

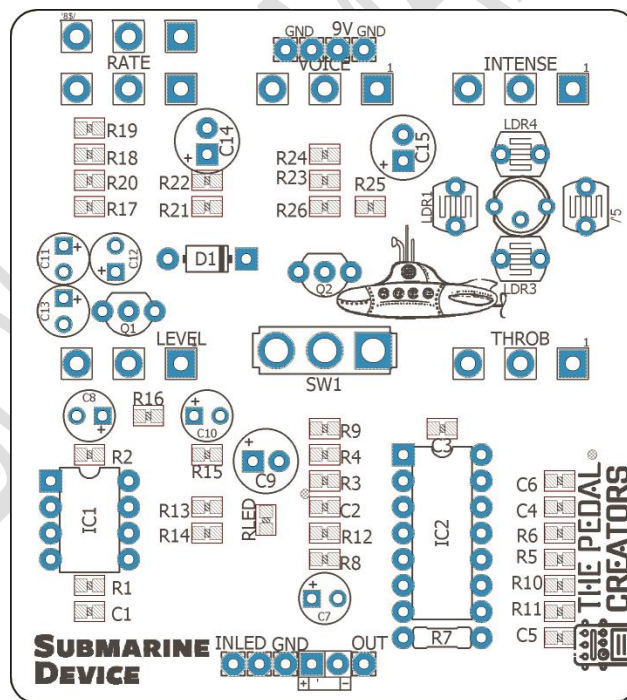
Submarine Device SMD

Based on: EQD the Depths	Number of parts: Low, 22 components	Enclosure type: 125b
Effect type: Analog Optical Vibe Machine	Technology: LDR Optical Vibe	Get your board at: Submarine Device SMD
Build difficult: Easy	Power consumption: 9v – 18v (check max voltage of capacitors)	Get your kit at: Das Musikding (Europe)

Project overview:

Welcome to your new Optical Vibe Machine! With roots on the classic Uni-vibe, the guys from Akron, Ohio, did a serious job updating that classic pedal for the 21st-century demands with the same lush, pulsating, three-dimensional swirling sound you know and love and some modern accouterments for all you land-lubbers out there.

Designed to use with all kinds of instruments, pickups, and to play well with dirt, so nobody's left waiting on shore!



About The Pedal Creators

Everyone can build excellent boutique guitar **pedals**.

Everything **we do** is to make that **experience** more accessible and **user-friendlier**.

The **Pedal Creators** series are the **best and easiest to build PCBs** ever. Including most **resistors** and **capacitors** already **soldered** on board as SMD components, leaving the key values for you to **experiment** and craft **your own tone**.

Now you can **build** a pedal you are **proud** of in **less than an hour** without any previous experience.

What are you waiting for to **become a Pedal Creator**?

The Pedal creators - key features:

- **Easy to build**, no previous experience required. It's like Lego for musicians.
- **Fast assembly** finish a pedal in less than an hour. Play your favorite record and enjoy the ride along.
- **100% mistake-proof**. Even my grandma can build one while she cooks.
- **Build** your own boutique pedal. Experiment with different values and make the **pedal you always dreamed of**.
- Easy to scale. **Turn your passion into a money-making machine**.

Index

- | | |
|------------------------------------|--|
| 1. Project overview | 6. Schematic |
| 2. About The Pedal Creators, Index | 7. Components recommendations, Build Notes, Wiring Diagram |
| 3. Introduction & Controls | 8. Drilling Template, Licensing and Usage |
| 4. Bill of materials | |
| 5. Shopping list | |

Introduction

The guys at Earthquaker made some improvements to the original circuit. Smaller, more reliable by using LEDs instead of light bulbs. Able to run it at 9v-18v and adding some extra controls.

So there was not much left for us to do but giving you an extra tonal option. Via toggle switch and bi Color led, you can get even more sounds out of it than the original provides. I highly recommend using sockets to experiment with the LEDs and solder the LDR's in after getting an idea of how tall the led in the sockets will be. So you can match the height.

While the original EQD unit uses a yellow LED, you could use a green/yellow led. With a minor difference in sound or a red/blue difference, there is way more present without a need to touch any knob, but it's overall a bit sharper sounding. Personally, I used a single Color orange diffused led for a tone that made me more than happy.

In case you're so in love with one specific LED, you can leave the toggle out and solder a jumper. I highly recommend experimenting with this and the distance between LDR and LED. To get an equal distance between them, you can simply use a guitar thick 2mm guitar pick as a spacer.

Controls

- **Intensity:** This controls how subtle or intense the overall effect is. Counterclockwise from noon are the more subtle, classic sounds. Clockwise from noon are the more drastic and intense sounds.
- **Voice:** Dials in the overall sound. Turn it clockwise for a fuller sound with more lows, bring it back for a thinner, more midrange-focused tone.
- **Rate:** Controls the speed of the effect. Counterclockwise for slow, clockwise for fast.
- **Level:** Controls the volume of the effect. Unity is around 1 o'clock; everything above that is boost.
- **Throb:** This controls the low-end pulse. It may not be immediately evident on the bridge pickup, but switch to the neck or add some dirt, and it comes alive. All the way up for more throb, dial it back for less. It works best when the Voice is set to a warmer tone.
- **LED toggle:** This allows you to choose which color of the bicolored LED will shine, changing the effect's behavior.

Bill of materials

Electrolytics Capacitors	
Part	Value
C7	1u
C8	1u
C9	100u
C10	10u
C11	1u
C12	1u
C13	1u
C14	47u
C15	47u

Potentiometers	
Part	Value
INTENSE	B25K
LEVEL	A100K
THROB	B25K
VOICE	B10K
RATE	B100K Dual gang (stereo)

IC	
Part	Value
IC1	TL072
IC2	TL074

Transistors	
Part	Value
Q1	MPSA18
Q2	MPSA18

Switches	
Part	Value
SW1	SPDT ON-ON***

Diodes	
Part	Value
D1	1N4001
D2	LEDSTATUS-LED
Bicolor LED	RED/GREEN 5mm COMMON CATHODE*

Shopping list

Electrolytics Capacitors

Qty	Value	Parts
1	100u	C9
1	10u	C10
5	1u	C7, C8, C11, C12, C13
2	47u	C14, C15

Potentiometers

Qty	Value	Parts
1	A100K	LEVEL
1	B10K	VOICE
2	B25K	INTENSE, THROB
1	B100K Stereo	RATE

IC

Qty	Value	Parts
1	TL072	IC1
1	TL074	IC2

Transistors

2	MPSA18	Q1, Q2
---	--------	--------

Switches

1	SPDT ON-ON***	SW1
1	3PDT Stomp foot	-

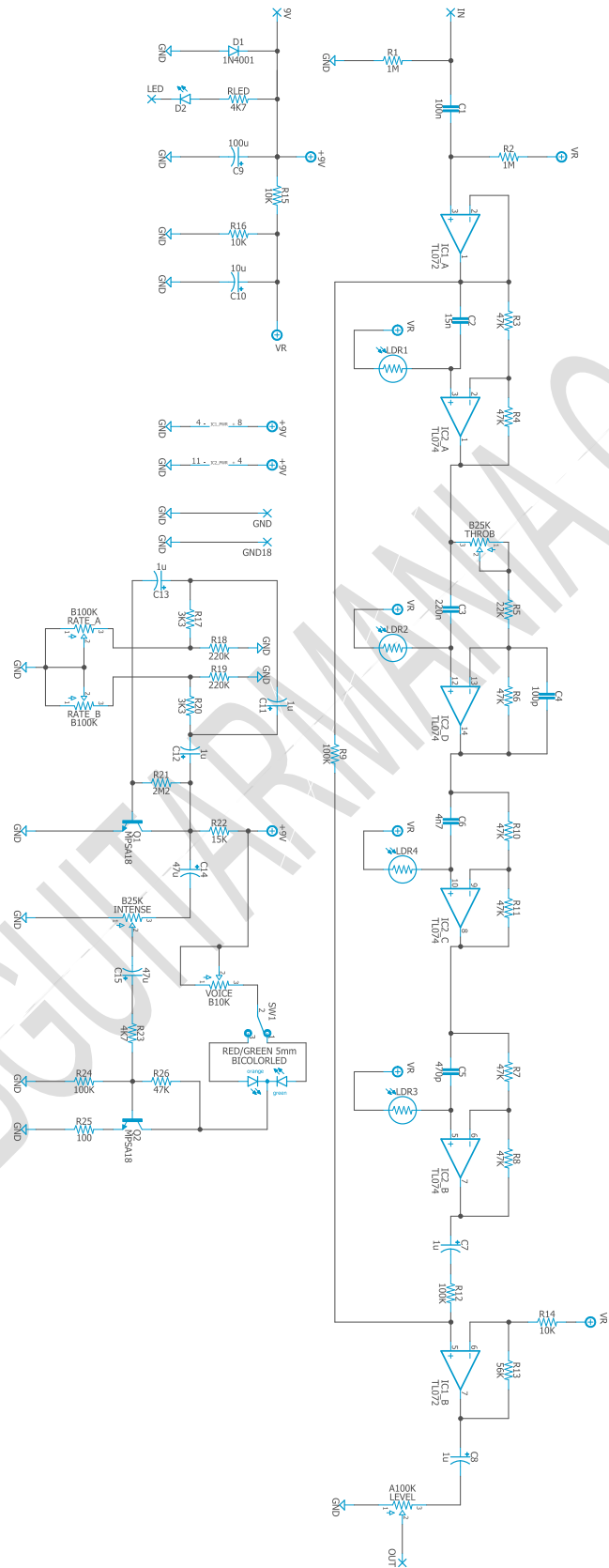
Diodes

Qty	Value	Parts
1	1N4001	D1
1	LEDSTATUS-LED	D2
1	RED/GREEN 5mm COMMON CATHODE*	BICOLORLED

Jacks

Qty	Value	Parts
1	DC JACK	-
2	AUDIO JACK	-

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

BICOLORLED*

This is a mod we included over the original EQD that uses a single Yellow LED.

The point of it is to change completely the character of the pedal just with a flip of a switch.

Remember this LED is common Cathode (Common ground).

LDR (photo resistor)**

If you are new with photo resistors don't worry, there are much common than what you believe.

Here you have some links bellow to see what I'm talking about.

<https://www.taydaelectronics.com/photo-conductive-cell-resistor-ldr-650nm-radial-ke-10720.html>

<https://www.musikding.de/LDR07-photo-cell-16k-50k-2M>

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!