

# Sinister Exaggerator: Build Document

Carcharias Effects

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## 1. About This Circuit

The **Sinister Exaggerator** is a super-modded Rat clone, custom-designed with bassists in mind! It is as heavy as it is nasty, and you can use it to build a variety of different Rat flavors. With the recommended default part values, you get a fully-featured pedal with a wide range of possibilities from a filthy distortion, to (and this is my absolute favorite use-case) a **sinister** low-gain overdrive combined with an **exaggerated** treble range (for those who love the sound of pick attacks) reminiscent of the Harmonic Percolator. Thanks to the magical "Grit" control, the Sinister Exaggerator can easily achieve brutal bass tones inspired by David William Sims, Bob Weston, and Justin Chancellor.

The original Rat was developed by a company named Pro Co in Kalamazoo, Michigan. It is essentially based very closely on the datasheet of the LM308, the IC that has become synonymous with the Rat's signature sound because of its low slew rate. I highly recommend socketing the integrated circuit on your Sinister Exaggerator PCB build, so you can discover which op-amp you like the best. I have personally tried this circuit with a handful of IC's, including both the classic and metal can LM308, 741, OP07, TL071. Each have their own advantages depending what you like.

All in all, the Sinister Exaggerator is a great spin on the Kalamazoo classic, and makes for an absolute must on your bass pedalboard. And even if you're a guitarist, you will definitely find something to love about this dirty beast of a distortion as well!

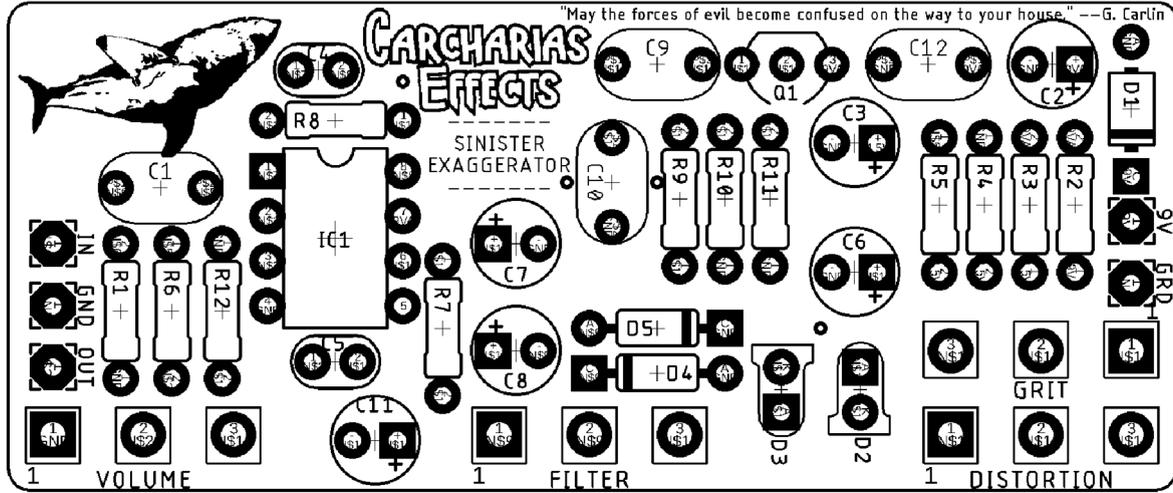
## 2. Controls

The following are the standard external controls for this pedal:

- **Distortion** — Controls the amount of distortion in the signal.
- **Grit** — Also known as the Ruetz mod, this control affects the maximum amount of gain that the circuit can achieve, allowing you to find excellent nuanced tones from anywhere in between overdrive to distortion distortion. It also flattens the frequency response. For you low-gain overdrive loving bassists
- **Filter** — Modifies the amount of high frequencies being filtered by the circuit's low-pass filter.
- **Volume** — Controls the output volume of the circuit.

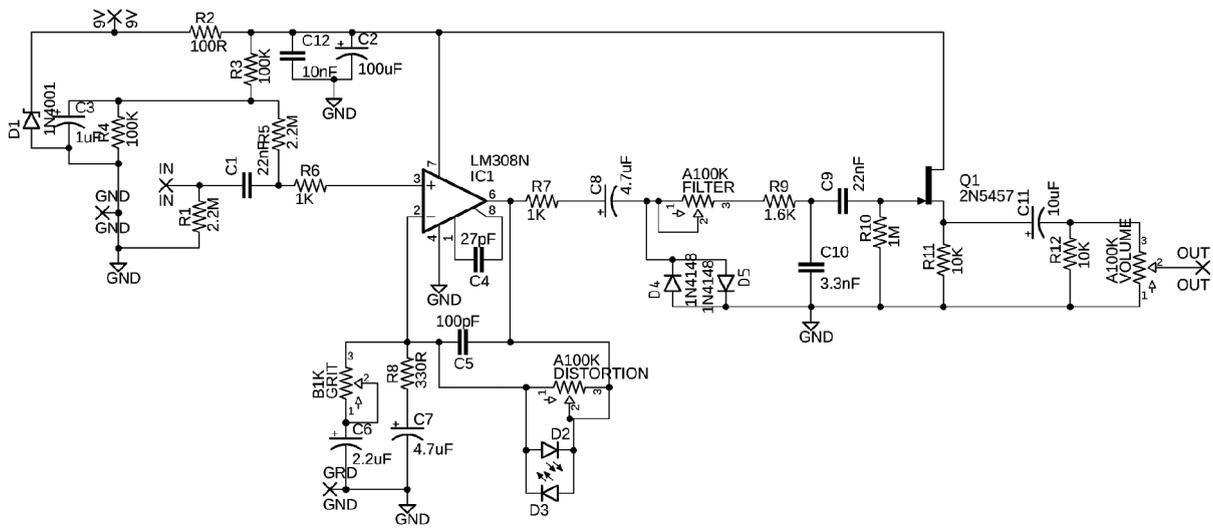
### 3. Circuit Board

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



### 4. Schematic

Below 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:

Part	Value	Description
C5	100pF	Capacitor (Ceramic)
C4	27pF	Capacitor (Ceramic)
C2	100uF	Capacitor (Electrolytic)
C11	10uF	Capacitor (Electrolytic)
C3	1uF	Capacitor (Electrolytic)
C6	2.2uF	Capacitor (Electrolytic)
C7	4.7uF	Capacitor (Electrolytic)
C8	4.7uF	Capacitor (Electrolytic)
C12	10nF	Capacitor (Mylar film)
C1	22nF	Capacitor (Mylar film)
C9	22nF	Capacitor (Mylar film)
C10	3.3nF	Capacitor (Mylar film)
D1	1N4001	Diode
D4 ( <i>optional</i> )	1N4148	Diode
D5 ( <i>optional</i> )	1N4148	Diode
D2 ( <i>optional</i> )	Red LED	LED (3mm)
D3 ( <i>optional</i> )	Red LED	LED (3mm)
IC1	LM308N	Op Amp
DISTORTION	A100K	Potentiometer (16mm)
FILTER	A100K	Potentiometer (16mm)
VOLUME	A100K	Potentiometer (16mm)
GRIT	B1K	Potentiometer (16mm)
R9	1.6K	Resistor (1/4W, metal or carbon)
R3	100K	Resistor (1/4W, metal or carbon)
R4	100K	Resistor (1/4W, metal or carbon)
R2	100R	Resistor (1/4W, metal or carbon)
R11	10K	Resistor (1/4W, metal or carbon)
R12	10K	Resistor (1/4W, metal or carbon)
R6	1K	Resistor (1/4W, metal or carbon)
R7	1K	Resistor (1/4W, metal or carbon)
R10	1M	Resistor (1/4W, metal or carbon)
R1	2.2M	Resistor (1/4W, metal or carbon)
R5	2.2M	Resistor (1/4W, metal or carbon)
R8	330R	Resistor (1/4W, metal or carbon)
Q1	2N5457	Transistor (N-Channel JFET)

## 6. Build Notes

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

- D4 and D5 are the soft-clipping diode pair and can be swapped for any type of diode pair you'd like, or can be omitted entirely (like on mine).
- D2 and D3 are also technically optional. I don't see too many Rat projects that put clipping diodes in the feedback loop, but I love them there.
- For the JFET, a 2N5458 is what appears on the Rat schematic this circuit was based on, but other JFETs can be used. A 2N5457 or J201 will make for a slightly more prominent high end, I've found, while a 2N5458 is a bit darker. I personally prefer the 2N5458, but feel free to socket and audition.
- Socket the IC. I've tried out several LM308s (classic and metal can), OC07, 741, even the basic TL071, and they all have different qualities that may appeal to your own tastes and sensibilities. Go nuts!
- The Grit control represents the Ruetz mod. If you want to forego this control for a stock Rat, connect a 47R resistor to lugs 3 and 2 instead of the potentiometer.

# 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.

I do not claim any cloned circuit (whether partially or entirely) as the intellectual property of Carcharias Effects, nor am I in the business of intentionally violating any copyrights. Unless otherwise noted, many of the circuits available on [carchariaseffects.com](http://carchariaseffects.com) are based on schematics that represent the works of many hardworking people who came before me, who have designed many wondrous and unique electronics for musicians. I am just one guy with a hobby and love for these electronics, and designing and selling these PCB's is simply one way that I can ensure that my hobby continues to be self-sustaining.

## Change Log

- **Rev1 (October 15, 2019):** First draft of this document, includes all standard features. This document corresponds to **PCB rev1.0**.
- **Rev2 (June 25, 2020):** Updated for the corrected PCB – This document corresponds to **PCB rev2.0**.

## 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](mailto:carcharias.effects@gmail.com)
- Web: [www.carchariaseffects.com/](http://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!