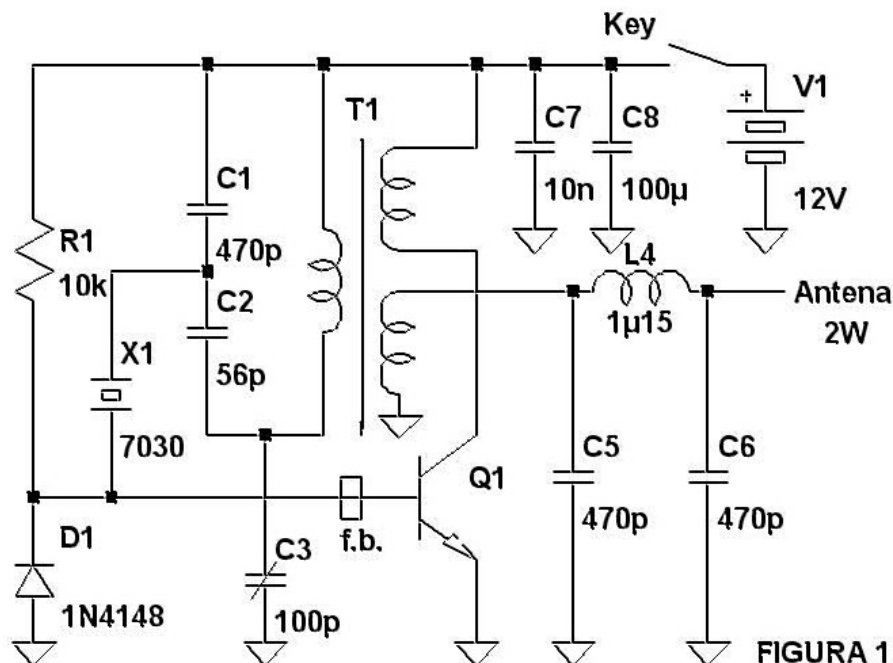


In the 1996 ARRL HANDBOOK Spanish edition appears an article about the transmitter designed by Dennis Monticelli AE6C named "Cubic Incher" that Spanish editor translated as "TX PULGA". "Pulga" means flea.

**TRANSMISOR PULGA (Cubic Incher)**



transmitter

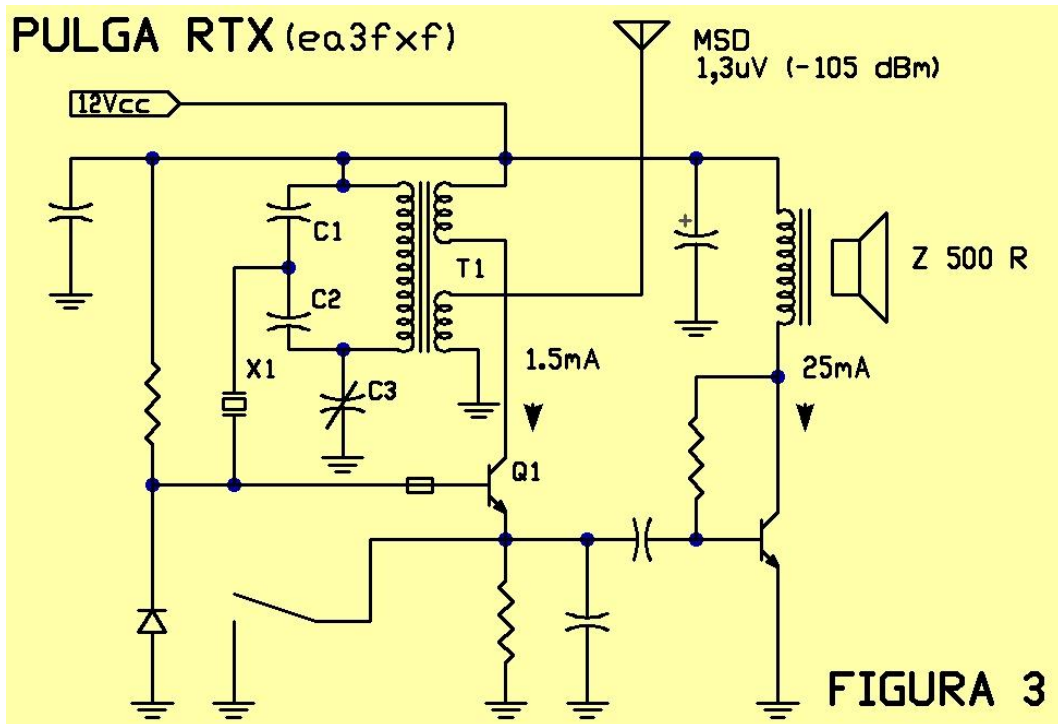
It's a nice and small CW transmitter that give from 1.5 to 2 W, depending on the used transistor. The adjustment is done by trimming C3 in the feedback network. Looking for the maximum output on 50 Ω antenna, and listening the best manipulation with a receiver. This has to appear crystalline, without humming's or frequency deviations. See figure 1.

Variations of Vcc It tolerates well , and works fine with 6 V. The consumption at 12V oscillates between 250-400mA, according to the used transistor. For Q1, I tried the 2SC2988 and 2N5909 giving 1,8W. The 2N3866 works well and gives 1W.

receiver

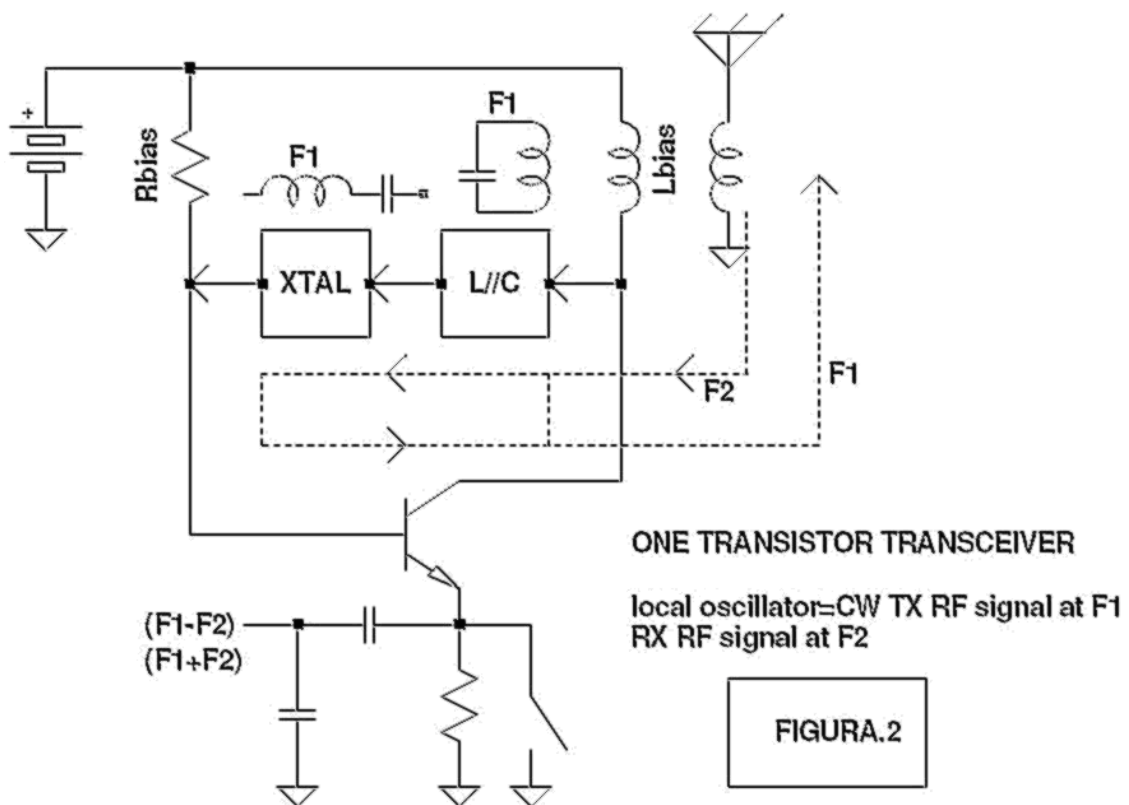
With few modifications, it is possible to transform the FLEA TX, into an excellent receiver and become a true transceiver, the FLEA TRX. See figure 3.

The emitter of the Q1 transistor is grounded through a resistance when the manipulator is unkeyed. A capacitor in paralell filters the RF and we can get a small audio/IF signal from this point. The resistor lowers the amplitude of objectable radiated signal.

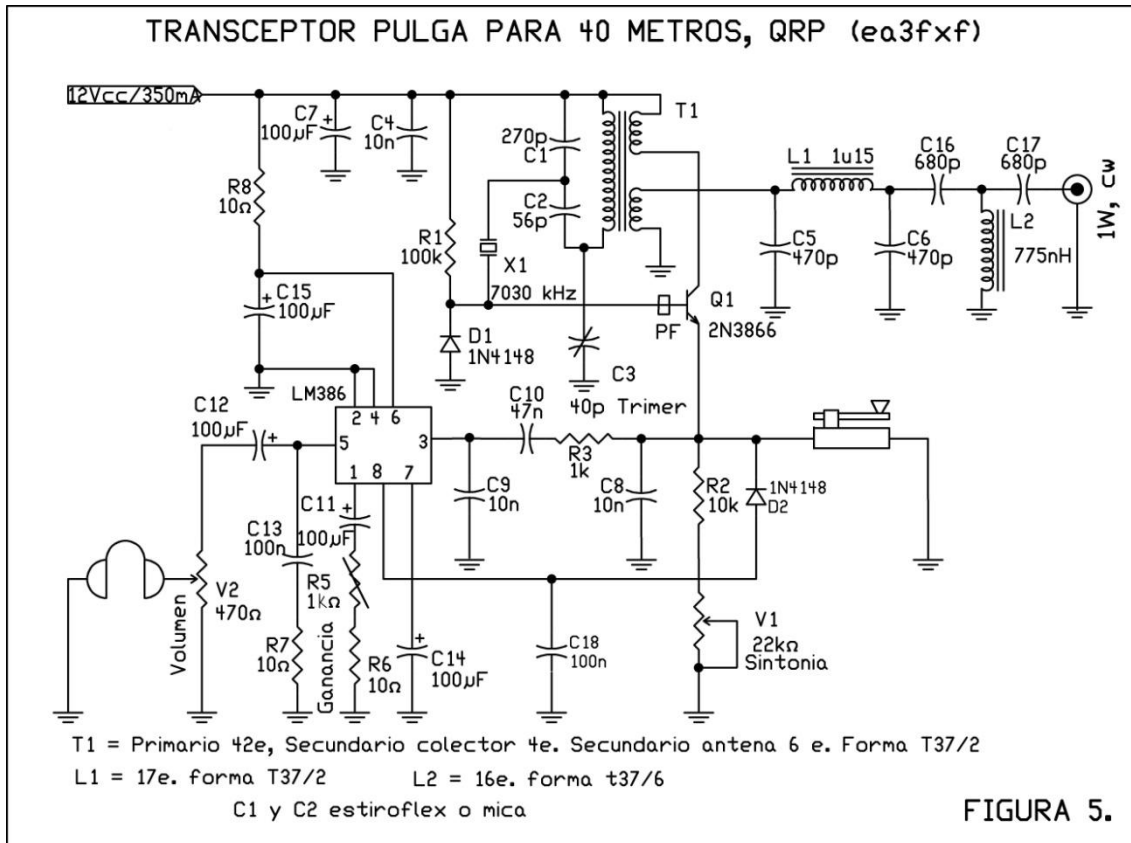


theory of operation

See figure 2. The signal from the antenna is coupled to a high Q tuned circuit, T1//C3. Then we reduce the impedance with C1/C2. Then the signal crosses the quartz crystal X1, working as a filter, and attacks the base of Q1 where it is mixed with the local oscillation also controlled by X1.



See figure 5. The audio is extracted from the emitter. It could be obtained from the collector too, where additional amplification would be obtained. After a brief filtrate, the audio signal attacks a LM386. If we put the pin 8 to ground through a diode, we mute the audio when the key is down. C18 establishes "delay" of reception.



alignment

In TX is very important to connect a load of 50  $\Omega$  , or one good antenna. If we transmitted accidentally without antenna we can forget Q1. In reception, the transistor 2N3866 works fine. With a 8 $\Omega$  earpieces and the antenna connected, we must leave the V1 completely turned to ground, and increase the capacity of C3, slowly, until we hear the basic noise of the band and signals. When we are transmitting the power must be near the maximum. For better manipulation C3 can be altered, but the reception point will also move. These adjustments are easy and intuitive. The oscillation frequency in transmission and reception will be different in about 1 kHz. With the V1 potentiometer it's possible move the Rx syntony in, approximately, 1 kHz, we can change the tone of the signals and, even, eliminate some of them outside the band of the filter.

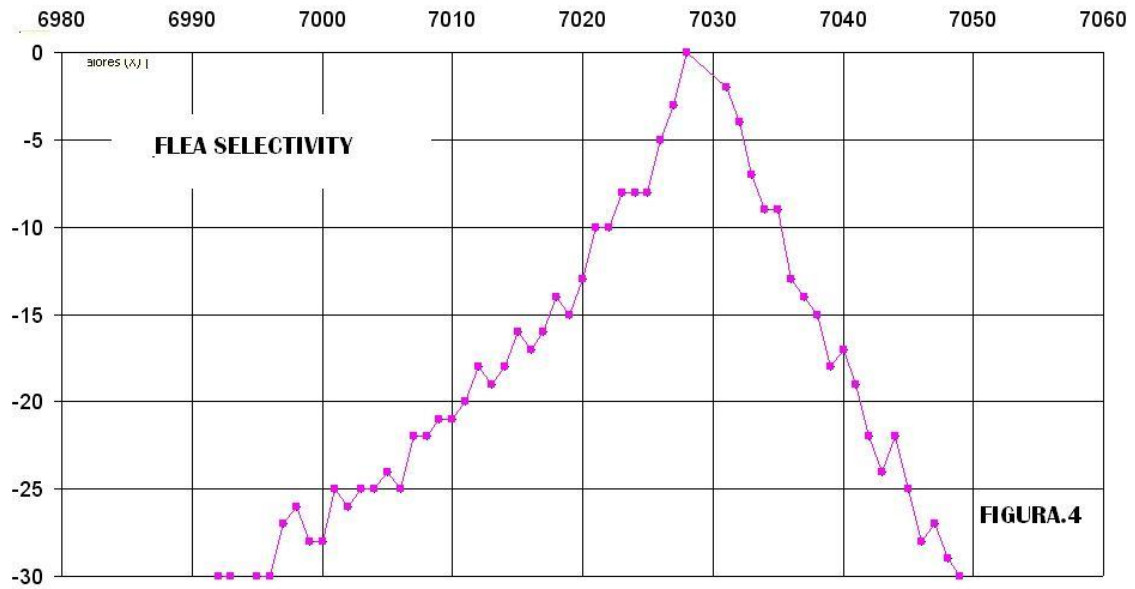
conclusion

The amount of signals received with this simple apparatus is surprising. It does not have the quality of a commercial receiver, but it is much more effective than its minimalist homonyms that I have tried: PIXIE, CURUMIM, DIXIE...

Get PCB, SPICE files and other resources at <http://ea3fxf.googlepages.com/flea>

PERFORMANCE

voltage	12	V
current	400	mA
power DC	3	W
number of components LCRQU		
TRANSMISION		
power	1	W
second harmonic		dBc
RECEPTION		
minimal detectable signal, MSD	-109	dBm
dinamic range, DR	102	dB
selectivity -3dB (see figure 4)	5	kHz



You may freely reproduce this circuit and the accompanying text as long as you don't change anything and reproduce both together.

END OF ARTICLE

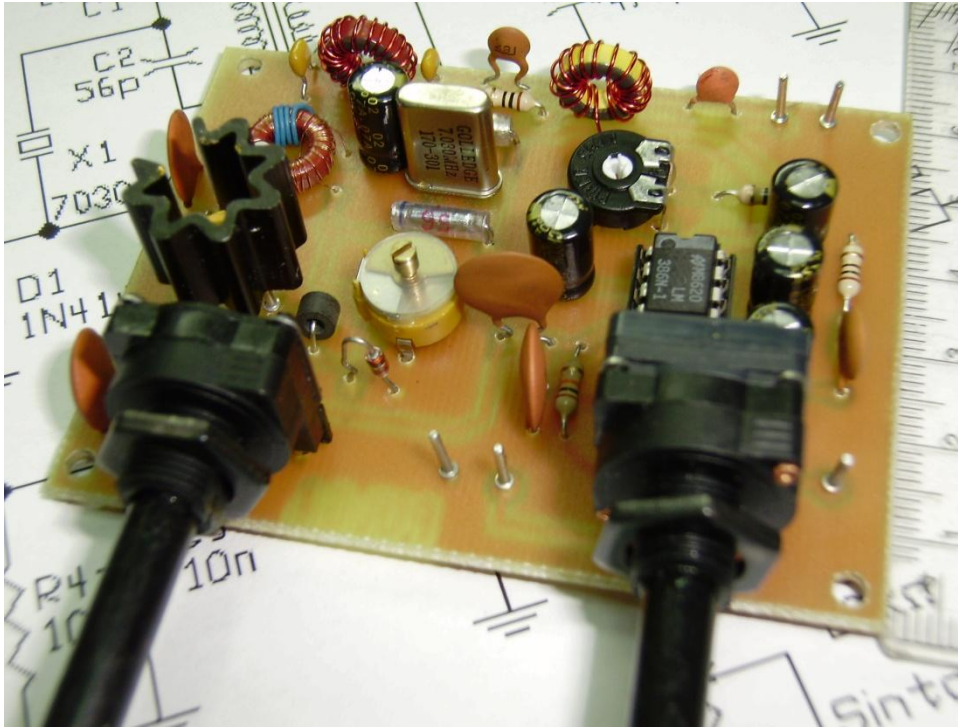
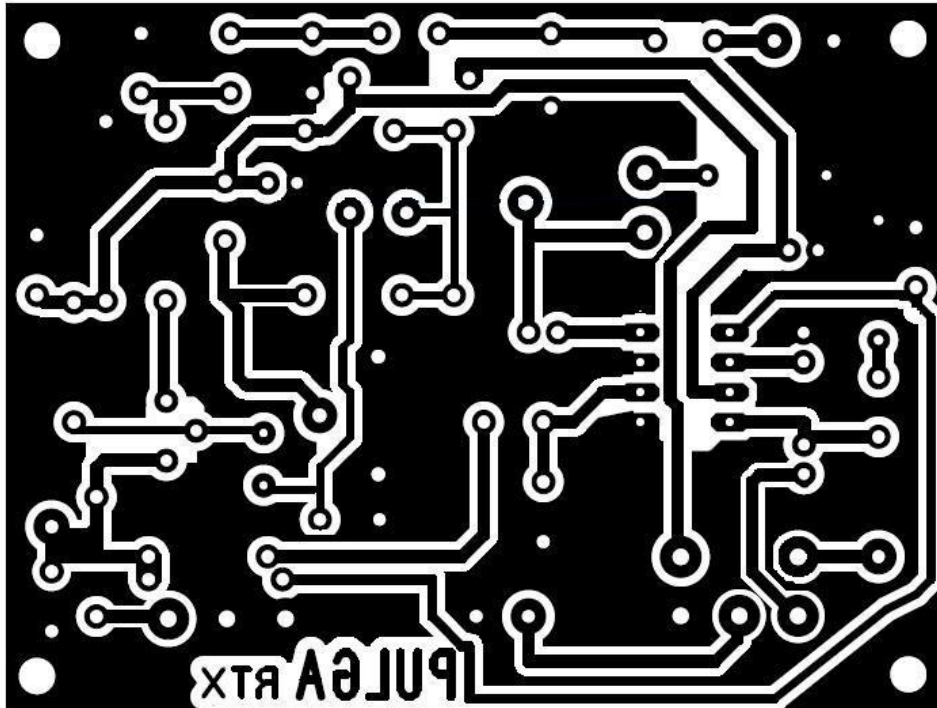


FIG 1

SUGGESTIONS

- 1 WIND + MOUNT T1 FIRST
- 2 WIND PRIMARY TO COVER WHOLE OF TOROID THEN WIND THE TWO SECONDARIES OVER PRIMARY. FIT AS SHOWN IN FIG 4 OBSERVE THE DOT NOTATION ( START OF WINDINGS )
- 3 WIND AND MOUNT L1 & L2
- 4 FIT ALL R's & Cs PLUS D1 & D2 ENSURE CORRECT POLARITY OF ELECTROLYTIC'S AND DIODES
- 5 FIT VERO PINS
- 6 FIT XTAL ( X1 ) & ( Q1 2N3866 ) DO NOT USE EXCESSIVE HEAT ON THOSE TWO COMPONENTS
- 7 FIT C3 ( 40pF TRIMMER ) + R5 ( 1K TRIMPOT )
- 8 LASTLY FIT V1 ( 22K ) AND V2 ( 470 OHM ) POTENTIOMETERS



PLACA REPRO 80 x 60 mm. (estandar)

FIG 3

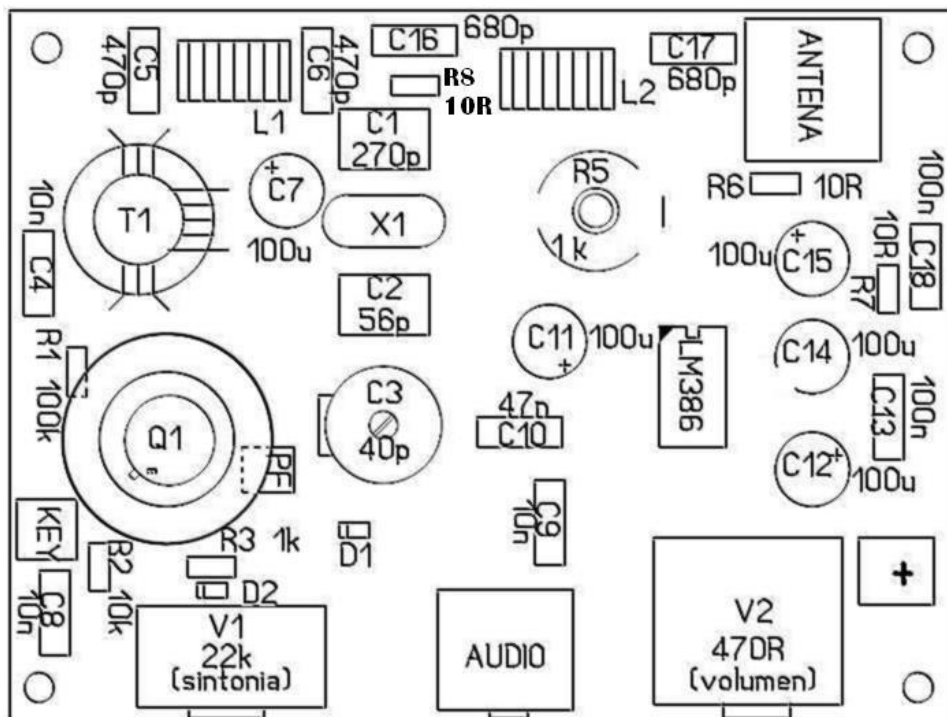


FIG 4

Dots denote START of winding

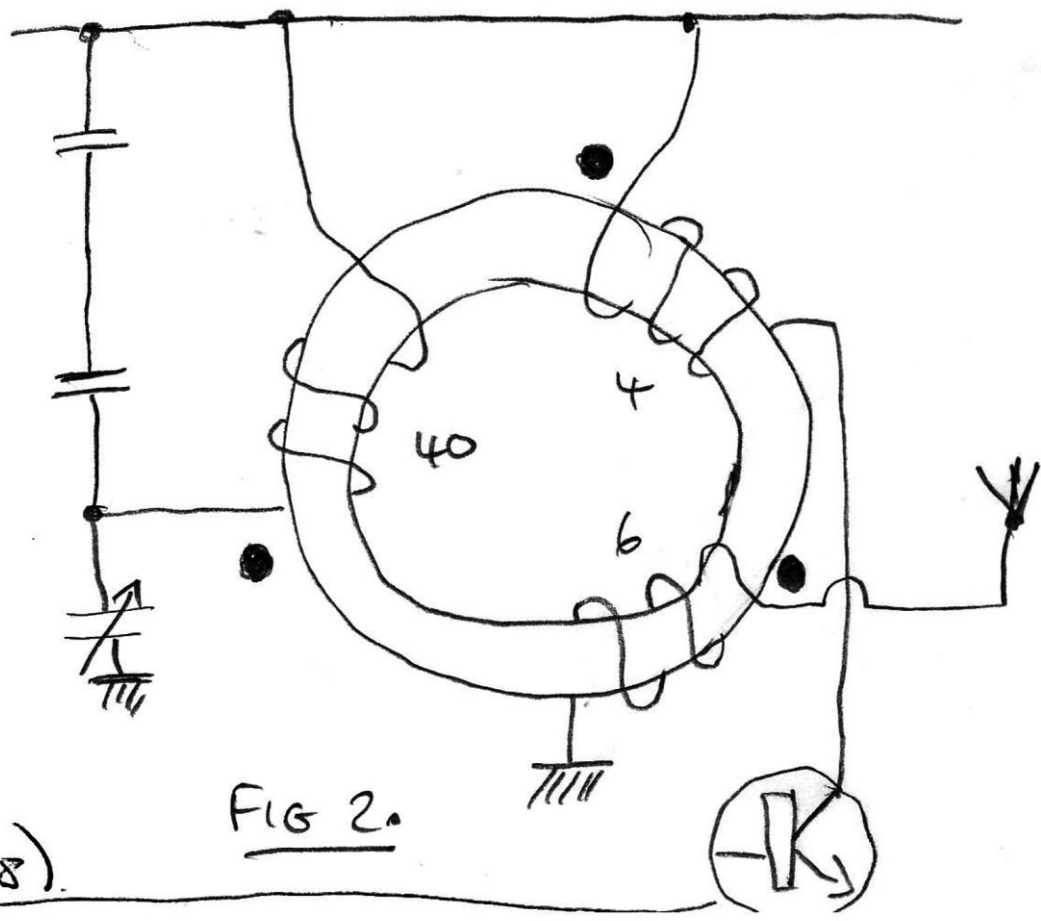


FIG 2.

8).



