



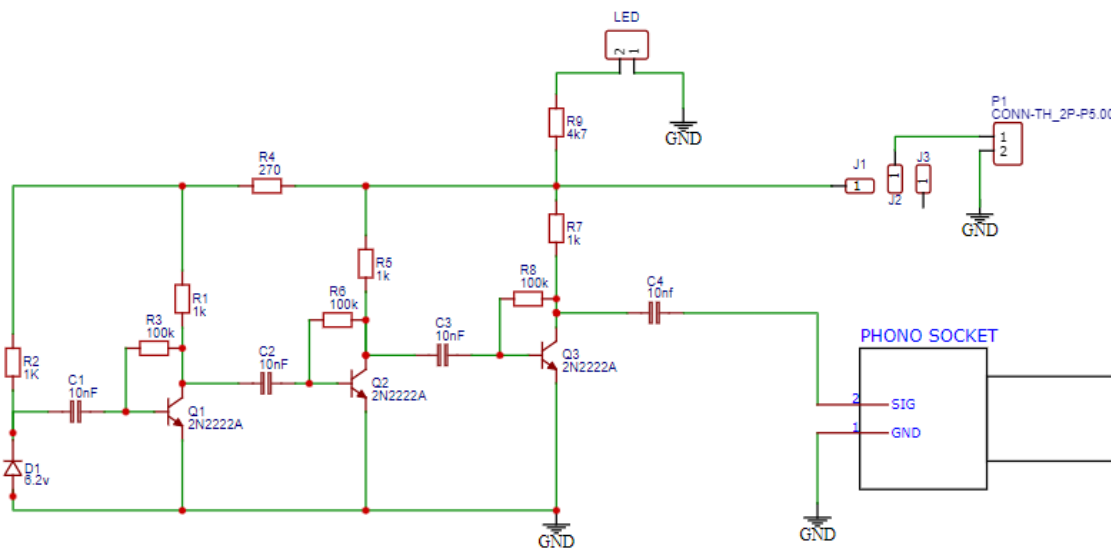
Wideband RF Noise Source



This Kit is designed to help with setting up Receivers filters and audio projects. It will produce strong white noise signals. Starting at audio frequencies right the way into the VHF spectrum. It is not a calibrated test instrument but uses the well know 'Noisy Diode' method of noise production that is amplified by 3 stages to produce a strong signal.

A very simple low-cost project that should be in the tool box of anyone that builds receivers or audio filters/amplifiers. Now supplied in an attractive practical metal case (80 x 50 x 20mm) and runs from an internal (9V) battery .

Let's see the circuit





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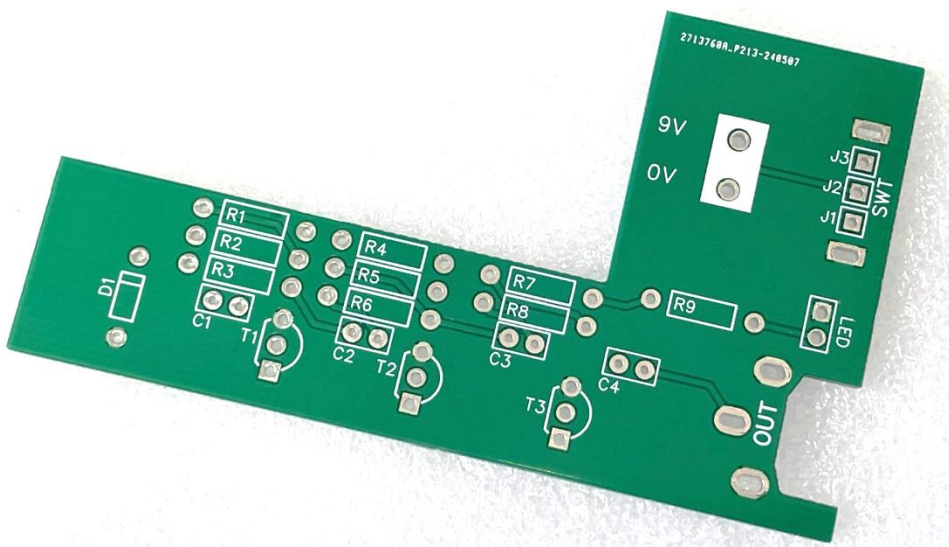
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Parts List

R1, R2, R5, and R7	1K ¼ watt resistor
R3, R6, and R8	100K 1/4watt resistor
R4	270 ohm ¼ watt resistor
R9	4K7 ¼ watt resistor
C1, C2, C3, and C4	10nF disk capacitor (Marked 103)
D1	6v2 Zener Diode
LED	3mm Red
2 way Terminal Block	
3 x 2N2222	
Transistors	
Power Switch	
9v Battery Clip	
PCB	
2 piece metal case	
Rear Panel	
Front Panel	
8 x M2 screws	
Foam Tape	
4 x Stick on feet	

Like all kits follow the instructions and you will end up with a great working project

Let's look at the PCB for this project





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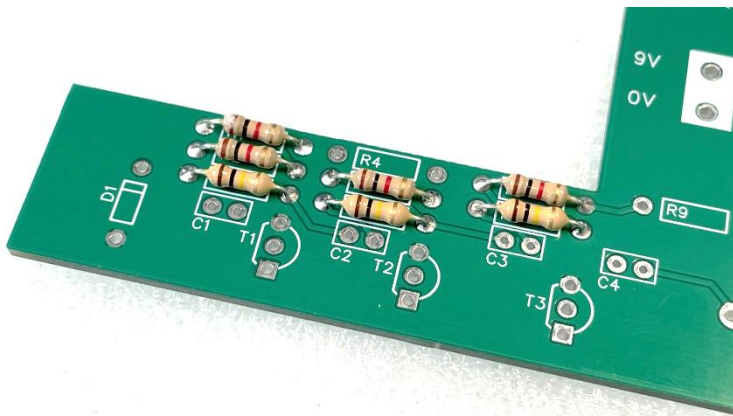
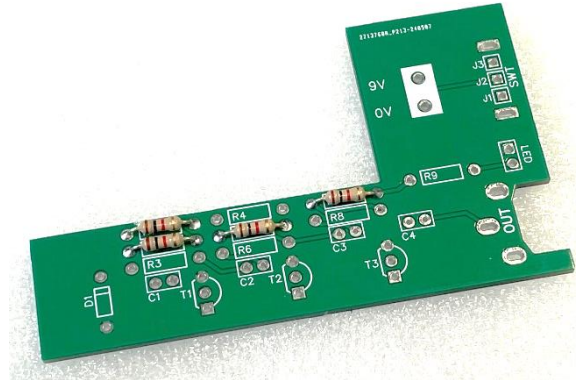
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Let's make a start building this noise source

First let's fit the resistors,

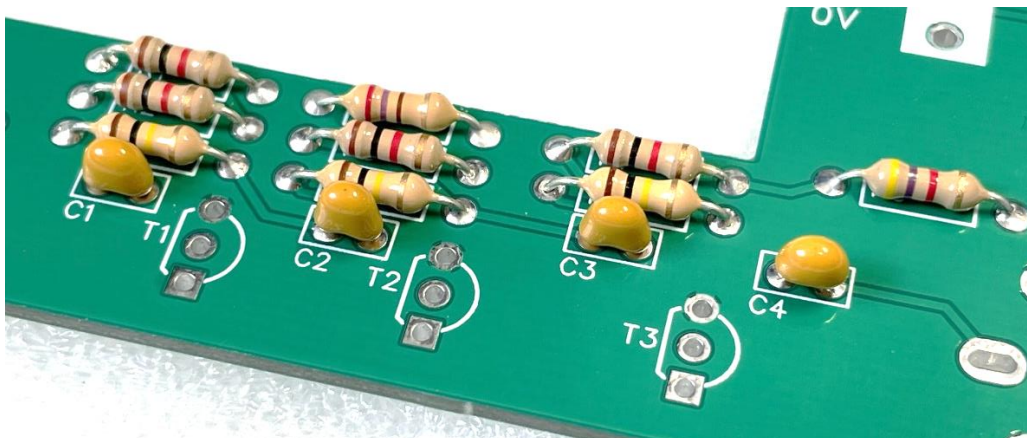
Start with the 1K resistors R1, R2, R5, R7 they can be fitted either way round, I have provided a colour resistor chart so you can use that if you're not sure which resistors are 1K. Fit them and after soldering trim the leads flush with the PCB.

Now fit the 100K resistors R3, R6, & R8. Again they can be fitted either way round.



Just two left now, fit R4 which is a 270 Ohm resistor, then move on to fit R9 which is the 4K7 resistor, in case you're interested this resistors value can be changed if you wish, it controls the brightness of the LED. Do not fit one lower than 1K, we don't want to burn out the LED.

Now fit the small disk capacitors, C1 to C4. They are All the same value and be fitted either way round.



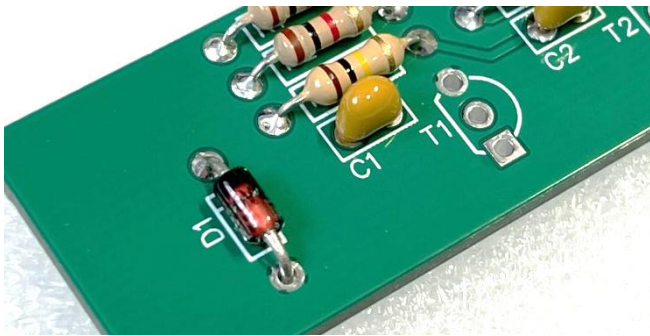


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OK stop and check your work, look for solder bridges or dry/missed joints.

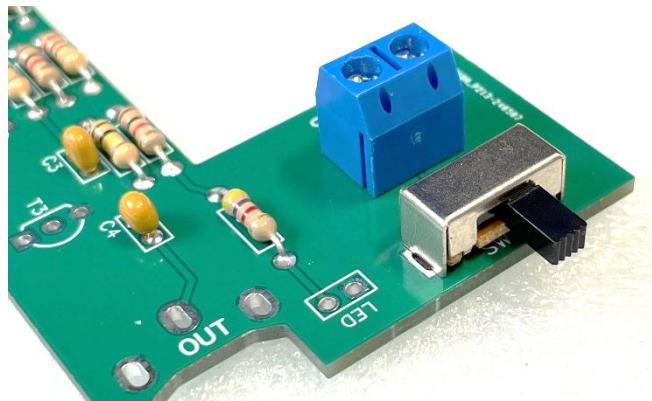
Now we are moving onto the active devices, these MUST be fitted the right way round, let's start with the Zener diode (D1). This is the device that produces the noise. If you lose this do not substitute it for a standard diode, it must be a Zener type around 6v.



Look at this diode and you will see one side as a black band. Look at the PCB layout and you will see that the image on the board for the diode shows a band on one end. The black band MUST be at that end. Fit the diode right down on the board and solder and trim the wire ends. **IMPORTANT! Keep the two offcuts from this diode, you will need them later.**

Now we will fit the two-way terminal block and the switch

Before you fit the block I suggest you unscrew the terminals and if you have such a thing as a watch makers screwdriver (or any small flat blade screw driver really) push it into the opening for the wires, the little metal flap in there that holds the wire in place often can make it hard to put the wires in the block if its stuck down.



Next fit the power switch, this should be pushed down as far as it goes on the board before you solder it in place.

Now we will fit the transistors, these amplify the noise one after another to get us the nice strong signal we want.

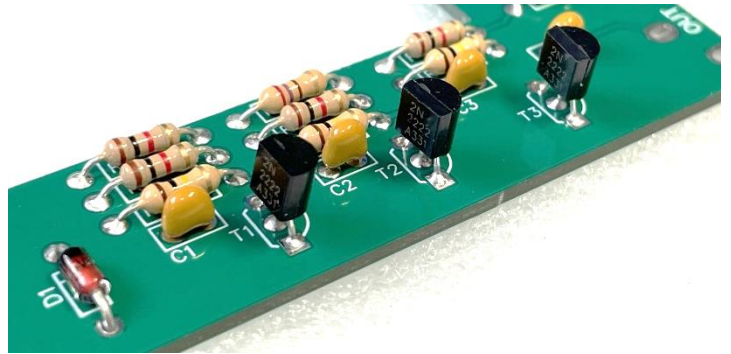
All the transistor are a general purpose NPN type, I have used the well know and easy to get 2N2222, these will operate up to 250Mhz so are ideal for this application.



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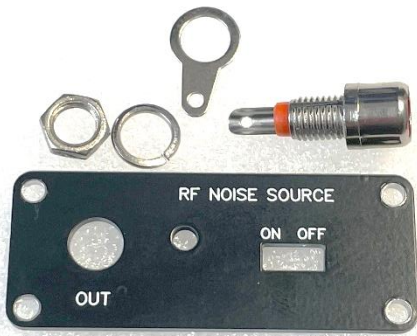
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The transistors must be fitted the correct way and to help with this the PCB shows the outline of the transistors, just fit them to match the silk screen layout, do not try and push them flush to the PCB they are intended to be sat about 5mm off the PCB, this distance isn't critical.



Now stop again and double check your work, the pads for the transistors are close to each other, make sure you have no solder blobs shorting any out.

Now it gets more difficult... For now, put the board on one side and find the parts for the front panel. Just the plate and the Phono socket.



Attach the socket to the front plate, pass the socket through the panel from the front, first put the solder tag on the back of the socket, then the locking washer and finally the nut. When you tighten the socket try and get the tag positioned as shown in this picture. I suggest you apply some solder to the tags, it will make it easier later.



We have a little 3mm LED to fit, that will be the Power On indicator. The LED has two legs and one will be longer than the other. It is very important that the LED is fitted the right way round. When we have finished mounting the LED the longer leg **MUST** have been put into the round pads hole.

For now, drop the led into place on the board but **DO NOT** solder its leads.

You need to bend the legs of the LED such that the LED passes through the front plate when it's all fitted, put the front plate in place next to the board and bend the LED's legs so that it is correctly aligned.

Once the position is correct for the LED solder and trim it, before you do solder make 100% sure that the long lead is in the round pads hole.

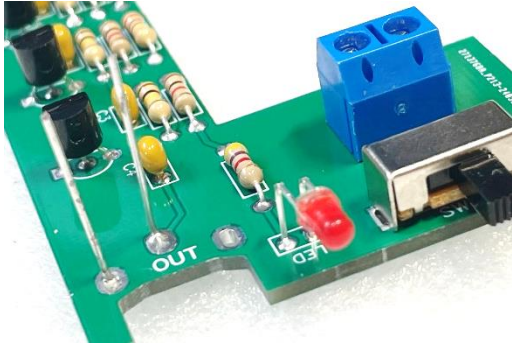


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Now I hope you took note about keeping the offcuts from the diode! If not you can use any other off cuts but the diode ones are nice and thick.

Solder the two offcuts to the PCB in the positions for the output socket.



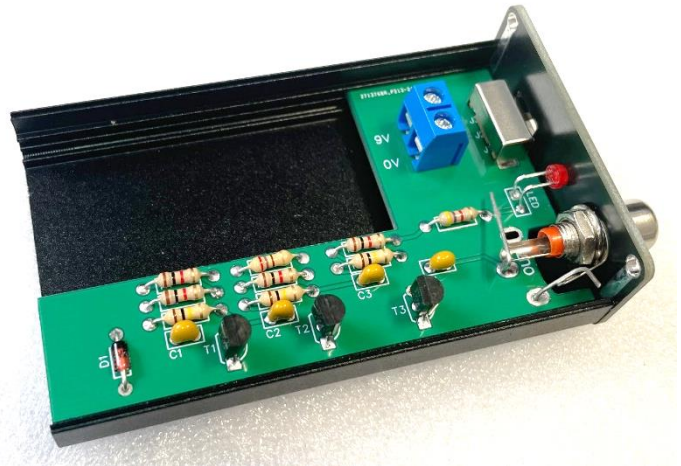
Now take one half of the case, both are the same so just choose one for the bottom. Double check the bottom of the PCB now and cut all pins/wires nice and flush If you have missed any.

Now fit the front plate to this half with 2 small M2 screws, don't tighten these screws fully at this stage.

Slide the PCB into this half, there is a groove machined in it for this.

The LED and switch should protrude though the holes in the front pre drilled for them.

Now we need to attach the two vertical wires to the back of the socket.



Bend these wires so that they are touching the centre tag and the ground tag, solder and trim them.



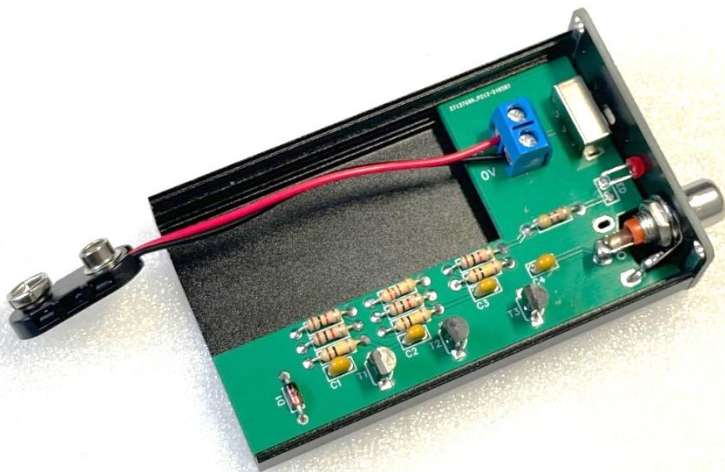


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Now we can fit the battery clip, cut this lead such that you can remove the battery at a later date.

I leave the leads fairly long but that's up to you.



That's it you're done, now you can fit the battery and the top cover. First, cut two small rectangles from the length of foam tape provided (about 20 x 10mm), peel the plastic backing from one and stick it to one side of the rear panel, it should be positioned so it sits behind the battery, I use another length stuck on top of the first to make a nice



snug fit that stops the battery moving when the back is fitted. Fix the rear panel with the screws provided, also fit the missing screws in the front panel and tighten any loose screws.

The only job left is to fit the four stick on feet to the bottom of the case.

Turn on the power switch and the LED should come on. Connect the output to an amplifier or antenna input of a radio and you should find strong white noise across the audio and rf spectrum right up to VHF frequencies.

An example of use of this noise source. Connect the output of a radio to computer, like you would for using a data mode. Run software like FLdigi or anything that provides a waterfall type display, with the noise source connected to the antenna socket of the radio you will see a strong signal right the way across the waterfall, adjust the receivers bandwidth and you will see the difference in the waterfall, you can use this to measure the bandwidth of the radios filter, or you could also use it to peak the receiver sensitivity. A more novel use, connect the output to a small audio amplifier, you will now have a white noise source that you could use to help you sleep. Many people find it helps, especially people with tinnitus can find this type of noise soothing.

This is just a simple AF/RF Noise source and you will find that the higher the frequency you use it with the lower the amplitude of the noise but it will provide useful noise up well into the VHF bands. Have fun building the kit and I hope you find it useful. Any problems please contact me

sales@kanga-products.co.uk



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Builders Notes:-