

NATIONAL RADIO ASTRONOMY OBSERVATORY
Charlottesville, VA 22903

February 11, 1985

To: VLBA Electronics Group
From: Dick Thompson
Subject: VLBA Electronics Meeting, Feb 7 1985
Attendees: Balister, Bradley, Brundage, D'Addario, Dill,
Kellermann, Mauzy, Napier, Norrod, Schlecht,
Thompson, Walker.

VLBA Design Workshop

The results of the design workshop held in Socorro Jan 22-24 were reviewed. Recent progress and decisions in the electronics area were reviewed at the workshop, but no particular design questions that could be resolved there were identified. Notes from the meeting will be published in a forthcoming VLBA memo.

Cryogenics

Harry Dill reviewed the results of a meeting with CTI representatives at Green Bank on Jan 29. Four model 22 refrigerator units that had been returned to CTI for rework were returned to Green Bank, and were inspected by H. Brown, Leon Audette (CTI quality control engineer), Jim Harrington (CTI production engineer) and members of NRAO staff. One of the reworked units was dismantled and inspected. It was concluded that the unit was mechanically satisfactory although Howard Brown noted that the surface finish on the shaft that drives the displacers could have been better. One unit that had just been removed from the Green Bank test system was also dismantled. This unit had been running for about 3000 hours and had shown erratic temperature variations. The unit showed only small wear of the bearings, but there was a grayish dust on the displacers and the inside surfaces of the cylinders. The origin of this dust is not known but it could have come from the lead shot in the displacers. It was tentatively concluded that the failure of the unit resulted from contamination rather than mechanical wear. Further details will be given in a forthcoming VLBA Electronics Memo by H. Dill.

System Installation Planning

Peter Napier introduced a discussion of plans for installation of the receiving system on the Pie Town antenna, and integration of the various parts. It had already been decided

that a mockup vertex room using a feed cone will be set up at the VLA site (see VLBA Electronics Memo No. 25). Peter pointed out the desirability of also testing the operation and interfacing of the electronics at the VLA or one of the other NRAO laboratory sites before taking it to Pie Town. This testing could take place at Green Bank, Charlottesville, or the VLA site, and should include the station computer. No final decision was made. It was noted that with the present state of flux in the funding plans it is not yet clear where certain parts of the electronics will be constructed. Furthermore, the status of preliminary operations funding is uncertain, and the current plan for construction and installation of the receiving electronics (see VLBA Electronics Memo No. 18) includes support of the maintenance and installation personnel from such funding. Detailed planning of pre-installation testing will become possible as these other details are clarified.

Progress Reports

Two of the reworked model 22 refrigerators and a model 350 refrigerator are being added to the test setup at Green Bank. This will test the operation of the compressor when loaded with 3 model 22 and one model 350 refrigerators.

The 8.4 GHz front end at the VLA continues to operate satisfactorily.

In the local oscillator area a x5 frequency multiplier is being constructed. This will be required in the LO Transmitter module, and is being developed at this time to provide a stable 500 MHz reference signal for testing the synthesizer breadboard.

Solar Calibration System

The requirement for high-level noise sources for gain calibration in solar observations was briefly discussed. These have been used successfully at the VLA. Larry D'Addario has pointed out (VLBA Electronics Memo No. 30) that such a calibration system is unnecessary if the receiving system has a calibrated ALC attenuator that can be read by the computer. However the requirements on the accountability of this attenuator are stringent. Without further study it is not clear whether the noise sources or the calibrated ALC attenuator will provide the best performance. It is also likely that the calibration is required only on a restricted number of antennas and/or frequency bands. Pending further study it was decided that front ends should be designed to accommodate the solar noise sources, but that such sources should not yet be procured.