Kanga Relative Field Strength Meter (1.8-500Mhz)

The Kanga Relative Field Strength Meter (FSM) will work over a very wide range of frequencies, typical 1.8 to 500Mhz.

Our FSM uses a sensitive 50uA large meter that is easy to read. Great for comparing antennas, checking transmitters and many other uses.

The FSM kit is complete down to the last nut, washer and even comes with an adjustable BNC telescopic whip (other antennas can be used if you wish). The case is pre-drilled ready to go.

This kit is in my mind a 'proper' kit, the builder will need to complete a number of stages, each requiring careful attention to detail in order to produce a professional looking item that they will be proud off.

First let's make sure we have all the parts we need, any problems please contact Kanga at

sales@kanga-products.co.uk

Parts List

FSM Case
FSM Front plates (3 off, see instructions)
FSM Meter Spacer
FSM PCB
Meter Terminal PCB
50uA Meter
Custom Meter Scale
Meter Connection wires (RED/BLACK 50mm)
PCB Connection wires (RED/BLACK 120mm)
2 x Germanium Diodes
1 x 1nF Capacitor
BNC Socket
M3 Solder Tag
M3 12mm Steel Washer
M3 Screw & Nut
4 X Case Screws
4 x Stick-on feet
10K Potentiometer
1 x 20mm Control Knob
BNC Telescopic Antenna

Once we have all the parts its time to get started. To make the build easier We have broken it into a number of stages

Stage One :- Preparing the Meter.

In the past getting a good analogue meter was easy, now not so easy and when you can the cost is very expensive. We have been lucky and found a high sensitivity meter that after a few modifications will be suitable for our FSM.
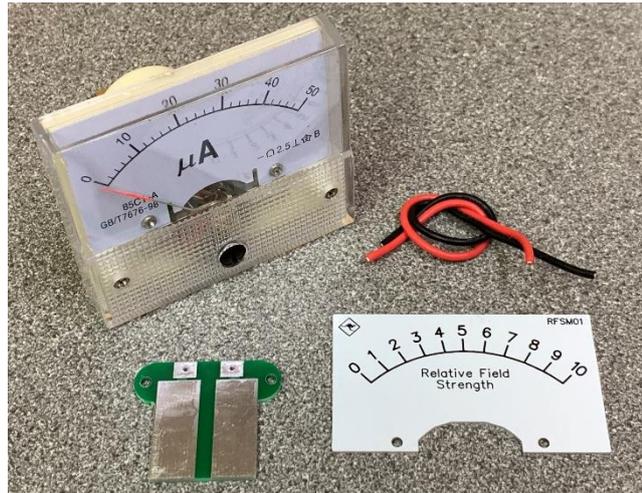
First find the Stage one Meter parts

50uA Meter
Custom Aluminium Meter Scale
Meter Termination PCB
RED Red/Black Meter Wires (50mm)

Now this is the hardest part of the kit, great care must be taken in this stage or you could damage the sensitive meter.

Look at the back of the meter, you will note it has two large connection point screws.
The rear panel with these screws attached makes the meter far to deep to fit into the supplied case.

Remove the two rear panel mounting screws and CAREFULLY lift the panel, now with care unsolder the two wires (yellow and red). You can discard the old rear panel. Make sure the screws are stored safely


Now we can get the new panel ready to be fitted, make sure you fit it the way round shown, we are doing this for a reason!

Apply a generous amount of solder to the two small square pads, don't worry about the small holes in the centre of these pads , we are not going to use them. Also apply solder to the bottom of the large rectangles as shown in the picture to the left.

Now we need to attach this new rear panel to the meter.
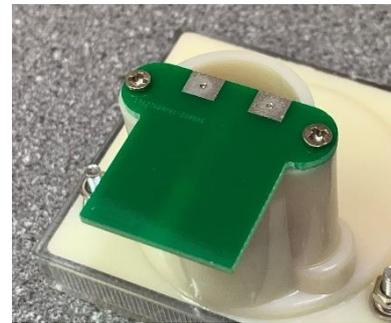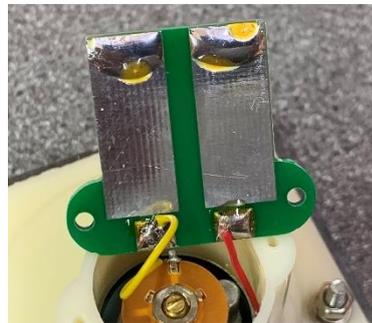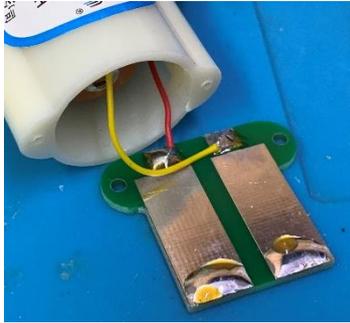
First solder the two wires as shown to the smaller solder pads, then CAREFULLY turn the panel over. Note that the large silver pads are not visible from the rear view of the meter. Now refit the two screws that hold the rear panel on to the meter. In the first picture the red wire is on the left hand side of the 'new' termination plate (The on-line colour instructions are MUCH better)

Now we can turn the meter over and start work on the front.

First remove the two screws (and put them up safe!), remove the lid and set it to one side.
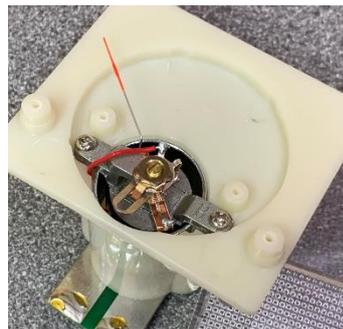
Now remove the meter scale screws (don't mix them up with the lid screws) , CAREFULLY slide the meter scale off the meter and replace it with the Custom new meter scale, secure with the two screws you removed a moment ago. Now refit the top lid to the meter.

Now the last part of this stage is to attach the two meter leads to the termination PCB. You will have already put solder 'blob' on the bottom of the two rectangles. Use the supplied Red and Black 50mm wires for this. The wires are not the normal PVC type that shrinks when you solder them, there are high quality silicon coated wires and are very flexible.

That completes Stage One.

Stage Two :- The FSM PCB

Now we will gather the parts for the small FSM PCB.
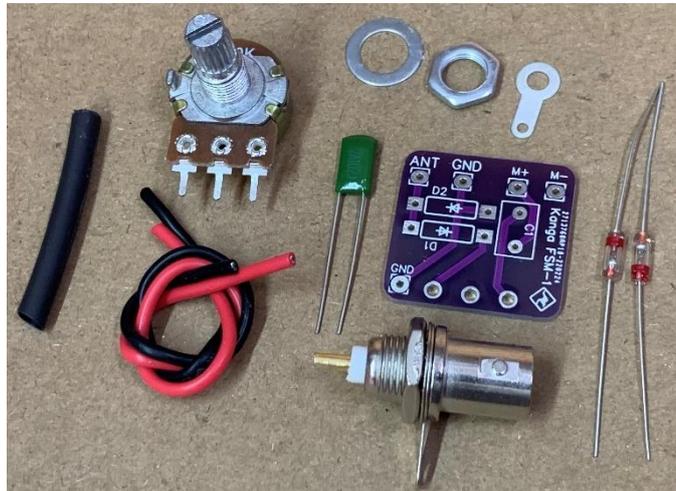
PCB
2 x Germanium Diode
1 x 1nf Capacitor
10K Sensitivity Potentiometer
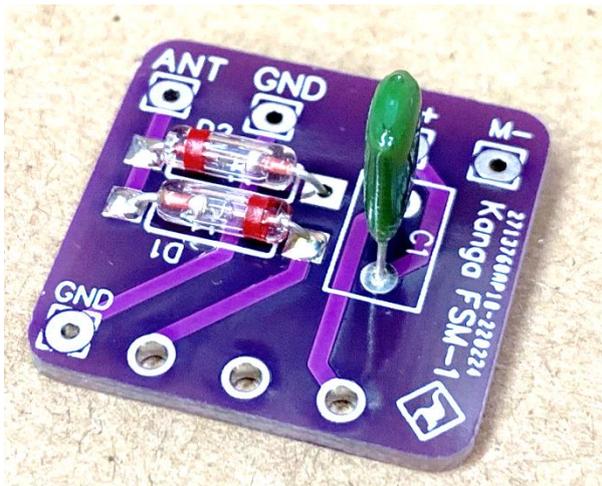M3 Solder Tag
50 Ohm Panel Mount BNC Socket
Heat shrink
120mm Red/Black Silicon Wire.

I suggest that you first give the PCB a clean with a lint free cloth to remove any grease and dirt. This will make it easier to solder.
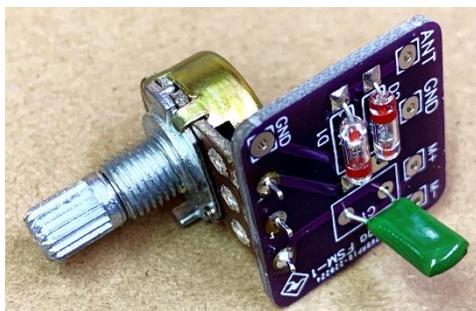

Now fit the two diodes, it is important that the diodes are mount in opposite directions as shown in the photo here and as shown on the PCB layout.

Next fit the capacitor C1 (1nf), this can be either way round.

Now we need to fit the sensitivity control.

IMPORTANT !!!

This control MUST be fitted as shown below

The control MUST be fitted on the opposite side of the board than the other parts.

Next prepare the BNC and the M3 solder tag, use the 120mm Red and Black wires for this and then finish them off with a little heat shrink.

That completes stage two.

Stage 3 :- The Front Panel

Now the FSM uses has slim has possible case, that is the reason why we needed to modify the meter. We still have a problem with the depth of the meter. We will get around this by the uses of front panel spacers. You will find 2 front plates (one thick, one thin) and a meter spacer. (The latest version has 3 front plates all the same thickness)

Now we know its easy to damage front plates when using test equipment so we have taken the opportunity to make each of these front plates reversable so you can swap them around at some later date if you need to.

Take the two plates and place them together, (Doesn't matter if you use the thick or thin one on top). (if you have three use all three!)

Remove if not already done, the nuts and washers that fasten the meter to the plates. Put the rectangle spacer on the back of the meter and pass the meter through the front plates.
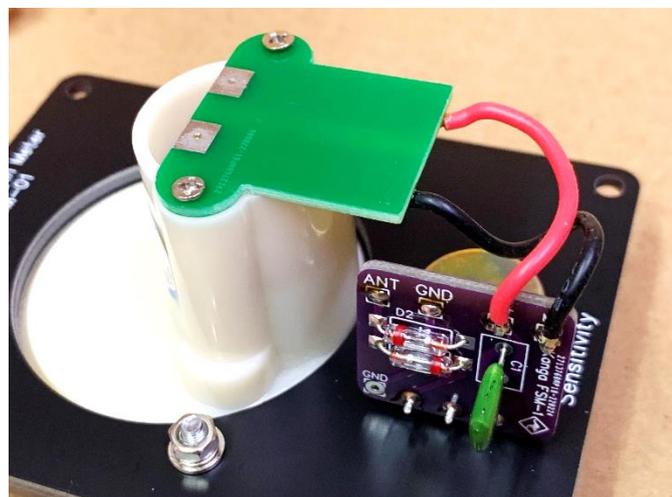
Secure the meter to the plates.

Next we need to fit the small FSM PCB and Pot to this panel.

Secure the PCB with the Washer and nut provide with the potentiometer, attached the wires from the meter to the PCB as shown, the red one to the M+ point and the black to the M- point.
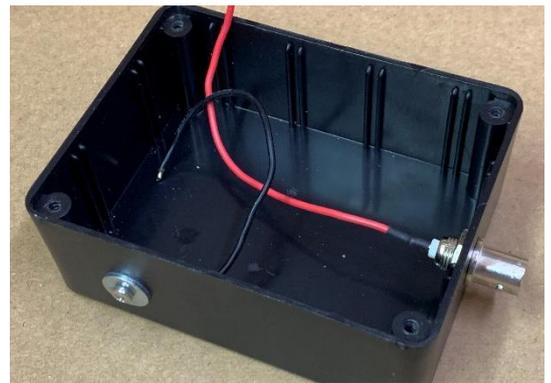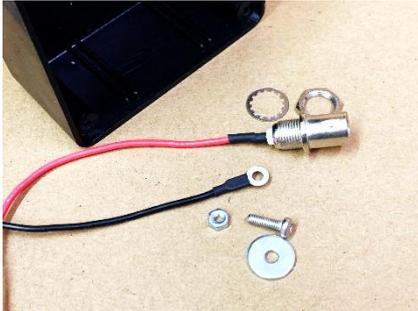
That Completes Stage 3.

Stage 4: The Case

For this stage we need to find the Prepared BNC, M3 Solder tag and the M3 Screw, Washer, and Nut

Fit the BNC socket to the top of the case, I recommend a BNC wrench and spanner for this job. Then fit the M3 screw and washer to the side hole of the case, fit the solder tag and then use the Nut to tighten the screw /washer to the box.

Once this work is done, we can connect the front panel to the case, the long Red and Black wires can be fitted now, take the Red wire from the BNC and solder the free end to the far right hand side of the PCB, it will be labelled ANT. The Black wire from the Solder Tag must be soldered next to it on the pad marked GND (there is another pad marked GND, do not connect anything to it.)

Now we can fit the front panel to the case. Put the assembly on top of the box and secure it with the 4 case screws provided.

Now turn the sensitivity control so the slot in the shaft is vertical and fit the control know so the white dot is at the 12 O'clock position.

That Completes Stage 4

Project Completed !

Well done you have completed the FSM.

The FSM comes with a telescopic whip that makes it ready for use right away, attach it. If you have a 2m/70cms handheld dig it out to test your new meter. If you're using a 2m Hand held than extended the antenna to full size, if using a 70cms radio then push the antenna right down (as in the picture here) if you're testing with HF the it depends on the field strength but start with the antenna fully extended.

Adjust the sensitivity control to adjust the reading.

I hope the Kanga FSM gives you good service and you enjoyed building it.

73 Paul M0BMN

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