

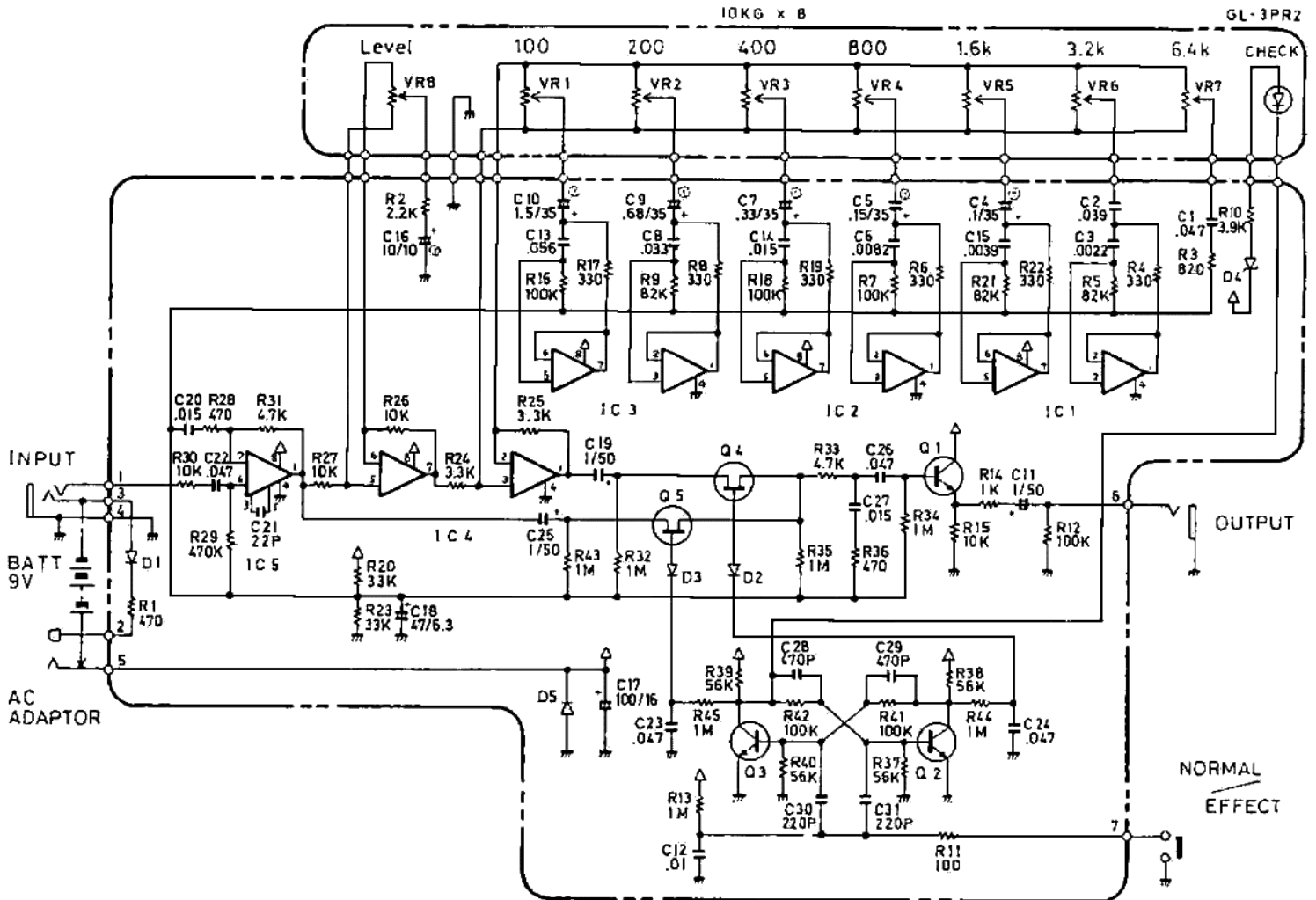
# The "EQ Driver"

## Turning a cheap EQ into a Mad Distortion Pedal.

(Oct 2021)

Traditionally, EQ pedals are used after drive pedals or even further downstream, in the effects loop of an amp. But if placed before a simple, relatively unfiltered distortion, like a DOD 250 / MXR Distortion+ for example, the individual faders can be used to create fuzz in just a narrow band. I recently added a distortion stage to the output of an Arion MEQ-1 seven-band EQ pedal. This is now a very versatile distortion pedal.

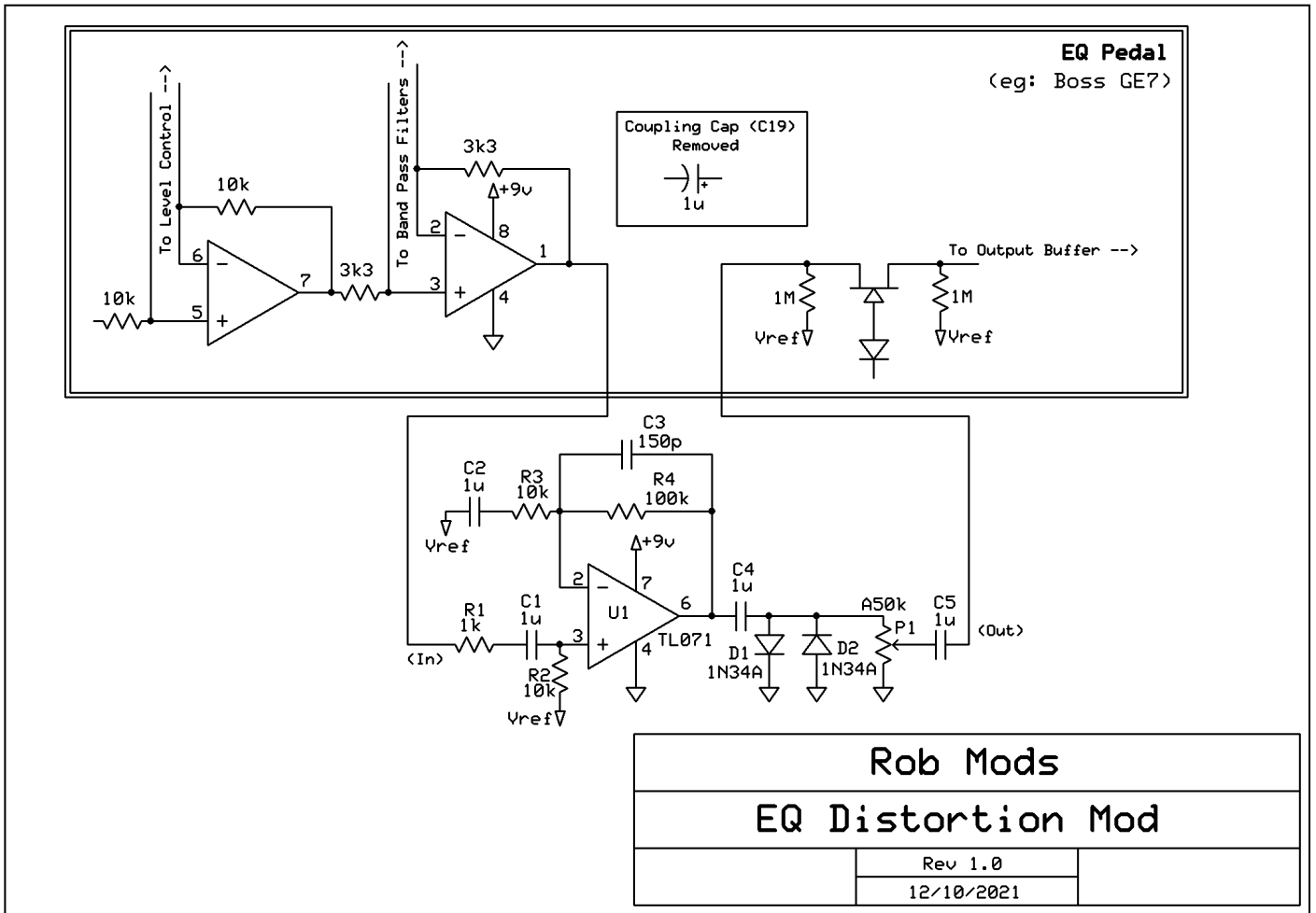
Without a schematic for the Arion pedal, I used the Boss GE-7 circuit as a reference guide.



I had to find the output coupling cap, plus the 9V, earth, and Vref. The earth and 9V were easy enough. The Vref (a.k.a. "virtual earth") was also fairly straightforward, since the Arion also uses fet bypass switches that are referenced with 1M resistors.

The output coupling cap (C19 in the GE-7) was found easily enough when I realised the pedal used the same dual op amps for the six gyrators (IC1,2 and 3 in the GE-7), but a different device for the other dual op amp.

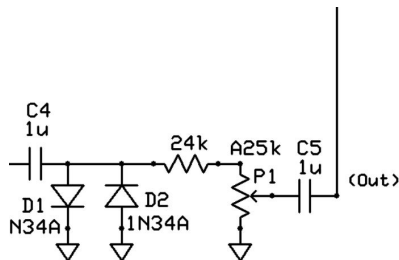
In the Arion, the output coupling cap came from pin 7 of the NJM4558. Removing this essentially left send and return pads for my little distortion circuit.



The gain is set with R3 and R4. With these resistors, it is just over 20dB, which seemed ideal for my pickups and these diodes. I'd encourage you to breadboard this as I did, and try different diodes and different feedback (R4) resistors. The larger R4 is, the greater the gain. Remember, the level control and the seven band-pass faders offer a further 15dB of gain or cut.

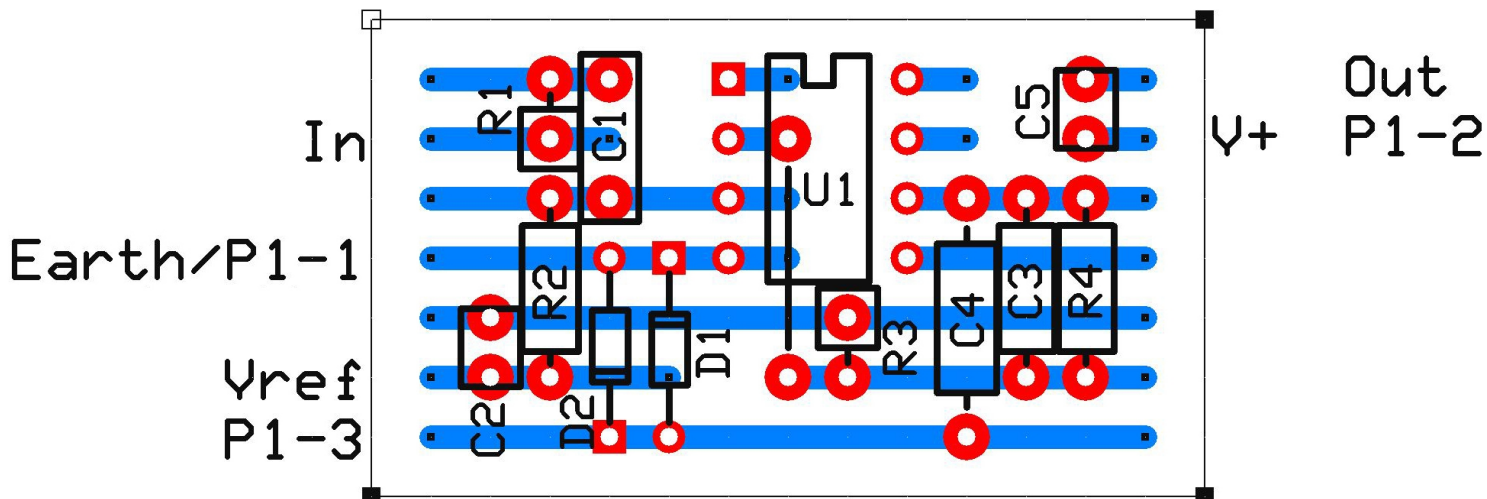
C1 and C2 create a low roll-off and C3 a high roll-off that limits the gain to the guitar range.

With LEDs, they clip at a much higher voltage than silicon and germanium diodes, so you might use a 220k or even 470k resistor for R4. This means the output volume pot may be a bit tricky to fine tune. If that's the case, I'd use a 25K pot, and put a 24K or 27K resistor in line. This will reduce the output level by around 6dB, and make the pot sweep more gradual.



**Rob Mods**

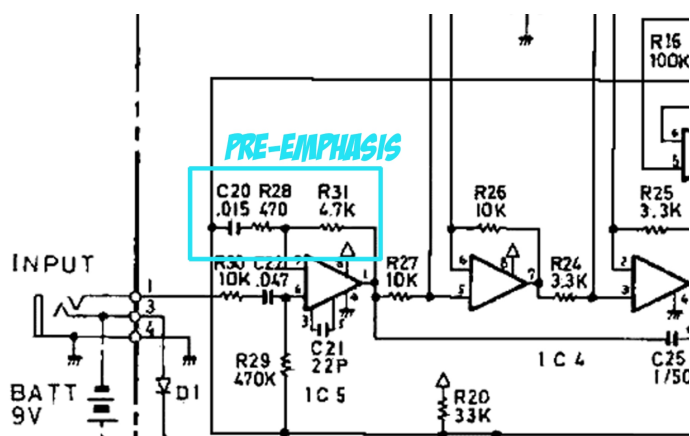
I created a small (18mm x 33mm) stripboard layout for the distortion circuit.



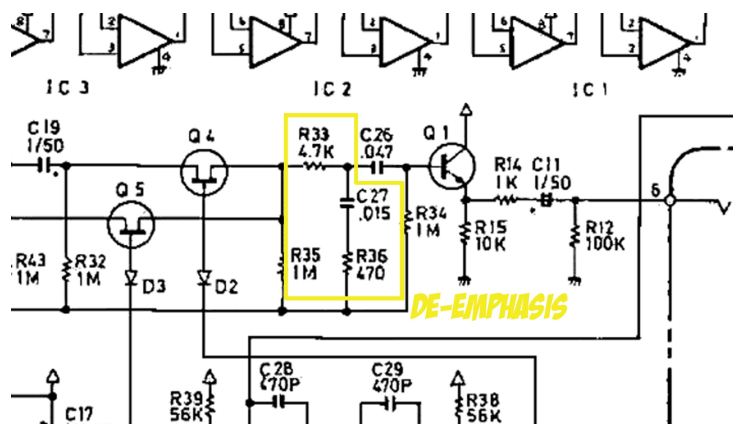
Unfortunately I don't have a GE-7, so I can't guarantee my little circuit will fit inside the pedal. If it is too tall, R1 and R3 could be laid on their side, plus the IC socket could be omitted and the op amp soldered directly to the board.

If it is still too bulky, it could be placed in the battery compartment. Very few musicians use pedals with batteries these days. Plus the GE-7 is notoriously noisy and a very common mod is to replace the op amps with more modern low-noise ones. This mod will invariably make the pedal consume far more current, and reduce battery life significantly.

The GE-7 features a basic form of noise reduction known as "pre-emphasis/de-emphasis". The input buffer is made with a low-noise op amp (well, "low noise" for the early 80's anyway!) and has a large gradual treble boost from around 2khz.

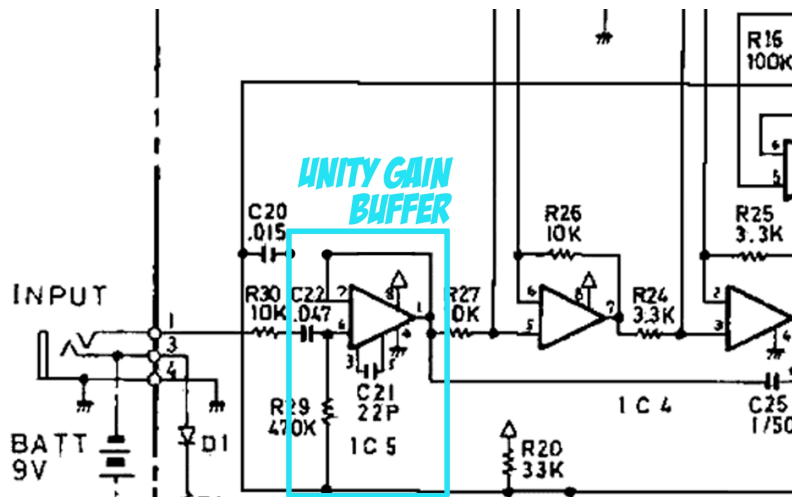


The other eight op amps are low-current devices to keep the pedal to a reasonable battery life (with 1980's dry cell batteries!), but of course they add a lot of noise. So there is an equal but opposite treble roll-off right before the output buffer.

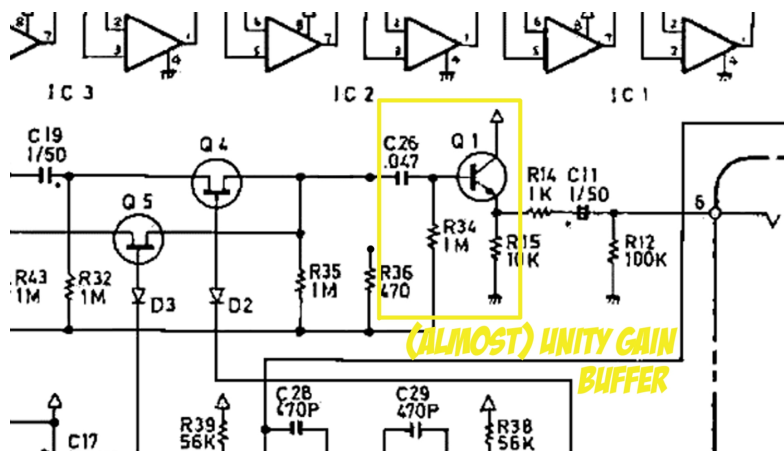


Putting a distortion stage between these two filters won't hurt anything, but the distortion may sound a bit fizzy and strange, so I'd recommend disabling these two filters.

To defeat the pre-emphasis filter, removing R28 and replacing R31 with a short, turns IC5 into a straightforward unity gain buffer.



To defeat the de-emphasis filter, remove C27 and replace R33 with a short.



This may make the circuit slightly noisier, but as already mentioned, replacing IC1,2,3 and 4 with a more modern low-noise chips will make the pedal quieter than ever.