Subject: Sideband separating mixer tests
To: rleduc@vaxeb.jpl.nasa.gov (Rick LeDuc)
Date: Fri, 6 Jun 1997 10:49:35 -0400 (EDT)
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Rick,

A quick update on the sideband separating mixer tests:

We have tested two mixers chosen at random from the first wafer, and the results are very encouraging. At ~220 GHz we measure receiver noise temperatures of 65-77K with a sideband ratio of 9-17 dB. The results are quite frequency dependent, and the behavior appears to be consistent with LO leakage from the LO port of the chip to the signal port via a waveguide mode in the substrate between the ground plane and the mixer block. This is something I had anticipated, and should be eliminated by inserting two small pieces of absorbing material in the mixer block. (I decided to try the initial tests without the absorber to see whether we could do without it).

The ~70 K receiver noise temperature is a good number -- it is about what we would expect if we built a sideband separating mixer using two double sideband mixers which gave receiver noise temperatures of 35 K DSB.

I will be away most of the next two weeks at the MTT Symposium in Denver and a meeting in Boston.

--Tony Kerr

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Noise Temperature of the complete SSB receiver

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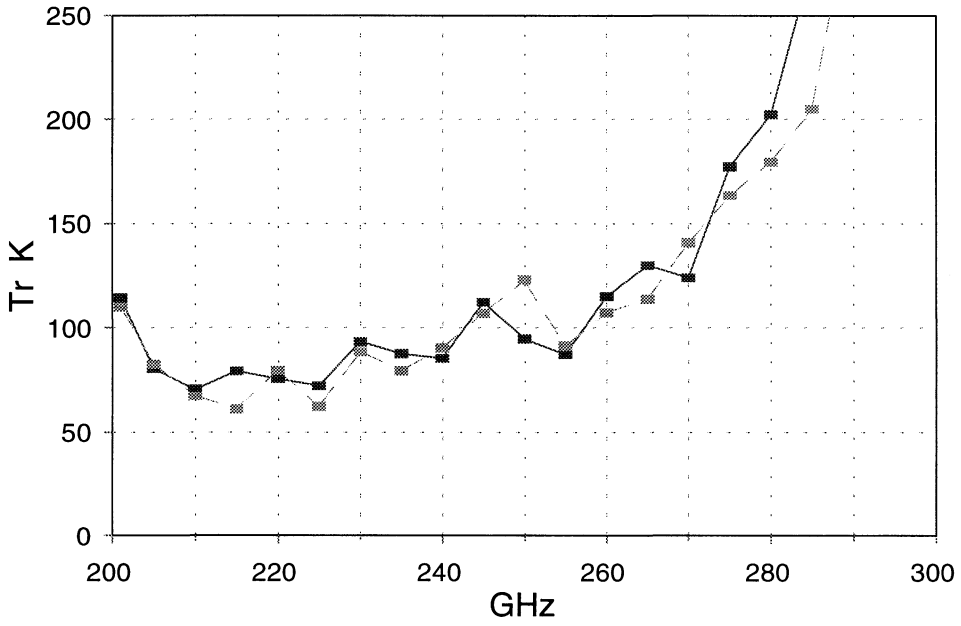
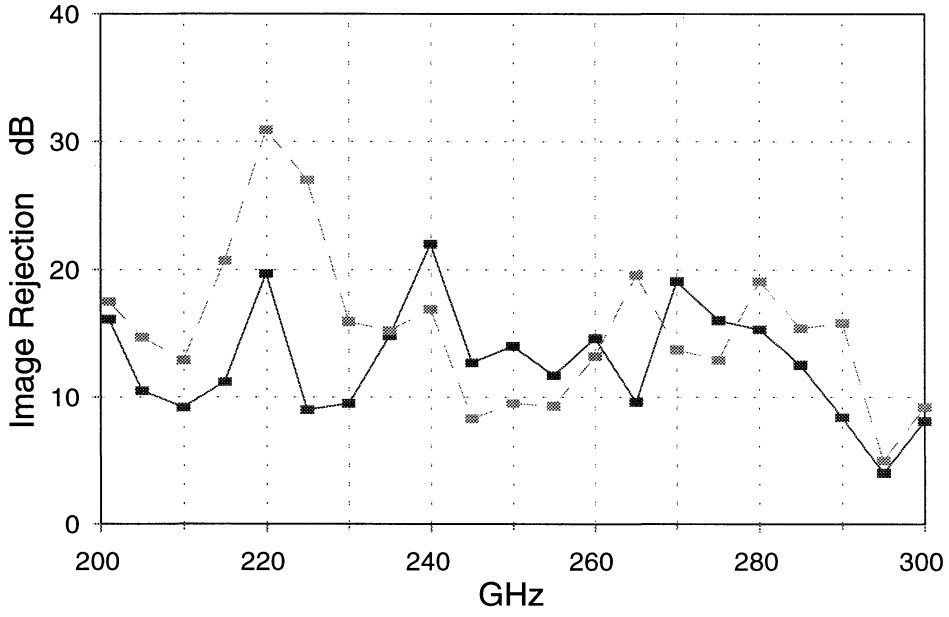
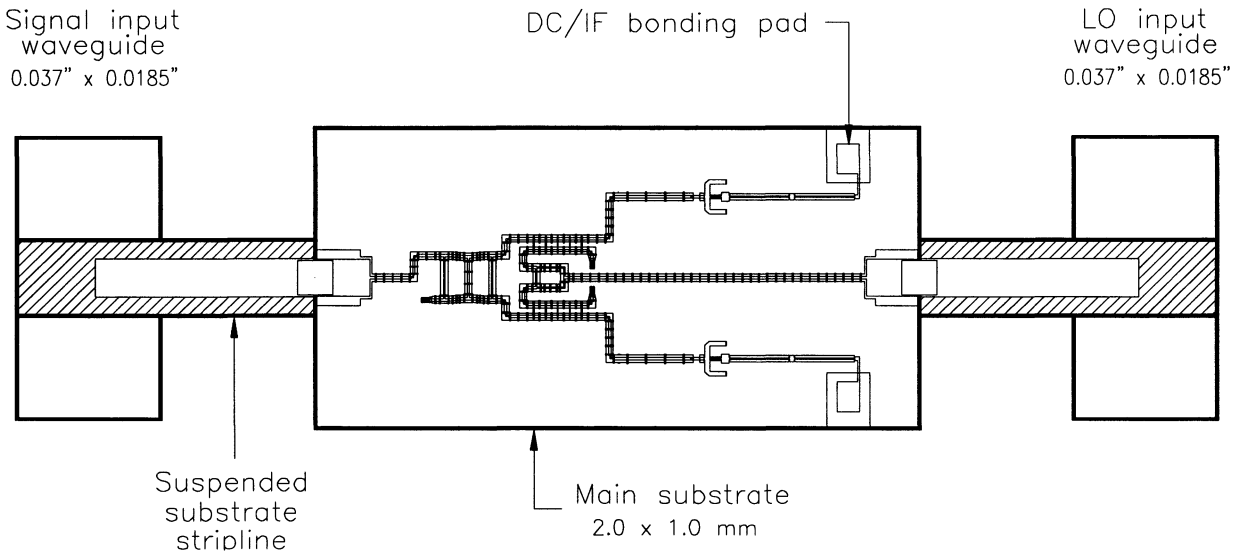
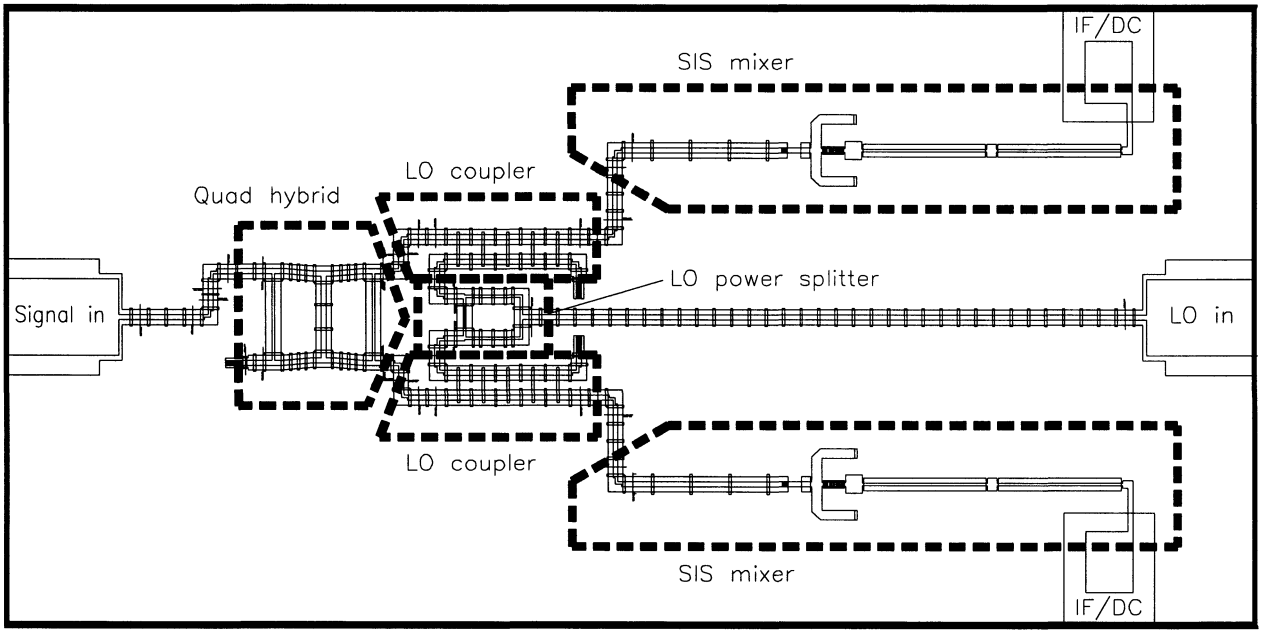


Image rejection





The image separating mixer, showing the signal and LO waveguides, suspended stripline coupling probes, and the main substrate.



Main substrate of the image separating mixer, showing the main components.