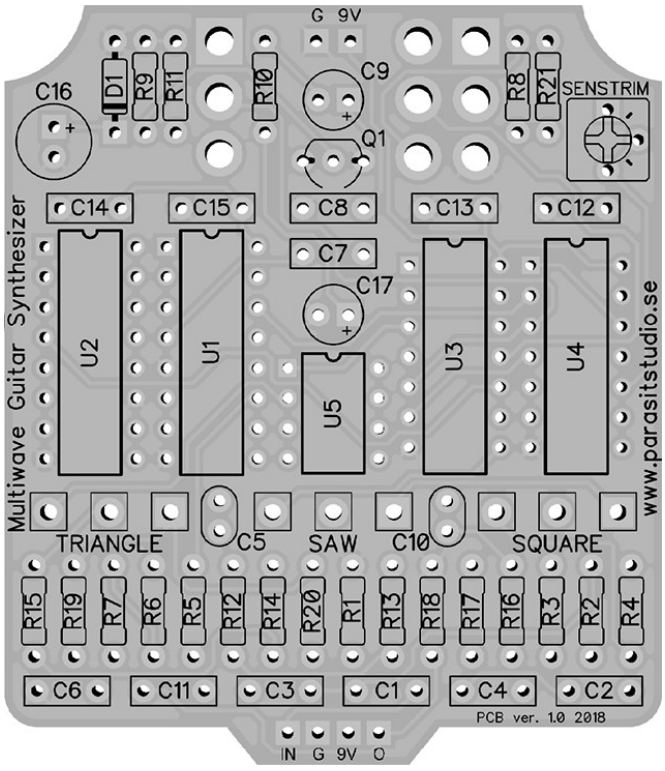
MULTIWAVE

GUITAR SYNTHESIZER

Build Document last updated november 2018
Version 1.0 2018

The Multiwave is a guitar controlled oscillator with 3 different waveshapes: saw, triangle and square. Combined, these can make some very interesting sounds that you won't get with square waves alone. It also has octaves down & up and a special ringmod setting for even more sound shaping possibilites.

Happy building and playing!



CONTROLS

POTENTIOMETERS

- SQUARE – The level of the square wave
- SAW – The level of the sawtooth wave
- TRIANGLE – The level of the triangle wave

  The square wave is the direct unison fuzz which works well with chords. This is unaffected by the other controls.

SWITCHES

- OCTAVE - toggle between (saw / triangle):
  - One octave up / Unison
  - Unison / One octave down
  - One octave down / Two octaves down

The triangle wave is always one octave below the saw wave

- SAW / RINGMOD – this switch toggles the saw:
  - ringmod
  - saw

The "ringmod" modes puts out a triangle wave shape (using the saw potentiometer) that are modulated by a square wave that is three octaves above the triangle wave.

- SENS trimmer - sets the sensitivity/sustain/gating of the guitar input from very sensitive and glitchy to more gated and controlled. Adjust to find a balance between glitch and sustain.

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.

- The square pad represents pin 1 of the pot.

- 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 the pot to mimic a PCB mount type.

- Mount the pots and the switches to the back side (solder side) of the PCB and solder them from the front side (component side).

- Cover the back of the pots (with pot covers or tape or a piece of carbon) 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

Multiwave Bill Of Materials (BOM)

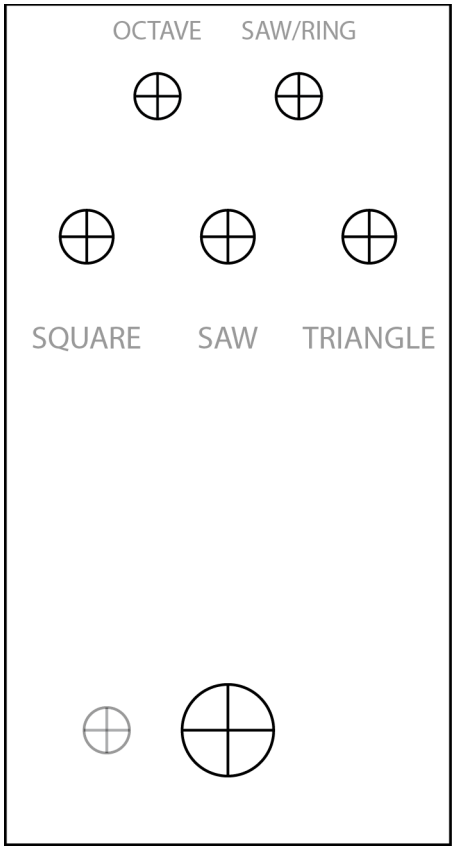
Resistors		Capacitors		IC's	
R1	1M	C1	100nF	U1	CD4046BE
R2	1M	C2	100nF	U2	CD4040BE
R3	1M	C3	2.2nF	U3	CD4066BE
R4	1M	C4	4.7nF	U4	CD4069UBE
R5	10K	C5	100pF	U5	TL072
R6	330K	C6	100nF		
R7	47K	C7	1nF		
R8	4.7K	C8	220nF	**Potentiometers**	
R9	2.2K	C9	2.2uF	SQUARE	A100K
R10	470K	C10	220pF	SAW	A100K
R11	10K	C11	100nF	TRIANGLE	B100K
R12	100K	C12	100nF	sens trim (trimpot)	200K
R13	100K	C13	100nF		
R14	27K	C14	100nF	**Switches**	
R15	27K	C15	100nF	OCTAVE	DPDT on/off/on
R16	330K	C16	100uF	SAW/RING	SPDT on/on
R17	150K	C17	47uF		
R18	100K	**Diodes**		**Transistor(s)**	
R19	4.7K	D1	1N4001	Q1	2N3904
R20	4.7K				
R21	1K				

BOM NOTES

- Use multilayer ceramic capacitors for C12-C15 (important!)
- I also recommend using multilayer ceramic caps for C7 & C8.
- The top PCB G & 9V pads are optional, for using a top mounted DC jack. You don't need to connect to both.

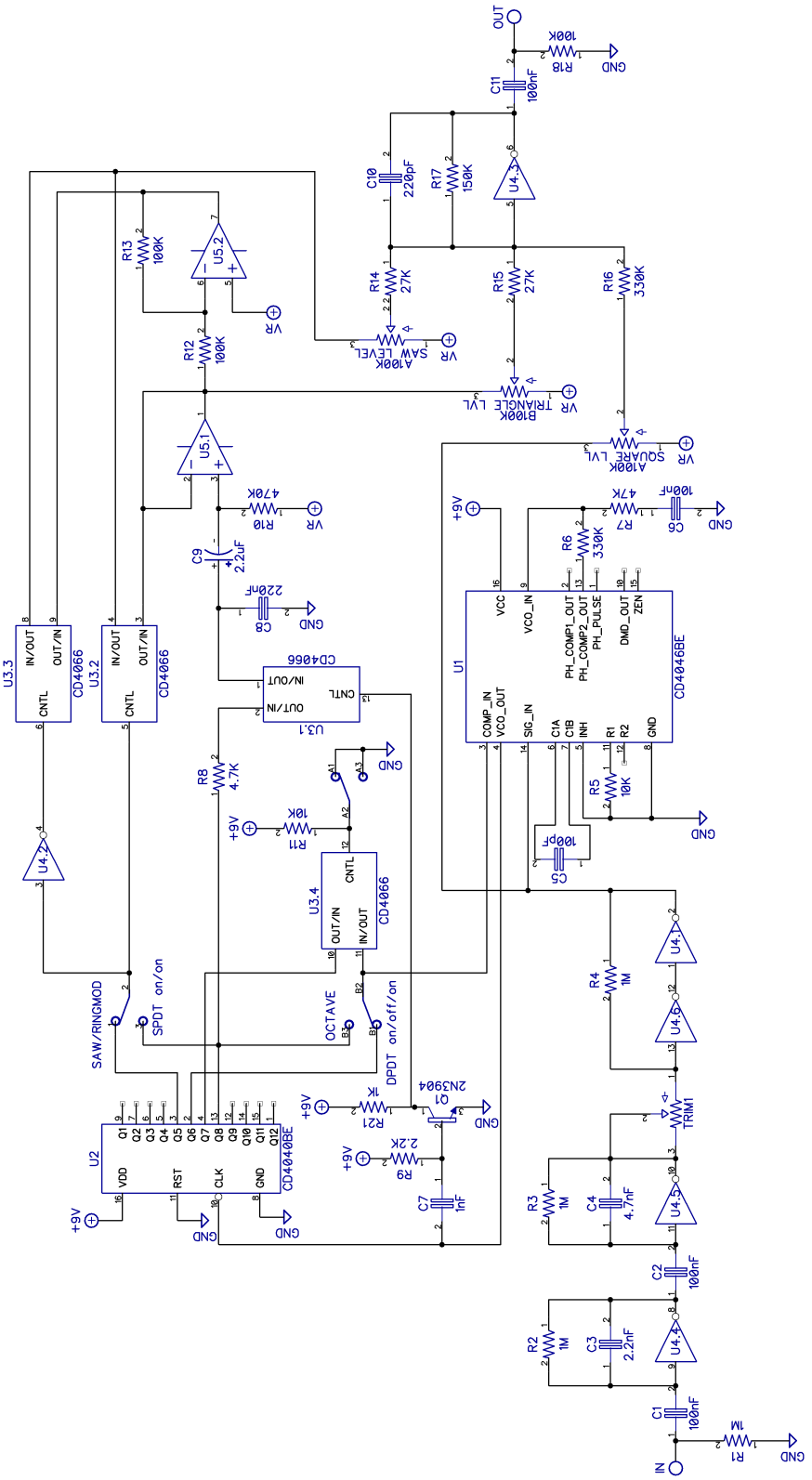
Other things not included in the BOM but good to have:
bypass LED and Current Limiting Resistor (these have to be mounted off-board), enclosure, input and output jacks, DC jack, led bezels, 3PDT switch and knobs.

Drilling template (1590B)



- This template is approximate. Use at your own risk!
- Make sure your printer isn't doing any scaling / is set to 100% print size.
- Drill the DC jack and input/output jacks to your own preference.
- **Measure and confirm before drilling!**

Schematic



Please note that DC filtering, polarity protection, voltage regulation and Vref is not shown in the 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 insted 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 recieved a faulty or missing component, please contact musikding directly.

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

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