

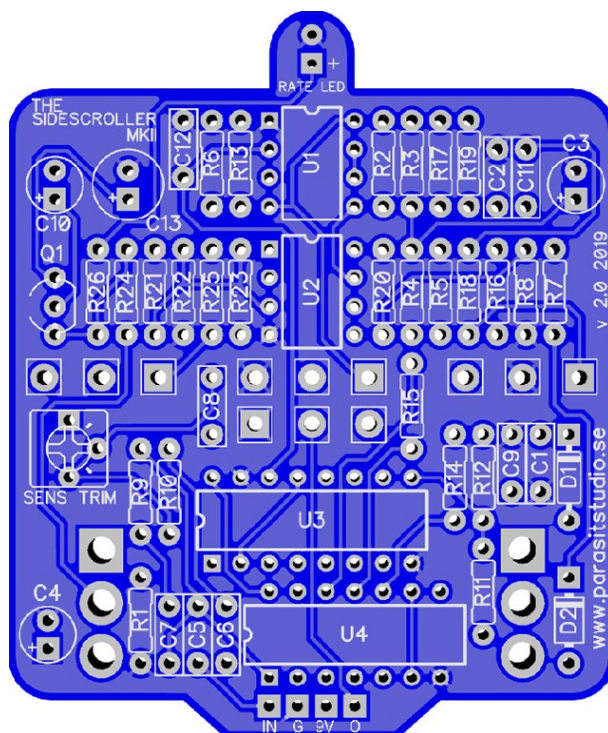
THE SIDESCROLLER MK2

Build Document last updated september 2019
for PCB version 2.0

The Sidescroller is an insane 8-bit sounding fuzz. It does octave down, octave up and pulse width modulation.

The pulse width modulation signal blended with the octave down gives it a retro game'ish sound that brings backs memories of the 8-bit era of videogaming. Sound-wise it's pretty close to The Arcadiator. I guess you can call it the "Arcadiator Light" since it has less control and fits in a 1590B. It does however have a unique feature: an LFO that modulates the pulse width, giving it that C64 phaser'ish sound.

This circuit works best with high output pickups. It's a gated circuit by nature of the CMOS logic. If you are using single coils and need more sustain, try a boost or compressor in front. To improve tracking of the octave down, use your neck pickup with the tone rolled off. Happy playing!



Changelog MK2 (PCB version 2.0)

- Circuit redesigned from scratch!

The original circuit was developed as a personal challenge to produce pwm, octave up and down only using inverters (two CD4069). Without that silly restriction the circuit can be improved... :)

- Improved tracking and sustain. Two gain stages instead of one.
- Improved pulse width modulation. The earlier versions had a pretty weak pwm that sounded best at high lfo rates. The MK2 now has the PWM part completely redesigned. It uses a 555 timer as a pulse stretcher that will automatically adjust the duty cycle in relation to the frequency being played.
- 50% duty cycle octave up! Instead of having a narrow pulse octave up (like the sidescroller 1.5, arcadiator ect.) you can now adjust the octave up width for a 50% duty cycle, so you get an octave up sounding more like the output from an PLL based circuit but without the typical lag that you can get with a PLL based oscillator.
- Added a width / depth control. Now you can tune the width (the earlier version had a fixed width when the LFO was disabled) and the LFO depth as well.
- Removed the LFO gate. The LFO can now run all the time without any ticking issues. This also means that the LFO rate indicator LED is separate from the bypass LED (so you need a bypass LED for the 3PDT board/or offboard mounted).

Controls

SWITCHES

- LFO: This turns the LFO on/off
- PWM/OCT: This toggles between Pulse modulated signal or Octave up

POTENTIOMETERS

- RATE: Controls the rate of the LFO / pulse width modulation
- BLEND: Blends between PWM/Octave up and Octave down
- WIDTH/DEPTH: Controls the pulse width and LFO depth
- LEVEL: Controls the overall output volume

General builds tips

- Solder the low profile components first, from short to tall height. Recommended order: resistors, diodes, IC socket, film-caps, electrolytics, pots and switches
- CMOS chips are very sensitive to static charges and can be easily damaged. It's a good idea to wear a anti-static wristband or at least avoid wearing a wool jumper and petting your cat/dog while building...
- Always use sockets for IC chips and transistors to avoid heating them directly. It also makes it much easier to swap them out if needed.
- Pay special attention to the orientation of the diodes and electrolytics.
- There are many switches and pots on this PCB. Be sure to place them in the PCB without soldering first, THEN place them in your drilled enclosure. Gently tighten the nuts to the enclosure, then solder LAST. Otherwise, it will be really hard to get this in your enclosure.
- This PCB's is designed for 16mm Alpha PCB mounted angeled pots. You could also use solder lug type and just tack some "legs" with short pieces of wire to each pot to mimic a PCB mount type. Again, it is a very good idea to drill holes in your enclosure first, and mount the pots with the nuts BEFORE soldering the pots to the PCB. This ensures you won't put a lot of stress on the PCB.
- The pots, switches and LED are meant to be mounted on the bottom (solder side) of the board, and soldered on the top (component side).
- The square pad represents pin 1 of each pot.
- Cover the backside of the pots so that they don't create a short on the PCB

Wiring

For more info on how to wire up the stompswitch, jacks ect, please visit the Parasit Studio website and download the PDF called "offboard wiring". You can find it here:

<http://www.parasitstudio.se/build-docs.html>

The Sidescroller MK Bill Of Materials (BOM)

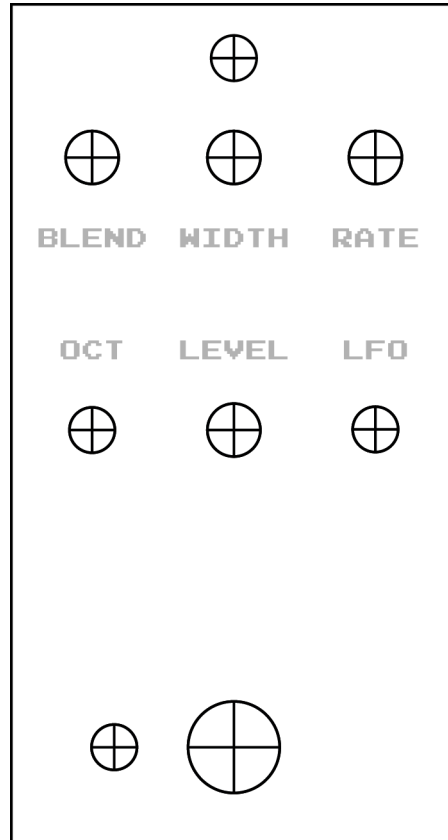
Resistors		R21	10K	IC's	
R1	1M	R22	10K	U1	NE555
R2	10K	R23	4.7K	U2	TL072
R3	10K	R24	4.7K	U3	CD4053
R4	10K	R25	2.2K	U4	CD4069UBE
R5	1M	R26	15K*		
R6	1K	Capacitors		transistor(s)	
R7	47K	C1	1nF	Q1	2N3904
R8	15K	C2	220nF	Potentiometers	
R9	1M	C3	10uF	LEVEL	A100K
R10	1M	C4	10uF	BLEND	B50K
R11	1M	C5	100nF	WIDTH/DEPTH	B100K
R12	10K	C6	100nF	RATE	C50K
R13	10K	C7	2.2nF	switches	
R14	100K	C8	4.7nF	OCTAVE	SPDT on/on
R15	10K	C9	1nF	LFO	SPDT on/on
R16	100K	C10	22uF	Diodes	
R17	100K	C11	100nF	D1	1N4148
R18	47K	C12	1nF	D2	1N4001
R19	47K	C13	100uF	1x LED (rate indicator)	
R20	22K			+ 1 LED for bypass**	

- * This is a current limiting resistor for the rate LED. Use the appropriate value for your LED.
- ** the bypass LED and additional current limiting resistor needs to be mounted offboard or on the optional 3PDT board

Not included in the BOM but also good to have:

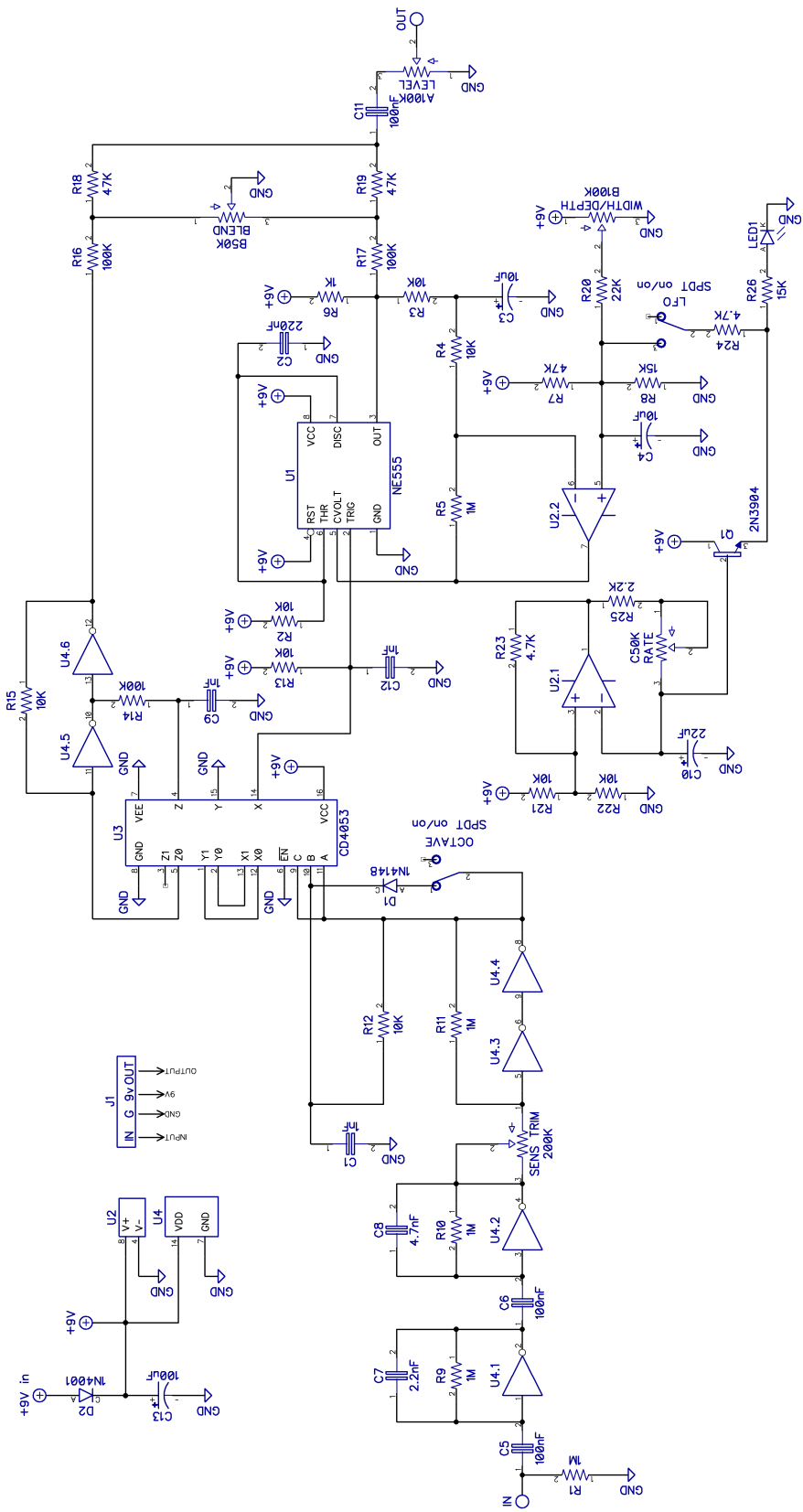
- enclosure
- input and output jacks
- DC jack
- 3PDT switch (bypass)
- LED bezel
- knobs

Drilling template (1590B)



- Use at your own risk! This template is approximate.
- Make sure your printer isn't doing any scaling / is set to 100% print size.
- Drill footswitch, DC jack and input/output jacks to your own preference.
- Some PCB mount pots have longer shafts than others, it will change the hole positions slightly =
- **Measure and confirm before drilling!**
- Read the build tips section highlighted in red before soldering pots and switches to the PCB.

Schematic



Troubleshooting

There's always a chance of running into trouble. To minimize error, follow the BOM and general building tips carefully. Take your time and don't rush. Take a break now and then. Use good solder, and it helps to have a decent soldering station instead of a cheap iron.

If you are still having trouble, please visit the madbean forum Parasit Studio subforum section and ask for help there.

<http://www.madbeanpedals.com/forum/index.php?board=84.0>

If you have bought the Musikding kit and have received a faulty or missing component, please contact musikding directly.

<https://www.musikding.de/kontakt.php?lang=eng>

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