

**VLBA Electronics Memo No. 42**

**MEMORANDUM**

April 8, 1985

**TO:** D. Thompson

**FROM:** R. Norrod

**COPY TO:** S. Weinreb  
L. D'Addario

**SUBJECT:** VLBA Vertex Room Interfacing

I have some thoughts about interfacing some of the VLBA vertex room equipment with the station monitor and control bus, and would like to pass them along to you.

The sketch attached shows the equipment which I have considered; the cooled front ends, vacuum pumps, and related items. A few comments about the conventions used in the diagram are in order. The diagram has two basic types of interface blocks: the Bus Interface converts the serial bus to a parallel form and is already defined; the other type of interface (e.g. the Dewar Interface) converts logic levels to the appropriate voltages or switch closures and scales sensor voltages as required for a particular piece of equipment. I have assumed that the dewar control and sensor cards used in the VLA 8.4 Ghz dewar will be used in the VLBA dewar interfaces, because their functions are required and there seems to be no need to tamper with an existing workable design.

A few things became apparent as the diagram took form:

1. Each dewar generates more than eight analog voltages worthy of monitoring, meaning we will have to piggy-back an additional MUX on the one built into the standard bus interface.
2. At least some of the Dewar Interface should be located at the dewar because of the number and type of signals that must travel between these two blocks. For example, it wouldn't be a good idea to put the fet bias cards in a rack several feet away from the dewar.
3. If all of the interface is moved up to the dewar, including the serial interface, then quite a few cables must be run up to the dewar, including the cal timing signal, DC power, and the serial bus itself. Of course, all these could be consolidated into one or two cables, but that would itself require part of a rack panel or module. Sandy's current design would move only the

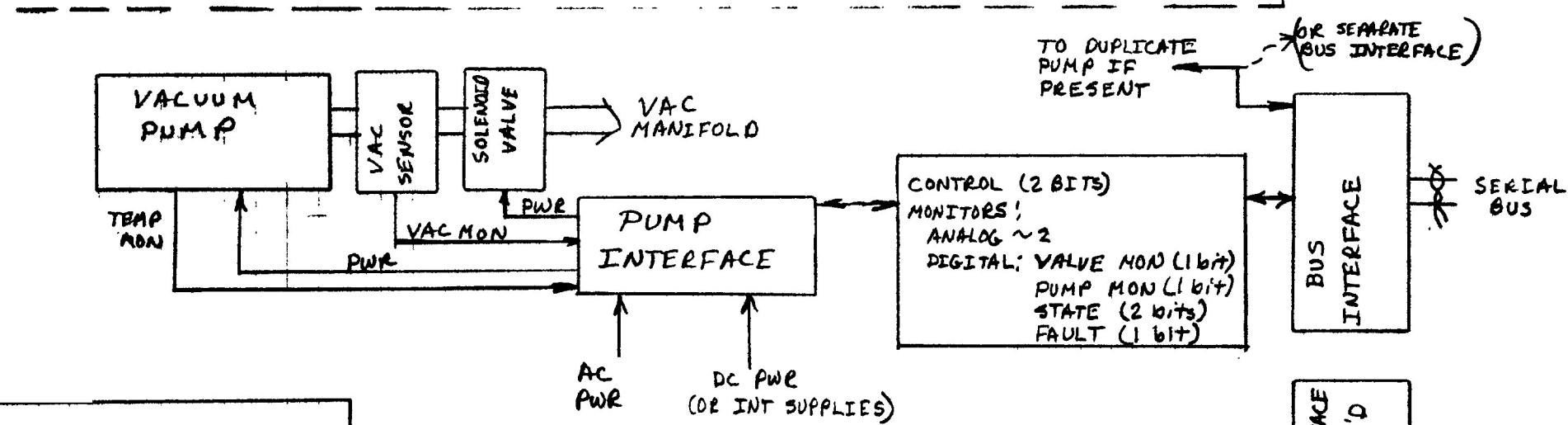
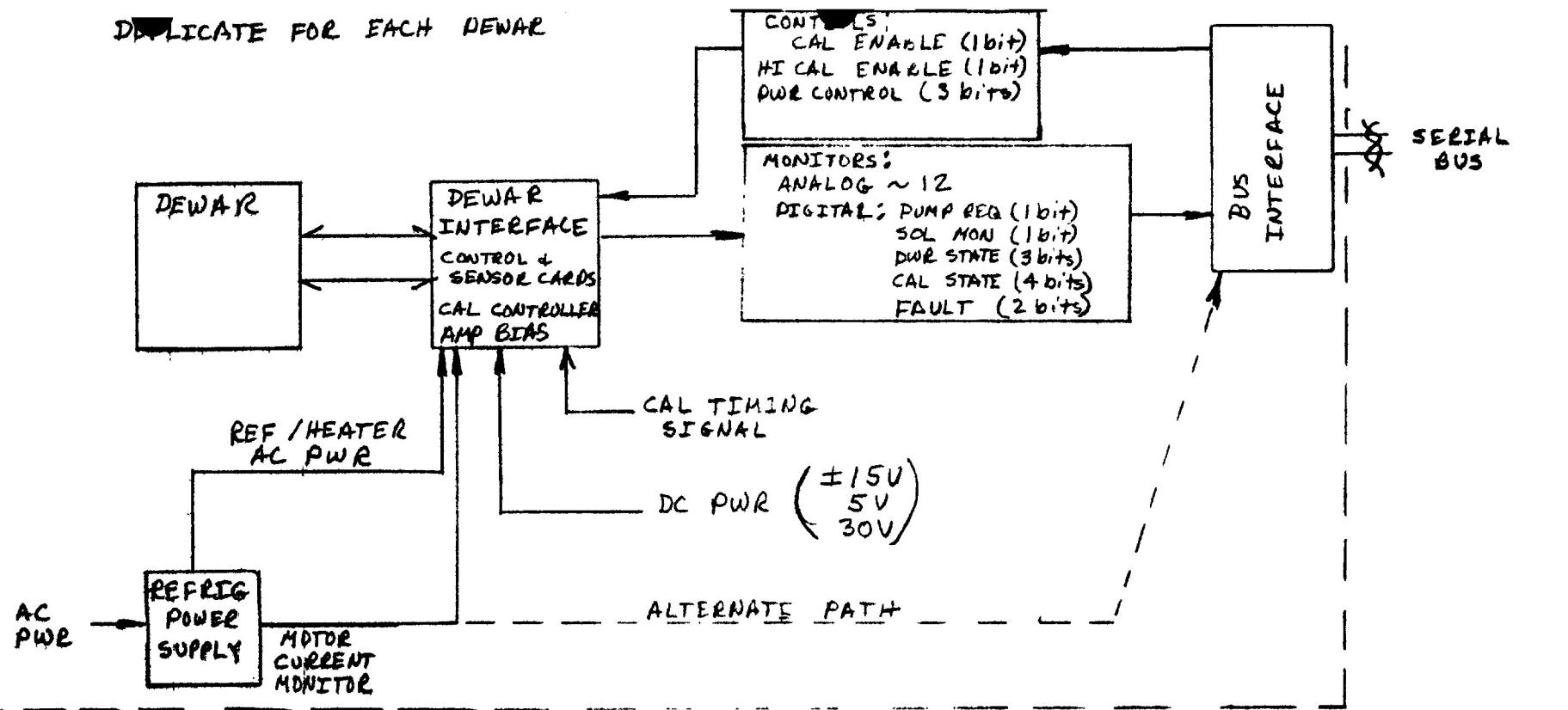
Control, Sensor, and Fet Bias cards up to the dewar. (My opinion is that the part of the Cal Controller that converts logic levels to the noise source bias level should also be moved up there; Sandy disagrees.) This scheme results in running one 25-pin cable plus the refrigerator AC power cable up to the dewar.

4. The vacuum pumps deserve a pair of interfaces by themselves.
5. Other miscellaneous equipment, including future and unforeseen expansions, should not be tied into the dewar interfaces. A Miscellaneous Interface should be provided, giving engineers easy access to a Bus Interface parallel port and a place to insert simple equipment interfaces. For example, if we decide to monitor a component's temperature, then a sensor card could be inserted into the Miscellaneous Interface and a cable run over to where the sensor is mounted.
6. The Bus Interface should be well designed and as inexpensive as possible.

The question of whether to provide manual controls in the vertex room is quite subjective and I won't belabor well worn arguments. It seems optimistic though, even risky, to expect the station computer and serial bus, much less good diagnostic software, to be fully operational during initial equipment installation. One example I might cite is the Model IV autocorrelator in use at the 140 foot. There are no manual controls or indicators provided and, unfortunately, when it was installed, no good status displays or manual control modes available through the control terminal. The designers were too busy trying to get the hardware and important software to work. As a result, the Model IV became known as somewhat of a mysterious black box with a resulting loss of confidence by users.

In conclusion, it is apparent that the overall vertex room interface configurations are complex and important enough that they deserve a great deal of emphasis in the early design. I hope manpower considerations allow the task to be assigned to someone experienced in telescope operations.

DUPLICATE FOR EACH DEWAR



CONCEPTUAL  
VERTEX INTERFACES

RON 5APR85

MISC EQUIPMENT  
INTERFACE  
COMPRESSOR PRESSURES  
AMBIENT TEMPS  
FEED PRESSURES  
(ETC, AD NAUSEAM)

BUS INTERFACE  
QTY AS REQ'D

SERIAL  
BUS