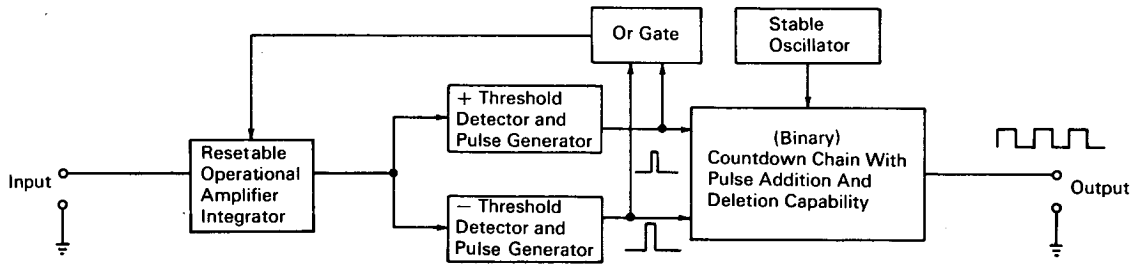
NASA TECH BRIEF

Digital Voltage-Controlled Oscillator



The problem:

To generate a variable frequency signal that is voltage controlled about a discrete center frequency in close linearity. Prior art VCO's (voltage-controlled oscillators) required expensive and critical temperature compensation coupled with closely regulated power supplies.

The solution:

A digital voltage-controlled oscillator that generates a variable frequency signal controlled linearly about a center frequency with high stability and that is phase controlled by an applied voltage.

How it's done:

The control voltage drives a resetable integrator. When the integral of the control voltage exceeds a positive threshold voltage, a pulse is generated that resets the integrator and simultaneously adds (or deletes) a specified number of pulses in a binary countdown chain. When the integrator becomes more negative than a negative threshold voltage, a pulse is generated that also resets the integrator but now deletes (or adds) pulses in the binary countdown chain. Thus, the output signal steps in phase at a rate proportional to the applied control voltage. A zero control voltage generates no pulses and the output signal frequency is an exact submultiple of the stable oscillator in this situation.

Notes:

1. The center frequency of this digital VCO is related to the accuracy of the stable oscillator but has the capability of large linear frequency excursions.
2. Integration ahead of the digital circuitry provides linear operation with control voltage having appreciable noise components.
3. Inquiries concerning this innovation may be made to:

   Technology Utilization Officer
   Goddard Space Flight Center
   Greenbelt, Maryland 20771
   Reference: B67-10449

Patent status:

No patent action is contemplated by NASA.

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Category 01