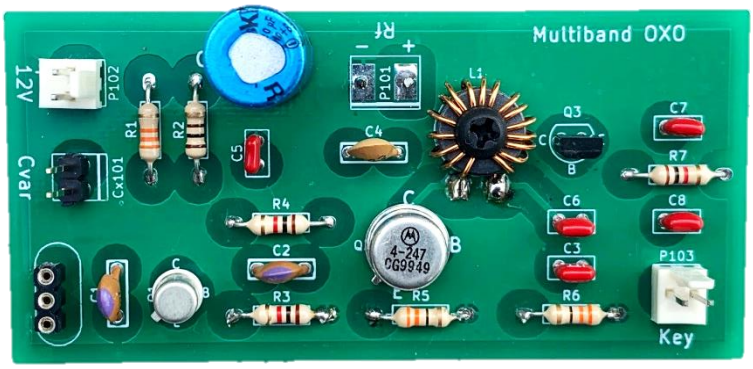
KANGA PRODUCTS
Electronic Kits For The Radio Amateur

The ‘OXO’ Transmitter



George GM3OXX (SK) and the G-QRP Club gave Kanga (UK) Permission to reproduce this design back in the 1990’s so all can enjoy, be it G-QRP members or not.
When George sadly became a silent key it was decided to do something to remember him. Richard G3UGF mentioned the Foxx or the OXO Challenge. So we set about bringing this little kit back to life for all to enjoy again.

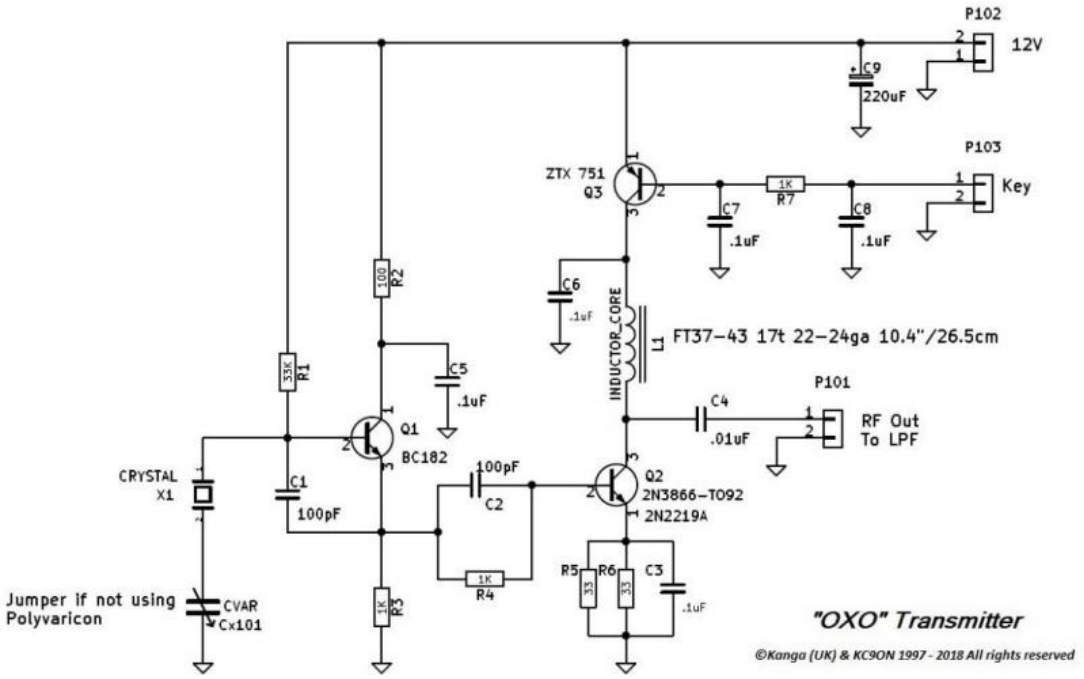
The OXO was intended to be used with fundamental crystals but you can use an external VFO and inject the signal into the same position as the crystal.

The OXO will operate on all bands from 160m to 20m.

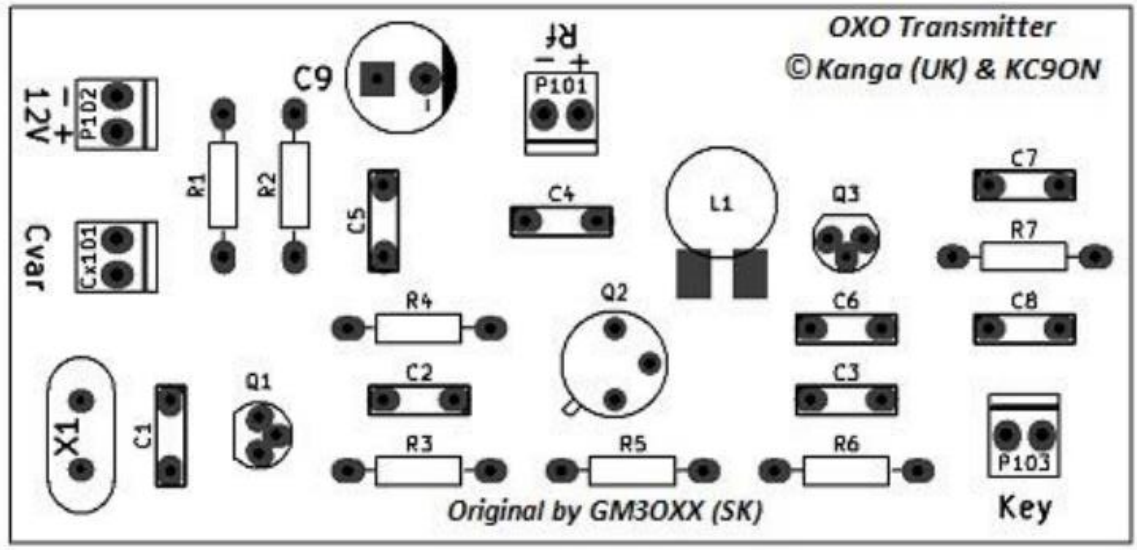
The transmitter can be used above 20m, but the power level will be severely reduced. A small variable capacitor maybe used to “PULL” the crystal a few “Hz” If used on 160m, a second 100n (0.1µF) will need to be placed across the 33Ω Resistors in the PA emitter.

Good luck in the challenge:

PLEASE NOTE: It should be remembered that a Low Pass Filter is to be used with this transmitter.



Board Layout



The OXO Kit was designed as a joint project between Kanga and KC9ON (3rd Planet Solar) We would like to thank John (KC9ON) for his help and the G-QRP Club who kindly donated the 2N3866 (Equivalent) that is used within this kit.

Lets look at the parts list for the kit.

Components :-

The kit is designed to be built in stages, each stage has its own bag of parts

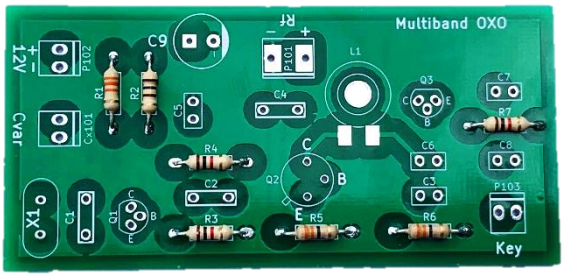
When you have fitted a part cross it off the list, when you complete a stage stop and double check you have the right part fitted in the right place.

Stage 1:- Resistors

Start with R1 and work though to R7, fit each one in turn

Resistors can be fitted either way round but be sure the right ones are used

R1 33k Ω	Orange, Orange, Orange, Gold
R2 100Ω	Brown, Black, Brown, Gold
R3 1KΩ	Brown, Black, Red, Gold
R4 1KΩ	Brown, Black, Red, Gold
R5 33Ω	Orange, Orange, Black, Gold
R6 33Ω	Orange, Orange, Black, Gold
R7 1KΩ	Brown, Black, Red, Gold

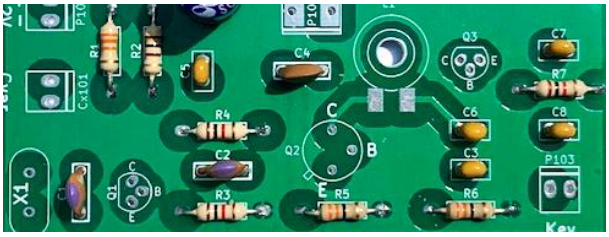


Now double check all are fitted correctly and trim the leads flush to the board.

Stage 2:- The capacitors

Capacitors C1 to C8 can be fitted either way round BUT C9 is polarised and must be fitted correctly.

C1 100pF Marked 101 Purple Tip
C2 100pF Marked 101 Purple Tip
C3 100nF Marked 104 Yellow-Multilayer
C4 10nF Marked 103 Brown Ceramic
C5 100nF Marked 104 Yellow-Multilayer
C6 100nF Marked 104 Yellow-Multilayer
C7 100nF Marked 104 Yellow-Multilayer
C8 100nF Marked 104 Yellow-Multilayer
C9 220µF Marked 220uF 16v Note Polarity

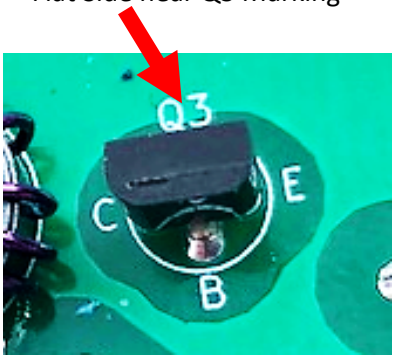


Stage 3:- Transistors

The transistors MUST be fitted the correct way round, look at the silk screen layout on the PCB to help you fit these parts

Q1 2N2222 Note Orientation
Q2 2N3866 /G-QRP Version Note Orientation
Q3 ZTX751 Note Orientation

Flat Side near Q3 Marking



The hardest part here is Q3, the ZTX751, its body shape does match the outline on the PCB so let's be careful with this one.

One side of the transistor (the side with the writing on) is larger and flat the other side is slightly curved. The FLAT side must be nearest to the Q3 marking on the PCB

Stage 4:- Connectors

Now we can fit the connectors for the leads and crystal

2 Pin Socket + Cable
2 Pin Socket + Cable
2 Pin Header
2 Pin Jumper
3 Pin Sip Required for Crystal swapping
2 x Vero Pin RF Connection

The external connections to the board can be hard soldered if you wish but we do provide sockets and wired plugs to connect for power and the key.

If you wish use the cable and sockets provided for these external connections, I suggest fitting the plug to the socket first to make sure that the RED wire on the lead use for the power connection is positioned on the +12v pins pad.

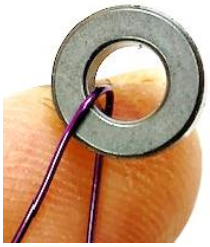
The connection for the antenna again can be made direct to the board or if you wish fit the two supplied Vero pins from the bottom of the board and solder them in place.

You COULD solder the crystal directly to the PCB but we suggest that you use the supplied SIP socket strip, the strip is 3 pins in length. You will need to cut the centre pin before you fit it to the PCB. Now is easy just to plug in or change the crystal for other frequencies if you wish.

Stage 5:- The Inductor

Now for many the most difficult part of the kit will be winding the toroidal inductor.

There needs to be 17 turns on this core, each time the wire passes though the core it is counted as one turn. When doing this take care not to scrape the enamelled covering off the wire as you pull it though the core.



Start with just one turn.

Continue winding until you get 17 in total.

Now trim the leads so there is about 5mm of lead on each leg, use a knife or sandpaper to remove the enamel from these ends. It may be a good idea to tin these two leads with solder at this stage.

Now you will have a plastic screw and nut/washer with the kit, Yours will be a small white 2.5mm arrangement. Pass the plastic screw through the core and secure it with the nut on the bottom of the board. Make sure the two trimmed leads are positioned so they are touching the two square pads on the PCB, trim any excess length from these leads and then solder the leads to the main PCB.

I pre-tin the two pads on the PCB.

If you haven't already, put the two-pin jumper and header onto the board.

Normally the jumper will be installed, if you wish you can wire a small variable capacitor across these pins to give a small amount of frequency shift

We have also included a 3.5mm Jack socket for the key (Not fitted to the board)

Congratulations! You have built the OXO.

The kit comes with two crystals one is the old colour burst 80m frequency , 3.5795MHz, this Crystal will allow you to test the Transmitter on 80m, the other Crystal in the Kit is on the 40m CW QRP frequency of 7.030MHz. Remember that you can use crystals from 160m-20m with this kit. You MUST use a Low Pass filter on the transmitters output to comply with regulations, Frequency 3.5795MHz (For Testing) and 7.030MHz (QRP Calling Frequency)

Circuit Notes

This simple transmitter operates in the usual way, Q1 is both RF and DC coupled to Q2 so this circuit will not oscillate unless Q2, the 33 Ohm resistors and the 100nF ceramic capacitor are connected as shown in the schematic. The two 33 ohm resistors are used to set the output power of the transmitter. They may be reduced, but care must be taken as to low then Q2 will fail through drawing to much current.

On my OXO I find the standard values in the kit give me approx. 1.5Watts RF on 40m with a 13.8V DC supply, I find with a 9V supply I still get 1 watt of RF.

Please don't forget that a Low Pass filter should be used with this transmitter!

Enjoy the 'OXO' and good DX.