

Proposed QUIET System Design Changes

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Testing the MMIC, PhSw and PreAmp prototype boards revealed the fact that all need to go through a new revision with regards to both layout and schematic capture. The changes are not minor, i.e. one or two blue wires, but very substantial; basically all boards in the Electronics Box, including the Housekeeping board, need to be redesigned. This fact gives us the opportunity to take a new look at the whole QUIET Electronics System Design and see room for improvement in cost and performance.

For the 91-element array, currently we have each of the 13 MABs being serviced by 1/2 PreAmp, 1/2 MMIC, and 1/3 PhSw boards, for a total of 19 boards. Then each PreAmp services 2 ADC boards, for a total of 13 ADC boards.

I propose a system in which one single board, an Electronics Box Board (EB) incorporates 1/2 PreAmp, 1/2 MMIC, and 1/3 PhSw boards. In this new design, one MAB is serviced by one EB, which is configured by, and passes data to, one ADC board. We would have 13 identical MAB/EB/ADC channels. The current and proposed design configurations are presented in Figure 1.

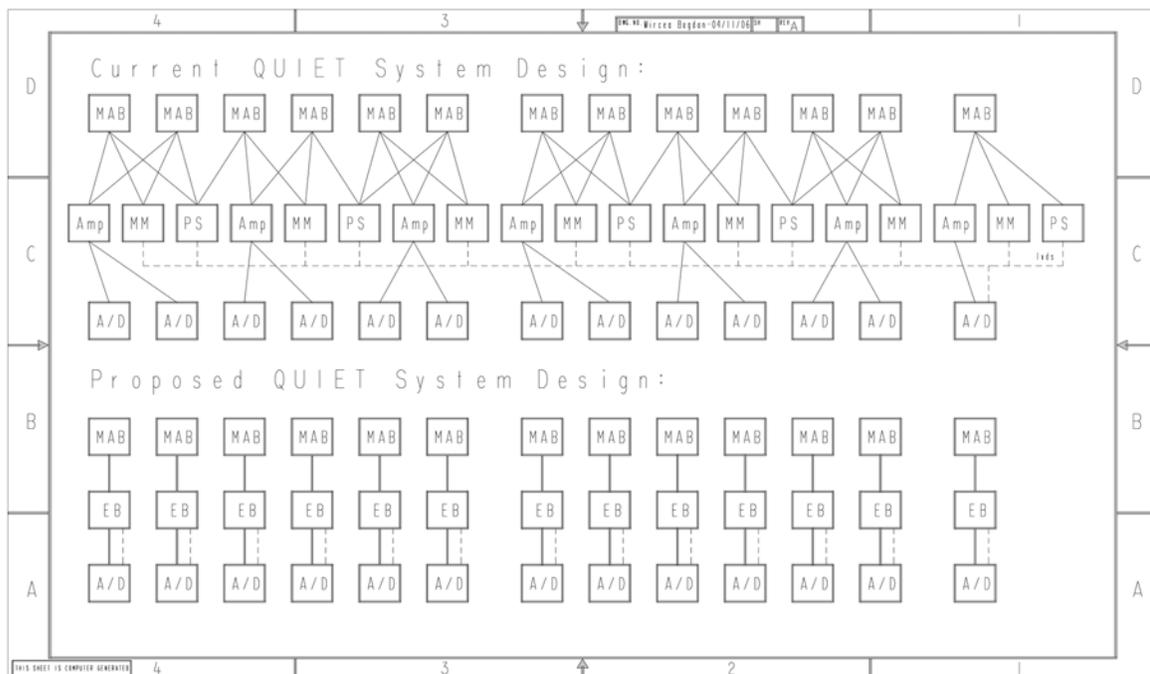


Figure 1 – QUIET Electronics System Design – 91-element array.

Some advantages of changing the system design now, are as follows:

- We are about to start redesigning all boards in the Box – now could be the time to make changes.
- Manufacturing of one kind of a board is cheaper than for 3 different boards.
- We will have a real “star”-grounding scheme – the noise performance may be improved.
- MABs and other boards won’t have the potential to influence each other.
- Testing would be easier and overall performance may be better.
- The overall system reliability would be better (e.g. in the current configuration, a defect in one PhSw board ruins 3 MABs).
- Maintenance and repair would be easier.

Some disadvantages of changing the system design now, are as follows:

- It will take longer to design and finish production.
- Chances to have to go through an additional (Rev.B) prototype stage are greater.
- Will concentrate efforts for design, circuit breadboarding, manufacturing and testing to one institution only.
- Will need a new back plane.