

WTF Octave Fuzz: Build Document

Carcharias Effects

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1. About This Circuit

The **WTFoxx** is a clone of the famous Foxx Tone Machine—an awesome fuzz that I can only describe as soft-and-fuzzy or as gritty-and-nasty as you want it to be. Match the diode pairs to get a superb octave-up with the flick of a switch, over a basis of fuzzy carpet of Big Muff proportions. The PCB is also wide enough to fit sideways in a 1590B, for those daring enough to attempt to install it like the original FTM!

Let me get a little personal here: this is the pedal circuit that [started it all for me](#). Several years ago, I began my pedal acquisition journey and started modelling my first real, tricked out pedal board after Justin Chancellor's. I was able to find many of the necessities and usual suspects locally—your Boss Chorus, Delay, and Flanger, your ProCo Rat, and MXR Bass Envelope Filter were all more or less readily available. But some of the seemingly crucial fuzzes such as the Colorsound Tonebender and the Foxx Fuzz Wah Volume were nowhere to be found locally.

And then I had the wild idea of building my own pedals. Why not?

So with that thought, I began researching. The Foxx Tone Machine is a high gain, silicon transistor fuzz that came out in the early 1970's. From a bird's eye view, four transistors and two pairs of clipping diodes bears a resemblance to [that other four-transistor high-gain silicon overdrive](#), but in terms of its circuit topography it is a very different beast. Whereas the BMP is composed of four nearly identical gain stages, the Tone Machine looks almost like a Tonebender with an additional gain stage after the tone control. Throw in the fact that the Tone Machine also achieves an obvious octave-up effect thanks to the Germanium diode pair, and the two are completely different animals.

After many trials and many errors, the day I finally got a working circuit was a day I will not soon forget. The Foxx is fuzzy, warm, and rough around exactly the right edges. It sat really nicely in the mix with several of my bands I was playing bass for at the time, either with the octave-up mode engaged or without. And guitarists in the know swear by it, as it yields a wide range of possible sounds from smooth solos to harsh and jangly punk riffs.

Again, this was the circuit that inspired me all those years ago to begin building pedals in the first place. Today, I am more than happy to share that inspiration in the form of this intuitively laid out circuit. Happy Building!

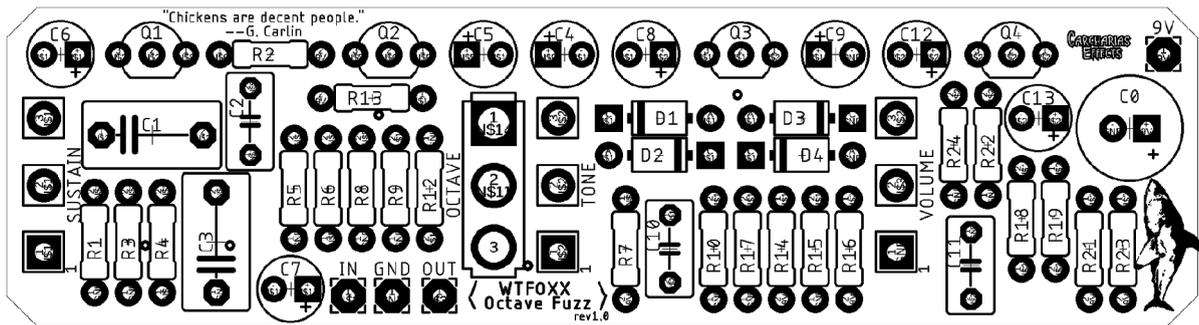
2. Controls

The following are the standard external controls for this pedal:

- **Sustain** — Controls the amount of signal gain after the octave-up module, which smashes into the third gain stage.
- **Tone** — This control alters the frequency response of the signal after the clipping stages, and prior to the final volume boost stage.
- **Volume** — This control gives a necessary clean boost to the signal following the clipping stages and the tone stack (which inherently results in some gain reduction).

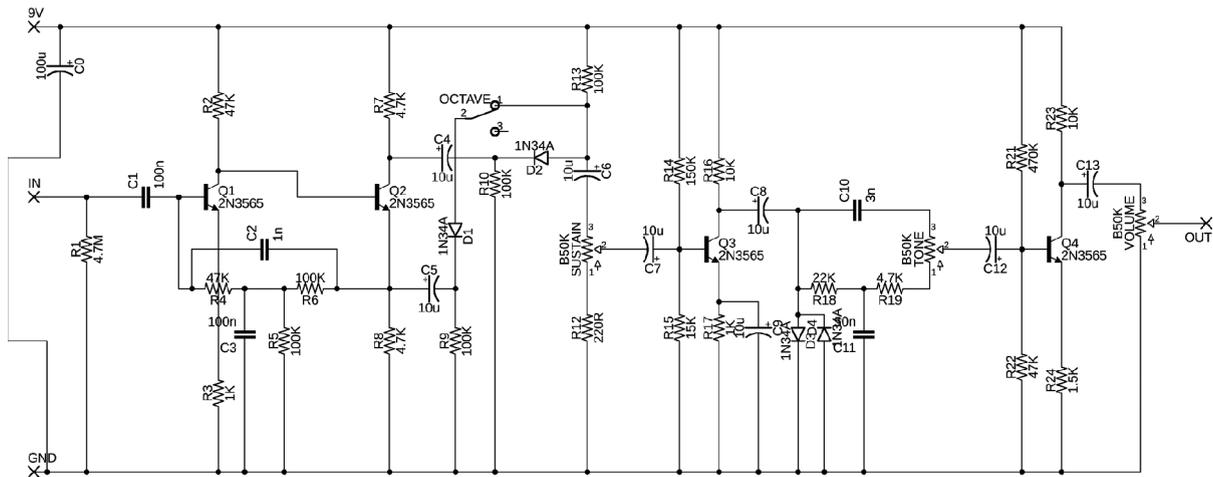
3. Circuit Board

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
1	100u	C0	Capacitor (Electrolytic)
8	10u	C4, C5, C6, C7, C8, C9, C12, C13	Capacitor (Electrolytic)
2	100n	C1, C3	Capacitor (Mylar Film)
1	1n	C2	Capacitor (Mylar Film)
1	3n	C10	Capacitor (Mylar Film)
1	50n	C11	Capacitor (Mylar Film)
4	1N34A	D1, D2, D3, D4	Diode (Germanium)
4	2N5089	Q1, Q2, Q3, Q4	NPN Transistor
3	B50K	SUSTAIN, TONE, VOLUME	Potentiometer (16mm)
1	1.5K	R24	Resistor (1/4W, metal or carbon)
5	100K	R5, R6, R9, R10, R13	Resistor (1/4W, metal or carbon)
2	10K	R16, R23	Resistor (1/4W, metal or carbon)
1	150K	R14	Resistor (1/4W, metal or carbon)
1	15K	R15	Resistor (1/4W, metal or carbon)
2	1K	R3, R17	Resistor (1/4W, metal or carbon)
1	220R	R12	Resistor (1/4W, metal or carbon)
1	22K	R18	Resistor (1/4W, metal or carbon)
3	4.7K	R7, R8, R19	Resistor (1/4W, metal or carbon)
1	4.7M	R1	Resistor (1/4W, metal or carbon)
1	470K	R21	Resistor (1/4W, metal or carbon)
3	47K	R2, R4, R22	Resistor (1/4W, metal or carbon)
1	SPDT	OCTAVE	SPDT Toggle Switch

6. Build Notes

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

- Take the time to measure your Germanium diodes in order to ensure that each diode pair (D1 & D2, and D3 & D4) matches as closely as possible in terms of their forward voltage. The more closely these diodes are matched, the more obvious the octave-up part of this effect will be.

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 27, 2020):** First draft of this document, includes all standard features. This document corresponds to **PCB rev1.0**.

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/

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!