VLBA Electronics Memo No. 59

NATIONAL RADIO ASTRONOMY OBSERVATORY Charlottesville, Virginia

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To: VLBA Electronics Group

From: Dick Thompson

Subject: Rack and Module Plan for VLBA Electronics

The VLBA electronics subsystems that are being constructed at NRAO will occupy three racks, two in the Antenna Vertex Room and one in the Equipment Room of the station building. This memorandum outlines the plan for the arrangement of equipment in The nomenclature and numbering system for racks and these racks. modules will use the same system as the VLA, which is described in VLBA Technical Report No. 31, but extended as necessary to incorporate the new equipment. Type numbers for modules will consist of a letter designating the subsystem (see p. 9-3 of VLA T.R. No. 31) and a number which will start at 101. This number will distinguish the VLBA modules from VLA modules, for which type numbers start at 1. The two racks in the vertex room will be attached to the room at ceiling level, and will be of the same special design as the VLA B rack. The rack in the Equipment Room will be a commercial type with shielding to prevent radiation of interference.

Rack A, Front-End Control Rack

Rack A is the Front-End Control Rack and will contain Front-End control modules (F101) and power supplies. It is located in the Vertex Room. The bin and module location is shown in Fig. 1. The Front End control modules are of single-slot width, and two bins will provide locations for up to 12 modules with alternate slots empty for air flow. The number to be used will depend upon the number of front ends eventually installed. For the purpose of this plan we assume that the number will be about ten, and that one module design can be used for all front ends. There will be two bins of power supplies which will contain at least one each of power supply modules Plo1, Plo2, Plo3, and Plo4: see Table 1 for a listing of the modules. Power supplies in Rack A will provide the DC power for all of the electronics in the Vertex Room, i.e. for the front ends and the electronics in both racks (A and B). Note that the position of the bins in Fig. 1 have been chosen for convenience on the assumption that the floor to ceiling distance in the vertex room is approximately 95 inches. These positions should be considered to be tentative at this time.

Rack B, IF/LO Rack

Rack B will contain the converter modules, local oscillator modules, and the switching to select the required IF and LO signals. Since the phase stability of the equipment is critical, no power supplies will be mounted in this rack. A schematic diagram showing the interconnection of the 15 modules included is shown in Fig. 2. These modules will occupy four bins, which will be at the top of rack B to minimize the lengths of the cables to the front ends. The positions of the switches and modules are The switches are mounted on back panels of the shown in Fig. 3. bins in a manner designed for easy replacement of switches in The bin slots in front of the switch panels case of failure. will be left empty.

Rack C, Master LO Rack

Rack C is located in the Equipment Room of the station building. It contains the modules that transmit the reference signals derived from the maser to the Vertex Room and measure the round-trip phase (L102 and L103), and the monitor and control interface module for the hydrogen maser L101. It also contains power supplies for these modules. Two bins will be required, with the power supplies in the upper one. It is proposed that Rack C be procured as one of a pair of shielded racks that are bolted together as a single unit. The other one would be the IF Distributor Rack (Rack D), the contents of which are being fabricated by Alan Rogers' group at Haystack. It is possible that the modules in racks C and D could use some common power supplies.

Please give me any comments on the above plan. We can discuss it in more detail at the next electronics meeting (Feb. 6).

Module Name	Type Number	Width in Bin-Slot Units	Designers
Front End Control	F101	1	E. Schlecht/W. Wireman
Maser Interface	L101	1	E. Schlecht/W. Wireman
LO Transmitter	L102	2?	R. Bradley
Round-Trip Monitor	L103	2?	R. Bradley
2-16 GHz Synthesiser	L104	3	R. Mauzy/L. Beale
LO Receiver	L105	3?	R. Bradley
9.4 GHz Oscillator	L106	2?	R. Mauzy/L. Beale
Switch Driver	L107	1?	E. Schlecht/W. Wireman
15V,10A Power Supply	P101	4	A.R. Thompson/W. Wireman
15V,5A Power Supply	P102	3	A.R. Thompson/W. Wireman
5V Power Supply	P103	3	A.R. Thompson/W. Wireman
28V Power Supply	P104	3	A.R. Thompson/W. Wireman
330 MHz Converter	T101	2	E. Schlecht
610 MHz Filter	T102	2	E. Schlecht
1.5 GHz Converter	т103	2	E. Schlecht
2.3 GHz Converter	T104	2	E. Schlecht
4.8 GHz Converter	T105	2	E. Schlecht
8.4 GHz Converter	т106	2	E. Schlecht
10.7 GHz Converter	T107	2	E. Schlecht
15 GHz Converter	T108	2	E. Schlecht
22 GHz Converter	T109	2	E. Schlecht

Table I. Preliminary List of VLBA Module Types



Approx. scole Sinch = S ft.

FLOOR FLOOR Figure 1. Locations of Bins in Front-End Interface Rack.

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UNIT SLOT WIDTH. 4



Figure 3

Preliminary Back-Panel Loyout for IF/LO Rock in Vertex Room (Top Four Bins). ART 9/26/85, 1/2