0415 Guitar Synth

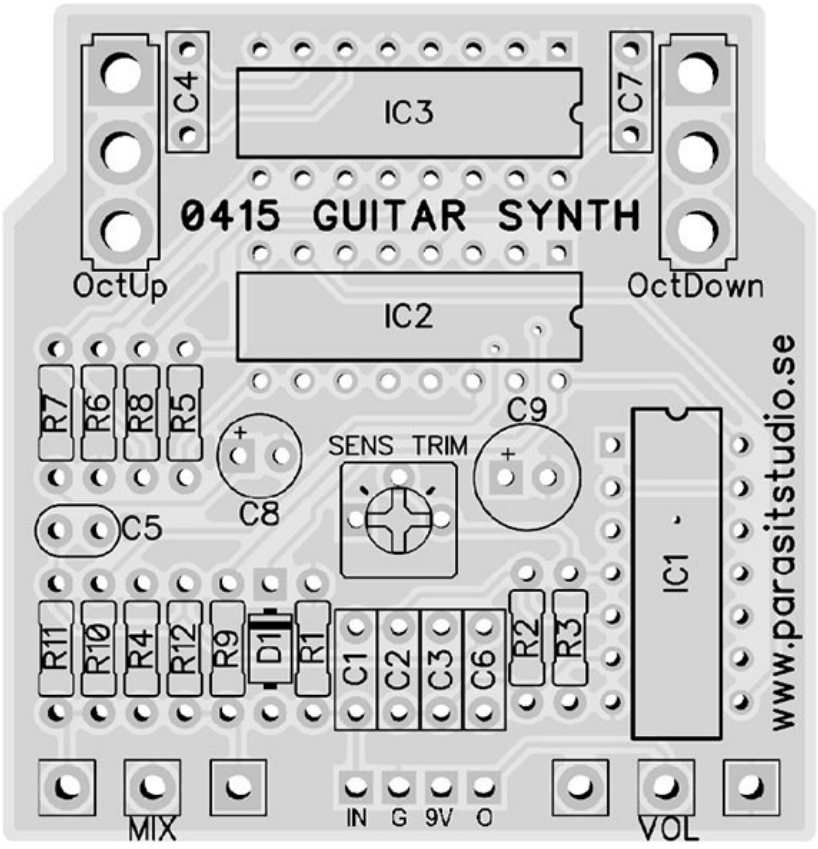
Build Document last updated may 2016

for PCB version 1.0 2015

The 0415 Guitar Synth is a fun a simple pedal that transforms the signal into a square wave, up to four octaves apart: one or two octaves up can be mixed with one or two octaves down for super synthy sounds.

Since this circuit is based around a PLL VCO, it doesn't scramble chords like octave up fuzzes normally do, and it tracks well over the entire fretboard. Single note playing still works best to avoid ”octave jumping” but simple chords can sound really cool.

This circuit works best with high output pickups (although I had decent results with single coils aswell). It is a gated circuit by nature of the schmitt trigger that turns the signal into a squarewave. If you are using single coils and need more sustain, try a boost or compressor in front. To tighten up the octave tracking, use your neck pickup with the tone rolled off. Happy playing!



Controls

- SWITCHES:
  - OctDown – Toggles between one or two octaves down
  - OctUp – Toggles between on or two octaves up
- MIX: Blends between octave down and octave up
- VOLUME: Controls the overall 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
- To make the PCB easier to mount inside the enclosure after drilling, it's best to put the pots and switchen in the PCB first without soldering them. Then put it inside the enclosure and gently tighten the nuts, then solder the pots and switches last.
- 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.
- All PCB's are designed for 16mm Alpha PCB mount 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.
- The square pad represents pin 1 of each pot.
- Both pots and switches are meant to be mounted on the backside (the solder side) of the PCB and soldered from the front side (component side).

Bill Of Materials (BOM)

Capacitors		Resistors		IC's	
C1	100nF	R1	1M	IC1	CD4069UBE
C2	4.7nF	R2	1M	IC2	CD4015BE
C3	100nF	R3	2.2M	IC3	CD4046BE
C4	33nF	R4	1M		
C5	470pF	R5	10K		
C6	100nF	R6	10K	**Potentiometers**	
C7	100nF	R7	10K	MIX	B50K
C8	2.2uF	R8	10K	VOLUME	A100K
C9	100uF	R9	100K	TRIMPOT	200K
Diodes		R10	100K		
D1	1N4001	R11	47K	**Switches**	
on/off LED x1		R12	47K	OctDown	SPDT on/on
		CLR*	4.7K – 18K	OctUp	SPDT on/on

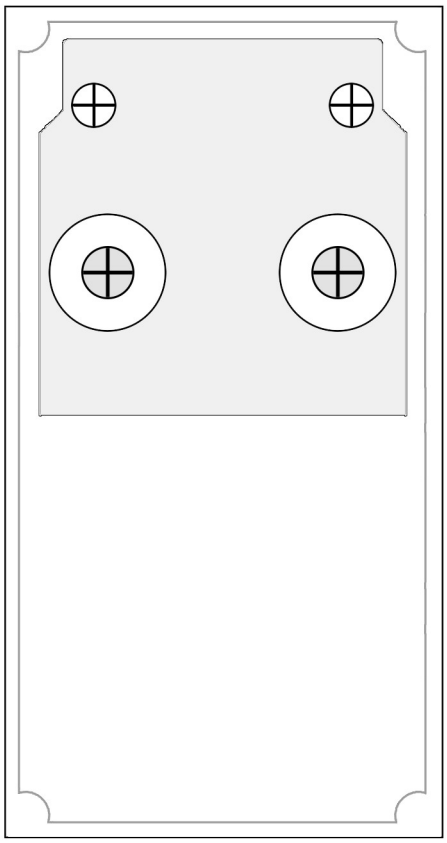
- The trimmer sets the input sensitivity, from very sensitive and noisy when just touching the strings to more gated and controlled. Adjust to suite your guitar output and taste.
- * = Current limiting resistor for the LED. This needs to be wired offboard. Choose the appropriate value for the type of LED you are using. A 4.7K resistor is usually a good value for a regular diffused LED and 15K resistor for a superbright clear LED.
- Other things that are not included in the BOM but good to have: enclosure, input and output jacks, DC jack, 3PDT switch and knobs.

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:

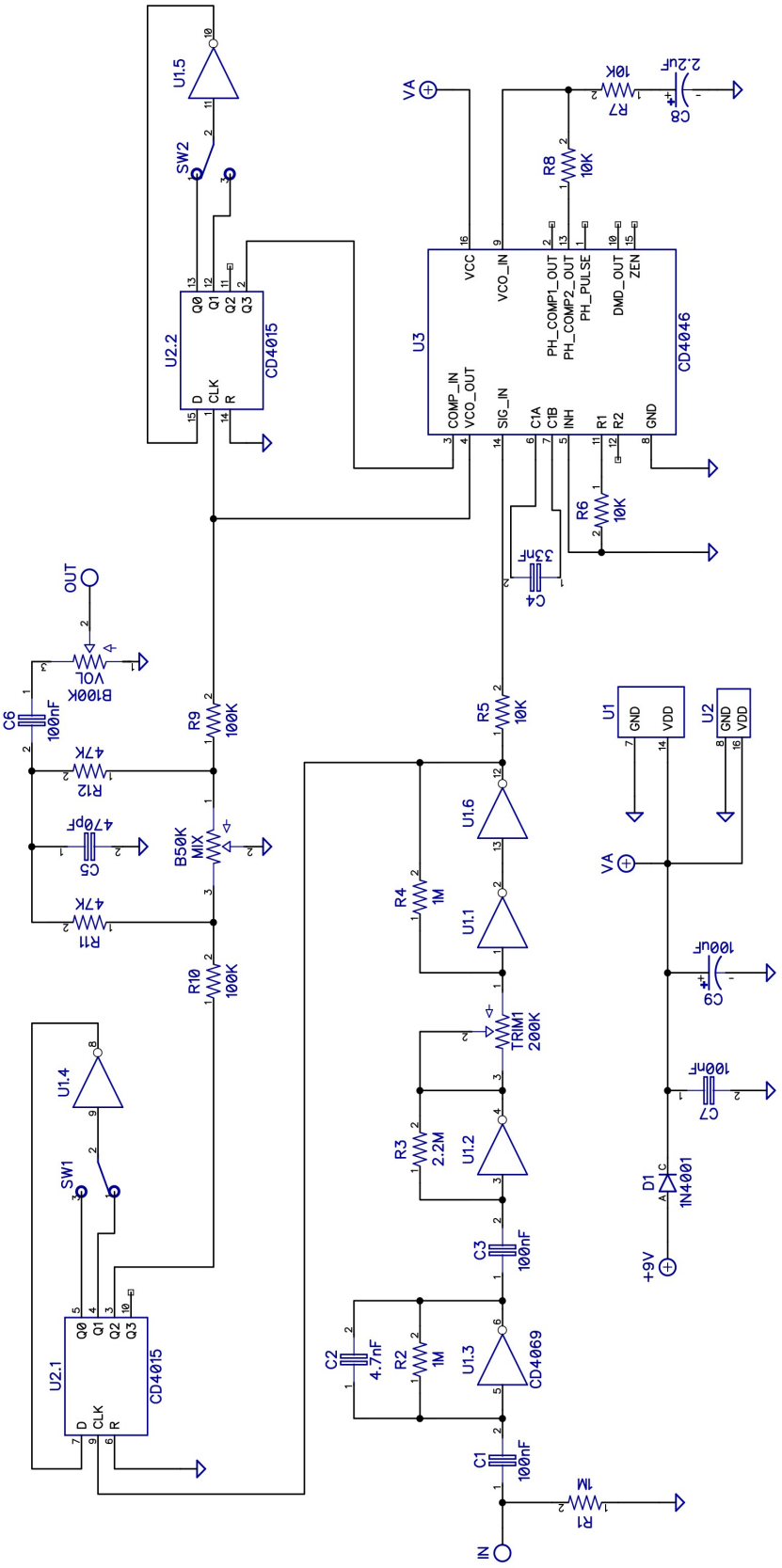
http://www.parasitstudio.se/build-docs.html

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.
- **Measure and confirm before drilling!**

Schematic


U1.5
SW2
U2.2
CD4015
VA
R7
10K
C8
2.2UF
R8
10K
U3
VCC
VCO_IN
PH_COMP1_OUT
PH_COMP2_OUT
PH_PULSE
DMD_OUT
ZEN
CD4046
COMP_IN
VCO_OUT
SIG_IN
C1A
C1B
INH
R1
R2
GND
R6
10K
C4
3.3nF
OUT
B100K
VOL
C6
100nF
R9
100K
R12
47K
C5
470pF
B50K
MIX
R11
47K
R10
100K
R5
10K
U1.6
U1.1
R4
1M
U1
GND
VDD
U2
GND
VDD
VA
C9
100uF
C7
100nF
TRIM1
200K
R3
2.2M
U1.2
C3
100nF
D1
1N4001
+9V
U1.4
SW1
U2.1
CD4015
C2
4.7nF
R2
1M
U1.3
CD4069
C1
100nF
R1
1M
IN

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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