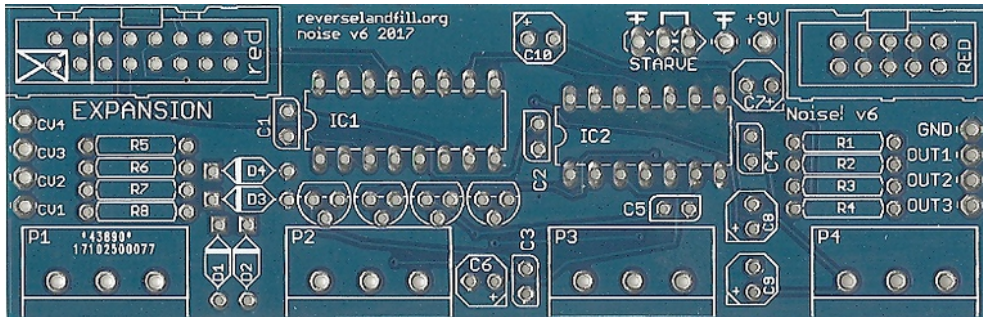


# Noise Oscillator Build Document. V6 Standalone 9v



The Noise! Synthesizer is a CMOS IC based instrument.  
The synth has 4 squarewave oscillators that modulate each other and go through a clock divider.  
After that, the separate divider outputs are mixed and shaped together.

## Start with the **Resistors**:



The **one 10R** resistor has the color code: 'brown-black-black-gold-brown'.  
It is used at the power input as a fuse.  
Bend the legs of the resistor 90 degrees and place the **10R** resistor at the **R1** location on the PCB.  
Solder the resistor and cut off the legs with a sidecutter.

The three **1K** resistors have the color code: 'brown-black-red'.  
These parts act as output protectors.  
Place the resistors at **R2**, **R3** and **R4**  
Solder and cut the legs.

**R5 to R8** can be skipped, they are for CV input (eurorack)

## **Starve is a modification option.**

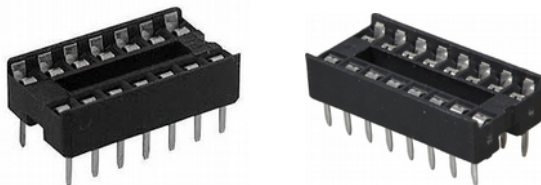
**Look at the end of this document for more info!**

Connect the middle and right hole of Starve together to bypass this option.  
Use a snapped-off leg of a resistor. Bend the leg in a U shape and solder.

**If you skip this step, the module will receive no power!!**

## **IC sockets:**

Take the tube or foam with the **two IC sockets** and the **IC's**. There is **one** with 16 pins and **one** with 14 pins!



These IC-sockets are to make the placement (and possible removal) of the IC's easier.  
Take out the **two** IC-sockets. Attention! These sockets have a direction. See the semi-circle gap?  
On the PCB you can see this marking as well. Place the 16-pin IC socket in **IC2**.  
Flip over the PCB and solder two legs, one in the upper row, one in the lower row, diagonally from each other.  
Flip the PCB back to the other side to check if the IC-socket is flat to the PCB.

If not, push the socket lightly to the PCB and reheat the two soldered legs. It should click to the PCB. Place the 14 pin IC socket in **IC1** and use the same method as before to solder it in. Solder all remaining legs.

### Capacitors!

There are a lot of capacitors in the kit.

They determine the frequency range of the oscillators and stabilise the power and outputs.

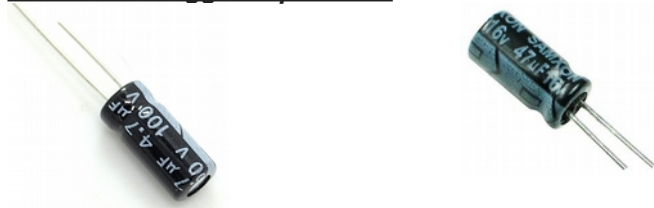
We start with the *three* orange disk-shaped capacitors.

**C1, C2, C4** are 100nF (104)

The 100pF goes in **C3**. This is a slightly smaller orange disk with the code "101".

**C5** = 1uF . This part is a blue blob with long legs.

### Now for the bigger capacitors:



These parts have a **polarity**. The long leg is the PLUS, The short leg is MINUS.

The value of these components is printed on the side as well.

Start with the *one* larger **47uF**.

(take care to get the right one, there are also *four* **4.7uF** capacitors!)

Place the *one* **47uF** capacitors in **C7**. Long leg goes into the PLUS!!

Now we do the four **4.7uF**. These go in **C6, C8, C9** and **C10**.

### The Potentiometers:

These parts are variable resistors. With these you can adjust the frequency of the oscillators.

You have four of these.

**P1** = B100K

**P2** = B100K

**P3** = B100K

**P4** = B100K

Solder one leg, check if the potmeters are straight in. Reheat to aligned them correctly, then solder the rest.

### IC's:

Take the small piece of foam with the *two* IC's.

**CD4040** (clock divider) en **CD4093** (quad NAND)



The IC's are the heart of the noise synthesizer.

IC2: **CD4040** divides the pitch of the oscillators

IC3: **CD4093** makes the four oscillators

**CD4040** has 16 legs, **CD4093** has 14 legs.

Bend the legs so that they are 90 degrees downward. (use your fingers or a flat surface to bend them all at once)

Take care that the semi-circle gap corresponds with the marking on the PCB. (and the sockets)

Fit the IC's carefully in the IC holders.

Push them in carefully but firmly.

### **Power:**

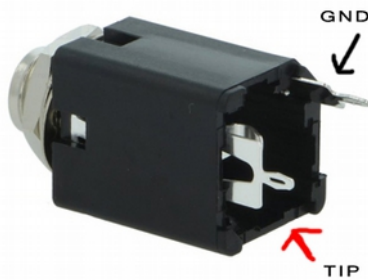


Solder the 9v battery cable to the +9v and GND hole.  
The RED wire goes into the +9v, the BLACK wire into the GND hole.  
Note: all GND connections on the PCB have the GND marking as shown above.

### **Front panel:**

Attach the PCB to the frontpanel with the potmeters. Use the rings + nuts. Fasten the nuts.  
Also attach the jack socket.

### **Now the OUTPUTS:**



Cut 2 wires of about 15 cm and strip the ends.  
Connect OUT1 to the TIP of the jack socket, connect the GND to the GROUND of the socket.  
Note: GND is the slanted side of the jack socket.

### **Knobs:**

Turn the four potmeters all the way to the left (CCW) and fit the knobs on.  
Push them firmly in, while supporting the back of the potmeter.

### **Now you can test if it works!**

First test OUTPUT1. Do you hear Noise? Great!!

### **Troubleshooting:**

If the synth does not work, DON'T PANIC!  
Check all solder connections, reflow if necessary. Check the orientation of the capacitors and IC's.  
Did you bridge the **Starve holes**? (else the module gets no power!!)

## **Modifications:**

### **Extra outputs:**

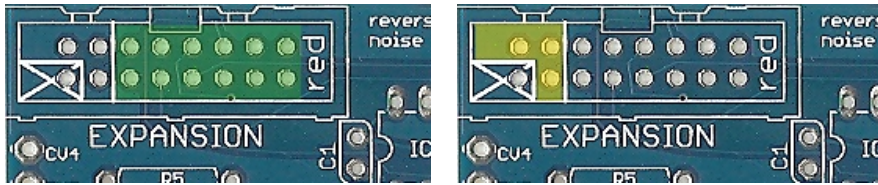
The noise PCB has a total of 3 outputs. Connect jacks to OUT2 & OUT3 for extra variations in the sound. OUT2 bypasses the clock divider and has a more bleepy sound. OUT3 is a patchable output. See in the pictures below on how to patch this up. You can solder wires directly, make a pinheader patchbay or even a separate panel with patchpoints on it.

### **Patchbay Panel:**

To make the patchbay accessible, you can make a 'patchbay panel'.

Use the pincables or any other cool way (such as banana plugs, touch points, switches) to connect the 12 "green" outputs to the 3 "yellow" inputs.

The 12 outputs come from the clock divider, they divide the audio by 2, 4, 8, 16 and so on.



### **S1 = Starve connection.**

Connect the three holes with a 10k potentiometer.

Now you can adjust the amount of voltage flowing in the circuit.

This has an interesting effect on the audio!

### **Capacitor values = noise ranges.**

Experiment with other capacitor values for C3, C4, C5 and C6 for other noise ranges / timbres.

For C3, try 10pf to 1nF, for C4 & C5, try 100nf to 1uF. For C6, try 1uF to 10 uF.

### **CV inputs:**

To add CV inputs (to control the 4 pitches of the oscillators with external voltages), solder in *four* 1m resistors, *four* 2n3904 transistors and *four* zener 9.1v diodes.

Use the 4x CV inputs to connect 4x jacks. Don't forget to connect the GND as well.