The Boss Blues Driver "Brent Mason" modification (as of 9-09), as created by Brian Wampler, Wampler Pedals, Inc.

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BD-2 BLUES DRIVER

Brent Mason mod	
C14	.1uF
C17	.01uF
C19	.01uF
C100	.22uF
D9	LED AND .001uF CAP IN PARALLEL D10(SEE IMAGE ON NEXT PAGES)
D10	LED
D3	LED
C10	.1uF
C35	.047uF
C34	.1uF
C27	.0022uF
C7	1uF

About the circuit:
The Boss blues driver is one of those pedals that everybody has owned or at least played through once. I'd venture to say it's nearly as popular as the beloved tubescreamer.

While many players like the sound of the stock pedal just fine, many other guitarists like the basic tone but just want it better – more organic, responsive, and dynamic. Some feel that there are just way too many high frequencies in the pedal, making it sound brittle… especially with a single coil guitar into a clean fenderish type of amp.

Let's discuss some modifications we can do to this pedal to make it much better.

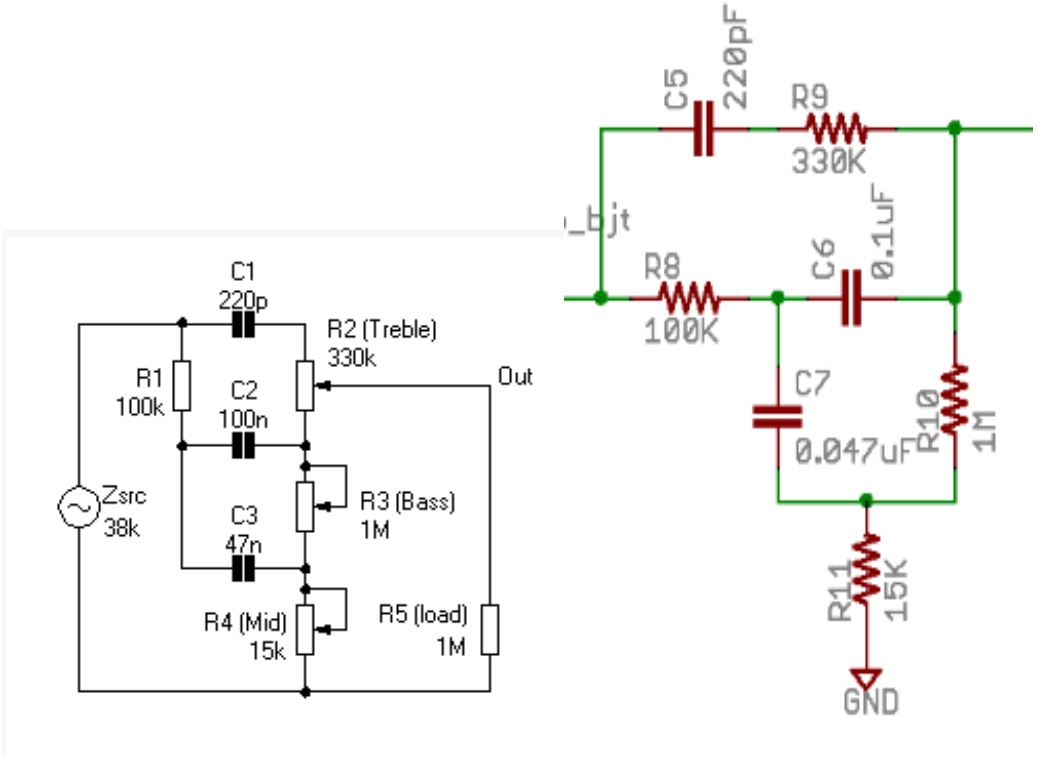
First though, let's break down the circuit a bit and see what is going on. Looking at the schematic we see that it is essentially two cascaded discrete op-amps which is then followed by a standard op-amp for gain recovery, bass boosting, and buffering of the signal. This is after it goes through a discrete buffer of course.

In laymens terms, a discrete opamp is similar to the IC chip version except that it does the same thing in a simpler fashion and in a way that some feel is more responsive and less 'sterile' feeling and sounding. It uses two FETs facing each other followed by a bipolar transistor. There are two of these type of gain stages in the bd-2, controlled by a dual gang 250k pot wired as a variable resistor. Just like the IC opamp circuits, there is a resistor/capacitor pair going to ground that will also help set a frequency to clip. This pair will also help set the gain, though they are fixed values in the bd-2. R31 and C22 are the pair for the first stage, while R15 and C9 are the pair for the second stage.

We know that eq before clipping determines the clipping feel, tonality, and response (distortion/overdrive) quite dramatically. For example, if we want a fuzzier type of distortion, we want to increase the bass before it is clipped. Then, we clip the signal as much as possible without creating a lot of noise or oscillations.

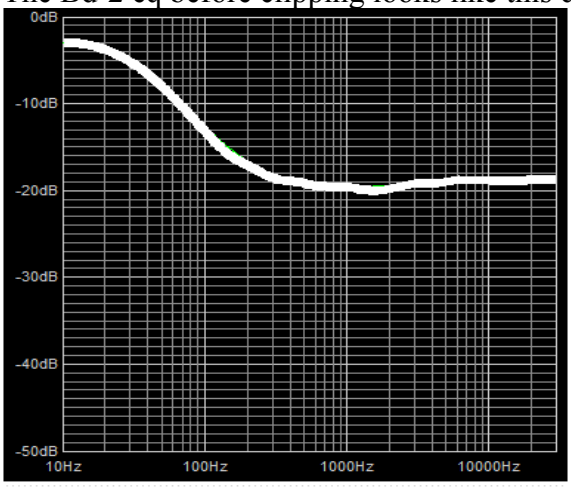
R31 and C22 in this first gain stage set a frequency of just a hair over 700hz. This is a normal frequency for most overdrives and distortion. If you want more fuzziness, increase this cap to .22uf (microfarad) or larger. If you want a tighter crunchier type of tone, make the cap smaller. If you plug in these values to my calculator at http://www.indyguitarist.com/filter.htm you will see the frequencies you can affect.

After this first gain stage we go through what first looks like an odd tone filtering stage. Upon closer look, it is actually a fender type of 3 band tonestack with fixed values(with the treble on 0 and the bass and mid on 10)! This is a really cool thing to mess with because if you want to go hog wild, you can add trim pots in place of R37 (use a 250k trim pot for treble), R50 (use a 1M trim pot for bass), and R51 (use a 25k trim pot for mids). In addition, you can change the 'slope' resistor, R36, to a 33k, C34 and C35 to a .022uf, and change C26 to a 470pf in order to get more of a 'Marshall' type of tonality before the signal is clipped. When you are replacing these resistors with trim pots, just connect one hole to pin 1 on the trim pot, and the remaining resistor hole to pin 2 on the trim pot. Leave the 3rd lug untouched.



traditional fender tonestack bd-2 tonestack

The Bd-2 eq before clipping looks like this due to this filter:



Notice how there is a TON of bass present? That is before the majority of the clipping is happening, so it's no wonder that the pedal sounds fuzzy when the gain is turned up!

A good mod at this location is to make R50 a 100 ohm, and change R36 to a 47k. That will give you a much flatter eq response.

After that the signal is clipped by diodes connecting to ground (D7, D8, D9, D10) with two diodes on each side and fed into another discrete opamp. This opamp is nearly identical except the frequency response is a little different. There is more gain in the bass (set by R34 and C24, frequency is about 72hz) but it works the exact same. Notice that since the bass is boosted yet again here, it's really no surprise that the bd-2 would be so fuzzy with the gain turned up.

C17, R25, and C19 from both a high pass and low pass filter, which will get rid of some high harmonics about 5k or so, as well as try to get rid of some of the bass content that was created by boosting the lows so much previously.

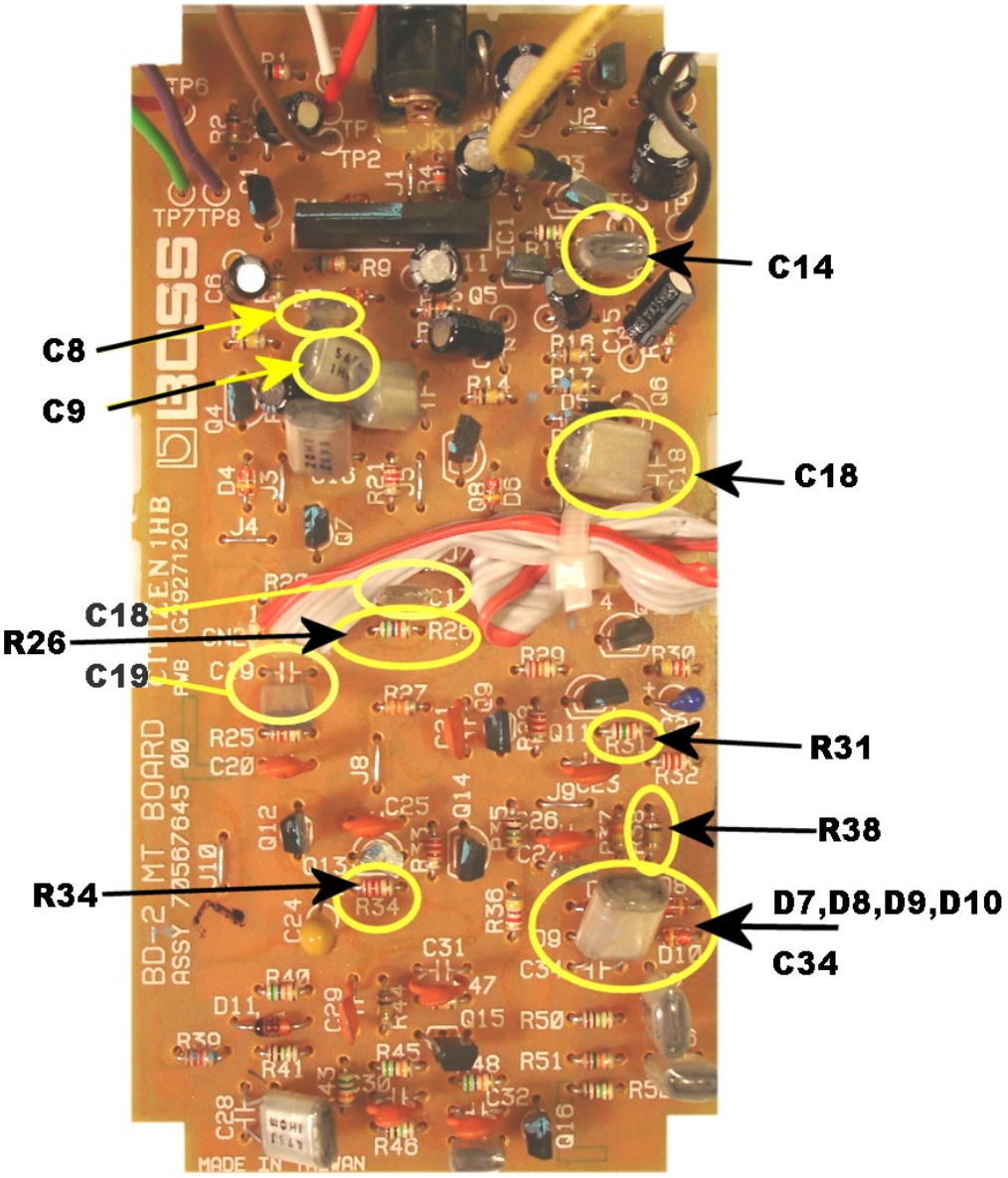
From here, the signal goes through a fairly standard tone control very similar to that of an old Fender tweed Princeton. It acts as a hi pass filter with the tone knob turned up and a low pass filter with the tone knob turned down. So, as you turn up the tone, you increase the highs and lose some bottom end once you are past about halfway or so. Changing C100 will change what frequencies of highs you have with the tone control up, and changing C101 will change what frequencies are filtered with the tone control turned down. The volume control is next before going into the next stage – the eq stage.

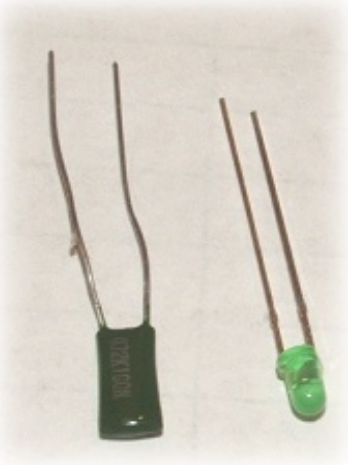
The next stage is a simulated inductor which is boosting the bass content at about 120hz or so by 6db. Even though there are diodes in this stage (D1 and D3), they aren't really clipping much at all like diodes usually are in an overdrive or distorton circuit – it is actually more to protect this opamp from being slammed with a loud and hard signal. It also does a little bit of filtering as well as help to output a low impedance signal. Changing these diodes to a different type WILL give a little bit different 'feel' however – it becomes a little less compressed if you use LED's, and becomes a bit more compressed and filters out a little bit of highs if you use germanium type diodes. My inclination is that this is probably due to varying degrees of harmonics being just *ever so slightly* clipped.

If you want to mess with the eq, there are several ways to do it. You can mess with changing the cap sizes of C9 and C16, or changing R21. Changing the caps can get you much more frequency options, just by subbing in various values. Increasing the resistance lowers the frequency and decreasing it raises the frequency to a point as well. You might even try subbing a 5k trim pot here just for fun! ☺

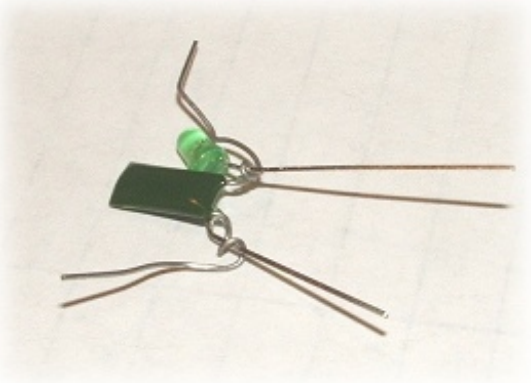
From here it goes into the switching circuit and then to an output buffer. Even when in bypass the pedal is going through three discrete buffers.

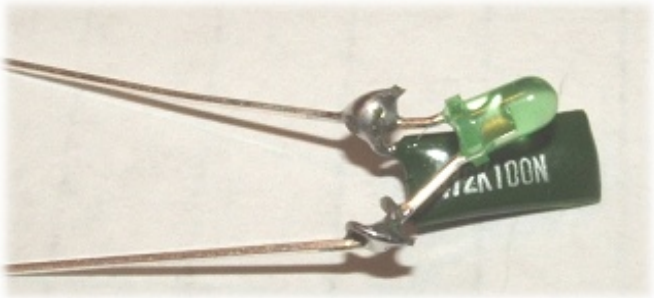
Note:
To make the pedal tailored towards low to mid gain applications, change r29 and r27 to 4.7k resistors.



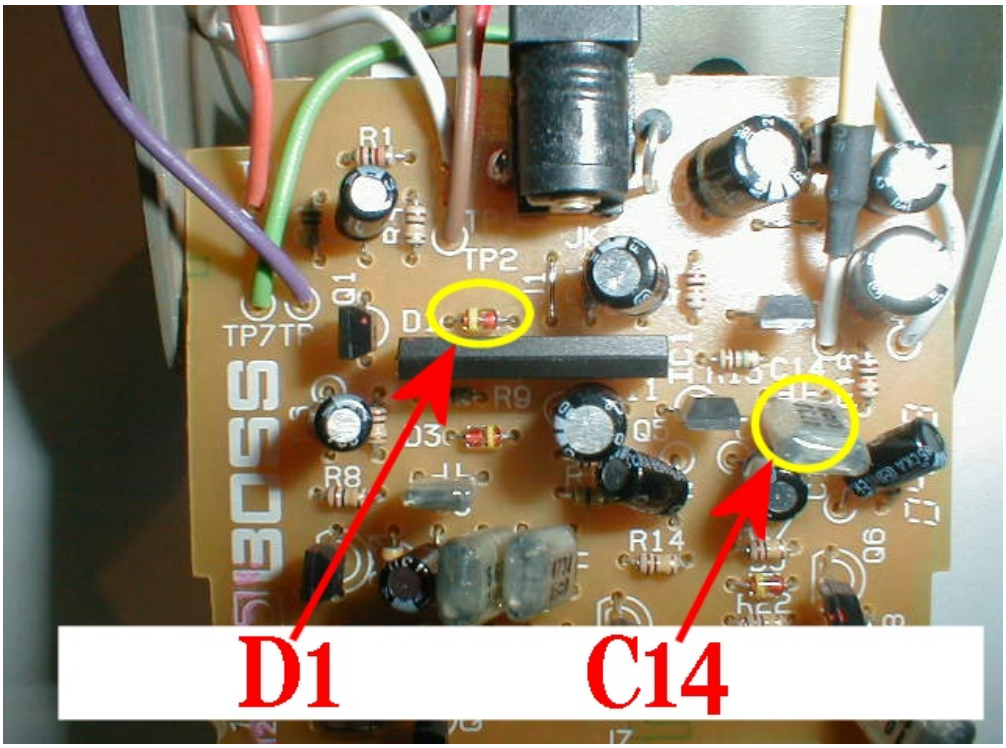


D9, (Led & .001 to .0047 cap in parallel)- this is what it will look like before you solder it together





After you solder them together, cut the excess legs off of the capacitor


R1
TP2
JK
TP7
D1
R9
D3
R8
R14
C14
BOSS
D1
C14

BD-2 Schematic without switching