

Derringer Fuzz: Build Document

Carcharias Effects

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1. About This Circuit

The Derringer Fuzz is based on the famous Univox Super-Fuzz circuit—an incredible, supersaturated, six-silicon transistor fuzzy beast of a pedal perfect for bass and guitar. This PCB includes options for many modifications to the original circuit which were suggested by user Derringer on the Free Stompboxes forum. While the original pedal includes two knobs and a switch between tone voicings, the Derringer schematic includes an option for a Tone knob which continuously pans between two tone capacitors. Derringer also added two small-value capacitors at the first and last transistors and encouraged experimentation with their values, giving a wide variety of tonal options for this circuit. I have included my own findings and suggestions in this build document.

2. Controls

The following are the standard external controls for this pedal:

- **Balance** — Controls the output volume of the circuit.
- **Tone** — Controls the panning between capacitors in the tone stack.
- **Expander** — Controls the fuzz amount.

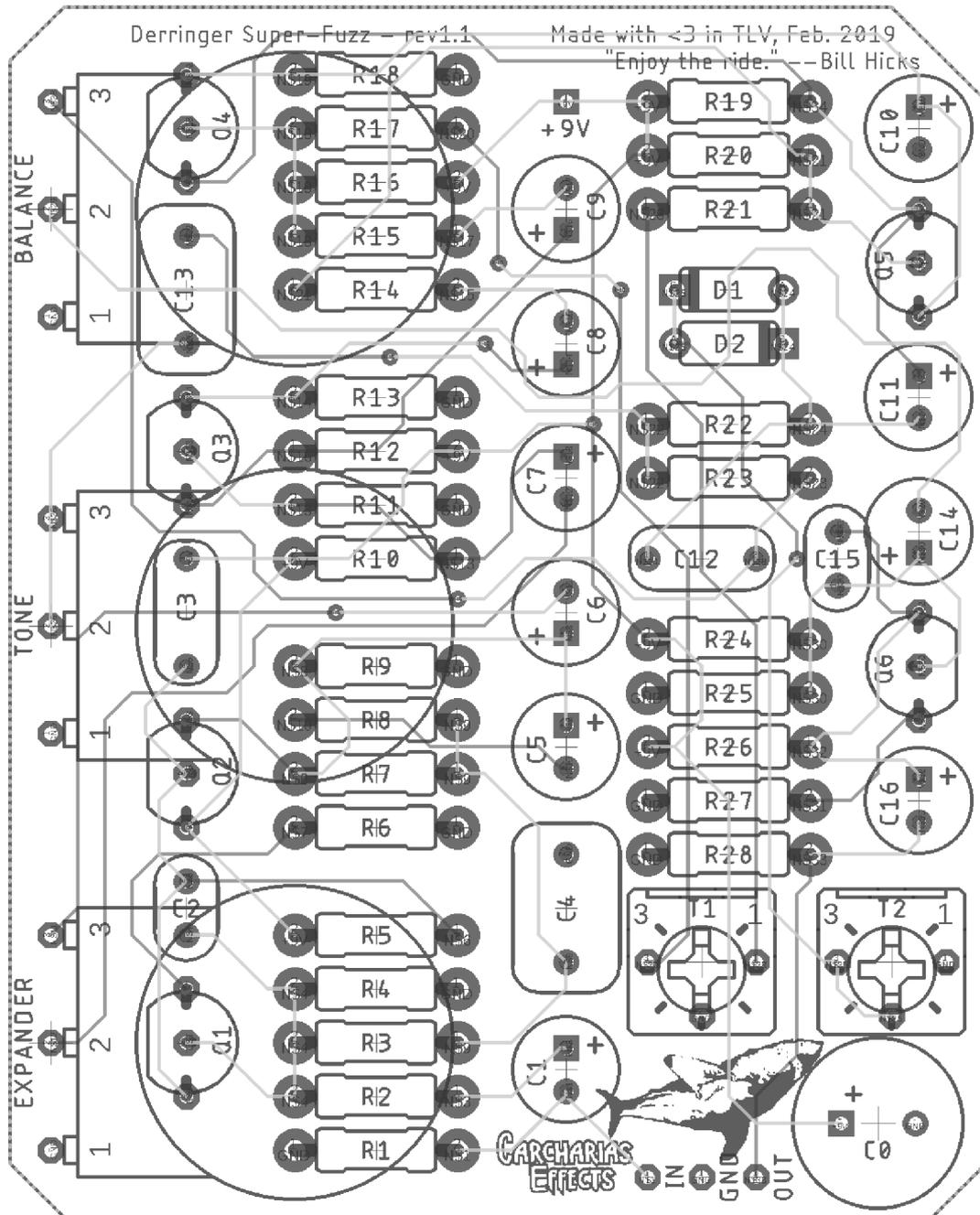
Optional:

- **T1** — This trimmer tapers the balance between the gain stages based around transistors Q4 and Q5, effectively allowing you to fine-tune the octave effect for which the Super-Fuzz is known. I kept it as a trim rather than an external control because I found its effect on the overall sound of the circuit to be more subtle. After experimenting with it, I decided that I liked it at pretty much at dead center, which is equivalent to omitting the control altogether. If you want to omit this control, simply jumper all three pads to one another (e.g., jumper pads 1 and 3 to pad 2). This connects R18 and C10 directly to ground as in the original Super-Fuzz circuit.
- **T2** — In my experience, this is a great control to externalize, because it gradually connects the asymmetrical diodes to ground. At 100% CCW, the diodes are connected to ground, which gives you more compression, and therefore a slightly more reasonable dynamic range to play with on the Balance control. At 100% CW, there is a larger resistance between the diodes and ground, which gives you a louder, darker, and bassier type of clipping.

- If you externalize this, you can use a linear (B10K) pot for this, but it might require a better taper. **Try A10K or C10K, otherwise maybe try adding a 10K resistor between lug 2 and 1?** Would that work?
- If you want to omit this control, simply jumper pad 2 to pad 1. This connects the asymmetrical diodes directly to ground as in the original Super-Fuzz circuit.

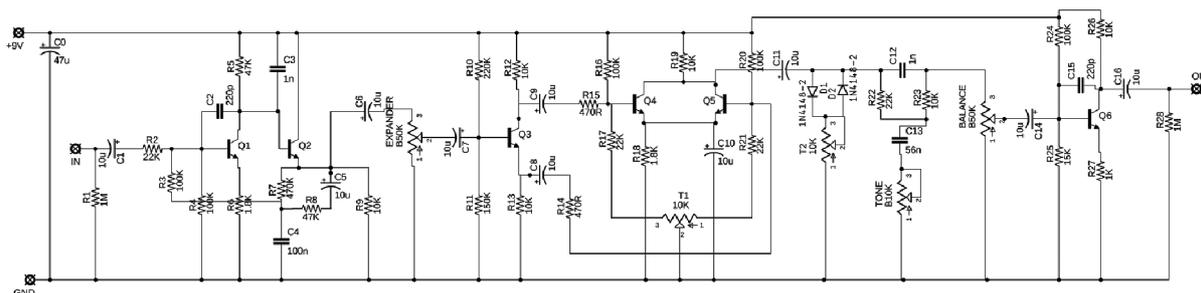
3. Circuit Board

The following is a screen capture of the printed circuit board (PCB):



4. Schematic

The following is a screen capture of this circuit's schematic, which can be used for reference when debugging:



5. Bill of Materials

You will need the following components to complete your build:

Qty	Value	Parts	Description
2	220p*	C2, C15	Capacitor - Ceramic
10	10u	C1, C5, C6, C7, C8, C9, C10, C11, C14, C16	Capacitor - Electrolytic
1	47u	C0	Capacitor - Electrolytic
1	100n	C4	Capacitor - Mylar
2	1n	C3, C12	Capacitor - Mylar
1	56n	C13	Capacitor - Mylar
1	B10K	TONE	Potentiometer
2	B50K	BALANCE, EXPANDER	Potentiometer
2	1.8K	R6, R18	Resistor
5	100K	R3, R4, R16, R20, R24	Resistor
6	10K	R9, R12, R13, R19, R23, R26	Resistor
1	150K	R11	Resistor
1	15K	R25	Resistor
1	1K	R27	Resistor
2	1M	R1, R28	Resistor
1	220K	R10	Resistor
4	22K	R2, R17, R21, R22	Resistor
1	470K	R7	Resistor
2	470R	R14, R15	Resistor
2	47K	R5, R8	Resistor
2	1N4148*	D1, D2	Silicon Diode
6	2N3904	Q1, Q2, Q3, Q4, Q5, Q6	Silicon Transistor
2	10K	T1, T2	Trimmer

6. Build Notes

The following are a collection of notes, comments, and tips about this circuit.

- Capacitors C2 and C15 are noted as 220pF, but you can socket them and try out any values from 50pF to 1nF. There are benefits and drawbacks to any combinations you can think of, but it's all to taste. You can even attach a switch and add multiple capacitors. The higher the value, the more bass you introduce into that part of the circuit. Omitting them altogether (without jumpering them) brings the circuit closer to the original SF schematic.
- T1 and T2 can be externalized if you solder in pots instead of trimmers. (see the *Controls* section above)
 - To omit T1, jumper all three pads to one another (e.g., jumper pads 1 and 3 to pad 2). This connects R18 and C10 directly to ground as in the original SF circuit.
 - To omit T2, simply jumper pad 2 to pad 1. This connects the asymmetrical diodes directly to ground as in the original SF circuit.
- From personal experience, this circuit feeds back heavily (i.e., high-pitched squeals) if you don't keep the cable connecting the PCB to the power line on the 9V jack short. If you experience squealing, check this.
- The pads for the pots are spaced a little close together, so they do not fit the regular right angle PCB mounted pots like the ones you can get from Tayda. If you use pots that have solder lugs or PCB-mount pins (the non-right angle standing kind), and connect them to the board with either wire or trimmed leads, then the pots can easily fit together side-by-side.
- Diodes D1 and D2 are noted as 1N4148, but feel free to experiment with different types of diodes (silicon, germanium, schottky, LEDs, etc.)
- I used 2N3904 transistors, which have a max hFE of ~400.

Terms of Use

The printed circuit board (PCB) discussed herein may be used for DIY purposes, such as personal builds or small commercial operations. This PCB may not be resold as part of a commercial kit. Resale from peer to peer is approved.

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Change Log

- **Rev1 (June 16, 2019):** First draft of this document, includes all standard features. This build doc corresponds to **PCB rev1.1**.
- **Rev2 (June 27, 2019):** Minor changes, added proper control names.

Contact

If you encounter any problems or issues with the PCB, or have any questions or comments, feel free to reach out to me anytime. I will try my best to be as responsive as possible. Here are the best ways to reach me:

- Instagram/Facebook (DM): **Carcharias.Effects**
- Email: carcharias.effects@gmail.com
- Web: www.carchariaseffects.com/contact

I **love** seeing pictures of other peoples' builds, so feel free to tag me (**carcharias.effects**) on Instagram or Facebook.

Best of luck and happy building!