

NATIONAL RADIO ASTRONOMY OBSERVATORY
Charlottesville, Virginia
March 11, 1987

To: VLBA Electronics Group
From: A. R. Thompson
Subject: VLBA Electronics Meeting, March 3, 1987
Attendees: Balister, Bagri, Beale, Bradley, Brundage, Clark,
Dill, Latasa, Mauzy, Newell, Norrod, Oty, Rogers,
Schlecht, Simon, Spaulding, Thompson, Wireman.

R. Norrod reviewed the results of the Model 22 refrigerator test setup at Green Bank. Three of the five units have been running since late 1984, and two since early 1985. There have been a total of 11 failures. The mean time between failures was 8100 hours, with minimum and maximum values of 680 and 17,000 hours respectively. Further details can be found in VLBA Electronics Memo No. 89. Cold trapping of the gas has been performed on one or more occasions, but was found to reduce the second stage temperature for a few weeks only before the performance again deteriorated. At the present time, one refrigerator has been removed because of failure, and the four remaining units are showing second-stage temperatures in the 25-30 K range. After some discussion it was decided that it is not necessary to continue running the test system since there is now a larger number of Model 22 units on the VLA. These, on average, have shown somewhat shorter periods between failures, one having failed at 1200 hours and several in the 3000-6000 hour range. Failures have resulted from bushing and seal wear.

Proposed modifications to improve the performance of the refrigerators are as follows:

- (1) Replace the carbon bushings with Envex.
- (2) Modify the Scotch Yoke design to allow the bushings to seat better.
- (3) Make the connection between the displacers and the drive less rigid.
- (4) Take care to minimize contamination of helium supply and lines.

Further details on these modifications can be found in VLBA Electronics Memo No. 90. In addition, CTI proposes adding O-rings to the valves, although performance of the valves has not been found to be critical to reliability by NRAO. At the present time, two refrigerators with the modified Scotch Yoke, one with carbon bushings and one with Envex, are in operation at the VLA.

J. Oty reported that he has crimp shields on order that should be satisfactory for use with Belden 9804 (thinner than Belden 9842) and the 9-pin D connectors for the M/C bus.

In the area of the feeds, D. Newell reported that the dichroic reflecting screen for S and X bands has been tested and found satisfactory, and requires only the addition of a honeycomb support structure. The principal remaining problem in the feeds is the fabrication of the 1.5 GHz horn.

R. Bradley reported progress with the 2.3 GHz front end. Development to date has concentrated on design of a directional coupler, transitions, and cold load.

On the question of choice of a programming language for laboratory test systems that was brought up last month, no single, best candidate has emerged. It seems clear that at least some form of Basic must be accepted, since it is probably the most widely used language by members of the electronics group. On the other hand, an attempt to limit programming to Basic only, would restrict the efforts of those who wish to use a more structured language. For the present the recommendation is to use Basic (a compilable form, if possible) or Turbo Pascal. Groups of people within a laboratory, who are likely to want to develop or combine software written by one another, may wish to make their own choice between the above languages for use within their group.