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VLBA PROTOTYPE ELECTRONICS MODIFICATIONS

A. R. Thompson

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Now that the first set of electronics has been at the VLA site for almost two months, and has undergone some basic performance tests, a number of modifications that it is desirable to make have been identified. These changes will be retrofitted on the Pie Town system before installation, and incorporated in future construction. They are listed below:

1. Combination of IF bands for 330 and 610 MHz bands. Currently these IF signals go to separated terminals of IF switches F3 and F4. In the modification the IF signals for the two bands will be combined, using separate combiners for each polarization, and go to IF switches S1 and S2. This will allow simultaneous reception of signals at 330 MHz, 610 MHz, and say one of the lower frequency Cassegrain bands (1.5, 2.3 or 4.8 GHz).

2. Reference cable for 100 MHz. The 100 MHz LO reference signal will travel on a separate cable from the LO Transmitter Module to the LO Receiver Module, instead of sharing a cable with the 500 MHz signal. This will eliminate the need for filters and traps to separate the signals.

3. Changes in the LO Transmitter and Receiver Modules. The layout of these modules will be redesigned to reduce some unwanted coupling of signals, and a 500 MHz VCXO will be added in the receiver module to filter the modulation sidebands from the 500 MHz signal. At a later time, Durga Bagri and I plan to perform tests to examine the relative performance of the round-trip phase measurement system with frequency and with time separation of the signals.

4. Provision of two outputs for each IF band. The outputs of the IF amplifiers that terminate the lines from the vertex room will each be split to provide a total of eight IF outputs from Rack C. This will accommodate two Data Acquisition Racks. The power splitter chosen for this application is Merrimac PDM-20-1100.

5. Mounting of coaxial switches. The mounting plates of the coaxial switches will be modified to allow the switches to be removed from the front of the rack rather than from the rear, so that it will not be necessary to bend the 0.141 signal cables out of the way.

6. Provision of air dusting in Rack C. It has now been determined that the air input to rack C will come from a duct beneath the floor. The transition unit from the duct dimensions to the rack dimensions will be installed in the base of the rack, and blank panels fitted to the front and rear of the rack to channel the air. The IF amplifiers near the base of the rack will be mounted on the side of the panel within the air flow. Harry Dill will design the necessary metal work for the air flow.

7. Rack wiring. Several small changes are needed: larger terminal blocks to accommodate lugs for #8 power supply wiring between racks; a single a.c. terminal block for rack A; heavier wire for some high current leads to the terminal panel on rack B; check of grounding of AC and DC power within the racks.

8. M/C Bus wiring. For M/C wiring within a rack a thinner cable, Belden 9804, will be used. This is more flexible than 9842 and should put less strain on the connections to the Amp-connector pins. Also, within the rack, the wiring will simply branch to the required module connector rather than going in a daisy-chain manner, so a break in the wiring cannot interrupt the connection to the next rack. Belden 9842 will still be used for connections between racks. (It is probably not necessary to retrofit this change in the Pie Town racks.)

9. Serial numbers readback. The facility to read the serial number of a module through the M/C system will be implemented for all modules that contain a M/C interface board. At the present time, this capability is missing only from the 2-16 GHz Synthesizer Module.

10. Cooling for the Switch Driver Module. Holes to allow air flow will be added to this module, attention being given to maintaining electromagnetic shielding as much as possible.