Tone Guard

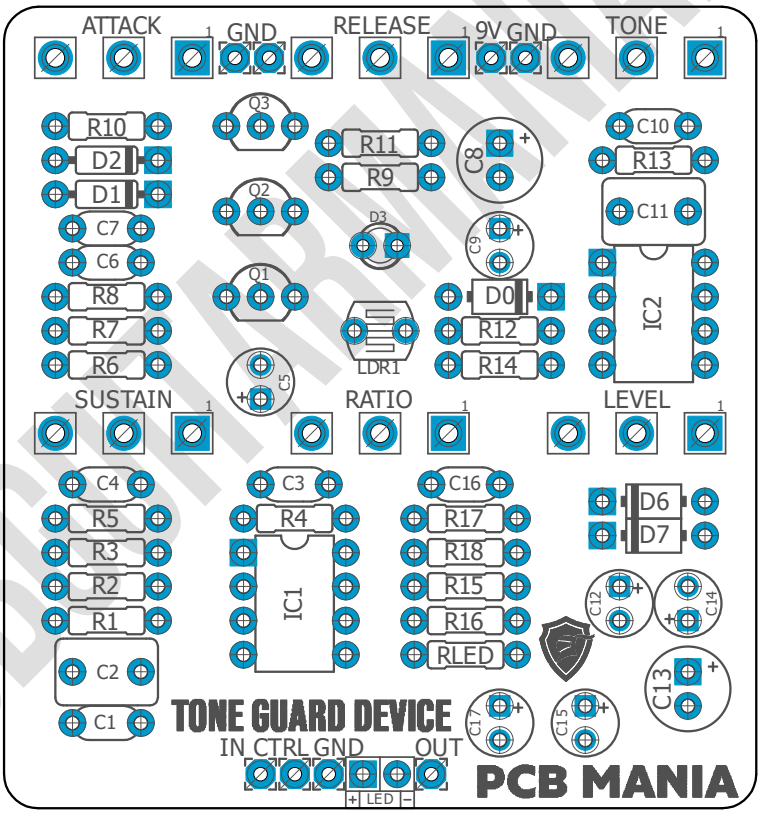
Based on:
EQD The Warden
Effect type:
Optical Compressor
Build difficult:
Average

Amount of parts:
Average, total 54 components
Technology:
LDR Optical compressor + Charge pump
Power consumption:
9V(31mA)

Enclosure type:
125b
Get your board at:
Tone Guard
Get your kit at:
Das Musikding (Europe)

Project overview:

High fidelity Optical compressor based on Earthquaker Devices 'The Warden' Features an internal charge pump to give your tone plenty of headroom.



Index

Introduction

The tone keeper is a six knob optical compressor based around the EQD Warden ™ and lifts every slightly hit note right into your face. A compressor with so many features usually reserved for studio gear and work equally well on bass guitar. A build in charge pump brings the unit up to 18v while you only need 9v to power it but still get the maximum clean headroom and sustain without getting noisy at all, thanks to the opa2134. (This chip is a bit more expensive but I really recommend it every time you want to make a build less noise - for instance ace had great results in my personal BE-OD.)

If you want to try your build first and order that chip later from a trusted source you can replace it with a TL072 - but keep in mind, backgrounders noise will increase by doing that.

But let's get back to the topic: tone, attack, release, level, sustain and ratio gives you every control in your hand you could need to get the maximum out of every note. For tweaking a compressor the first time, start with all knob at noon and adjust from there while switching the pedal on and off from time to time so your ears get a better chance to hear the difference. Led is a clear white, no. Red to angle it, I had around 2-3mm distance to the LDR that faces the direction of the led. You can use sockets if you want to try different leds but keep in mind that this raises your led and the legs of the LDR should stick out far enough to compensate that.

Controls

- Attack
- Release
- Tone
- Sustain
- Ratio
- Level

Bill of materials

Resistors	
Part	**Value**
R1	1M
R2	10K
R3	10M
R4	2M2
R5	22K
R6	1M
R7	10K
R8	10K
R9	1M
R10	1M
R11	4K7
R12	10K
R13	47K
R14	10K
R15	1K
R16	100K
R17	47K
R18	47K
RLED	4K7
LDR1	Photo resistor

Capacitors	
Part	**Value**
C1	100p
C2	1u
C3	100p
C4	100n
C6	22n
C7	22n
C10	22n
C11	1u
C16	100n

Electrolytics Capacitors	
Part	**Value**
C5	1u
C8	47u
C9	1u
C12	1u
C13	100u
C14	10u
C15	10u
C17	10u

Potentiometers	
Part	**Value**
ATTACK	B10K
LEVEL	B50K
RATIO	B100K
RELEASE	B50K
SUSTAIN	C1M
TONE	B100K

IC	
Part	**Value**
IC1	OPA2134
IC2	TC1044

Transistors	
Part	**Value**
Q1	MPSA18
Q2	2N5089
Q3	2N5089

Diods	
Part	**Value**
D0	1N5817
D1	1N4148
D2	1N4148
D3	LED 5mm WHITE
D6	1N4001
D7	1N4001
LED	3mm LED

Shopping list

Resistors		
Qty	**Value**	**Parts**
1	100K	R16
5	10K	R2, R7, R8, R12, R14
1	10M	R3
1	1K	R15
4	1M	R1, R6, R9, R10
1	22K	R5
1	2M2	R4
3	47K	R13, R17, R18
2	4K7	R11, RLED

Capacitors		
Qty	**Value**	**Parts**
2	100n	C4, C16
2	100p	C1, C3
2	1u	C2, C11
3	22n	C6, C7, C10

Electrolytics Capacitors		
Qty	**Value**	**Parts**
1	100u	C13
3	10u	C14, C15, C17
3	1u	C5, C9, C12
1	47u	C8

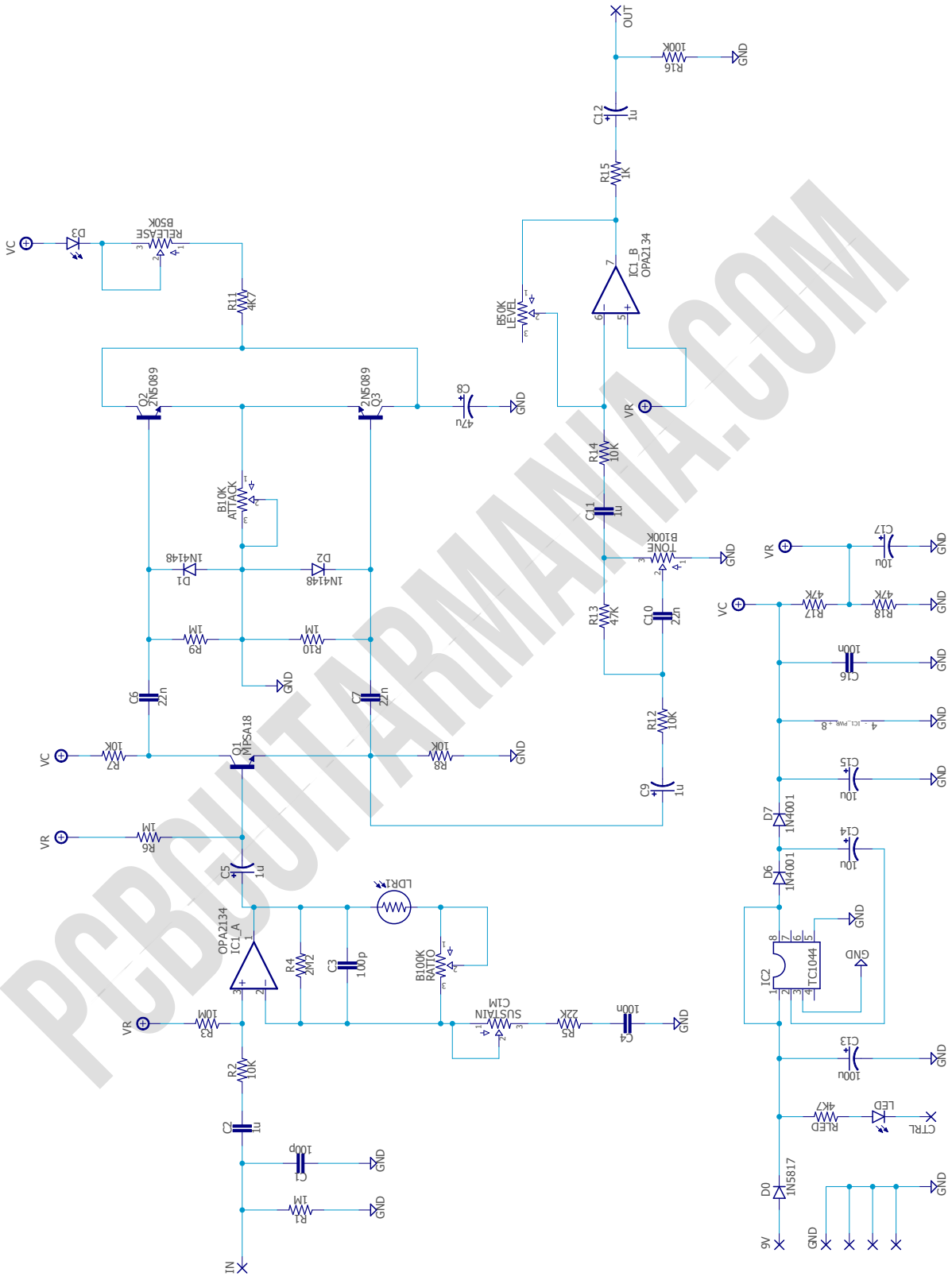
Potentiometers		
Qty	**Value**	**Parts**
2	B100K	RATIO, TONE
1	B10K	ATTACK
2	B50K	LEVEL, RELEASE
1	C1M	SUSTAIN

IC		
Qty	**Value**	**Parts**
1	OPA2134	IC1
1	TC1044	IC2

Transistors		
Qty	**Value**	**Parts**
2	2N5089	Q2, Q3
1	MPSA18	Q1

Diods		
Qty	**Value**	**Parts**
1	**Photo resistor**	LDR1
2	1N4001	D6, D7
2	1N4148	D1, D2
1	1N5817	D0
1	LED 5mm WHITE	D3

Schematic


OUT
R16 100K
GND
C12 1u
R15 1K
IC1_B OPA2134
B50K LEVEL
D3
B50K REVERSE
VC
R11 4K7
Q2 2N5089
Q3 2N5089
C8 47u
VR
R14 10K
B10K ATTACK
C11 1u
B100K TONE
D1 1N4148
D2 1N4148
R13 47K
C10 22n
R9 1M
R10 1M
C6 22n
C7 22n
R12 10K
C9 1u
R7 10K
Q1 MPSA18
R8 10K
R6 1M
C5 1u
LDR1
IC1_A OPA2134
R4 2M2
C3 100p
B100K RATIO
SUSTAIN
R5 22K
C4 100n
R3 10M
R2 10K
C2 1u
C1 100p
R1 1M
IN
C17 10u
R17 47K
R18 47K
C16 100n
C15 10u
D7 1N4001
C14 10u
D6 1N4001
IC2 TC1044
C13 100u
LED
RLED 4K7
CTRL
D0 1N5817
9V
PCBGUITARMANIA.COM

Components Recommendations

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

This board has been tested using Film box capacitors for most of the values over 1nf, and ceramics discs for the ones 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 exclusively 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 on 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 control slug of your 3PDT.

This board has been designed to match our EZ 3PDT PCB check it here to access to 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 in an A4 page.

Licensing and Usage

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

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

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

These boards may be used for commercial endeavors in any quantity unless specifically noted. No attribution is necessary, though accreditation or a link back is always greatly 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 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 silk screen, 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 own designs, with your brand and logo we could certainly reach an agreement.

Follow us on Instagram and Facebook to stay in tune with the latest projects!