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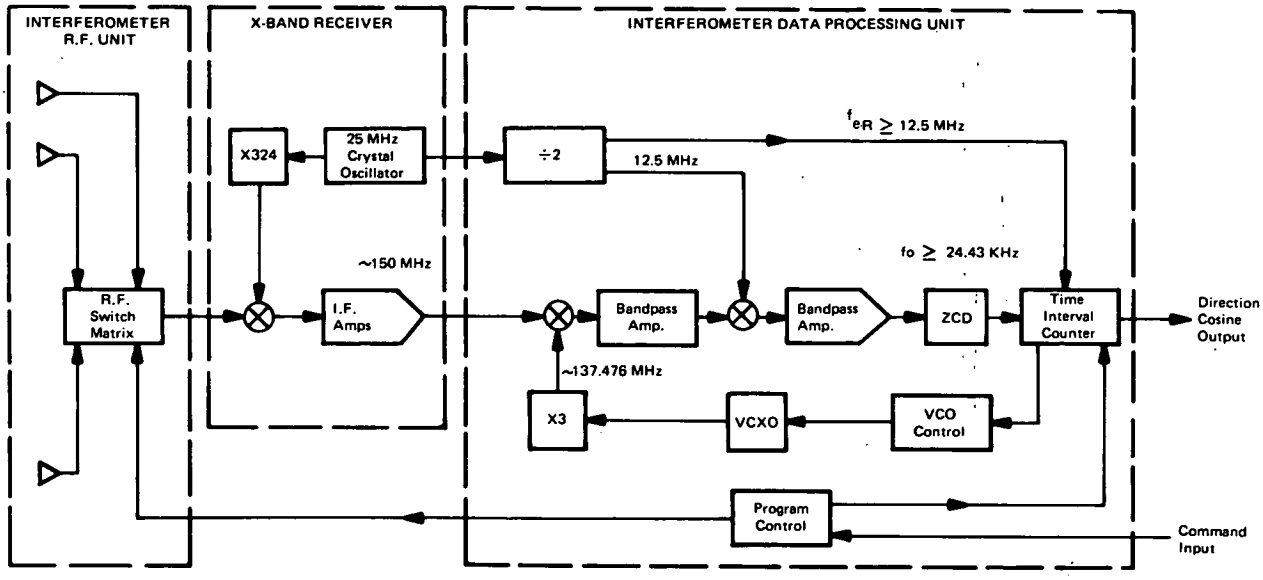
NASA TECH BRIEF

Goddard Space Flight Center

Interferometer Using R.F. Switching Matrix



The problem:

Long term phase matching and system calibration on dual data channels inherent in conventional interferometer systems are costly and time consuming.

The solution:

An RF switching technique allows a single receiver and data processing channel to be utilized for phase movement measurement.

How it's done:

An RF switching matrix (see figure) sequentially connects the interferometer horn antenna to a single receiver/data processor channel. The conventional interferometer approach uses two (or more) receiver channels and a data processor to compare the phase at the output of the receivers. The conventional approach requires that the two receiver channels be phase matched, and differential phase changes with frequency, temperature, and time, be acceptably small, or periodically calibrated out. The single channel approach switches between antennae with a phase stable RF switch and, using a single receiver/data processor channel, measures the resulting phase step in the RF signal. The result is that long term phase changes in the receiver/data processor channel have no effect on subsystem accuracy. The receiver phase need be constant only over a single measurement interval, which is the order of 10 to 50 milliseconds, depending on the amount of data smoothing involved. The single channel, switched RF approach, thus eliminates a major measurement error source (receiver phase match), and also requires less receiver hardware.

(continued overleaf)

Note:

Requests for further information may be directed to:

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Patent status:

No patent action is contemplated by NASA.

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