

NATIONAL RADIO ASTRONOMY OBSERVATORY
Charlottesville, Virginia

July 14, 1986

To: VLBA Electronics Group
From: Dick Thompson
Subject: VLBA Electronics Meeting, July 10, 1986
Attendees: Bagri, Balister, Bradley, Brundage, Dill,
Greenberg, Napier, Norrod, Oty, Schlecht,
Thompson.

Tests of the polarizer (quarter wave plate plus orthomode junction) for the 1.5 GHz feed indicate a ratio of 1 dB for the orthogonal linearly-polarized waves emanating from the plate. The 1 dB figure is approximately twice the desired value, and corresponds to 25 dB isolation in the separation of opposite circularly-polarized components. The goal is 30 dB isolation, corresponding to 0.5 dB difference for the orthogonal waves. Some of the difference may be attributable to the measurement system and further measurements will be made. Design studies of the 2.3 GHz feed show that it will operate satisfactorily at the 2.69-2.7 GHz radio astronomy band if the matching section is replaced. Similarly the 4.8 GHz feed will operate at the 6.1 GHz OH-line frequency. Fabrication of the 10.7 GHz feed is just being completed at Green Bank, and fabrication of the 15 GHz feed is about to be started.

The 15 GHz front end was completed and cooled down for the first time during the past month. The initial measurements of the noise temperature were high by a factor of about 2.5, but this problem disappeared when the styrofoam plug that had been inserted just behind the waveguide window was removed. The 15 GHz circular waveguide is of small enough diameter that the plug does not appear to be necessary. The present system temperatures are 57K and 60K at the band center, rising to 100K and 114K at 14.4 GHz and 78K and 86K at 15.4 GHz. The 4.8 GHz front end being assembled at Green Bank cools down satisfactorily in 8-10 hours and testing with a one-watt thermal load indicates adequate cooling capacity. The cold load for testing this receiver will be completed during the coming month, and the front end should be completed and tested by late August.

Tests of the three 2-16 GHz synthesizers have been completed at Green Bank. The LO Transmitter and Receiver modules and the Round Trip Monitor module for Pie Town are under construction and will be completed by the end of the month. In Charlottesville, racks A and B (Front End Interface and IF/LO Racks) are being wired, and these and rack C (Master LO Rack) will be completed by the end of the month. The Switch Driver module for Rack B is under construction and about 75% complete. The immediate goal is to have the system assembled and ready for testing at the beginning of August.

Documentation of the electronics was briefly discussed. I will issue a memorandum outlining the recommended contents and layout for the manuals that describe the modules, front ends and other units. A new drawing of the overall electronics block diagram has been produced during the past month, and copies are being sent to each of the various locations at which VLBA electronics is under development.

Purchasing of electronic hardware for antennas 2 and 3 should now be under way, with the goal of completing most of the electronics for initial installation on these antennas by about the end of 1986. During 1987 the electronics for antennas 4 and 5 will be assembled. However, some items for 2 and 3, such as cables and compressors, need not be procured until 1987. Thus, some items for antennas 4 and 5 can be procured this year: please take advantage of this fact in any cases where simultaneous procurement for all four systems (2, 3, 4 and 5) will result in savings in cost or manpower.