VLB ARRAY MEMO No. 77

ADDITION TO VLBA FRONT-END DRAFT

Craig Moore

February 3, 1982

The first local oscillator frequencies will be fixed tuned and derived from microwave oscillators phase locked to the frequency standard described in section ___. The one exception is the K-band LO which will be generated with an indirect frequency synthesizer. A K-band yig tuned oscillator (YTO) phase locked to harmonics of a 100 MHz reference signal will enable conversion of the 4 GHz maser tuning range into the 1 GHz IF band in steps of 0.9 or 1.1 GHz. The Q-band LO will be derived from the K-band YTO with a doubler integrated into the Q-band mixer. The mixer will be biased for starved LO operation, so that the LO power available from the YTO will be sufficient. The X-band LO will be dervied from the S-band phase locked oscillator with a X4 multiplier. This will insure a constant phase relationship between the S and X-band signals. The prime focus receivers will be the tuned RF type. These signals will not be subject to frequency conversion until processed in the record terminal. Only low order frequency multipliers or phase locked oscillators (where large frequency multiples are required) will be employed in order to control the oscillator phase noise, which increases as the square of the frequency multiplication. Reference frequencies of 50 MHz and 100 MHz will be generated in the frequency standard. These frequencies will have spectral purity and frequency stability comparable to that of the traditional 5 MHz output. All of these techniques are presently employed in various NRAO receivers used successfully for VLBI experiments up through K-band frequencies.