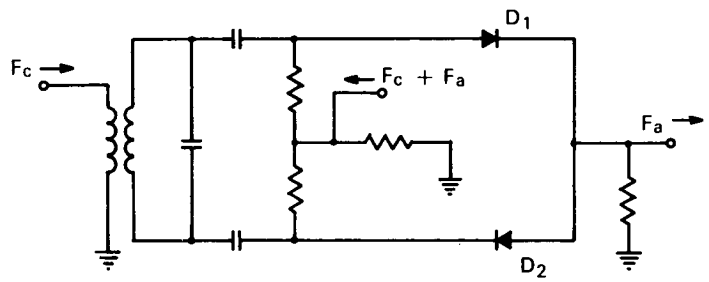
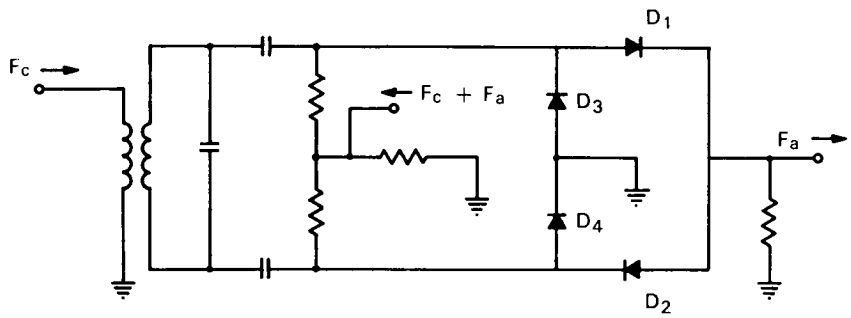
NASA TECH BRIEF

Added Diodes Increase Output of Balanced Mixer Circuit



OLD CIRCUIT



IMPROVED CIRCUIT

The problem: To increase the output signal level of conventional balanced mixer circuits, commonly used in radio transmitting and receiving equipment, with a minimum of added components. It is desirable to avoid the addition of push-pull amplifiers as a means of summing out-of-phase outputs.

The solution: The addition of two diodes to form a half-wave carrier switch balanced modulator. This doubles the output signal level and reduces spurious output and distortion by one half.

How it's done: Two additional diodes, D_3 and D_4 with center tapped ground are added to a conventional balanced mixer. The result is a half-wave carrier switch balanced modulator that functions to generate a difference frequency F_a (audio) at the output. The inputs F_c and $F_c + F_a$ represent inputs at the carrier frequency and at the carrier plus audio frequencies, respectively. Addition of the centertap grounded diodes permits both legs of the circuit to function throughout the ac cycle. This effectively doubles the output frequency F_a while the level of spurious signals at frequencies $F_c + F_a$ and $F_c - F_a$ is reduced by one half. Distortions caused by signals at the third harmonic of F_a are also reduced by one half.

(continued overleaf)

Notes:

1. This invention should be of general interest to persons engaged in designing radio receivers and transmitters.
2. Inquiries concerning this invention may be directed to:

   Technology Utilization Officer
   Goddard Space Flight Center
   Greenbelt, Maryland, 20771
   Reference: B65-10276

Patent status: NASA encourages the immediate commercial use of this invention. Inquiries about obtaining rights for its commercial use may be made to NASA, Code AGP, Washington, D.C., 20546.

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(GSFC-354)