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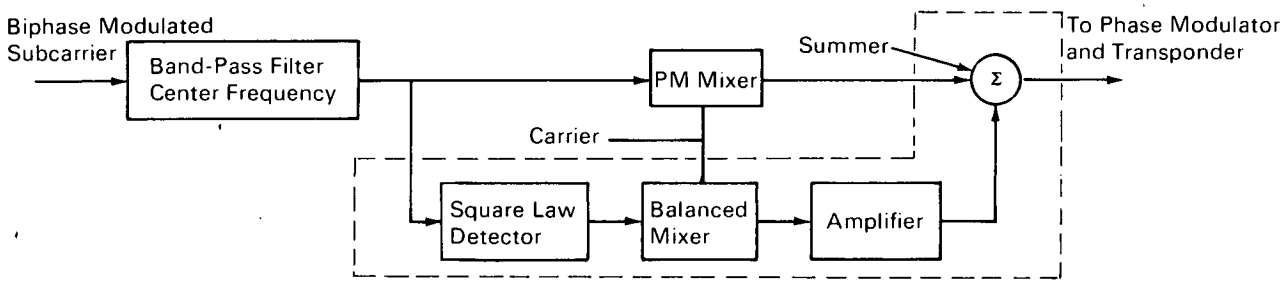
NASA TECH BRIEF

Circuit Suppresses Spurious Sidebands



A technique has been developed for the suppression of spurious sidebands (spurs) that are generated by rf transmission systems. This technique should find application in most pulse modulation and frequency modulation communication systems in which the receiver must lock on the transmitted carrier. This would include satellite systems for both audio and video communications, data exchange, navigation, earth resources research, and possibly for some multiplex data systems that use multiple modulation techniques.

Normally, the subcarrier conveying telemetry is fed directly into the phase modulator, which modulates the s-band carrier. In the present circuitry, the modulated subcarrier is split, part going to the mixer, and part to the new circuit which is shown within the broken lines in the block diagram. The modulated subcarrier is first squared in the square law detector and then fed into a balanced mixer where the squared modulated subcarrier and the carrier are multiplied. The mixer output is then amplified (given the proper coefficient) before being fed to a summer that adds it to the output of the phase modulator. The signal reaching the phase modulated transponder no longer includes the spurs.

If the telemetry modulation index is 1.3, and the gain ratio (the ratio of actual gain to that gain required for complete spur elimination) is 0.9:1, the spurs that were -29 db relative to the carrier are now reduced to -54db. Simultaneously, the carrier power has been given a theoretical 1.1:1 db gain. Even with such small gain ratios, the spurs are sufficiently suppressed to permit the receiver to lock automatically on the carrier.

Note:

Requests for further information may be directed to:

Technology Utilization Officer
Manned Spacecraft Center, Code BM7
Houston, Texas 77058
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Patent status:

No patent action is contemplated by NASA.

Source: Patrick J. Ready of
TRW Systems Group
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Category 01