

VLB ARRAY MEMO No. 538

VLBA Electronics Memo No. 63

NATIONAL RADIO ASTRONOMY OBSERVATORY
Charlottesville, Virginia
March 11, 1986

(860314)

TO: VLBA Electronics Group
FROM: Dick Thompson
SUBJECT: VLBA Electronics Meeting, March 6, 1986

ATTENDEES: Bagri, Dill, Greenberg, Kellermann, Moffet,
Napier, Oty, Romney, Schlecht, Thompson, Walker,
Weinreb.

Two modifications have recently been made to the plan for electronics construction in 1985/6 described in VLBA Electronics Memo No. 48. First, because of funding changes, the total number of antennas for which the initial electronics systems will be built is reduced from four to three. In some cases parts have already been ordered for four sets, and in these cases the fourth set will be used for construction during 1987. Orders for 1986 construction from this point onwards, however, should include parts for three systems only. The second change is that for the initial electronics for antenna no. 2 onwards the 330/610 MHz front end will be omitted, and a front end for 23 GHz will replace that for 15 GHz. The inclusion of 23 GHz results largely from the suggestion of several members of the VLBA Visiting Committee who emphasized the importance of this band for early scientific use of the VLA, and the usefulness of the H₂O maser lines for pointing and holographic measurements on the antennas. Two 23 GHz amplifiers for the VLBA should be available in the second half of the year, and it should therefore be possible to have the first 23 GHz front end for installation in the spring of 1987.

Peter Napier reported that the 330/610 MHz feeds have been tested, and pattern measurements indicate that an aperture efficiency of 35-40% will be achievable in these bands. The problem of matching the feeds for dual-frequency operation is still being worked on. The 1.5 GHz scale model, a bell-shaped corrugated horn, has been tested satisfactorily. The return loss is greater than 25 dB over most of the band, but falls to 19 dB at the high end (1.65-1.75 GHz). The final design of the 4.6-5.1 GHz feed has been tested and looks very good with return loss better than 25 dB over the whole band. This is a standard narrow-band, corrugated, conical design and will be the scale model for all frequency bands from 2.3 GHz upwards.

Harry Dill reported that most of the parts for the 15 GHz front end for the Pie Town antenna are on hand and the dewar has been machined.

Erich Schlecht discussed a problem found in several of the frequency converter modules in which the IF isolation between the channels is no more than about 30 dB, as a result of IF coupling through the local oscillator inputs. Filters have been ordered to provide the desired isolation of >50 dB.

Alan Moffet pointed out a potential problem in the Sigma Tau masers in the use of a digital divider circuit to generate the 5 MHz output from the 10 MHz crystal frequency.

Dick Thompson briefly discussed the azimuth cable wrap and opined that for the LO reference cables it would be improved if the diameter were decreased. This would reduce the vertical motion of the lower end which is almost 4 ft for ± 270 deg rotation. Some of the new, high-stability types of flexible cable are being considered for use at the azimuth wrap and elevation axis.