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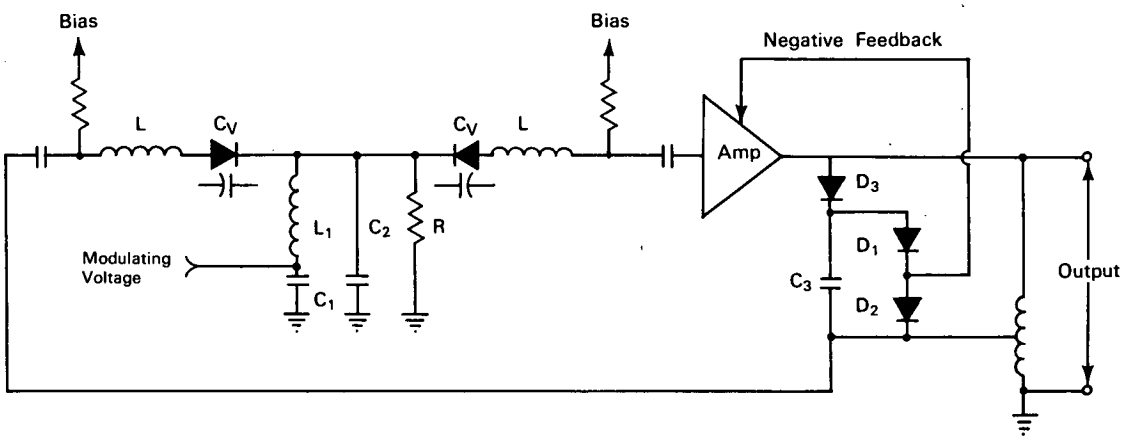
NASA TECH BRIEF

Voltage Variable Oscillator Has High Phase Stability



The problem: Although frequency-modulated oscillators are available, their applications are restricted by certain operating limitations. In LC or reactance-tube oscillators relatively low levels of phase stability are normal, and in piezoelectric crystal oscillators, modulation is limited to a fraction of a percent of the center frequency.

The solution: A voltage variable oscillator using a low noise, phase stable amplifier with negative feedback, plus two (or more) series resonant LC circuits for high phase stability and optimum frequency deviation.

How it's done: The resonant part of the oscillator consists of two identical series resonant circuits, each consisting of an inductor (L) and a voltage variable capacitance (C_V) loosely coupled by capacitor C_2. Since C_V is a voltage variable capacitance, the oscillator frequency can be varied by applying a modulating voltage. A low-pass filter section, consisting of C_1, L_1, and C_2, is used to isolate the RF oscillator signal from the modulating signal. The filter load resistor R has a resistance much greater than the capacitive reactance of C_2 at the oscillation frequency.

Amplifier negative feedback is accomplished by the network consisting of C_3, D_1, D_2, and D_3. A dc voltage proportional to the oscillator output voltage is developed across D_3 and C_3 and applied to the high-frequency point contact diodes D_1 and D_2. If the amplifier output tends to increase, the higher output signal reduces the dynamic resistance of D_1 and D_2 and negative feedback to the amplifier increases to maintain a constant output signal level.

Note: Inquiries concerning this invention may be directed to:

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Reference: B65-10204

Patent status: NASA encourages the immediate commercial use of this invention. It is owned by NASA and inquiries about obtaining royalty-free rights for its commercial use may be made to NASA, Code AGP, Washington, D.C., 20546.

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