VLBA ACQUISITION MEMO #222 REVISED

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To: VLBA Data Acquisition Group

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Subject: Changes needed in BBC using Analog Devices 5539 (*Revised 16 October 1990)

The Analog Devices 5539 ultra-high frequency operational amplifier has better performance than the Signetics 5539 and is being used in some BBCs. VLBA Acquisition Memo #176 shows the open loop gain for both the Analog Devices and Signetics ICs. We now have some experience with the Analog Devices 5539 and the following changes are needed to make a BBC have very similar performance to one used Signetics ICs without changing the bandwidth codes. The changes are as follows:

When AD ICs are used in SSB mixer:

1. Omit 4.7 pf compensation capacitors on sum and difference amplifiers (affects only the 16 Mhz roll-off).

When AD ICs are used in filter boards:

2.* Omit 4.7 pf compensation capacitor (between pins 12 and 14) on bandwidth compensation 5539.

3.* Omit 2 pf compensation capacitor (between pins 12 and 14) on 20 dB output 5539.

4.* Use 82 pf as initial starting capacitance for C4 in Q=2.56 filter section (100-150 pf is normally used for the Signetics 5539)

The main advantages of the Analog Devices IC are:

1. Better 8 MHz bandpass (less rounded).

2. More accurate phase shifting in SSB mixer in the range of 8-16 MHz.

3. Should be more consistent i.e. fewer adjustments needed to obtain consistent performance - experience will tell.

It should also be possible to use a mixture of Analog Devices and Signetics ICs provided appropriate adjustments are made.

*Added Note on SSB Mixer:

Low pass filters consisting of a 50 ohm chip resistor (in series with mixer output) followed by 16 pf capacitors to ground may be advantageous in SSB mixer submodule. Larry Benno has suggested this improvement to present a better match to the mixers which may make it easier to obtain the required image rejection.