THE PHASE LOCKED FUZZ!

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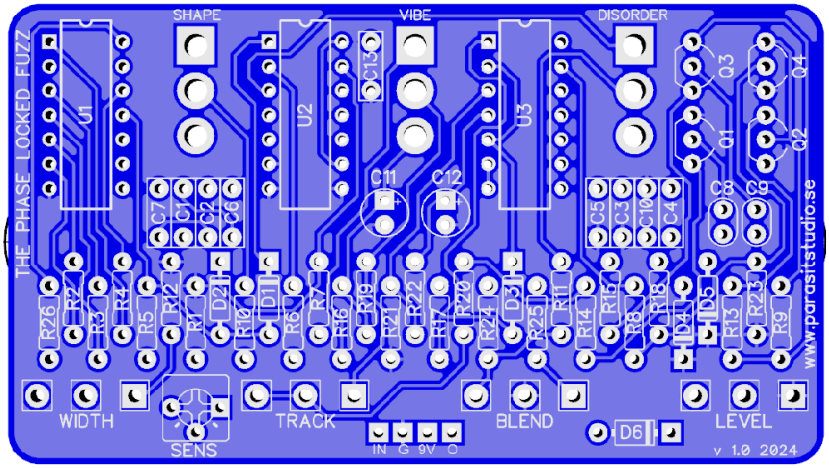
The Phase Locked Fuzz is a square wave fuzz / guitar synth with a ”discrete” phase locked loop oscillator with both sawtooth and squarewave outputs. It has a vibrato, pwm control, tracking control and a disorder mode for making fun chaotic sounds!

Have fun building and playing the Phase Locked Fuzz!



Prototype build

Power

Input voltage - 9V DC
Current draw - 12mA

Controls

Potentiometers

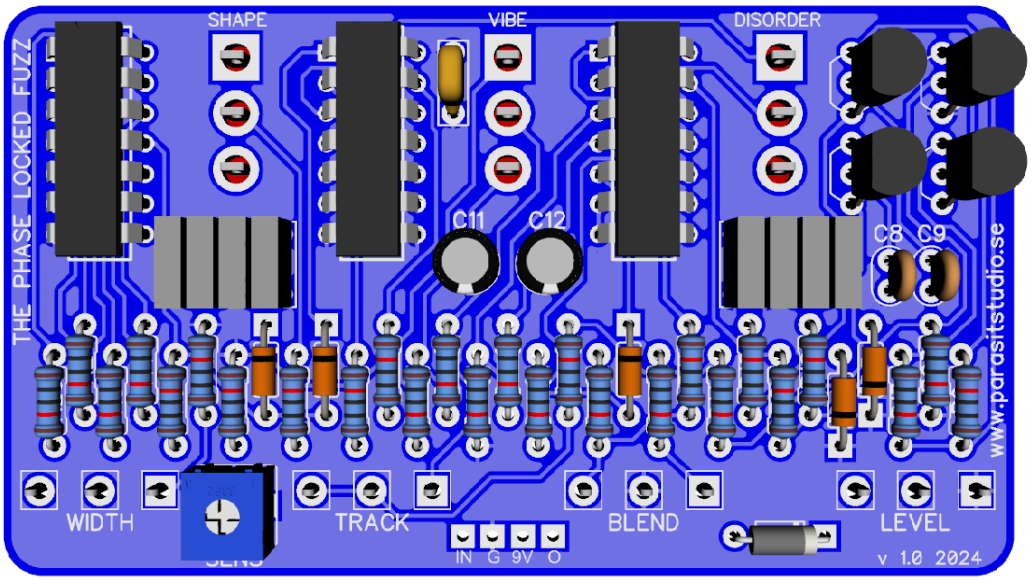
- Level – Controls the overall output volume
- Blend – Blends between fuzz/disorder and the PLL oscillator
- Track – Tunes the PLL lowpass filter to slow down the tracking
- Width – Controls the pulse width of the oscillator square wave output

Switches

- Disorder – Switches between the fuzz or an output that puts out the difference between the input and the PLL output. This can create some chaotic sounds with the Track control turned up and the vibrato enabled
- Vibe – enables vibrato on the PLL oscillator output. It has two different modes – continuous (up) or triggered (down). Adjust the Track control to shape the vibrato depth and rate
- Shape – Switched between saw tooth or square wave PLL oscillator output

The populated PCB

Here's a 3D render approximation of what the fully populated board should look like (except that the IC's should be in sockets).



The PCB measures 85mm wide x 48mm tall

General building tips

- Just follow the Bill of Materials and solder the low profile components first.

  Recommended order: resistors and diodes, chip sockets, trim pot, multilayer and ceramic capacitors, film box capacitors, electrolytic capacitors, transistors, pots and switches, offboard wiring (jacks and the 3PDT switch). Bend the legs of the components alittle bit to prevent them from falling out, or use tape to hold them in place while soldering.

- Pay special attention to the orientation of the diodes, transistors and the electrolytic capacitors.
- Always use sockets for IC chips to avoid heating them directly. It also makes it much easier to swap them out if needed.
- 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 don't wear a woolen jumper and pat your dog while building, and keep the circuit away from rugs... Put the chips in last, after everything else is soldered in place.
- Break off the small tap on the potentiometers, so they can sit flush against the top cover.
- Make sure that the backside of your pots are covered so they don't short anything on the PCB. If you don't have pot covers I recommend using pvc electrical tape.
- When it's time to solder the potentiometers, switches and buttons I recommend having the enclosure/lid prepared to make sure that they line up with the holes.

  I recommend that you solder only the middle pin of each potentiometer to the PCB (so that the placement matches the silkscreen on the PCB and the pot stays in place when you turn the PCB around but still has some wiggle room).
  Don't solder the switches to the PCB. Instead, screw the switches into place inside the enclosure and then put the PCB with the pots into the enclosure so that everything fits together and finally solder the rest of the pot pins and the switches from the component side of the PCB.

The Phase Locked Fuzz BOM (Bill of Materials)

Resistors

R1	1M
R2	1M
R3	1M
R4	1M
R5	100K
R6	100K
R7	100K
R8	100K
R9	100K
R10	100K
R11	100K
R12	100K
R13	100K
R14	1K
R15	1K
R16	1K
R17	2.2K
R18	2.7K
R19	10K
R20	10K
R21	10K
R22	10K
R23	22K
R24	47K
R25	47K
R26	82K
CLR *	4.7K-22K

Capacitors

C1	100nF
C2	100nF
C3	100nF
C4	100nF
C5	1nF
C6	2.2nF
C7	4.7nF
C8	100pF
C9	100pF
C10	68nF
C11	3.3uF
C12	47uF
C13	100nF **

Diodes

D1-D5	1N4148 (5x)
D6	1N4001

1x LED for bypass (daughterboard mounted)

IC's

U1	CD4069 (UBE)
U2	CD4013
U3	LM324

Transistors

Q1-Q2	2N3904 (2x)
Q3-Q4	2N3906 (2x)

Potentiometers

LEVEL	A100K
BLEND	B50K
TRACK	A250K
WIDTH	C100K
SENS (trimpot)	200K

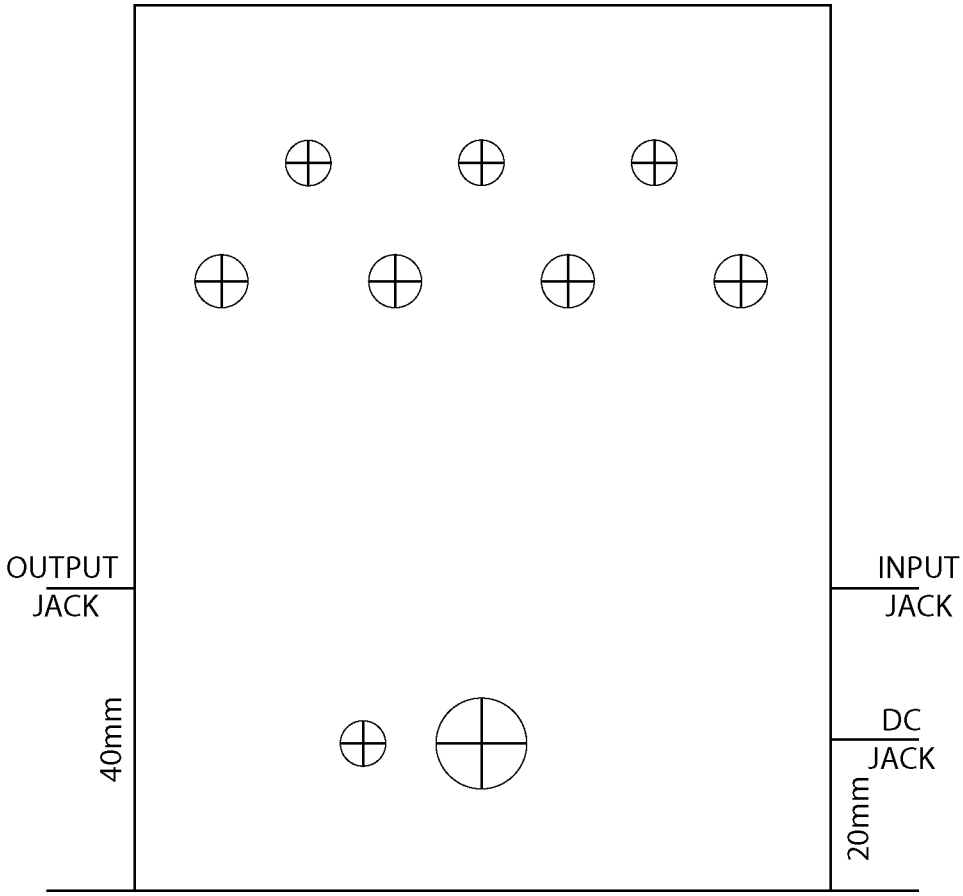
Switches

VIBE	SPDT on/off/on
DISORDER	SPDT on/on
SHAPE	SPDT on/on

BOM Notes

- * = current limiting resistors for the bypass LED. Mounted on the 3PDT daughterboard (or offboard).
- ** = should be a multilayer ceramic capacitors (yellow capacitors)
- The sens trimpot adjusts how gated/touch sensitive the input is.
- Things that are not included in the BOM list: enclosure, input and output jacks, DC jack, 3PDT stomp switch, led bezel and knobs.

Drill Template (1590BB)

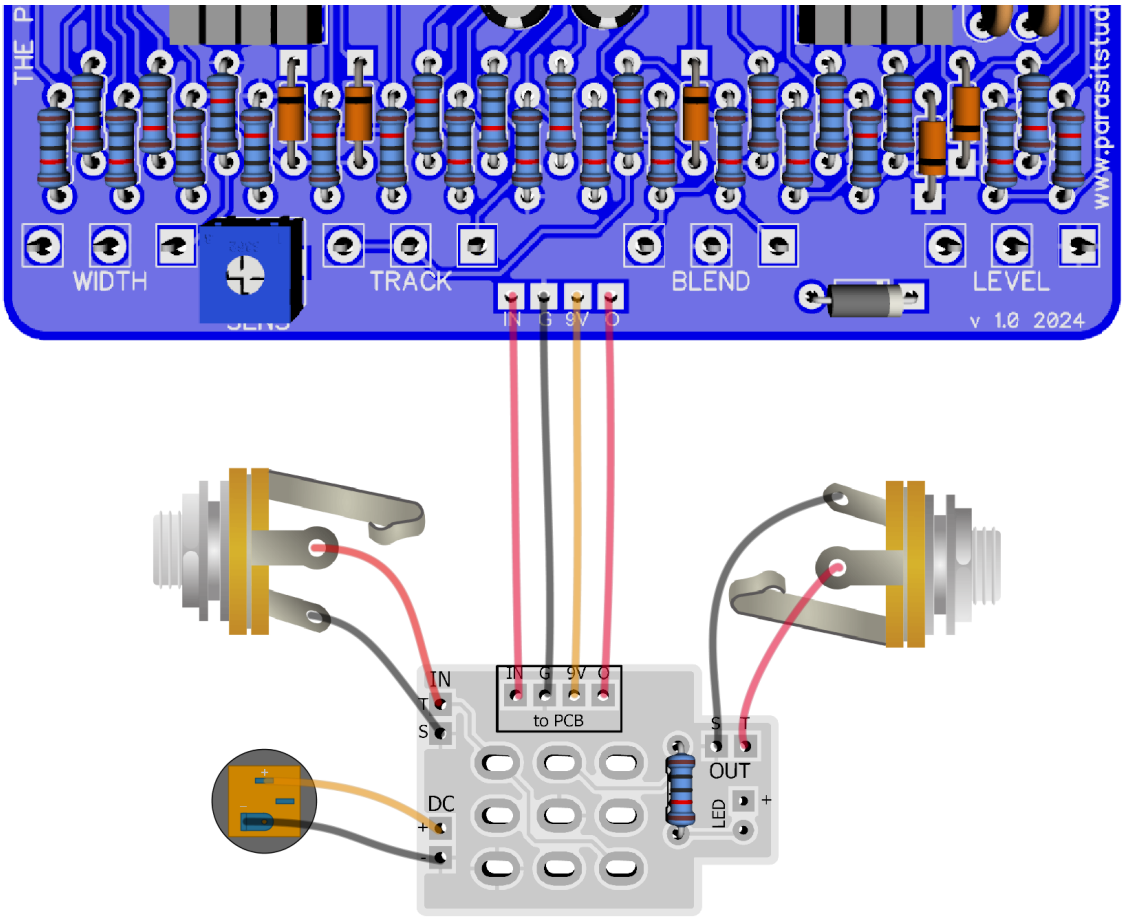


- Use at your own risk! This template is approximate.
- Make sure your printer isn't doing any scaling (100% print size).
- Jacks are measured from the edge at the front/top of the enclosure (as they were drilled on the prototype), but you can drill the positions for the footswitch, DC jack and input/output jacks to your own preference. These are just suggestions.

- Typical drill sizes are:
  - switches / LED bezel (for a 3mm LED) - 6mm
  - potentiometers - 7mm
  - DC jack / 3PDT footswitch – 12mm
    (8mm for lumberg style DC jacks)
  - input/output jacks (Neutrik style) – 9,5mm
    (9mm for Lumberg style jacks)

Measure and confirm before drilling!

Off Board Wiring



The top row of connections on the 3DPT daughterboard connects directly across to the main PCB as shown.

Input jack sleeve → ”S” IN pad *the lug that connects with the inner ring of the jack*
Input jack tip → ”T” IN pad *the lug that connects to the tip bracket on the jack*

Output jack sleeve → ”S” OUT pad *the lug that connects to the inner ring of the jack*
Output jack tip →”T” OUT pad *the lug that connects to the tip bracket on the jack*

DC jack negative → ”–” DC pad *the widest lug, or the short lug (Lumberg style jack)*
DC jack positive → ”+” DC pad *the outer lug if it's a 3 pin DC connector, or the long lug if using a Lumberg style jack*

If you are not using the 3PDT daughterboard PCB, have a look at the offboard wiring diagram here (fig1/3): [wiringrev3.pdf (parasitstudio.se)]

The short leg of bypass LED is the negative side (the side with the flat edge of the LED)

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.

Musikding DIY kit

If you have bought the Musikding DIY kit and have recieved a faulty faulty, incorrect or missing component, please contact musikding.

Contact us

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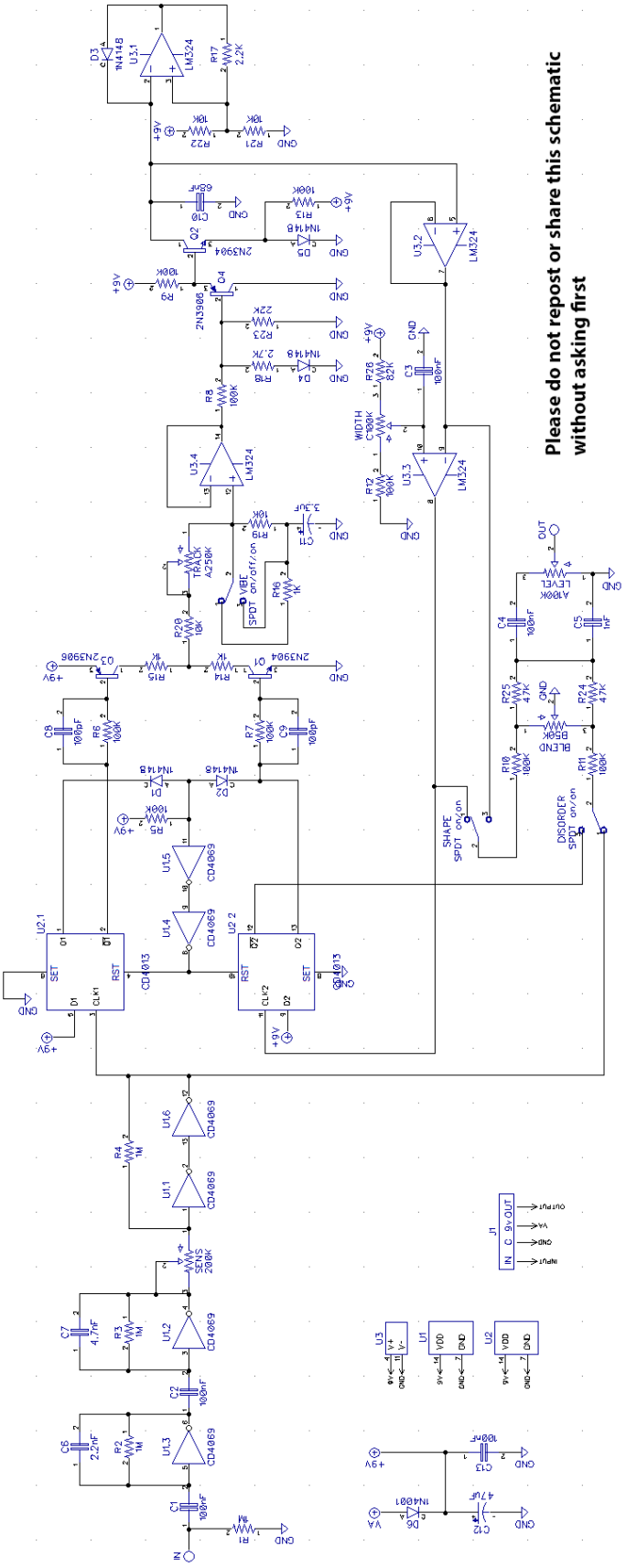
www.parasitstudio.se
parasitstudio@gmail.com

Schematic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