

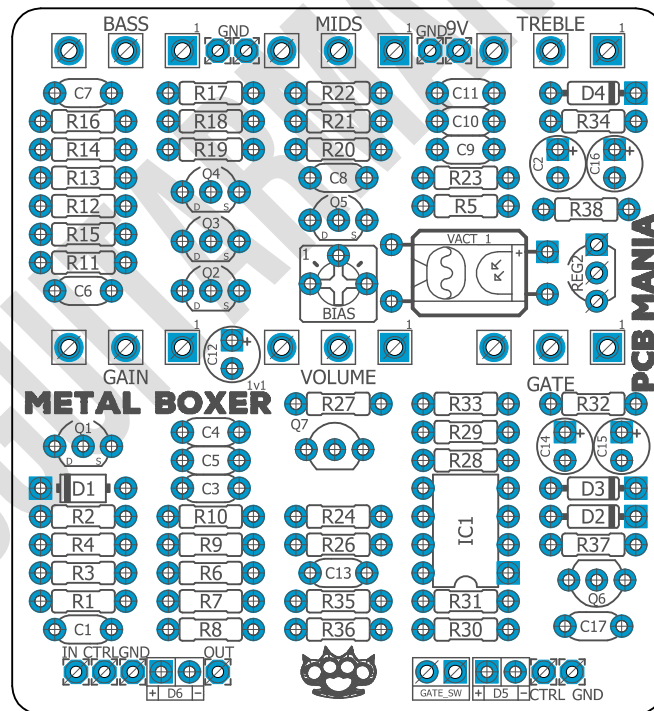
Metal Boxer

Based on: Zvex Box of metal	Number of parts: High, total 79 components	Enclosure type: 125b
Effect type: Distortion	Technology: Mosfet / Drive + Op Amp / Gate	Get your board at: Metal Boxer
Build difficult: Advanced	Power consumption: 9V	Get your kit at: Das Musikding (Europe)

Project overview:

Inspired by the Box of Metal, one of the heaviest-sounding pedals in the ZVEX lineup. This board will punch your audience with a massive wave of distortion with a great thump and excellent tone control. It also includes a noise-silencing gate feature that can be turned off or on with a convenient footswitch.

Just don't expect mercy from this pedal; the gain knob adjusts from hard to harder.



Index

1. Project overview
2. Index, Introduction & Controls
3. Bills of Materials, BOM
4. Shopping Lists
5. Schematic
6. Components, Build Notes, Wiring Diagram
7. Drill Template, Licensing and Usage

Introduction

Metal Boxer is an aggressive high-gain pedal whose gain and tonal characteristics are somewhat similar to high-gain tube amplifiers that have been the staple of hard rock and metal sounds since the '80s.

There are many pedals out there, but none of them can deliver those punching waves like the Metal Boxer. Its superb sound quality provides excellent harmonic content while consistently delivering gain on tap for your desired tone. The set of knobs also adds all the versatility you need to hit the right spot.

Gate: Adjust for your playing style. When fully clockwise, palm-muting will create an audible thump, and bumping the strings will open the gate. Turn down to make the gate tighter. Gate is unaffected by other controls.

Volume: Sets the output volume of the pedal.

Bass: Sets the bass/sub-bass level.

Treble: Adjust for treble content. Use this in tandem with your amp's presence and treble controls to get the precise top-end texture... the presence control is essential on your amp if you have one.

Gain: Sets the amount of distortion. The BOM does NOT clean up. This control goes from hard to very hard. It may crackle when turned, which is perfectly normal.

MIDs: Adjust to accentuate or scoop out mids.

Controls

Potentiometers:

- Bass
- Gain
- Gate
- Mids
- Treble
- Volume

Bill of materials

Resistors	
Part	Value
R1	1m
R2	2m2
R3	2m2
R4	1k5
R5	1k
R6	2m2
R7	680k
R8	470k
R9	2m2
R10	2m2
R11	1k5
R12	470k
R13	2m2
R14	2m2
R15	1k5
R16	220k
R17	2m2
R18	2m2
R19	1k5
R20	2m2
R21	2m2
R22	1k5
R23	47k
R24	100k
R25	1m
R26	2m2
R27	15k
R28	10m
R29	10k
R30	10k
R31	10k
R32	47k
R33	47k
R34	4k7
R35	22k
R36	22k

R37	4k7
R38	5k6

Capacitors	
Part	Value
C1	22n
C3	22n
C4	1n
C5	10n
C6	22n
C7	22n
C8	100n
C9	180p
C10	22n
C11	22n
C13	10n

Electrolytic Capacitors	
Part	Value
C2	10u
C12	10u
C14	10u
C15	10u
C16	22u
C17	22u

Potentiometers	
Part	Value
BASS	1M A
GAIN	5K C
GATE	500K B
MIDS	20K A
TREBLE	250K A
VOLUME	100K A

Trimpots	
Part	Value
BIAS	5K
TRIM	10K

IC	
Part	Value
IC1	TL072

Transistors	
Part	Value
Q1	BS170
Q2	BS170
Q3	BS170
Q4	BS170
Q5	BS170

Switches	
Part	Value
-	3PDT Stomp foot
-	3PDT Stomp foot

Diodes	
Part	Value
D1	9v1
D2	1N4001
D3	1N4001
D4	1N5817
D5	3mm LED
D6	3mm LED

Jacks	
Part	Value
-	DC JACK
-	AUDIO JACK
-	AUDIO JACK

Shopping list

Resistors		
Qty	Value	Parts
1	100k	R24
3	10k	R29, R30, R31
1	10m	R28
1	15k	R27
1	1k	R5
5	1k5	R4, R11, R15, R19, R22
2	1m	R1, R25
1	220k	R16
2	22k	R35, R36
12	2m2	R2, R6, R10, R17, R18, R20, R3, R9, R13, R14, R21, R26
2	470k	R8, R12
3	47k	R23, R32, R33
2	4k7	R34, R37
1	5k6	R38
1	680k	R7

Capacitors		
Qty	Value	Parts
1	100n	C8
2	10n	C5, C13
1	180p	C9
1	1n	C4
6	22n	C1, C3, C6, C7, C10, C11

Electrolytic Capacitors		
Qty	Value	Parts
4	10u	C2, C12, C14, C15
2	22u	C16, C17

Potentiometers		
Qty	Value	Parts
1	100K A	VOLUME
1	1M A	BASS

1	20K A	MIDS
1	250K A	TREBLE
1	500K B	GATE
1	5K C	GAIN

Trim pots		
Qty	Value	Parts
1	10K	TRIM
1	5K	BIAS

IC		
Qty	Value	Parts
1	TL072	IC1

Transistors		
Qty	Value	Parts
5	BS170	Q1, Q2, Q3, Q4, Q5

Switches		
Qty	Value	Parts
2	3PDT Stomp foot	-

Diodes		
Qty	Value	Parts
2	1N4001	D2, D3
1	1N5817	D4
2	3mm LED	D5, D6
1	9v1	D1

Jacks		
Qty	Value	Parts
1	DC JACK	-
2	AUDIO JACK	-

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 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.

Follow us on [Instagram](#) and [Facebook](#) to stay in tune with the latest projects!