the circuit always being present even when bypassed, and thus loading down the output of the guitar. The prevalence of DPDT and 3PDT switches nowadays makes this easy to rectify, and the **Weener Wah** will not suffer from any loading whatsoever provided you use one of those types of switches.

A switch-able output buffer has been added to keep the output level as close to the bypass as possible, and to lower the overall output impedance of the effect.

Additional controls have been added to fine tune and personalize allowing the builder much more tweaking ability than a standard wah. Extra pads have been included to allow for a variety of inductors, as well.

## Controls

**Sweep** – This pot controls the range of the Wah Wah filter and is what your foot controls with the pedal.

**Peak** – This trimpot lets you adjust the Q of the resonant peak of the Wah filter from gentle to sharp.

**Freq** – This trimpot allows you to adjust the frequency of the resonant peak. Fully counterclockwise is very dark and clockwise is bright.

**SW1** – This switch lets you bypass the output buffer if you want to run the **Weener** before a fuzz-type pedal.

## Mods

**C1** – lowering this to 10n will reduce the overall bass.

**R2** – lowering this to 47k or 33k will increase the output.

**R4** – A socket is recommended here to experiment. Lower values from the stock 390R will increase the gain and dirtiness of the wah. Higher values such as 470R or 560R will clean it up. If you jumper **R4** instead of using a resistor, it will connect the emitter of Q1 to ground. This will make a very dirty, dirty, bad, bad wah that deserves to be punished.

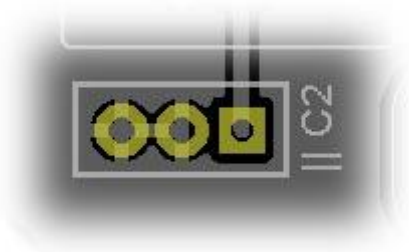
## Notes

WTF.....4uF?

**C2** is listed as 4uF, which is not at all a common value by guitar pedal standards. It was very common in older wahs, though. Typically you will see newer wahs using 4u7 for this cap.

A 4uF cap is not required to make the wah operate properly, but my advice is get one if you can. If not, don't worry about it! Or, use this convenient mod to approximate it:

*On the bottom left of the PCB there is a rectangular area labeled "||C2", which means "parallel to C2". This space allows you to add a secondary cap to C2 in parallel, which you should know means the resulting capacitance is additive. So, you could use, for example, a 2u2 for C2 and another 2u2 for ||C2 to get about 4.4uF. Or, you could use a 1uF and 3.3uF to get a little closer to 4uF. You could even use forty 100n caps in series to get 4uF, but this would not only sound terrible but make your wah approximately the size of a toilet seat.*



Where can you get a 4uF electrolytic cap? Here!

<http://www.mouser.com/ProductDetail/Vishay-Sprague/TE13021-E3/?qs=sGAEpiMZZMtZ1n0r9vR22beeiJol0EpCZfexeJLBHfY%3d>

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A 2n3565 is suggested for **Q1** and BC549C for **Q2**. These are not required and you can use any number of BJTs here. However, this particular combination sounds very, very good. Substitutions include 2n3904, 2n5088, and similar. Note that the pinout for the BC549C is 180° opposite of a 2n5088.

While the schematic lists the Whipple as the chosen inductor, this is not a requirement. You should be able to use a number of other wah inductors on the **Weener**, including the Red and Yellow Fasel type. There are additional pads around **L1** on the PCB to allow for some flexibility in mounting it.



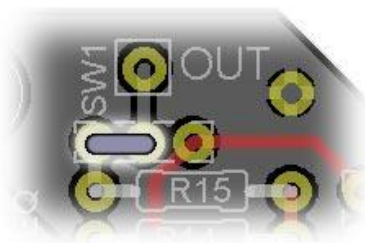
The green and red highlighted areas are for the two inductor pins. The pads in the green area are connected to together and the pads as are the pads in the red area. The area with the blue highlight has extra pads for connecting mounting pins on your inductor, if it has any. For example, the Whipple inductor has five mounting pins. One that goes in the green area, one in the red, two on opposite sides in the blue area and one at the top (by the L1 label).

The Fasel inductors typically have two pins. These should mount properly on the two pads in the middle, where the distance is 12.5mm between pads.

Other inductors may have slightly different spacing on the pins. You will either want to use some of the extra pads included to mount it, or use a small adaptor board such a perf board or vero in that case.

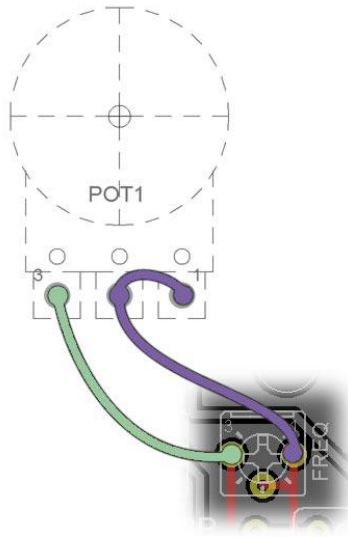
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The buffer bypass switch is also a good idea for making the **Weener** work best with different pedal setups. I do recommend you use it. If you prefer not to use the buffer bypass, simply jumper the middle and left pad of **SW1** together to keep the output buffer always connected.



If you instead want to bypass the output buffer altogether, connect the middle and right pads of **SW1**

I highly recommend making the **FREQ** control external rather than a trimpot. The FREQ control gives you a very wide range of resonant frequencies for the Wah, and allows you to dial in some sweet spots. See below for some mod suggestions on other ways to implement the FREQ control if you want to experiment.



The **PEAK** control, while useful, is mostly “set and forget” in my opinion. You can certainly make this an external pot, too, but I found it to be unnecessary.

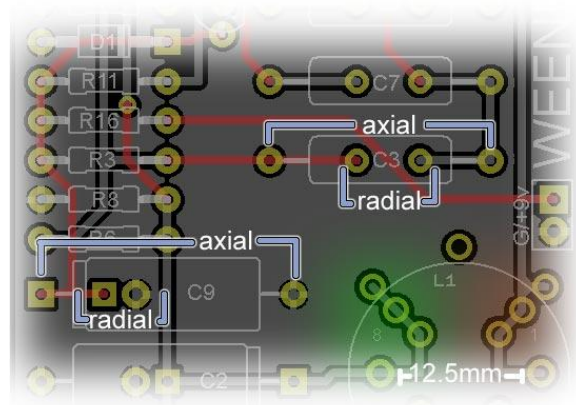
There are alternatives to using just a plain pot for the **FREQ** control. Here are some ideas:

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- A notched pot, which typically has 10 or 11 detents, will give you the same range as a regular pot, but allow you to turn it in fixed increments. This might be helpful for keeping the pot in a fixed position if you find a sweet spot, but still offer the flexibility of changing it.
  - A rotary switch could be used in place of the pot. In this application, you would typically use something like a 3P4T or even a 1P12T rotary to utilize any number of fixed capacitors. In this case, you would omit the **FREQ** pot altogether, and **C6**. Leave **C5** in, but wire the two pads to the rotary switch so that each cap is added in parallel to **C5**. Typical values might be 22n, 47n, 68n and 100n.
  - Lastly, Smallbear offers a 9mm 1P6T rotary switch that works perfectly for the same kind of application, but in a much smaller package. This switch is here: <http://www.smallbearelec.com/Detail.bok?no=581>. This switch works best by using a small breakout PCB or a bit of perf. Note that I do not offer PCBs for this switch, so it's up to you to make that one work 😊
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## Licensing

The user may utilize a purchased **Weener Wah** PCB from madbeanpedals for DIY/non-commercial purposes. You may not use the artwork to sell your own version of the PCB design or as part of a “kit” or similar commercial product.

You can use either axial or radial caps for the **Weener Wah**. The radial spacing is 5mm and is similar to most other madbeanpedals projects. The axial spacing is about 19mm or so. Something like the Mallory 150's would be a good choice for axial film here. It's possible to use Orange Drop caps, too, like the Sprague 715 or 716, but note that this might require some finessing since they are physically large caps. The 100n and 220n Orange Drops are pretty huge!



### 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. There is one round and one slotted hole in the middle area of the board. These will fit through the long screw bodies that poke through on some shells. There is one other round hole on the top right, and this is where you can actually attach the **Weener** PCB with a screw. 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.