

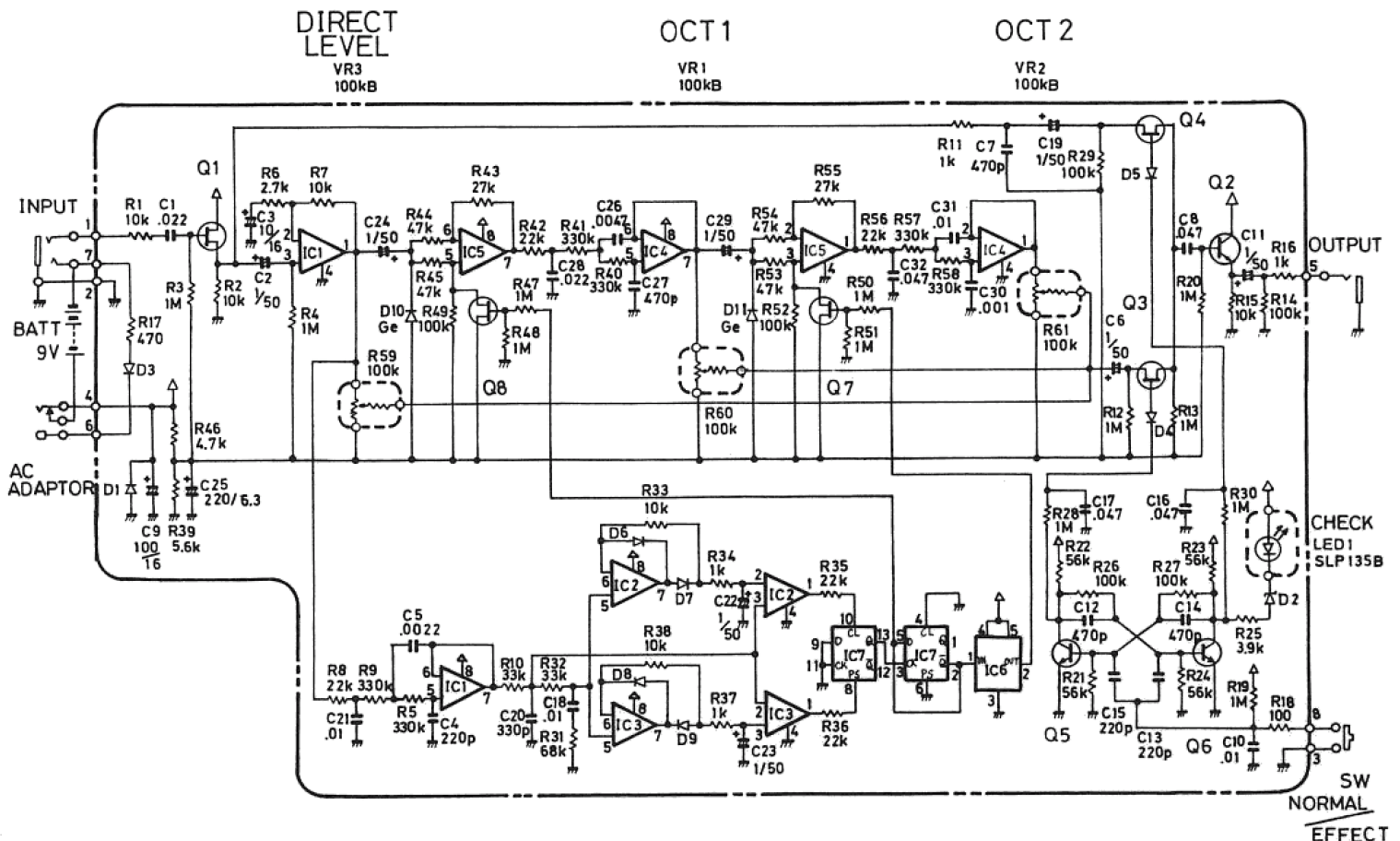
Rob Mods

Boss OC-2 Mods

January 2021

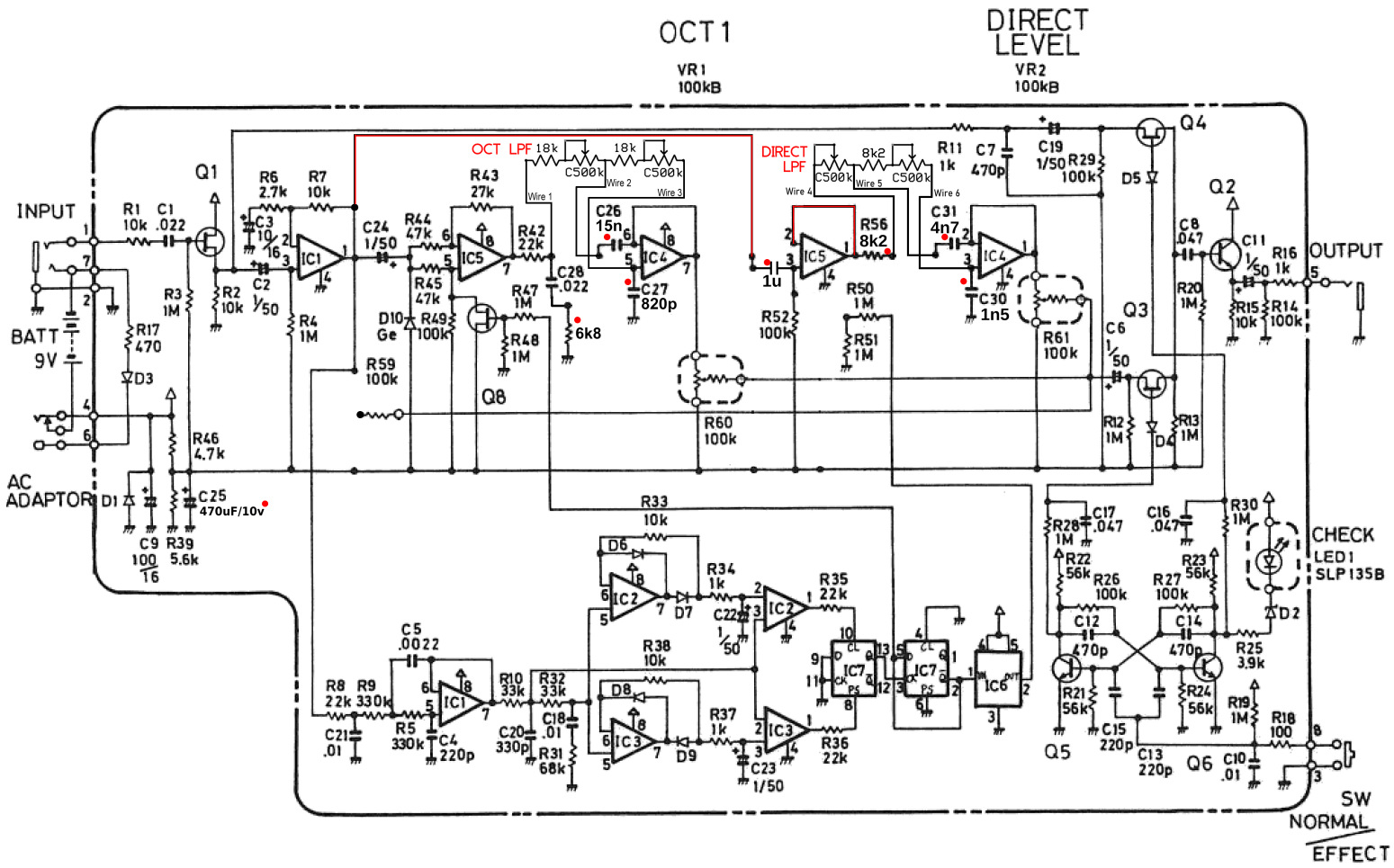
By rewiring the original circuit, I've added adjustable low pass filters for both the octave effect, and the direct signal.

Here's the original 1982 schematic:

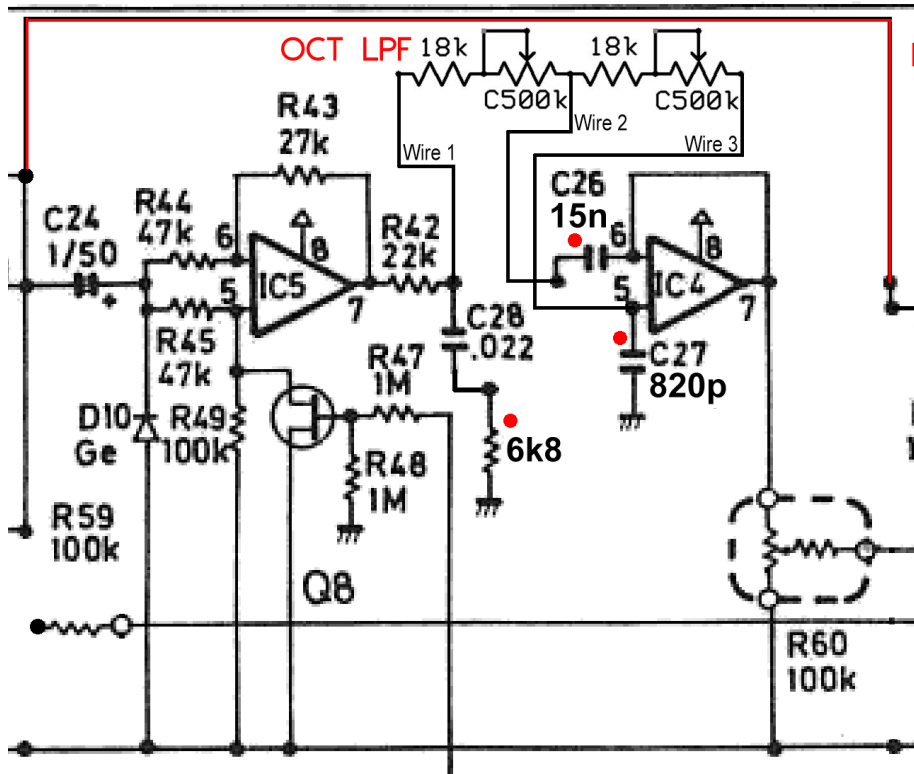


My pedal is missing its label, but it's a Taiwanese ACA model, so it was made sometime between 1989 and 1997. From my memory of buying this pedal, more likely it is early to mid 90's. It is (was!) exactly as shown in this schematic, however manufacturers change and tweak designs, especially as parts become obsolete, so yours may not match. For example, at some stage, I believe IC6 was changed from a single T-type flip flop (BA634) to a 4027 dual flip flop. I can't imagine this would effect the tone or response of the pedal. If it did, it would only be the second octave down, which I'm disabling as part of these mods.

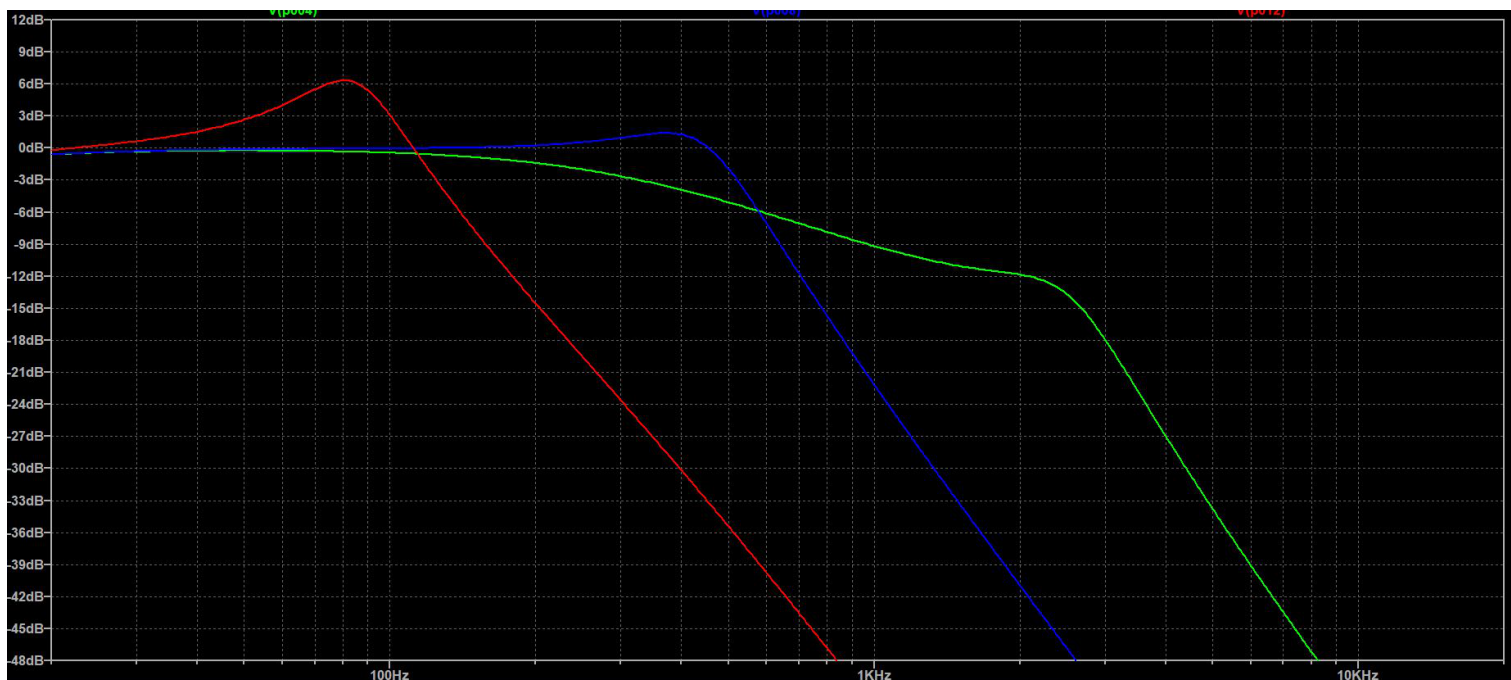
Final Modified Schematic:



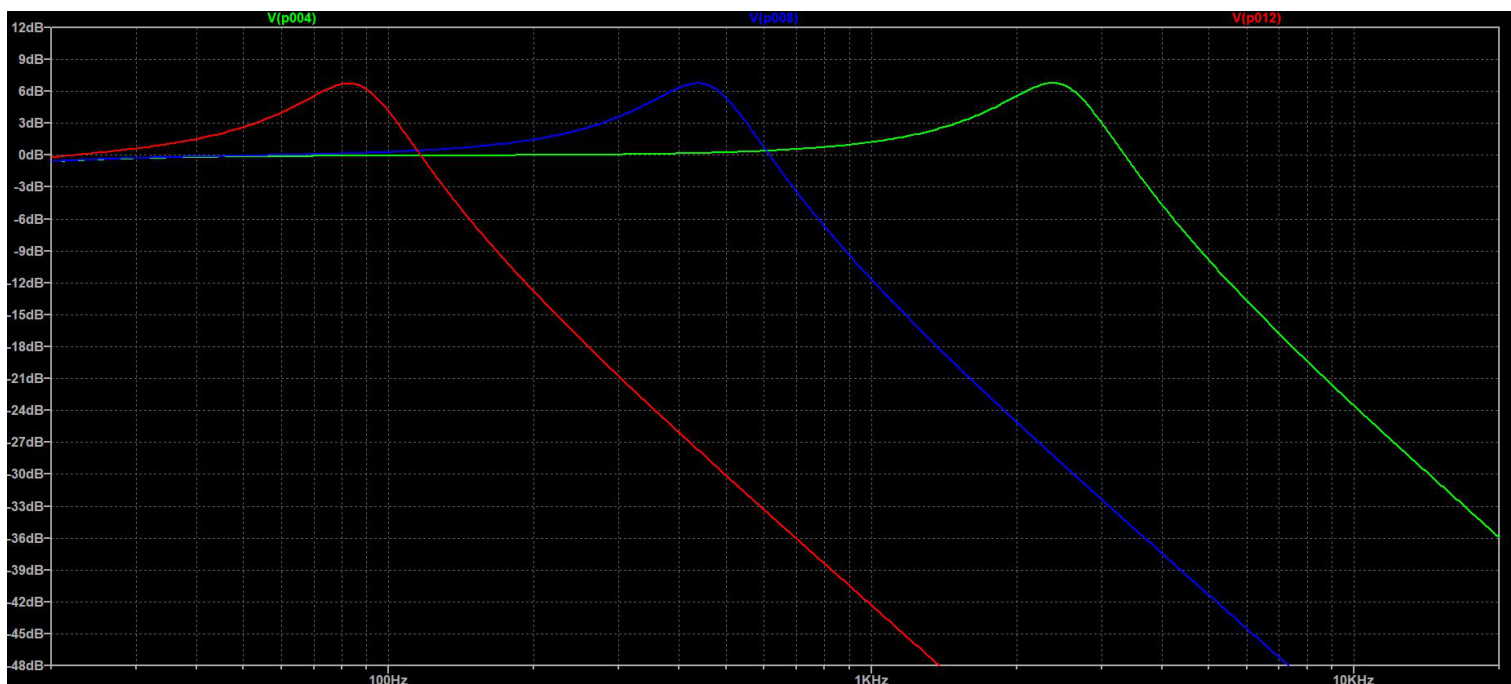
OCT 1 Low Pass Filter Mod:



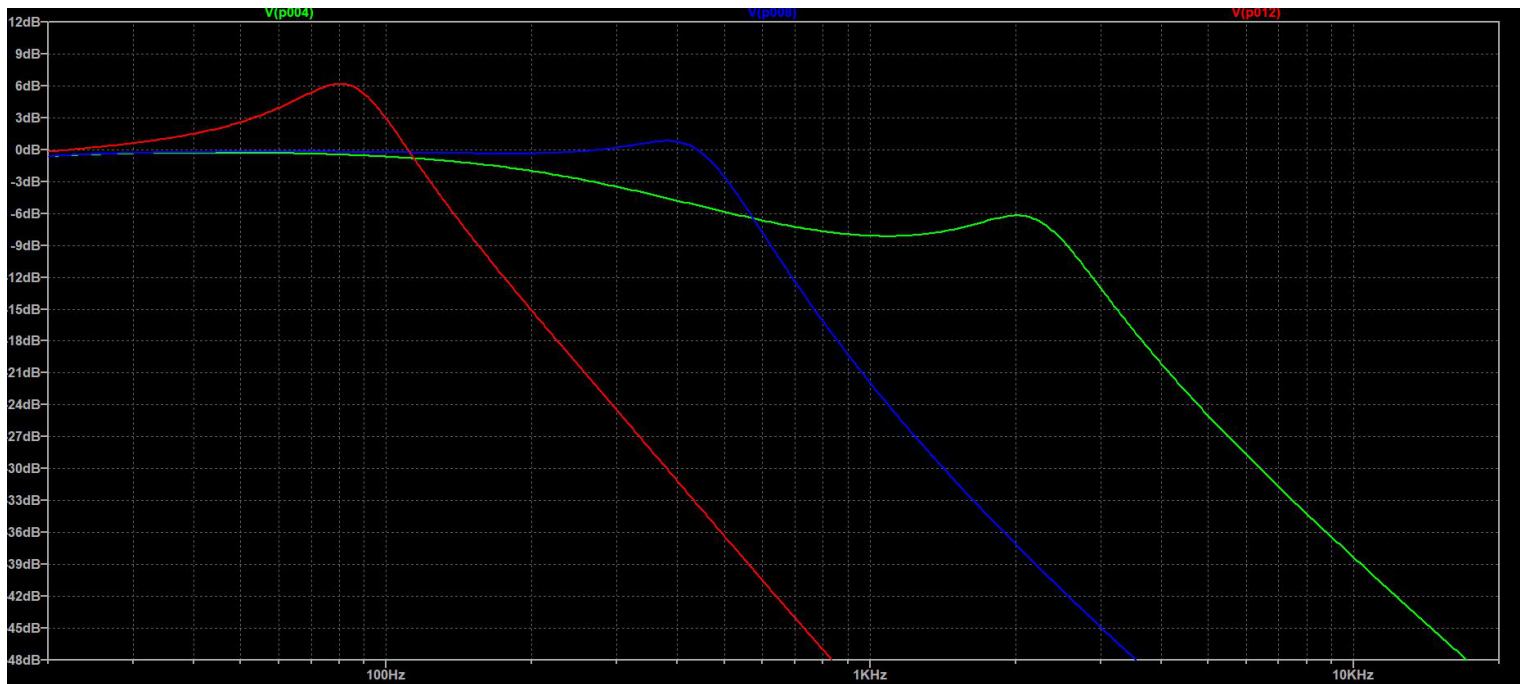
The two 330k resistors (R40, R41) have been removed and replaced with a dual gang C500k potentiometer and two 18k resistors. This means the Sallen-Key part of the filter is adjustable from 85hz to 2.4khz.



After the video was posted, I experimented with the tone of the octave effect some more. I was finding it a bit too dark. Initially I removed C28 and replaced R42 with a short. This left just the 2nd order part of the filter.

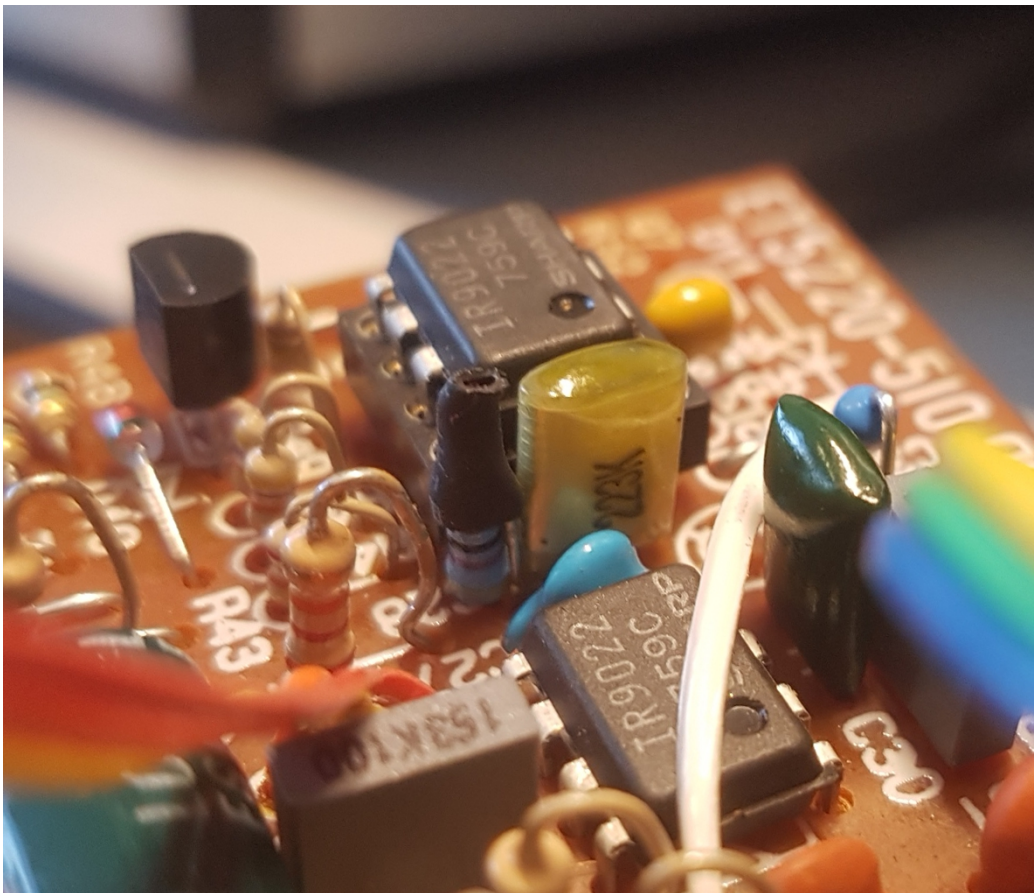


For my ear, this was too bright, so I returned R42 and C28, but placed the 6.8k resistor in series with C28.



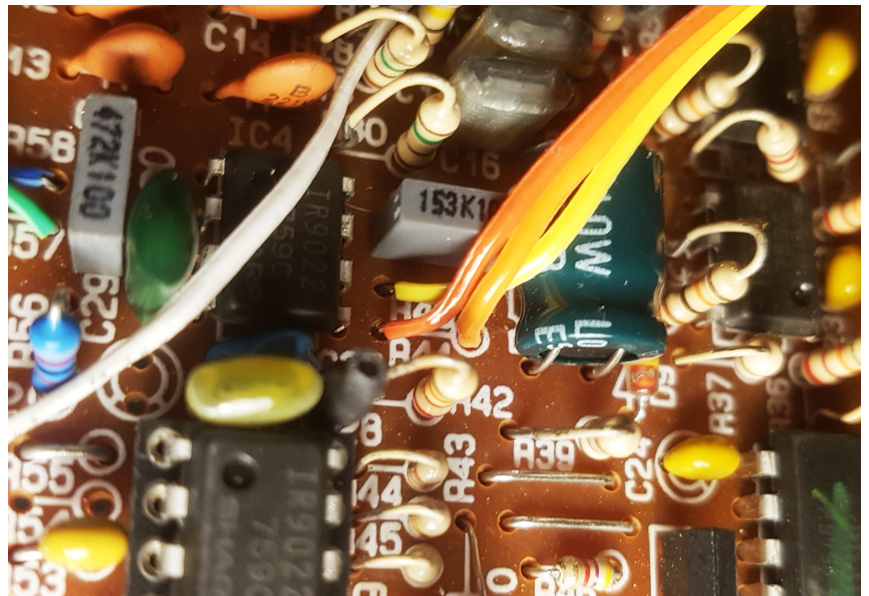
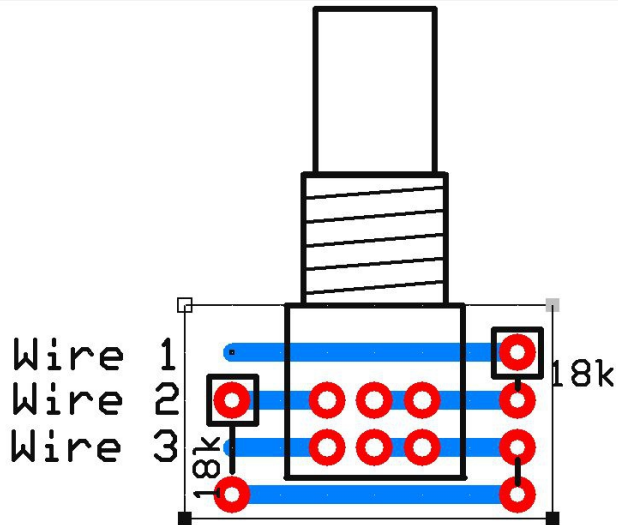
With the pot at 11 o'clock, it is faithful to the original filter. But when the tone is turned up, it is synthy without being too fizzy.

The resistor is squeezed in beside the cap, standing on end.



The heatshrink was there in the off chance the connection should short to the top of the enclosure.

The pot and the two 18k resistors are mounted on a small piece of stripboard.



In the first video, the OCT2 pot was removed, and my new LPF control was put in its place. A 100k resistor was installed between pin 1 of IC4 and the Vref, using the solder pads vacated by the original OCT2 Pot. This was to tie the op amp's output to virtual earth.

Direct Signal Low Pass Filter Mod:

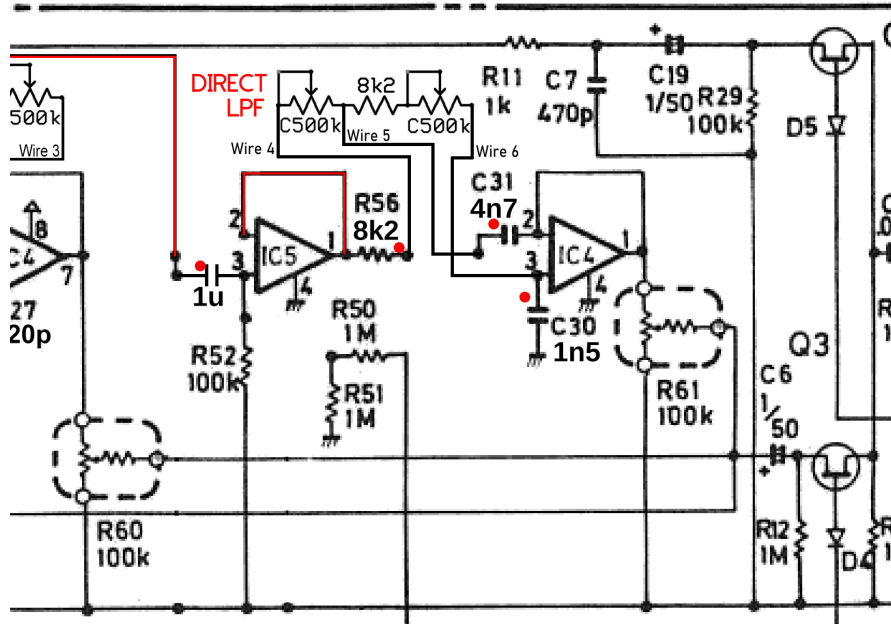
In part 2, I decided to also have a low pass filter on the original signal. This meant repurposing the now unused part of the circuit that creates and filters the lower octave signal. The op amp at pins 1,2 and 3 of IC5 was rewired as a non-inverting buffer, and the filter was made adjustable similar to the first mod.

OCT 1

VR1
100k Ω

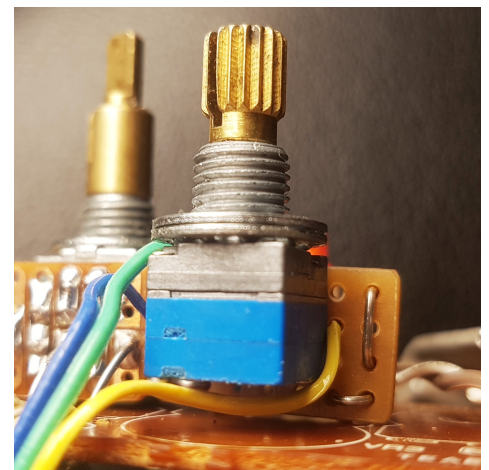
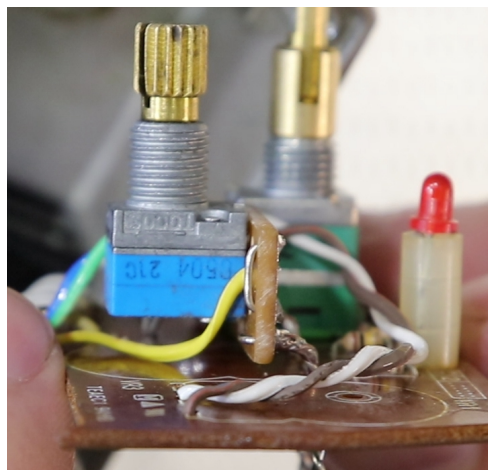
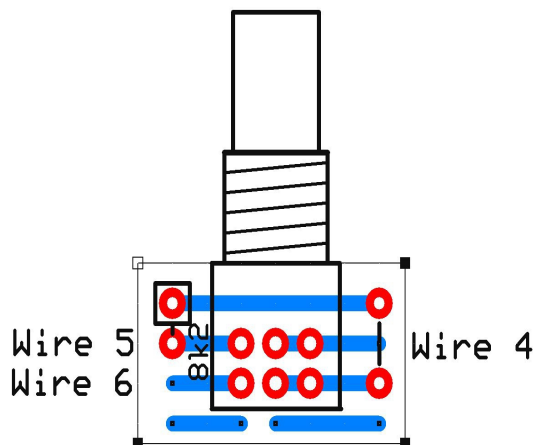
DIRECT
LEVEL

VR2
100k Ω



To create the buffer, C29, R54, D11 and Q7 were all removed. R55 was replaced with a short, R53 was replaced with a coupling cap. To convert the fixed 3rd order filter to an adjustable 2nd order LFP, R56 was replaced with an 8.2k resistor, C32 was removed, C31 was changed to 4.7nF, C30 was changed to 1.5nF, and the two 330k resistors (R57, R58) were replaced with the dual gang C500k pot and another 8.2k resistor.

The pot and 8.2k resistor were mounted on a small piece of stripboard. The spare track was cut into two lands so pieces of hook up wire could be used to hold the original upper circuit board since all three original pots would be removed.

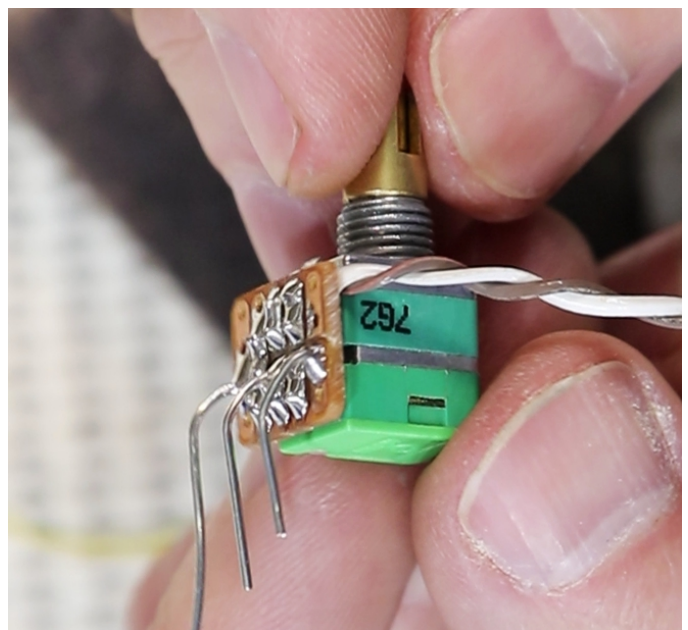
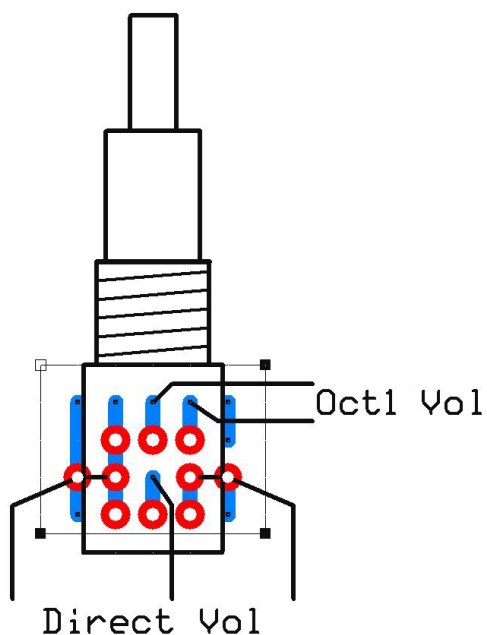


Stacked Volume Controls:

The direct and octave volume controls were combined using a mini B100k dual concentric potentiometer. I also needed to buy a set of knobs for this. Pedal Parts Australia and Small Bear Electronics stock both these parts. I bought silver, then painted it to match the original Boss knobs. I also shortened the upper knob by 6mm as it was sticking up way above the others and much higher than the footswitch.



I soldered the stacked pot to a small piece of stripboard. I also used a drop of hot glue to centre it before soldering it in place. Notice the two left-hand tracks are not cut. Both left-hand (anti-clockwise) pot lugs go to the Vref, so you only need to run two wires across to the OCT1/VR1 solder pads.

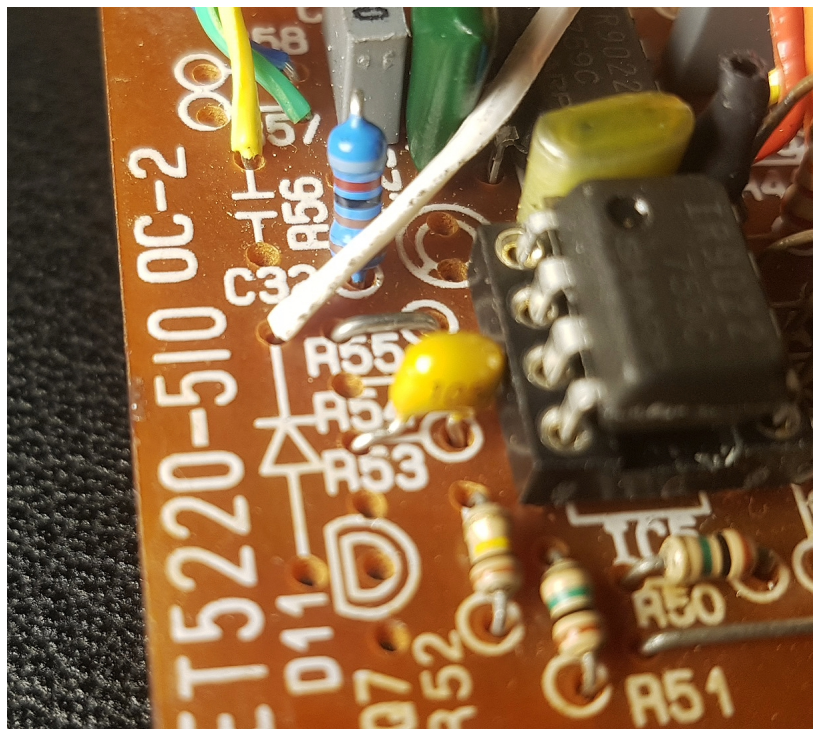


Obviously I've removed the 100k resistor that was used in the first mod, now VR2 has been reinstated as the post-filter direct signal control. (Lower gang / upper control of stacked pot.)

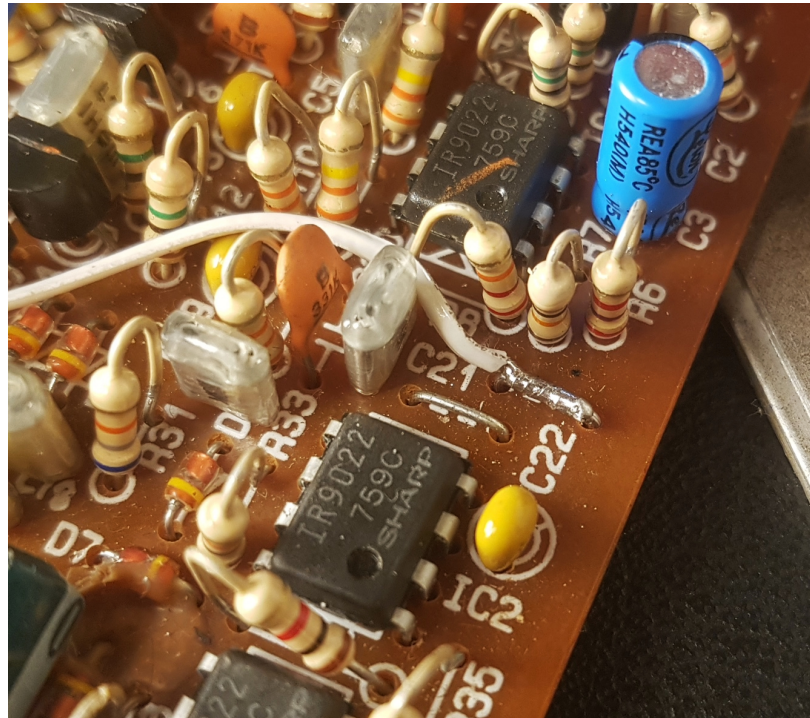


Connecting The Direct Signal:

To connect the direct signal from pin 1 of IC1 to the new coupling cap at pin 3 of IC5, I ran a wire from D11's vacant solder pad...



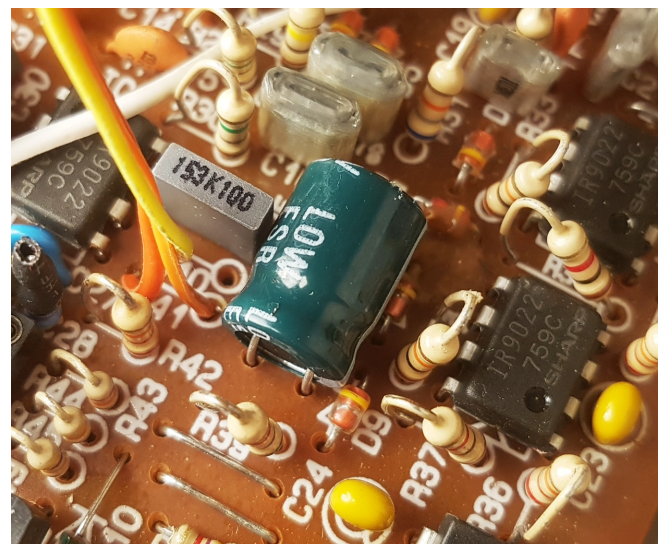
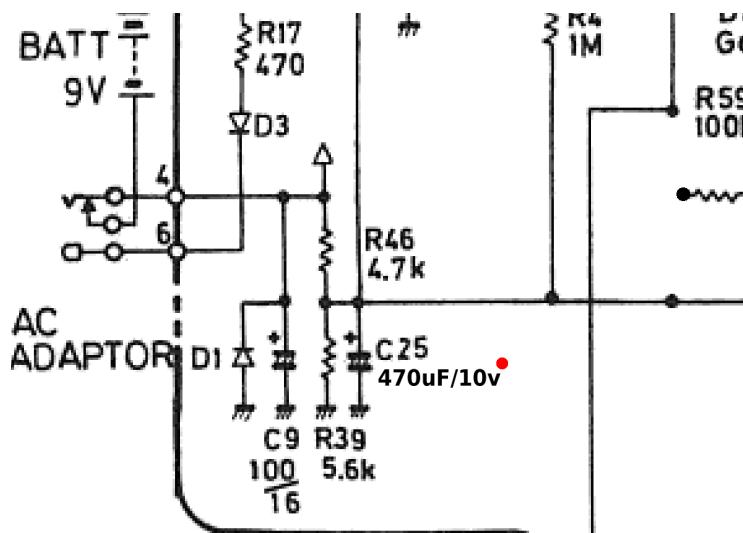
... to a wire link near C22.



In the video I mentioned other options for this end of the link, but this seemed the easiest.

Other Tweaks:

I also replaced C25 with a 470uF / 10v Electrolytic cap.



With vintage Boss pedals the Vref cap will often be suspect as it's only rated to 6.3v as standard. There's a good chance this voltage has been exceeded at some stage during the life of the pedal. Plus of course, the early examples are nearly 40 years old now, and electrolytic caps have a finite lifespan.

For good tracking, the OC-2 needs a very stable virtual earth (V_{ref}). In my pedal, doubling the original capacitance here has greatly improved the tracking and also extended its range. The pedal will now track down to low C on my 5-string basses.

I like to think that if Boss had ever made a bass version of this pedal it would be similar to my circuit. So I've called mine the "OC-2B". ;-)

In the future I'm also planning to mod this pedal from ACA (original non-regulated Boss power supply) to be suitable for a regulated 9V supply.



Thank you for watching my content and supporting my channel.

Rob.