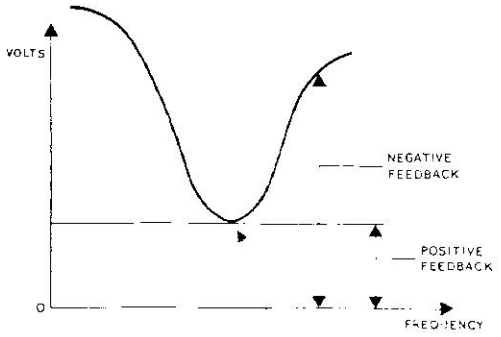
CIRCUIT DESCRIPTION

The circuit of this instrument may be divided into four parts: the power supply, the oscillator, the attenuator and the metering circuit.

The power supply uses the conventional power transformer full wave rectifier circuit feeding a ripple filter consisting of two condensers and a choke.

The oscillator uses a 6AU6 pentode voltage amplifier and a 6CL6 triode-connected cathode follower. Regenerative feedback from the 6CL6 to the 6AU6 cathode is applied through the tungsten filament candelabra based lamp.

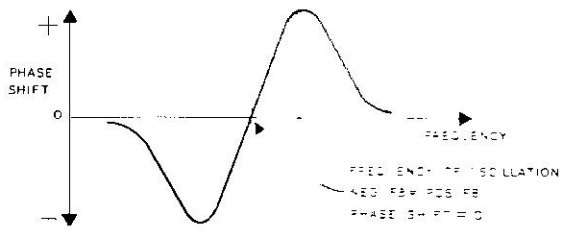
Degenerative feedback is applied from the 6CL6 through a "notch" network to the grid of the 6AU6. The resultant oscillation occurs at the "notch" frequency, where degeneration is minimum and phase shift is zero.



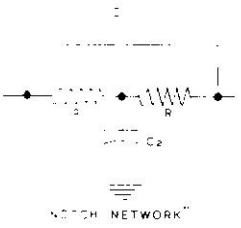
The "notch" network is a capacitor-shunted bridged-T type. The "notch" occurs at a frequency:

$$F = \frac{1}{2\pi RC}$$

where $C = \sqrt{C_1 C_2}$



The amplitude of oscillation is maintained at a nearly constant value by the tungsten lamp. The regenerative feedback is applied through a voltage divider consisting of the lamp and the "oscillator" control. An increase in output signal increases the lamp current, the lamp temperature and the lamp resistance. This reduces the amount of feedback applied to the 6AU6 cathode and the resultant output. A balanced condition is thus obtained. The "oscillator" control is used to set the nominal output level.



The "notch" network consists basically of two resistances and two condensers. From the relationship shown it is evident that a decrease in capacities by a factor of 10 will increase the frequency by a factor of 10. As the values of C_1 and C_2 were chosen with a 10:1 ratio, five condensers can do the job of four pair or eight, in achieving four decade ranges.

For frequency variation within the steps of 10 times provided by the multiplier switch, the value of R is changed. For a multiplier switch setting of X1 a resistance (R) of 100 KΩ will produce a frequency of 10 cycles. As F and R are inversely proportional, 20 cycles or twice the frequency, requires half the resistance, or 50 KΩ. Likewise, 30 cycles or three times the frequency requires 1/3 the resistance or 33.3 KΩ. The 0-100 "cycle" switch uses two decks, each deck switching four resistors as follows: 100 KΩ, 50 KΩ, 33.3 KΩ, 25 KΩ. 100 K // 25 K = 20 K; 50 K // 25 K = 16.7 K; 33.3 K // 25 K = 14.3 K; 100 K // 33.3 K // 25 K = 12.5 K; 50 K // 33.3 K // 25 K = 11.1 K; 100 K // 50 K // 33.3 K // 25 K = 10 K. These resistance values produce frequencies of 10 to 100 cycles in steps of 10 cycles. (// means "in parallel with.")