CERAMIC RESONATOR VFO

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The circuit described here is actually a modification of the circuit appeared in the SPRAT magazine. It was observed that the oscillating frequency of a ceramic resonator can be pulled considerably. This property is used in this circuit. It was found that the ceramic resonator for 3.58 MHz is able to operate from 3.5MHz to well above 3.6 MHz. This ceramic resonator is commonly used for telephone dialer circuits, low cost clock modules etc. Hence ceramic crystal for the above frequency is easily available in the local electronic markets. The cost of this component is in the range of 9 to 15 Rupees. A colpitts oscillator configuration is selected and was also noticed that the amplitude of oscillations decreases as the frequency increases. The wave shape obtained is distorted as it contains harmonics. This output is given to the doubler and again filtered to get clean output. The output was observed on a high frequency CRO and was found perfect. This circuit gives an output frequency from 6.99 MHz to 7.125 MHz. This range may slightly vary from resonator to resonator and can be adjusted by changing the value of the feed back capacitors C6 and C7. The output voltage was also found constant at about 1.2 volts pep on no load and more than 500 mV when a load of 100 ohms was connected across the out put. This level is more than sufficient to drive the popular VWN QRP.

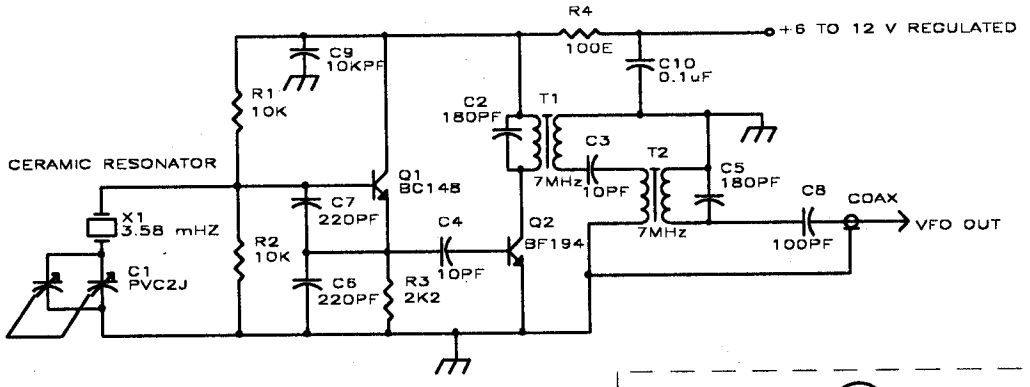
One who needs more out put can add one more transistor at the output. The frequency stability is very good compared to the LC tuned VFO, but don't expect a x'tal stability from this VFO. The output frequency slightly varies with the supply voltage, hence a stabilised power supply for the VFO is recommended. A zener diode regulated power supply is a low cost solution. The current taken by the circuit is less than 10 mA. The PCB layout is not very critical. A general purpose PCB is sufficient. Since there is no tank coil for the oscillator and all other coils are in metal cans, the circuit doesn't require any special care when placed in the transmitter cabinet.

Ceramic disc capacitors were used in the prototype and the circuit was fairly stable. I have used low cost audio transistor for the oscillator which was adequate for 7MHz operation. Experimentation with other transistors is recommended.

ALIGNMENT

Testing and alignment of the circuit is very simple if you have a frequency counter and an RF probe. Switch on the device and connect the RF probe to the emitter of BC148 transistor. Place the tuning of variable capacitor midway and observe for the deflection in the meter. If there is deflection in meter, measure the frequency at that point by connecting the frequency counter. The counter should indicate a frequency in the range 3.5 to 3.6 MHz. Observe for a while and check for stability.

The next step is to tune the transformers; connect the RF probe to the secondary of T1 and tune the coil for maximum deflection. Then check the frequency of signal at that point. The counter should read the doubled frequency. If not check the coil and the disc capacitor connected across the secondary . Repeat the same procedure for T2.



ALL CAPACITORS IN PF ARE DISC CERAMIC
ALL RESISTORS ARE 0.25 W CARBON RESISTORS
T1,T2 ARE WOUND ON STARNDARD 10 MM IFT CORE
T1 : PRIMARY 11 TURNS, SECONDARY 4 TURNS 34 SWG
T2: PRIMARY 4 TURNS SECONDARY 11 TURNS, SWG 34 WIRE
USE 10.7 MHZ CORE FOR BETTER RESULTS