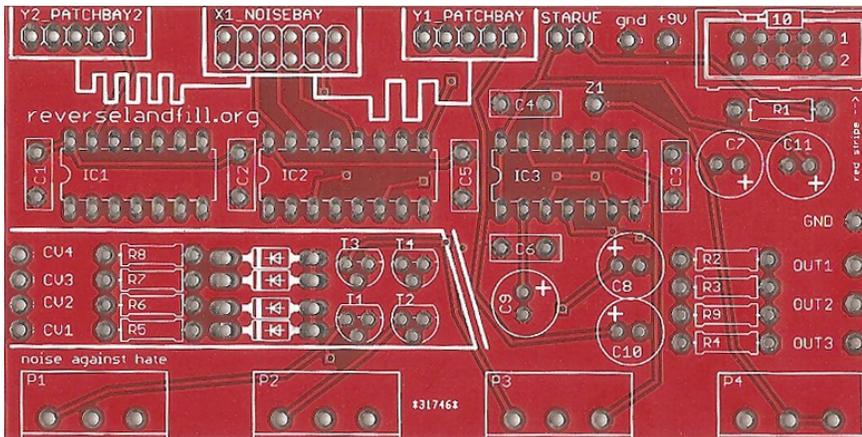


# Noise Oscillator Build Document. V.5d - 9v - English



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. Then the signal is routed through a pseudo ringmod.

*Start with the Resistors:*



The one **10R** resistor has the color code: 'brown-black-black'.

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** are four 1M resistors.

**R9** can be skipped, It is a voltage divider with R3, to reduce the volume of OUT2

**Starve** a modification option.

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

Connect the two holes of *Starve* together to bypass this option.

Use a snipped-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!!**

Diodes:

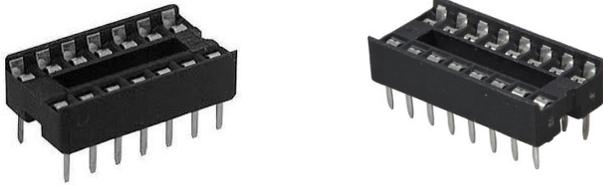


There are four zener diodes. These make sure that the CV input voltage cannot be higher than 9.1 volt.

Diodes have an important orientation, marked with a black stripe. This stripe is white on the PCB.  
Place the four diodes in **D1**, **D2**, **D3** and **D4**.

#### IC sockets

Take the tube or foam with the *three IC sockets* and the *IC's*. There is *one* with 16 pins and *two* 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 half moon-shaped 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 to the PCB and reheat the two soldered legs. It should click to the PCB.  
Place the 14 pin IC sockets in **IC1** and **IC3** 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, stabilise the power and outputs.  
We start with the *four* small light yellow capacitors.

**C1**, **C2**, **C5** en **C6** are 100nF (.1K63)

**C3** = 680pF (you can also use a 100pF)

**C4** = 220nF / 100nF (.22J63)

#### Now for the bigger capacitors:



These parts have a **polarity**. The long leg is the PLUS, The short leg is MINUS.  
There is also a MINUS symbol printed on the side.  
The value of these components is printed on the side as well.

Start with the *one* **47µF**.

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

Place the *one* **47µF** capacitors in **C11**. Long leg goes into the PLUS!!

Now we do the three **4.7µF**. These go in **C7**, **C8**, **C9** and **C10**.

#### Transistoren



Place the four transistors in **Q1**, **Q2**, **Q3** and **Q4**.

These parts are heat sensitive, so make sure that you don't overheat them.

Solder one leg at a time and let it cool off, then solder the rest.

### The Potentiometers.



These parts are variable resistors. With these you can adjust the frequencies.

You have four of these. One of these has a different value, **so pay attention!**  
The value is printed on top.

**P1 = B100K**

**P2 = B50K**

**P3 = A100K**

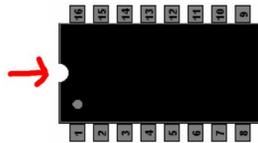
**P4 = B100K**

Solder one leg, check if the potmeter is straight in, then solder the rest.

### IC's

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

**CD4070 (XOR)**, **CD4040 (clock divider)** en **CD4093 (quad NAND)**



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

The **CD4093** makes the four oscillators, the **CD4040** divides the pitch of the oscillators

The **CD4070** is a pseudo ringmodulator and gives OUTPUT2 a metallic character.

**CD4040** has 16 legs, **CD4070** and **CD4093** have 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 half-moon gap corresponds with the marking on the PCB. (and the sockets)

Fit the IC's carefully in the IC holders. The **CD4070** goes in **IC1**, the **CD4040** in **IC2** and **CD4093** in **IC3**

Push them in firmly.

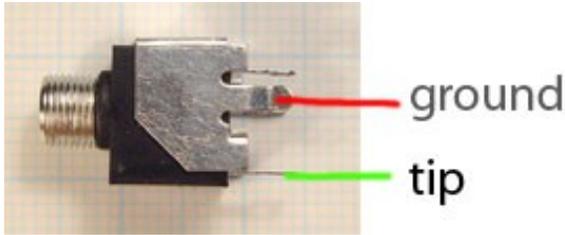
### Power



Place the 10 pin eurorack connector. The open side goes up, with "10" marking on the PCB .

Now the OUTPUTS!

Take the 7 jack sockets.



Connect OUT1 to the TIP of the jack socket, connect the GND to the GROUND of the socket. Do the same for the OUT2 and OUT3 sockets. You can interconnect the GROUNDS. The CV inputs are located on the left side of the PCB. Connect them in the same way as the outputs. Connect the GROUNDS of the CV jacks to the GROUNDS of the output jacks.

### **Outputs:**

The pcb has 3 outputs.

What you will need for OUT2 and OUT3:

Solder a 12pin header on the X1\_noisebay and 5pin headers on the Y1 and the Y2 patchbays.

Patch a few pincables from the X1\_noisebay to the Y2\_patchbay. Now you will have noise coming out of OUT2

The Y2 patchbay goes to the CD4070 'pseudo ringmod' IC. The noise has a different character.

Patch some wires to Y1 as well. Y1 goes to OUT3. Listen to OUTPUT3!

The Y1 patchbay goes directly to the OUT3. by patching to this output, you can make noise pitch changes and also route it as a random modulation output (use the large divisions)

The X1\_noisebay has 12 outputs.

**Output scale / divided by 4096, 2048, 1024, 512, 256, 128, 64, 32, 16, 8, 4, 2**

The Y1\_patchbay is connected internally, so it does not matter where you patch the pincables.

Note: The potentiometers are LEFT orientated. (noise against hate!)

**Troubleshooting:**

Check all solderconnections, reflow if necessary.

Check the orientation of the capacitors and IC's.

The red battery cable must be connected to the +9v!

Did you connect the **S1**? (else the module gets no voltage!!)

**Modifications:****S1 = Starve connection.**

Connect the two holes with 2 legs of a 10k potentiometer.

(use the left and middle pins of the potentiometer)

Connect the right pin to GND

Now you can adjust the amount of voltage.

This has an interesting effect on the audio!

**Z1 = bypassed output.**

This extra output comes directly from the 4 oscillators, bypassing the rest

You can connect this output to the Y1\_Patchbay, but only if nothing else is plugged in.

Use OUTPUT3 to hear the results

(else no audio will come through)

**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 X1\_patchbay outputs to the Y1 and Y2\_patchbay inputs.

Have fun with your Noise! Synthesizer!!! :)

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