

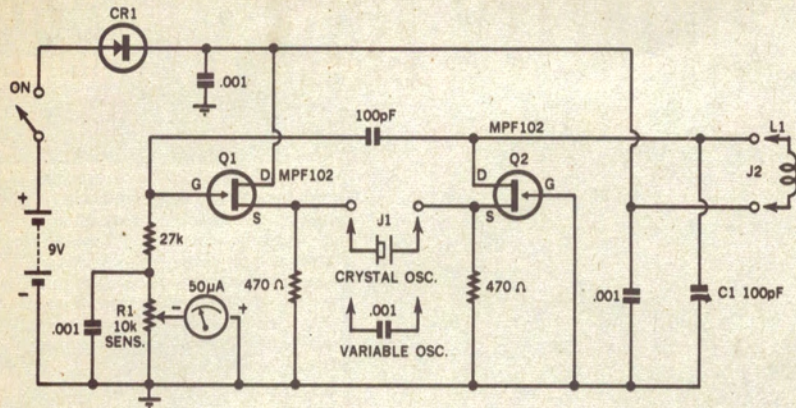
Crystal-Controlled Gate-Dip Meter

Dip meters are not known for their precise frequency calibration or frequency stability. A gate-dip meter emphasising

stability and calibration accuracy is described. It has all of the performance characteristics of a conventional grid-dip

meter together with the capability for crystal control and being battery operated it is also portable.

CIRCUIT & DESIGN IDEAS



Either a .001 μ F capacitor or a quartz crystal (operated in series mode) completes the feedback loop and causes the circuit to oscillate. The resonant frequency of L1 and C1 determines the frequency of oscillation when the coupling capacitor is used. When a quartz crystal is used instead and the tuned circuit L1C1 is tuned to the series-resonant frequency of the crystal (fundamental or overtone) the oscillator will be crystal controlled.

When an external tuned circuit is brought

close to L1 and is tuned to the dipper frequency, some of the RF power of the dipper will be coupled to the external circuit, the current through the meter will be reduced. The potentiometer is used to adjust the meter reading to occupy the upper half of the meter scale. Tuning capacitor C1 is a single-section, grounded-rotor unit. The circuit operates over the frequency range of 2.9 to 155MHz, using the coil set as described in the table.

With the .001 μ F capacitor in place the

dipper operates like a conventional dip meter inasmuch as resonance of the external circuit is indicated by a dip in meter current. When crystal control of the oscillator frequency is desired, the .001 μ F capacitor is replaced by a quartz crystal and the appropriate coil is inserted at J2. C1 is tuned for maximum meter current. Oscillation will take place only when the crystal is operating in a series-resonant mode. Since most crystals are calibrated for parallel resonance, the frequency will be several kHz lower than marked on the holder. Coupling an external circuit to coil L1 that is resonant at the frequency of oscillation will cause a dip in meter current.

The gate-dip meter is contained in a 5 $\frac{1}{4}$ in x 3in x 2 $\frac{1}{8}$ in Minibox. A saddle-mount, 6-pin transistor socket is mounted on an L bracket permitting short leads between various components. When the gate-dip meter is used as an absorption wavemeter, battery power must remain on. The solid-state circuit performs well as a dip meter but is somewhat insensitive when operated as an absorption wavemeter.

COIL DATA Freq Range

2.9-5.9MHz
5.2-10.8MHz
8.1-17MHz
16.5-34MHz
33-71MHz
70-155MHz

Turns on Blank FT-243 Crystal Holder

65 turns 30B&S enamel
40 turns 30B&S enamel
20 turns 22B&S enamel
7 turns 22B&S enamel
3 turns 22B&S enamel
Hairpin loop inside crystal compartment

(Extract from an article by Willie L. Steed, K4PRL, in "QST".)