National Radio Astronomy Observatory
Tucson, Arizona

April 2, 1990

MEMORANDUM

To: Distribution

From: D. T. Emerson, P. R. Jewell, and J. M. Payne

Subject: Old 3 mm Schottky Receiver

We hereby retire the 70 - 90 GHz Schottky receiver. We will not schedule this receiver for any more observations on the telescope. The staff should feel free to remove any telescope cables belonging to this receiver, and to salvage any parts from the receiver that might be useful in current or future receivers.

PLEASE NOTE: This decision is predicated on the assumption that the new 3 mm SIS receiver (68 - 90 GHz and 90 - 115 GHz) will be ready sometime in the fall of this year. We have several proposals in the queue for the 68 - 90 GHz band that we have deferred in anticipation of the new receiver. Some of these projects are for the Galactic Center region, which is unobservable in December because of the proximity of the sun. Hence, if at all possible, the new receiver should be available before the end of November 1990.

DISTRIBUTION:

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Jewell

NATIONAL RADIO ASTRONOMY OBSERVATORY
Charlottesville, Virginia

March 26, 1990

MEMORANDUM:

TO: Addressee

FROM: A. R. Kerr, J. Lamb and J. Payne JP. ARK

SUBJECT: SIS Receivers for the 12-Meter Telescope

Recently several users of the 12-meter telescope have stressed the importance of our providing, as quickly as possible, SIS receivers to cover the 3, 2 and 1 mm atmospheric windows.

This memo is a summary of our plans to provide SIS receivers at the 12-meter telescope.

The 68-115 GHz Band

SIS mixers to cover this entire band have been fabricated and are ready for use. The band will be covered by a receiver using two pairs of mixers, one pair for 68-90 GHz, the other for 90-115 GHz. The mixers will be tunable for single sideband operation in the same manner as the existing 90-115 GHz mixers. Receiver temperatures of < 100 K SSB are anticipated. We are aiming for telescope tests of this receiver in September 1990 with availability for observing soon after this date.

The 130-170 GHz Band

Mixers to cover this band are currently being designed and the receiver components are being purchased. We anticipate that this frequency band will be added to either the 68-115 GHz receiver or the 200-240 GHz receiver by January 1991. Receiver noise temperatures of less than 150 SSB are anticipated.

The 200-240 GHz Band

A receiver for this band is nearing completion in Tucson and will be tested on the 12-meter telescope in March 1990. Receiver temperatures of approximately 200 K SSB are expected. We hope to schedule this receiver for use shortly after the telescope tests.

The 240-360 GHz Band

Within the next six months, we will start design work on a cryostat to support this band using three pairs of mixers. Quasi-optical LO injection and image termination will be used. The availability of suitable SIS devices for use in this receiver makes the completion date uncertain. It may be that existing devices can be used to give acceptable performance. It is also possible that completely new devices will be needed. The position will become clearer in the next six months as new devices become available and existing devices are tested at higher frequencies.

A Multi-Beam Capability

The 8-beam receiver in use at the 12-m telescope gives a unique mapping capability at 230 GHz. The existing receiver uses Schottky-diode mixers and has been useful for developing the techniques and software needed for multi-beam mapping. This receiver should be converted to SIS now that good SIS mixers are available at 230 GHz. We anticipate that this conversion will be the first step in a new generation of multi-beam SIS receivers.

The conversion is a major task and, in view of the other receiver work planned, it is difficult to see how it can be accomplished before June 1991.

Addressee:
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NATIONAL RADIO ASTRONOMY OBSERVATORY
Charlottesville, Virginia

March 26, 1990

MEMORANDUM:

TO: Addressee

FROM: J. Payne JP

SUBJECT: Time Scales for Millimeter Receivers (*For Internal Circulation Only*)

The following are time tables for the construction of the various receivers for the 12-m telescope. This schedule represents the most optimistic times and may not be realized due to machine shop load, telescope work or other factors.

68-115 GHZ RECEIVER

Activity	Person	Location	Comp. Date
Fabrication of dewar	GB shop	GB	5/01/90
Fabrication of refrigerator	Cochran	GB	5/15/90
Dewar test	Payne/Cochran	GB	5/15/90
Completion of 68-90 GHz inserts	Bailey/Boyd/Cochran	CV	6/01/90
Completion of 90-115 GHz inserts	Bailey/Boyd/Cochran	CV	6/15/90
Installation of inserts in dewar and test	Payne/Bailey	CV	6/30/90
Ship to Tucson			7/01/90
Pattern measurement on optics	Lamb	Tucson	5/01/90
Design of rotating table for optics	Lamb/Kingsley	Tucson	5/15/90
Fabrication of rotating table	Tucson shop	Tucson	6/15/90
Construction of circuitry	Lamb/Kemp	Tucson	7/01/90
Fabrication of parabolas	Tucson shop	Tucson	6/01/90
Design of front-end box	Kingsley	Tucson	5/01/90
Fabrication of front-end box	Kingsley	Tucson	6/01/90
Receiver assembly and test	Lamb/Kemp/Cochran/etc.	Tucson	9/01/90
Receiver test on telescope	Tucson group	Tucson	9/15/90

This schedule is extremely tight and I have real doubts that it can be done. To stand any chance of success, we must attempt to minimize the involvement of the receiver builders in summer shutdown.

130-170 GHZ RECEIVER

Activity	Person	Location	Comp. Date
Order LO components	Lamb	Tucson	5/01/90
Design feeds and optics	Lamb	Tucson	7/01/90
Design insert	Bailey	CV	8/01/90
Mixer design	Kerr/Pan	CV	6/01/90
Mixer test	Pan/Kerr	CV	9/30/90
Insert fabrication	CV Shop	CV	10/30/90
Insert test	Pan/Bailey	CV	12/01/90
Ship to Tucson			12/15/90
Telescope tests		Tucson	3/01/91

240-360 GHZ MIXER

No action planned for next six months.

8-BEAM CONVERSION

Activity	Person	Location	Comp. Date
Design dewar	Payne	TUC/CV	7/01/90
Design LO modifications	Payne	TUC/CV	7/01/90
Fabricate dewar	GB Shop	GB	9/01/90
Fabricate 10 mixers	Horner/CV shop	CV	11/01/90
Test mixers	Pan/Bailey	CV	12/01/90
Fabricate 10 amplifiers	Harris	CV	11/01/90
Design inserts	Payne	TUC/CV	8/01/90
Fabricate inserts	CV Shop	CV	12/01/90
Fabricate LO mods	CV Shop	CV	11/01/90
Fabricate circuitry	Kemp/etc.	Tucson	12/01/90
Design new front-end box	Kingsley	Tucson	12/01/90
Assemble inserts and and test in dewar	Payne/Cochran	TUC/CV	2/01/91
Remove 8-beam Schottky from service			3/01/91
Assemble new receiver and test			7/01/91
Telescope tests and placed into service			9/01/91

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