

Crystal Sword

Based on:

Blackout Effectors Crystal Dagger

Effect type:

Octave Fuzz/Phaser/Ring mod

Build difficult:

Advanced

Number of parts:

High, total 126 components

Technology:

Silicon Fuzz + Octaver
+ LM13700

Power consumption:

9V

Enclosure type:

1590bb

Get your board at:

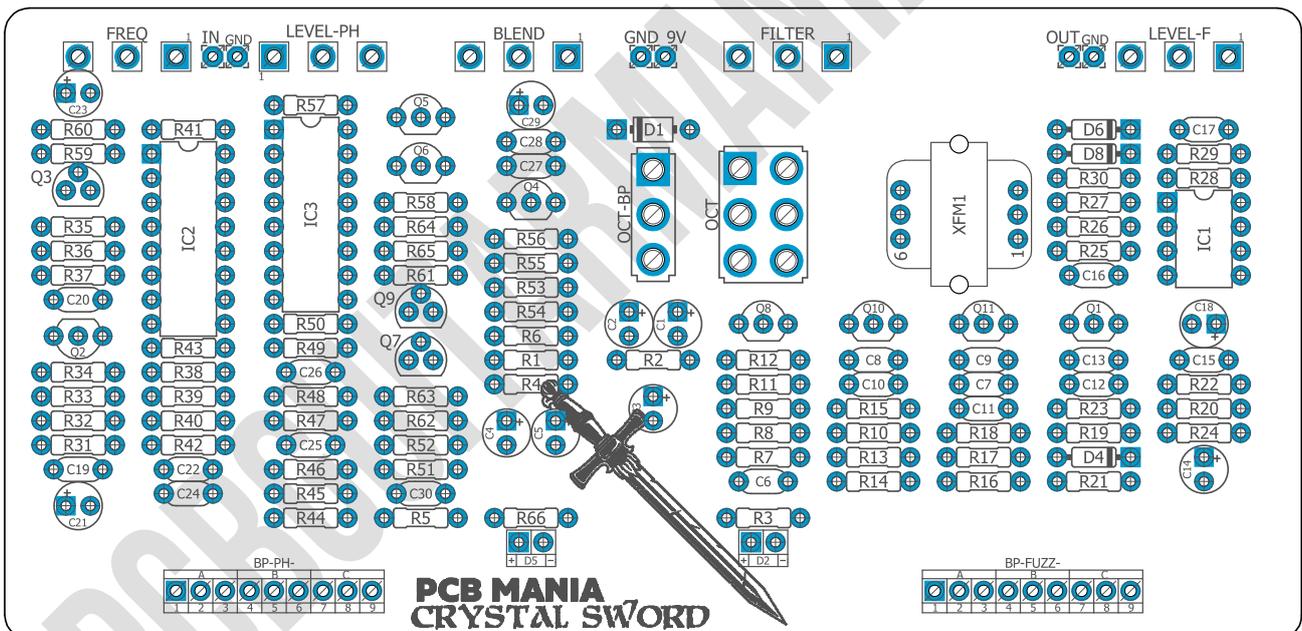
[Crystal Sword](#)

Get your kit at:

[Das Musikding \(Europe\)](#)

Project overview:

The Crystal Sword is an Octave Fuzz / Phaser / Ring mod which consists of a dual harmonic device that comprises two independent circuits: a scorching octave-up fuzz and a unique conglomeration of ring modulation, unpredictable octaving, and phasing. Both circuits are true-bypass footswitchable and run in series.



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

Blackout Effectors is widely known for its bizarre and beautiful modulation, breath-taking fuzz, and deep reverb-type pedals. It is no wonder why bands like Bongripper, Animal Collective, Band of Horses, Wilco, and another significant number of contemporary groups always have some of their products at hand. Crystal Sword has all the beauty of these odd tones, but it's also able to make an intense and fluid octave sound. Mixing this with the ring modulation feature results in a startling board that can also become a very atonal beast.

The octave fuzz and ring modulator in Crystal Sword work from their own dedicated analog circuit boards. Each has separate controls that can be used individually or blended together, making this board capable of unique things. The fuzz side has filter and volume knobs and a handy toggle switch that activates the octave-up effect. The more chaotic ring modulator side has carrier-frequency tuning and volume knobs, which help induce phasing sweeps and pulsating effects. Both circuits sound great individually but used together is where the magic begins.

Unlike most octave fuzz pedals, Crystal Sword is very clean, with smooth lows and mids, and a not-too-piercing high end. You can highlight precise frequency bands with the filter function and shape tones with the same ease with simple picking dynamics.

This board is specifically created for those players who want to break the conventional tone rules in order to craft their own.

Controls

Potentiometers:

- Blend
- Filer
- Freq
- Level-F
- Level-PH

Switches:

- BP-Fuzz
- BP-PH
- OCT-BP
- OCT

Bill of materials

Resistors	
Part	Value
R1	100r
R2	10k
R3	4k7
R4	10k
R5	1k
R6	1k
R7	1m
R8	100k
R9	390r
R10	1k
R11	1m
R12	10k
R13	220k
R14	100k
R15	56k
R16	100k
R17	39k
R18	33k
R19	56k
R20	2m2
R21	2m2
R22	10k
R23	470r
R24	2k7
R25	1m
R26	100k
R27	100k
R28	1m
R29	10k
R30	100r
R31	2m2
R32	390k
R33	470k
R34	10k
R35	4k7
R36	4k7

R37	22k
R38	27k
R39	1k
R40	27k
R41	100r
R42	10k
R43	27k
R44	1k
R45	27k
R46	10k
R47	27k
R48	1k
R49	27k
R50	10k
R51	12k
R52	22k
R53	470k
R54	10k
R55	47k
R56	470r
R57	47k
R58	1k8
R59	27k
R60	7k5
R61	27k
R62	4k7
R63	15k
R64	1k
R65	1k8
R66	4k7

Capacitors	
Part	Value
C6	100n
C7	10n
C8	100n
C9	100n
C10	220n

C11	10n
C12	220p
C13	100n
C15	100n
C16	100n
C17	220p
C19	100n
C20	100n
C22	6n8
C24	6n8
C25	6n8
C26	100n
C27	100n
C28	100n
C30	100n

Electrolytics Capacitors	
Part	Value
C1	100u
C2	100u
C3	47u
C4	100u
C5	33u
C14	10u
C18	22u
C21	10u
C23	33u
C29	1u

Potentiometers	
Part	Value
BLEND	100K B
FILTER	100K B
FREQ	1M C
LEVEL-F	100K A
LEVEL-PH	100K A

Switches	
Part	Value
OCT	DPDT On-On

BP-Fuzz	3PDT Footswitch
BP-PH	3PDT Footswitch
OCT-BP*	3PDT Footswitch

IC	
Part	Value
IC1	4558
IC2	LM13700N
IC3	LM13700N

Transistors	
Part	Value
Q1	2n7000
Q2	2N5088
Q3	2N5087
Q4	2N5089
Q5	2N5088
Q6	2N5088
Q7	2N5087
Q8	2N3904
Q9	2N5087
Q10	MPS2222
Q11	2N5089

Diodes	
Part	Value
D1	1N5817
D2	3mm red LED
D4	9v1
D5	3mm red LED
D6	Ge
D8	Ge

Transformer	
Part	Value
XFM1	42TM022

Shopping list

Resistors		
Qty	Value	Parts
5	100k	R8, R14, R16, R26, R27
3	100r	R1, R30, R41
10	10k	R2, R4, R12, R22, R29, R34, R42, R46, R50, R54
1	12k	R51
1	15k	R63
7	1k	R5, R6, R10, R39, R44, R48, R64
2	1k8	R58, R65
4	1m	R7, R11, R25, R28
1	220k	R13
2	22k	R37, R52
8	27k	R38, R40, R43, R45, R47, R49, R59, R61
1	2k7	R24
3	2m2	R20, R21, R31
1	33k	R18
2	390r	R9, R32
1	39k	R17
2	470k	R33, R53
2	470r	R23, R56
2	47k	R55, R57
5	4k7	R3, R35, R36, R62, R66
2	56k	R15, R19
1	7k5	R60

Capacitors		
Qty	Value	Parts
12	100n	C6, C8, C9, C13, C15,

		C16, C19, C20, C26, C27, C28, C30
2	10n	C7, C11
1	220n	C10
2	220p	C12, C17
3	6n8	C22, C24, C25

Electrolytics Capacitors		
Qty	Value	Parts
3	100u	C1, C2, C4
2	10u	C14, C21
1	1u	C29
1	22u	C18
2	33u	C5, C23
1	47u	C3

Potentiometers		
Qty	Value	Parts
2	100K A	LEVEL-F, LEVEL-PH
2	100K B	BLEND, FILTER
1	1M C	FREQ

Switches		
Qty	Value	Parts
3	3PDT Footswitch	BP-Fuzz, BP-PH, OCT-BP*
1	DPDT On-On	OCT

IC		
Qty	Value	Parts
1	4558	IC1
2	LM13700N	IC2, IC3

Transistors		
Qty	Value	Parts
1	2N3904	Q8
3	2N5087	Q3, Q7, Q9
3	2N5088	Q2, Q5, Q6
2	2N5089	Q11, Q4
1	2n7000	Q1
1	MPS2222	Q10

Diodes		
Qty	Value	Parts
1	1N5817	D1
2	3mm red LED	D2, D5
1	9v1	D4
2	Ge	D6, D8

Transformer		
Qty	Value	Parts
1	42TM022	XFM1

Jacks		
Qty	Value	Parts
1	DC Jack	-
2	Audio Jacks	-

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

OCT-BP*

Toggle Oct-BP does not work out as expected and it's better to jumper it between pad 1 and 2.

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 1590bb 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!