

Kheiron Klon

Based on:

Klon Centaur

Effect type:

Transparent Overdrive

Build difficult:

Advanced

Number of parts:

High, total 154 components

Technology:

Op Amp

Power consumption:

9V

Enclosure type:

1590bb

Get your board at:

[Kheiron Klon](#)

Get your kit at:

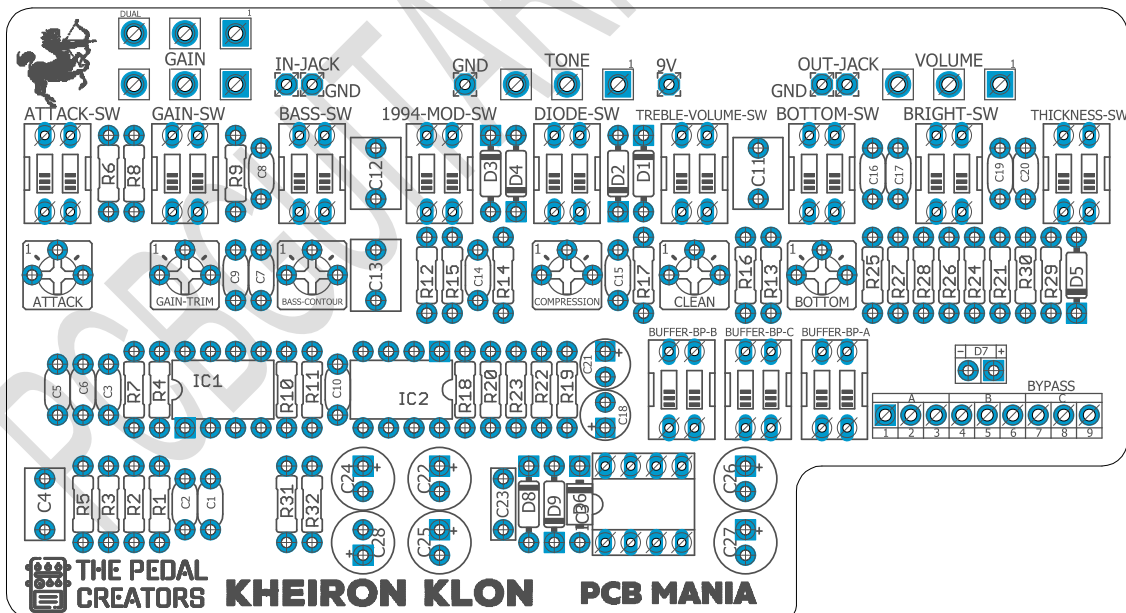
[Das Musikding \(Europe\)](#)

Project overview:

This is the Kheiron Klon project, a [Klon Centaur](#) on steroids that teaches you how different parts of the circuit work.

We compiled every possible mod on this classic circuit and designed a board that allows you to switch between stock and modded versions. In some cases, you can even choose to use a fixed resistor or a trimpot to set the amount of resistance you want.

Kheiron Klon is both ideal for beginners and advanced builders who want to dig deeper into how pedal works and modding.



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Introduction

Kheiron Klon is based on the legendary [Klon Centaur](#), one of the most highly regarded and in-demand effect pedals ever created. Appreciated for its creamy overdrive, it's also used as a Clean Boost for warming up the signal. This ground-breaking transparent overdrive circuit adds gain to your signal without significantly altering the guitar's tone.

The introduction of the Klon back in the early to mid '90s is arguably one of the most relevant events in the history of overdrive pedals. Its use by such players as John Mayer, Nels Cline, and Joe Perry (to name just a few) and its scarcity on the used market have propelled prices to unparalleled levels, giving it the title of the most expensive pedal in the world.

In PCB Guitar Mania decided to praise the original and created this unique version that allows you to choose, experiment, and learn from a board that gathers every conceivable mod. In this document, you will find a description of the different switches' positions, the section they affect, and the overall tone resultant.

Are you ready to add this mythological board to your collection?

Controls

Potentiometers

- Tone
- Volume
- Gain

Switches

- Diode-SW

- Thickness-SW
- Treble-Volume-SW
- Attack-SW
- Bottom-SW
- Bright-SW
- Buffer-BP-A
- Buffer-BP-B
- Buffer-BP-C

Switches Instructions

Buffer Switches:

- **A1 (ON), B1 (ON), B2 (OFF)** – gives buffered bypass output.
- **A1 (OFF), B1 (OFF), B2 (ON)** – gives true bypass output.
- **C1** – mixes buffered output to FX out when FX is on.
- **C2** – adds “always-on” buffered and FX signal to the output jack. Both will make pedal guitar dependent. Applicable, for example, as a treble booster.

Diode Switch:

This way of diode application gives a hard diode. Clipping Switch allows choosing between Ge diode clipping (pos.1) and any other you wish to solder in D3, D4 pads (pos.2).

You can try the following: Schottky, germanium, silicon, 1N4xxx series, red LED, other LED colors, going from lowest to highest clipping threshold (the forward voltage at which the diode conducts). Also, remember that different diodes, such as Ge, Si, etc., can sound different because of their different frequency response.

Attack Switch:

- **Pos.1 ON, Pos.2 OFF** – fixed attack via R6 (1k) resistor.
- **Pos.1 OFF, Pos.2 ON** – variable attack via ATTACK trimmer. This gives you a wide attack range from 0k to 5k resistance.
- **Both ON** – variable attack via ATTACK trimmer, but lower attack range, because trimmer and R6 are connected in parallel with maximum 1k resistance.

Gain Switch:

- **Pos.1 ON, Pos.2 OFF** – standard fixed gain, controlled by GAIN potentiometer with R8 (2k) in series.
- **Pos.1 OFF, Pos.2 ON** – GAIN-TRIM trimmer is added in this position. It gives you a broader, additional gain range from 0k to 5k resistance control, so you can add more gain by increasing resistance or lower gain by lowering resistance.
- **Both ON** – variable gain via GAIN-TRIM trimmer, but lower additional gain range, because trimmer and R8 are connected in parallel with maximum 2k resistance.

Bass Switch:

Gains low frequencies through feedback chain. Allows choosing between different capacitance combinations. Available only when pos.2 of 1994 mod is off.

- **Both OFF** – standard 82nf capacitor is on.
- **Pos.1 ON, Pos.2 OFF** - increases frequency width by adding 150nf capacitor in parallel and having 232nf as a result.
- **Pos.1 OFF, Pos.2 ON** - increases frequency width more by adding 270nf capacitor in parallel and having 352nf as a result.

- **Both ON** – gives the widest frequency range with 3 capacitors in parallel and 502nf overall capacity.

When necessary, color is chosen using a switch, this frequency is added (gained) using the BASS-CONTOUR trimmer.

1994 Mod:

- **Pos.1 OFF, Pos.2 ON** – no 1994 mod. R9 is shortened. It also shortens BASS-CONTOUR control.
- **Pos.1 ON, Pos.2 OFF** - gives more gain by adding R9 in the feedback chain.
- **Both ON** – also delivers no 1994, because R9 is shortened. It also shortens BASS-CONTOUR control.

Bottom Switch:

Activates BOTTOM potentiometer when Pos.1 OFF and Pos.2 ON. This trimmer allows adding low-mid frequencies.

Treble Switch:

Boosts treble through feedback chain.

- **Pos.2 ON and Pos.1 OFF** - variable treble boost using the CLEAN trimmer.
- **Pos.2 OFF, Pos.1 ON** – fixed boost via R16.
- **Both ON** – CLEAN trimmer with 27k resistor in parallel. Because the value is lower, R16 won't have an effect and will act like Pos.1 OFF and Pos.2 ON.

Brightness Switch:

Adds higher frequencies by adding capacitors in the feedback chain of IC2_A. The more capacitance – the broader range.

- **Both ON** – the widest range using two capacitors in parallel with 1560pf in total.
- **Pos.2 ON, Pos.1 OFF** – getting less wide from the side of high-mid. 1nf cap is working.
- **Pos.2 OFF, Pos.1 ON** – getting even less wide with only 560pf capacitor left.
- **Both OFF** – brightness off.

Thickness switch:

Allows you to choose the frequency color of TONE control accordingly to your taste.

- **Pos.1 ON, Pos.2 OFF** – gives you more highs and fewer lows than when pos.1 off and pos.2 on, because a lower capacitor is used (3n9 against 6n8).
- **Both ON** - gives you a broader range because two capacitors are in parallel, giving you 10n7 in total.

Bill of materials

Resistors	
Part	Value
R1	2m2
R2	10k
R3	1m
R4	5k1
R5	1k5
R6	1k
R7	10k
R8	2k
R9	15k
R10	422k
R11	1k5
R12	1k
R13	15k
R14	22k
R15	47k
R16	27k
R17	12k
R18	390k
R19	100k
R20	1k8
R21	100k
R22	100k
R23	4k7
R24	510r
R25	470r
R26	68k
R27	68k
R28	100k
R29	22r
R30	4k7
R31	22k
R32	22k

Capacitors	
Part	Value
C1	220pf

C2	100n
C3	68n
C4	390n
C5	100n
C6	68n
C7	270n
C8	82n
C9	150n
C10	390pf
C11	1uf
C12	1uf
C13	1uf
C14	2n2
C15	27n
C16	1n
C17	560pf
C19	3n9
C20	6n8
C23	100n

Electrolytic Capacitors	
Part	Value
C18	4u7
C21	4u7
C22	100uf
C24	10uf
C25	10uf
C26	10uf
C27	10uf
C28	10uf

IC	
Part	Value
IC1	TL072
IC2	TL072
IC3	TC 1044SCPA

Potentiometers	
Part	Value
GAIN	100k B Stereo
TONE	10K B
VOLUME	10K A

Trimpots	
Part	Value
CLEAN	20k
GAIN-TRIM	5K
ATTACK	5K
BASS-CONTOUR	50K
COMPRESSION	10K
BOTTOM	50K

Switches	
Part	Value
DIODE-SW	Dip Switch 2 poles
GAIN-SW	Dip Switch 2 poles
THICKNESS-SW	Dip Switch 2 poles
TREBLE-VOLUME-SW\	Dip Switch 2 poles
1994-MOD-SW	Dip Switch 2 poles
ATTACK-SW	Dip Switch 2 poles
BASS-SW	Dip Switch 2 poles
BOTTOM-SW	Dip Switch 2 poles
BRIGHT-SW	Dip Switch 2 poles
BUFFER-BP-A	Dip Switch 2 poles
BUFFER-BP-B	Dip Switch 2 poles
BUFFER-BP-C	Dip Switch 2 poles
-	3PDT Stop foot

Diodes	
Part	Value
D1	1n34a
D2	1n34a
D3	Red LED 3mm
D4	Red LED 3mm
D5	1n5817
D6	zener 12v
D7	5mm LED
D8	1n5817
D9	1n5817

Jacks	
Part	Value
DC JACK	-
AUDIO JACK	-

Shopping list

Resistors		
Qty	Value	Parts
1	2m2	R1
2	10k	R2, R7
1	1m	R3
1	5k1	R4
2	1k5	R5, R11
2	1k	R6, R12
1	2k	R8
1	15k	R9
1	422k	R10
1	15k	R13
3	22k	R14, R31, R32
1	47k	R15
1	27k	R16
1	12k	R17
1	390k	R18
4	100k	R19, R21, R22, R28
1	1k8	R20
2	4k7	R23, R30
1	470r	R25
2	68k	R26, R27
1	22r	R29
1	510r	R24

Capacitors		
Qty	Value	Parts
1	220pf	C1
3	100n	C2, C5, C23
2	68n	C3, C6
1	390n	C4
1	270n	C7
1	82n	C8
1	150n	C9
1	390pf	C10
3	1uf	C11, C12, C13

1	2n2	C14
1	27n	C15
1	1n	C16
1	560pf	C17
1	3n9	C19
1	6n8	C20

Electrolytic Capacitors		
Qty	Value	Parts
2	4u7	C18, C21
1	100uf	C22
5	10uf	C24, C25, C26, C27, C28

IC		
Qty	Value	Parts
2	TL072	IC1, IC2
1	TC 1044SCPA	IC3

Potentiometers		
Qty	Value	Parts
1	100k B Stereo	GAIN
1	10K B	TONE
1	10K A	VOLUME

Trim pots		
Qty	Value	Parts
1	20k	CLEAN
2	5K	GAIN-TRIM, ATTACK
2	50K	BASS-CONTOUR, BOTTOM
1	10K	COMPRESSION

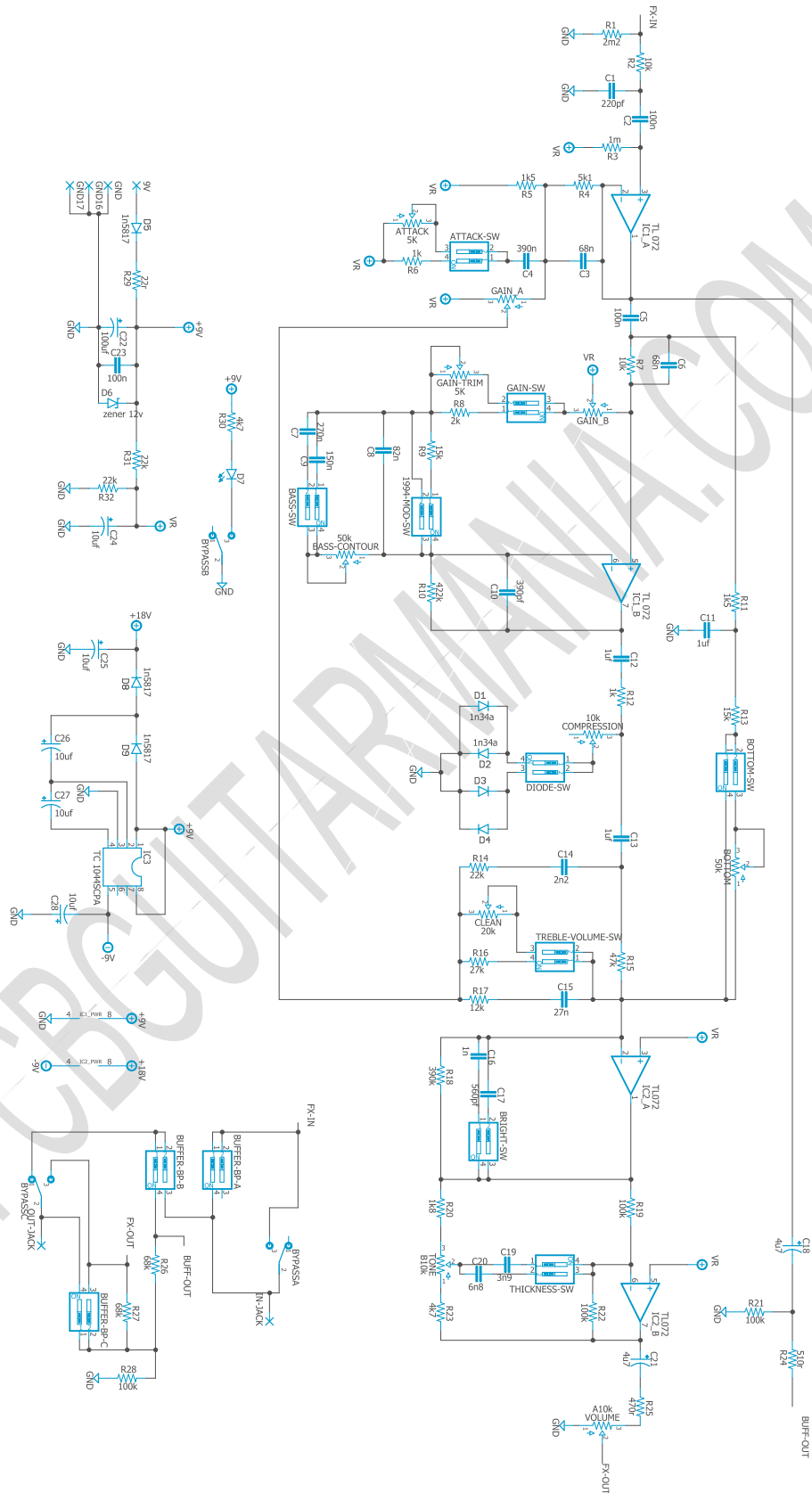
Switches		
Qty	Value	Parts
12	Dip Switch 2 poles	DIODE-SW, GAIN-SW, THICKNESS-SW, TREBLE-

		VOLUME-SW, 1994-MOD-SW, ATTACK-SW, BASS-SW, BOTTOM-SW, BRIGHT-SW, BUFFER-BP-A, BUFFER-BP-B, BUFFER-BP-C
1	3PDT Stop foot	-

Diodes		
Qty	Value	Parts
2	1n34a	D1, D2
2	Red LED 3mm	D3, D4
3	1n5817	D5, D8, D9
1	zener 12v	D6
1	5mm LED	D7

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](#).

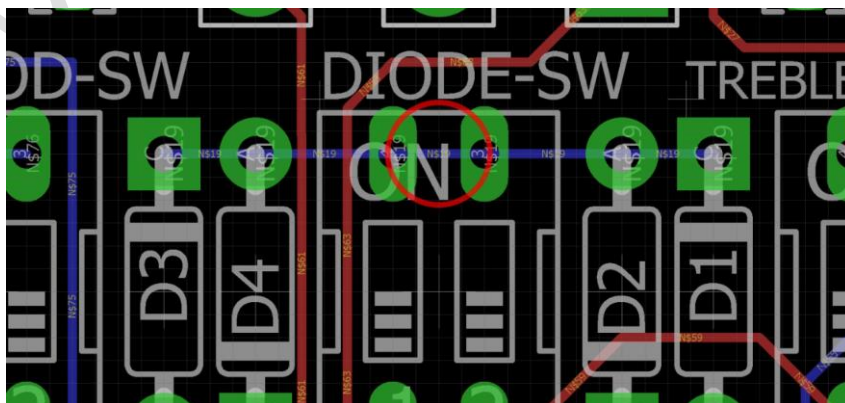
For a successful and tidy build, it's recommended the following order:

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

IMPORTANT:

There is a small fix you will need to do if you have the first version of this PCB:

Make a cut between pins 3 and 4 of the Diode-SW Toggle. Otherwise, it will clip with four diodes instead of 2 as it should. This has been fixed from version 1.1 onwards.



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 and 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, designed 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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