Interoffice

VLB ARRAY MEMO No. 256

National Radio Astronomy Observatory

Charlottesville, Virginia

August 19, 1983

To: VLBA Members

From: S. Weinreb

Subject: Synopsis of VLBA Electronics Meeting of August 17, 1983

Attendees: J. Payne, A. Moffet, J. Campbell, D. Weber, B. Brundage, R. Fisher, A. Rogers, J. Carter, L. D'Addario, C. Walker and S. Weinreb.

Synopsis of Agenda Items

1) IF/LO Block Diagram Change

(From triple-conversion to double-conversion with 0.5-1 GHz IF and four 2-16 GHz local oscillators) - This change was generally endorsed by the group as making the system simpler and more easily maintained. Some comments:

a) The cost and complexity of a low phase noise 0.5-1 GHz synthesizer may be higher than for the 0.1-0.5 GHz synthesizer. This is a design problem which needs early investigation. Increasing the tuning step from 10 kHz to 20 kHz would ease the problem; the Scientific Committee should be asked about this.

b) There is concern about the reliability and cost of the switching matrices, diode or mechanical, needed for both IF and LO. This also needs early investigation.

c) In order to allow observations of two bands over 500 MHz apart with the same polarization, two first LO's and mixers must be allowed on front-ends with over 500 MHz instantaneous bandwidth (8.0-8.8 GHz, 10.2-11.2 GHz, and 14.4-15.4 GHz).

2) System Layout

The module approach of the VLA, with an improved coaxial connector or SMA connectors, is favored. The front-ends will have some circuitry mounted directly on the dewar but will probably also have a service module per front-end. There will probably be one rack in the vertex room in a non-critical location and two data acquisition racks, an LO/timing rack, and the hydrogen maser in the control room. Electronics requirements need to be incorporated in the control building plans.

3) Monitor and Control Interface to Equipment

A serial data bus system with variable address space per data set was described. There was discussion about the size and RFI generation of the data sets and whether an ASCII based system such as that used in Mark III could be used. The ASCII system could be monitored by data terminals while the specialized system is simpler but requires a special data tap to monitor data.