# Scarab Bender

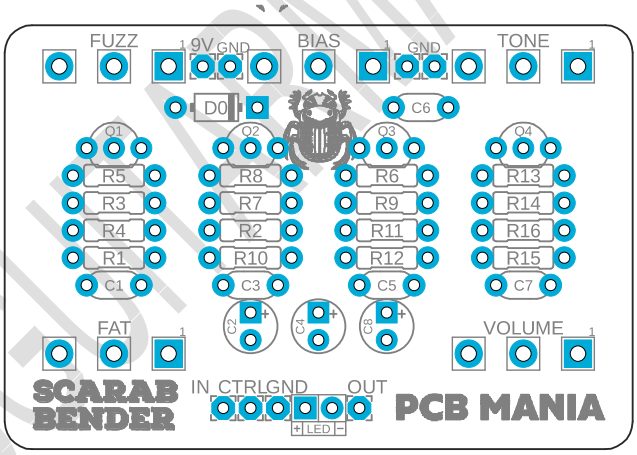
**Based on:**
Basic Audio Scarab
**Effect type:**
Tone bender style Fuzz
**Build difficult:**
Intermediate

**Amount of parts:**
Average, total 35 components
**Technology:**
Silicon NPN transistors
**Power consumption:**
9V

**Enclosure type:**
125b
**Get your board at:**
Scarab Bender
**Get your kit at:**
Das Musikding (Europe)

**Project overview:**

Heavy moded Silicon Tone bender MKII designed by John Lyons of Basic Audio. Capable of delivering trademarks Tone benders tones full of sustain and gain while also being versatile enough to craft your own gritty and fat tones through their bias, fat, and tone control respectively.



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# Introduction

If you are looking for a Tone Bender that jack of all trades the Scarab bender is for you!

This pedal is a go for heavy riffing and ripping leads, but versatile enough to cover all the possible spectrum of fuzz tones delivering slightly fuzzy overdrive, distortion, heavy fizzy distortion/fuzz, muff-like fuzz, and certainly get you into heavy gated, spitting fuzz. All this and still relatively easy to dial, with multiple sweet spots, no bad tones, no extreme and useless settings, like its "distant cousin" Fuzz factory.

The key features that make this fuzz so unique are its Bias control, which sets the amount of voltage that receives Transistor Q3, affecting the overall tone from being gated and gritty on one extreme, sustaining lead tone in the middle. Clean overdrive sounds at the other extreme.

The fat knob switches in between two input capacitors, thickening your signal straight from the start.

This Circuit was verified using both 2n5088 and the higher gain 2n5089; for sure, some MPS18 could do a great job as well. Feel free to socket and try different transistors until you find the one you love the most and share it with our pedal building community.

# Controls

- BIAS
- FAT
- FUZZ
- TONE
- VOLUME

# Bill of materials

| Resistors | |
|---|---|
| **Part** | **Value** |
| **R1** | 1m |
| **R2** | 22k |
| **R3** | 1k |
| **R4** | 150k |
| **R5** | 10k |
| **R6** | 10k |
| **R7** | 100r |
| **R8** | 47k |
| **R9** | 750r |
| **R10** | 100r |
| **R11** | 1k |
| **R12** | 10k |
| **R13** | 4k7 |
| **R14** | 10k |
| **R15** | 2k2 |
| **R16** | 4k7 |

| Capacitors | |
|---|---|
| **Part** | **Value** |
| **C1** | 10n |
| **C3** | 100n |
| **C5** | 100n |
| **C6** | 8n2 |
| **C7** | 100n |

| Electrolytics Capacitors | |
|---|---|
| **Part** | **Value** |
| **C2** | 10u |
| **C4** | 4u7 |
| **C8** | 100u |

| Potentiometers | |
|---|---|
| **Part** | **Value** |
| **BIAS** | 25k B |
| **FAT** | 100k B |
| **FUZZ** | 1k B |
| **TONE** | 50k B |
| **VOLUME** | 100k A |

| Transistors | |
|---|---|
| **Part** | **Value** |
| **Q1** | 2N5088 |
| **Q2** | 2N5088 |
| **Q3** | 2N5088 |
| **Q4** | 2N5088 |

| Diods | |
|---|---|
| **Part** | **Value** |
| **D0** | 1n5817 |
| **Led** | 3mm Red LED |

# Shopping list

| Resistors | | |
|---|---|---|
| **Qty** | **Value** | **Parts** |
| **2** | 100r | R7, R10 |
| **4** | 10k | R5, R6, R12, R14 |
| **1** | 150k | R4 |
| **2** | 1k | R3, R11 |
| **1** | 1m | R1 |
| **1** | 22k | R2 |
| **1** | 2k2 | R15 |
| **1** | 47k | R8 |
| **2** | 4k7 | R13, R16 |
| **1** | 750r | R9 |

| Capacitors | | |
|---|---|---|
| **Qty** | **Value** | **Parts** |
| **3** | 100n | C3, C5, C7 |
| **1** | 10n | C1 |
| **1** | 8n2 | C6 |

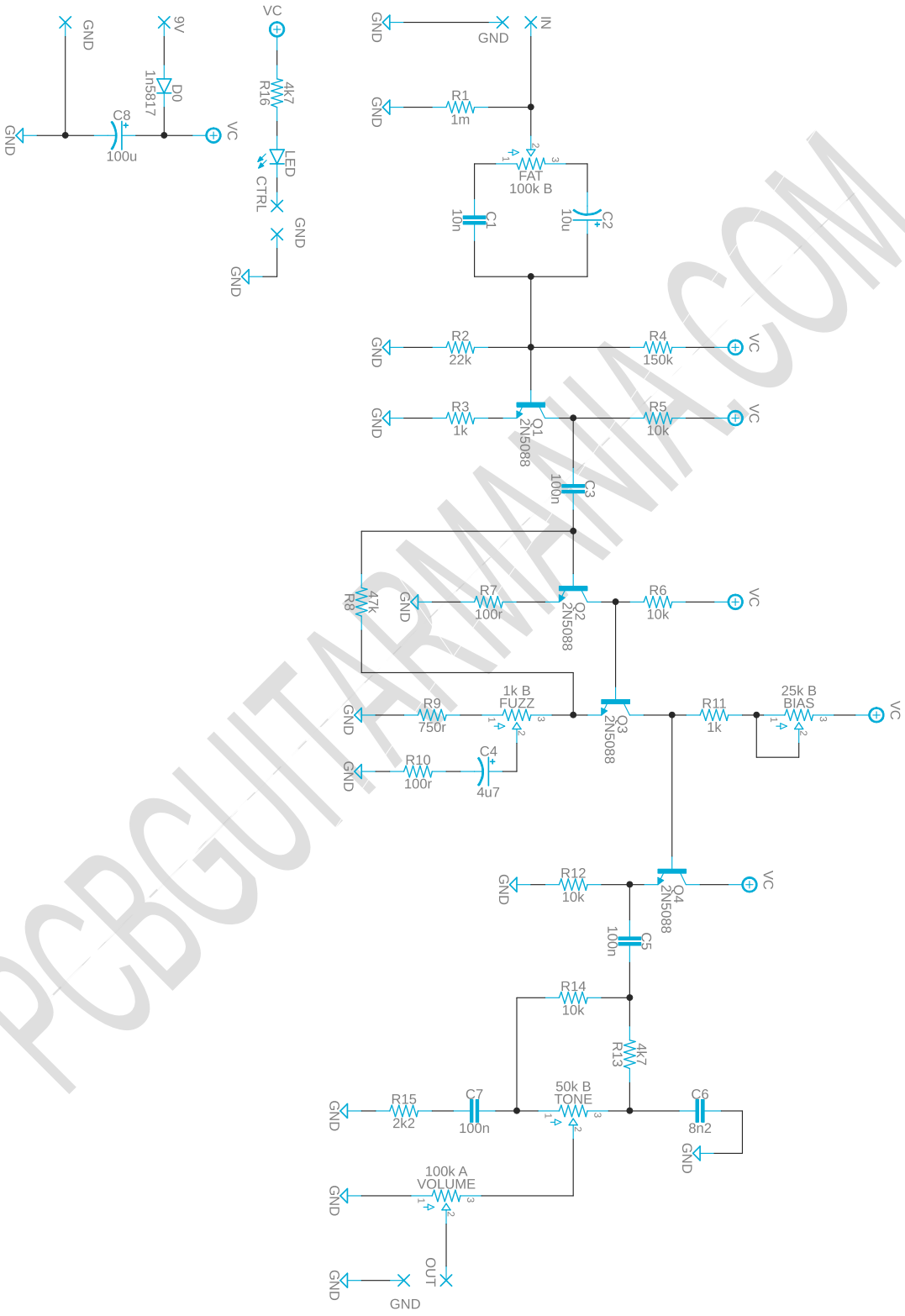
| Electrolytics Capacitors | | |
|---|---|---|
| **Qty** | **Value** | **Parts** |
| **1** | 100u | C8 |
| **1** | 10u | C2 |
| **1** | 4u7 | C4 |

| Potentiometers | | |
|---|---|---|
| **Qty** | **Value** | **Parts** |
| **1** | 100k A | VOLUME |
| **1** | 100k B | FAT |
| **1** | 1k B | FUZZ |
| **1** | 25k B | BIAS |
| **1** | 50k B | TONE |

| Transistors | | |
|---|---|---|
| **Qty** | **Value** | **Parts** |
| **4** | 2N5088 | Q1, Q2, Q3, Q4 |

| Diods | | |
|---|---|---|
| **Qty** | **Value** | **Parts** |
| **1** | 1n5817 | D0 |
| **1** | 3mm Red LED | LED |

# Schematic



# Components Recommendations

As many people like to experiment with some pedals with higher voltage, always ensure your **electrolytic capacitors'** max tolerance is over 25v.

This board has been tested using Film box capacitors for most of the values over 1nf and ceramics discs for those under 1nf. However, high-quality components such as Wima's Capacitors and Panasonic's electrolytics can deliver a better performance.

All the resistors used for testing this project are 1/4W Metal Film.

The BOM and Shopping list are exclusive regarding this project. It doesn't include all the hardware like the 3PDT bypass switch, audio/dc jacks, enclosure, etc.

# Build Notes

If this is one of your first projects, I recommend you to take a look at our Pedal Building Guide.

For a successful and tidy build, it's recommended the following order:

1. Resistors & diodes
2. Capacitors, starting with the smaller ones and the ceramic ones.
3. Electrolytic capacitors (always check the polarity)
4. Transistors
5. Wires
6. Potentiometers and switches
7. Off-board wiring

# Wiring Diagram

All our projects include a free 3PDT Board to make the wiring easier and tidier. Also, all of our PCBs feature the status LED on board.

The pad named "Ctrl" or "LED" is the one that controls the status of the led; wire it to the "LED" pad on the 3PDT board or in the control slug of your 3PDT.

This board has been designed to match our EZ 3PDT PCB; check it here to access our Pedal Wiring Guide.

# Drill Template

This Project has been planned to fit into a 125b enclosure type.

Check the Attached “Drilling templates” to drill the box properly. The files are on Scale 1:1, ready to print on an A4 page.

# Licensing and Usage

We really appreciate your trust and support in buying this PCB, as well as your will to dive into the DIY electronics world. For us, that's why you can make this project work properly and enjoy not only the building process but also experiment and play with it on your rig.

We try to reply to every question we receive on our email or our social media. Still, we try to encourage all our customers to join our PCB Guitar Mania – Builders Group on Facebook to post all your doubts, issues, suggestions, or requests, share your builds, and have some feedback from other fellow builders and us!

We tested all our projects following this same guide on their standard configurations. Although, not all of the variations and mods have necessarily been checked. These are suggestions based on the schematic analysis and the experiences and opinions of others. Feel free to share with us your views and recommendations regarding the mods your personal experimentation.

These boards may be used for commercial endeavors in any quantity unless expressly noted. No attribution is necessary, though accreditation or a link back is always much appreciated.

If you are a builder planning to make your own run of pedals, we also offer the service of custom-made boards with your brand and logo, design according to your specifications.

The only usage restrictions are that, first, you cannot resell the PCB as part of a kit without prior arrangement with us, and second, you cannot scratch off the silkscreen or other way of trying to hide our logos and the source of the PCBs. Like it's written above, if you want to have your designs with your brand and logo, we could undoubtedly reach an agreement.

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