VLBA Electronics Memo No. 124

43 GHz FRONT-END

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Upon testing of the 43 GHz front-end it has been found that the post amplifiers (Miteq Model No. AMF-45-4890-18) have a large amount of gain around 6 GHz. The noise created from this excess gain at 6 GHz is mixed into the IF passband and increases the receiver noise temperature. The best way to correct this problem was found to be placing a band pass filter on the output to the front-end, connectors J6 and J7.

Currently there exists a band pass filter in two of the channels in the 8.4 GHz converter module. This filter has a pass band of 7.92 to 8.88 GHz, which is less than the band of the front-end's output. When the channel with the filters is used it has presented somewhat of a problem at the high end of the band, when the signal to be evaluated lies around 8.9 GHz. If measurements are to be made using the upper and lower limits of the band, it would be advisable to use another filter with a wider bandwidth.

Prior to the post-amplifier and after the mixer is a band pass filter in the front-end. It would be advantageous, for the 43 GHz system, if filters like the ones used in the front-end (Reactel Model No. 4C11-8.4G-1.4GS11) are used in place of the filters in the 8.4 GHz converter module.

A problem was also discovered within the LO system. It was found that the 2 to 16 GHz synthesizer was generating a signal at a frequency of half the local oscillator frequency, which is a potential problem if the characteristics of the limiting amplifiers are taken into consideration. A band pass filter has been added to the system, prior to the limiting amplifier. This filter has a pass band of 10.9 to 12.1 GHz so as to reduce the effect of any spurious responses generated from the local oscillator system.

The following is a listing of local oscillator settings used in the testing of the 43 GHz front-end. It is recommended that these settings be used whenever possible.

MFM/cjd

Attachment
Table of Local Oscillator Settings
for 43 GHz Front-End Test Setup

Local Oscillator Settings
for 43 GHz Front-End Test Setup

Observation Frequency (GHz)	Front-End LO Setting (GHz)	8.4 GHz Converter Module Setting	Observation Frequency Mixed Down to (GHz)
41	10.9	7.6	0.7
41.2	10.9	7.6	0.9
41.4	11.1	7.4	0.7
41.6	11.1	7.6	0.7
41.8	11.1	7.6	0.9
42.0	11.1	7.9	0.8
42.2	11.4	7.4	0.6
42.4	11.4	7.4	0.8
42.6	11.4	7.6	0.8
42.8	11.6	7.4	0.6
43.0	11.6	7.4	0.6
43.2	11.6	7.6	0.8
43.4	11.6	7.9	0.7
43.6	11.6	7.9	0.9
43.8	11.9	7.4	0.7
44.0	11.9	7.6	0.9
44.2	11.9	7.6	0.7
44.4	11.9	7.9	0.8
44.6	11.9	8.1	0.8
44.8	11.9	8.1	1.0
45.0	12.1	7.9	0.8