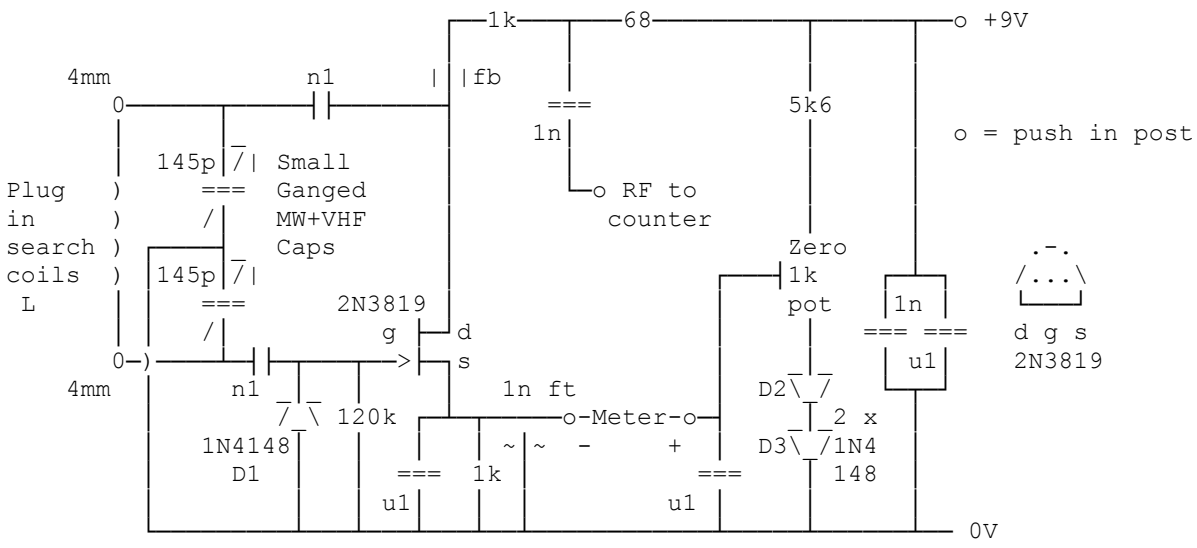
Dip Oscillator

By G8MNY (New Nov 07)
(8 Bit ASCII Graphics use code page 437 or 850)

Here is the circuit of a 1 FET dip oscillator that was used for a club on the evening construction contest. (by G4VTD)

The "Grid Dip Oscillators" were originally valve & the dip in the current indicated that some of the oscillator power is being "sucked away" by a nearby resonant circuit, aerials etc. thus indicating the correct resonance or not. It also works just as a simple signal source, but not too stable! It can even be use for testing Crystals as poor ones won't oscillate.

This is the FET equivalent of the valve circuit.

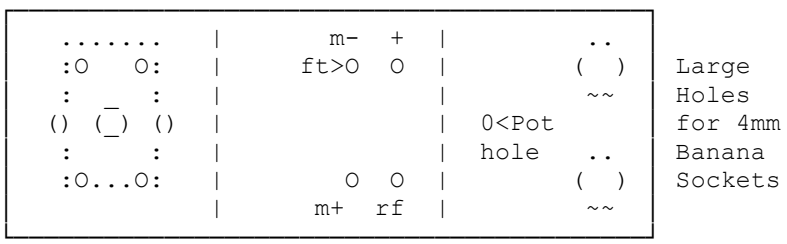


HOW IT WORKS
The split tuning caps with the search coil L gives 180° phase reversal between the FET's Drain & Gate to from a Colpitts oscillator. As the gate is not a Valve grid, a diode D1 is needed to keep the gate voltages all negative. The source voltage follows the mean Gate voltage plus the FETs bias potential (~2V), & this appears across the source 1k resistor. The meter compares this voltage to zero pot preset voltage. Now if the tuned circuit gain "Q" is altered due to loss from a nearby tuned circuit, the oscillator power will change, reducing the mean -ve Gate voltage, so the source will go more positive & the meter will show this as you tune
across the nearby circuits resonance.

The frequency counter output is a small tapping of the drain output, set here at 50Û Z with a 68Û for 120mV output (60mV term), for 75Û use 82/100Û for 200mV output (100mV term).

The Ferrite Bead (fb) on the drain 1k gives a little bit more gain at VHF.

TIN CAN CONSTRUCTION
A pre punched U tin plate is used to house all components.



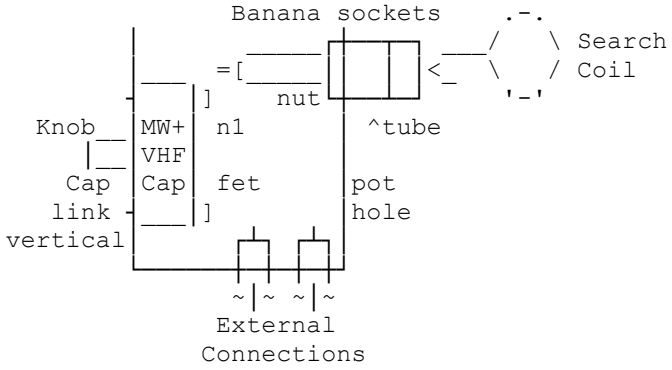
holes for
3 through push in posts,
1 preset adjustment pot,
1 feed through cap.

COMPONENT MOUNTING
All were standard small components as the design are ugly mounted & the lead wires used to support the components on the available fixed points. The wire connection push in post use the component leads as the connection wire. The feed through capacitor is soldered into the Tin Can. All wire lengths kept at a minimum in the best VHF practice.

The tuning capacitor is only soldered in, when most of the smaller components are fitted, there are vertical wires needed on the outside of the tin can linking its VHF & MW sections.

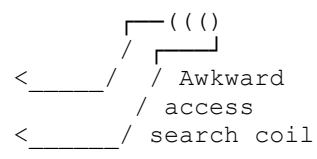
Finally the search coil sockets are mounted & wired up with the n1 capacitor leads to the tuning capacitor.

LAYOUT
There was no specific layout, but the finished item looked like this.

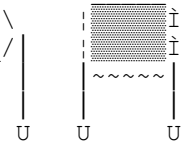


TESTING
With about 20cm of thick 1mm enamelled copper wire 8 turns 10mm dia as the search coil & ends prepared to make firm connections (bent into U), the oscillator ran between 24-70MHz with a frequency counter connected. The indicating dip meter can be any sensitive (100uA) VU type or a centre zero meter, or even a DVM. Once the preset Zero pot for a particular coil it should not need adjusting.

Various coils can be made to get the desired frequency needed, or even just made up as needed for best size, access shape & frequency range



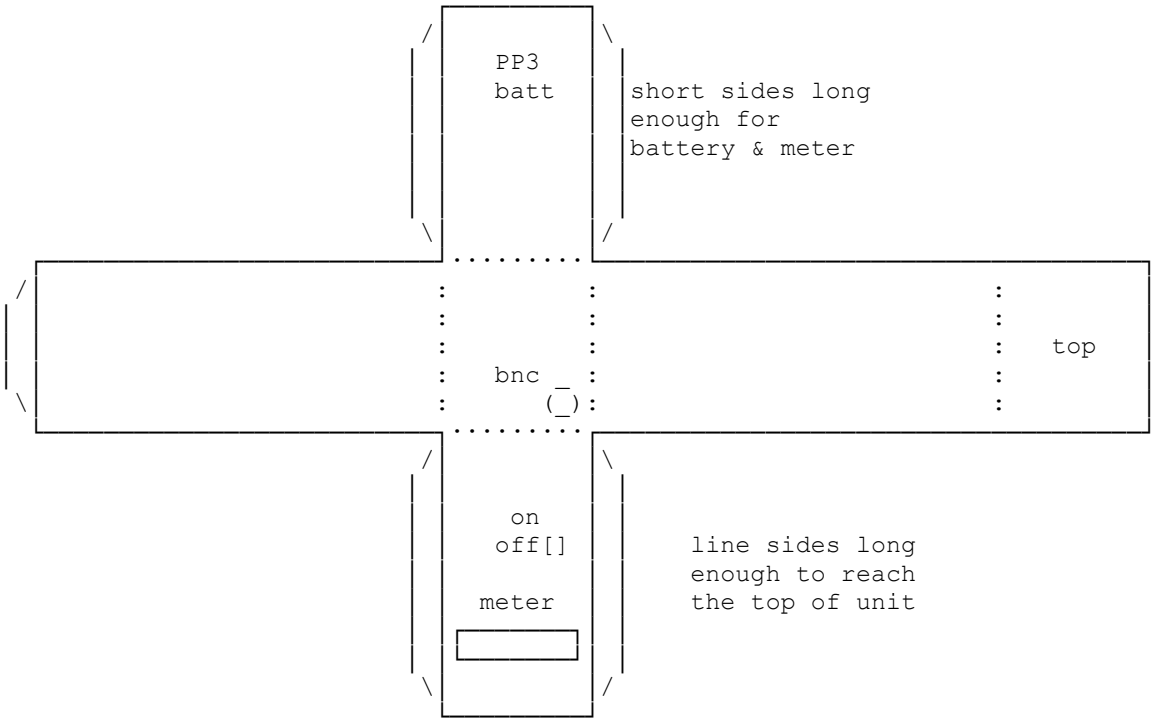
Turns	Dia	Wire	Usable range
Single U	10mm	2mm	100-200MHz
2t	10mm	2mm	68-170MHz
8t	10mm	1mm	24-72MHz
28t	10mm	0.8	8-24MHz
48t	10mm	0.4	3-19MHz
110t	10mm	0.2	2- 8MHz

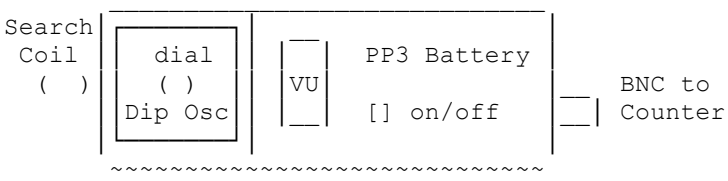


Heat glue melted on the coils (soldering iron) will help to keep the smaller coils stable. With more turns & thinner wire you need a paper former (sticky label inside out making a tube on a pen) wind the coil & again use heat glue to hold in place. Double up or use thicker wire for the in & out leads. Much lower frequencies can be obtained with a ferrite rod cored coil of needed for say 1.8MHz or 465KHz.

If the coils are well made & stable, a frequency scale for the capacitor can be made for each coil.

FINISHING OFF
If all works well & you want to box all the bits, try adding a cross shape of Tin Can....





In practice some of the tin plate is left off for battery access etc.

Why Don't U send an interesting bul?

73 De John, G8MNY @ GB7CIP