Clockwork Orange

Based on:
Orange Graphic MKII ™

Amount of parts:
Average, total 55 components

Enclosure type:
1590bb

Effect type:
Pre-amp JFET conversion

Technology:
J201 tube emulation.

Get your board at:
Clockwork Orange

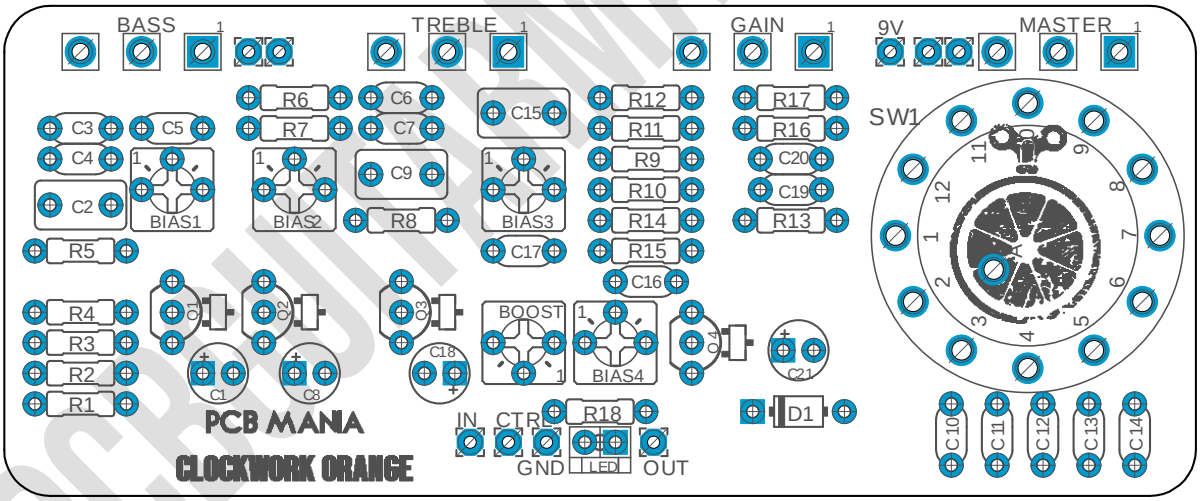
Build difficult:
Intermediate

Power consumption:
9V(22mA) 18V(24mA)

Get your kit at:
Das Musikding (Europe)

Project overview:

Jfet conversion of the Orange Graphic MKII ™ that delivers a thick and saturated drive. This project really stands out from the standard Jfet amp emulators due the nature of its schematic, you can find the baxandall eq at the beginning, in between the first and second gain stages, to have total control of your tone before the signal gets saturated. But what makes this project and the original Orange Graphic MKII so interesting is the FAC switch that acts as a high pass filter in between the third and fourth stages, allowing you to do dial your tone in unique ways.



Index

Introduction

It´s not about Alex and his droogs in Stanley Kubricks Masterpiece of a Movie based on a Book from Anthony Burgess. Big sorry for that. But send me a mail if you want to talk about it. It´s one of my all time favorites and I could chat about that for hours.

So... Why the name? When we are basically talking about an all-time classic british amplifier pressed into a rocking hot preamp/drive project where the tubes get replaced by Jfets to make it even DIY friendlier without sacrificing the response and behavior that you are looking for? Maybe it´s because of the fact that this super rare Amps where also made in the 70´s and maybe the color got to do something with it as well. Maybe the artists who played the original Orange Graphic MKII ™ back in the days like Led Zeppelin, Black Sabbath, Sleep, High on fire, etc.... Watched the movie as well. Who knows, I just like that name but should probably get back to the point. To get the dust from this schematic we added a rotary switch to select different filter caps what is altering the whole behavior of the effect and makes it even better suitable for anything in between classic rock to doom metal.

Controls

- Gain
- Master
- Bass
- Treble
- FAC switch (high pass filter)

Bill of materials

Resistors	
Part	**Value**
R1	1m
R2	68k
R3	220k
R4	2k2
R5	10k
R6	22k
R7	100k
R8	2k2
R9	100k
R10	1m
R11	220k
R12	2k2
R13	1k
R14	1k5
R15	15k
R16	15k
R17	15k
R18	4k7

Trimpots	
Part	**Value**
BIAS1	100k
BIAS2	100k
BIAS3	100k
BIAS4	100k
BOOST	1k

Potentiometers	
Part	**Value**
GAIN	1M A
MASTER	100k A
BASS	1M A
TREBLE	1M A

Switches	
Part	**Value**
SW1	1p12t

Capacitor	
Part	**Value**
C2	680n
C3	22n
C4	2.2n
C5	1n5
C6	10n
C7	330p
C9	680n
C10	330pf
C11	1n
C12	2n2
C13	4n7
C14	47n
C15	680n
C16	680n
C17	1n
C19	2n2
C20	2n2

Electrolytic Capacitors	
Part	**Value**
C1	47u electro
C8	47u electro
C18	47u electro
C21	100u electro

Transistors	
Part	**Value**
Q1	J201
Q2	J201
Q3	J201
Q4	J201

Diodes	
Part	**Value**
LED	3mm Led
D1	1n5817

Shopping list

Resistors		
Qty	**Value**	**Parts**
2	1m	R1, R10
1	1k	R13
1	1k5	R14
3	15k	R15, R16, R17
1	4k7	R18
1	68k	R2
2	220k	R3, R11
3	2k2	R4, R8, R12
1	10k	R5
1	22k	R6
2	100k	R7, R9

Transistors		
Qty	**Value**	**Parts**
4	J201	Q1, Q2, Q3, Q4

Diodes		
Qty	**Value**	**Parts**
1	1n5817	D1
1	3mm	LED

Trimpots		
Qty	**Value**	**Parts**
4	100k	BIAS1, BIAS2, BIAS3, BIAS4
1	1k	BOOST

Pots		
Qty	**Value**	**Parts**
3	1M A	BASS, GAIN, TREBLE
1	100k A	MASTER

Capacitors		
Qty	**Value**	**Parts**
1	330pf	C10
2	1n	C11, C17
3	2n2	C12, C19, C20
1	4n7	C13
1	47n	C14
1	680n	C16
3	680n	C2, C9, C15
1	22n	C3
1	2.2n	C4
1	1n5	C5
1	10n	C6
1	330p	C7

Electrolytic Capacitors		
Qty	**Value**	**Parts**
3	47u electro	C1, C8, C18
1	100u electro	C21

Switches		
Qty	**Value**	**Parts**
1	1P12T	SW1

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.

The **Transistors JFET J201 are the heart of this build. Make sure to get high quality ones from trusted vendors and not cheap Asian counterfeits! I strongly recommend the use of SMD transistors as they are much more reliable quality wise.**

To bias correctly the transistors you must plug your finished build into the power supply first. With your tester on voltage mode (V20) plug the negative tip into the ground of the project, some alligators could be really helpful. With the positive tip touch the Drain leg of your transistor and it should appear the voltage on your tester screen. Tweak the trim pot till you read 4.5v if you are using a 9v power supply. Do the fine adjustment by ear, in order to bias at your own personal taste.

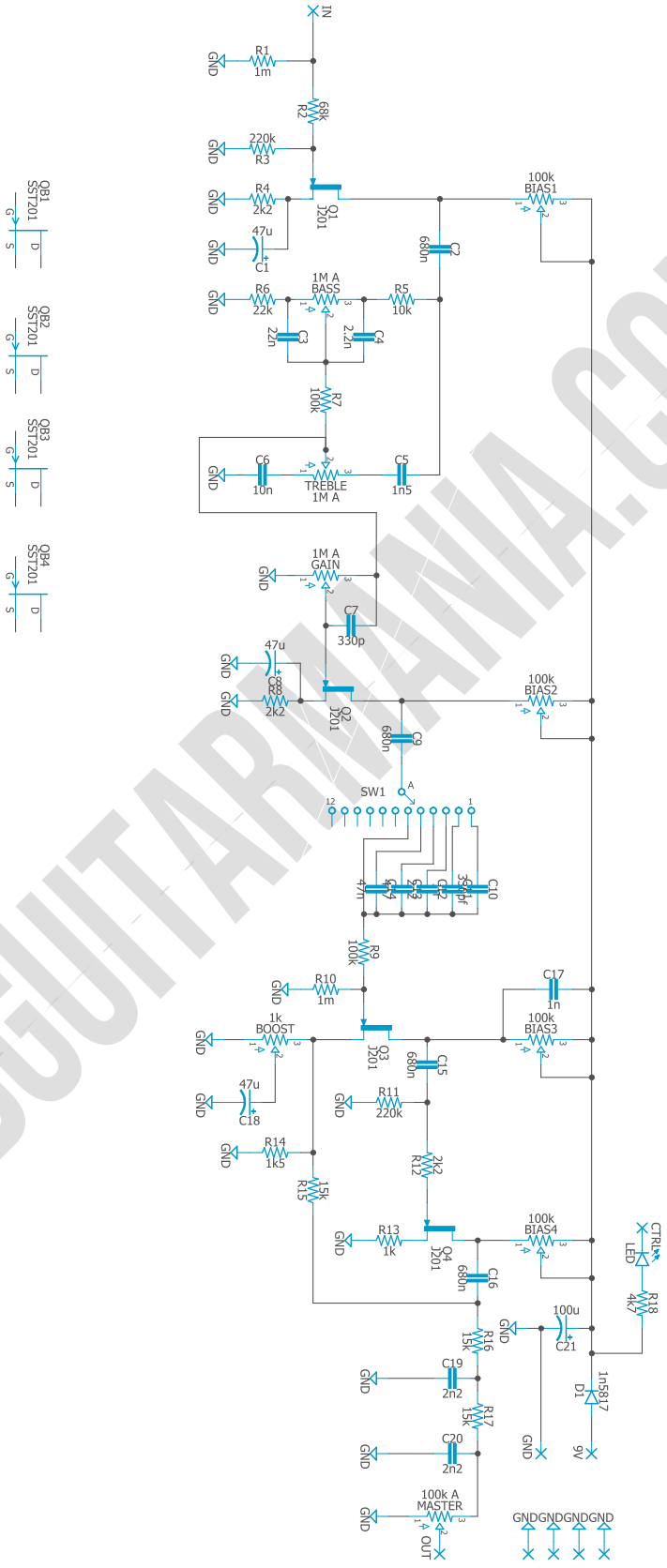
Build Notes

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

Schematic



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 1590b 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.

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