Proposed command structure for addressing multiple VIRUS controllers

In my minutes of October 1, 2010 last week I wrote the following paragraph that describes commands and replies between the VDAS computer, the 8-channel MUXes and the controllers.

"Commands sent from the computer to the controller can be broadcast, that is, sent to a range of controller numbers, if a 'DON' or 'ERR' is replied by the controllers. If the reply varies from controller to controller then the commands must be issued to each controller separately, with each reply needing to be received before the next command is issued."

I'd like to revisit this issue by proposing a more general and useful command structure:

1. Broadcast mode with all controllers replying: This mode instructs all VIRUS controllers to execute the command and and have each of them reply accordingly. All replies will be received by the MUXes, passed to the PCI interface boards and be read, one by one, by the VDAS computer. This will be useful for reading the CCD temperatures, where each controller will give a different reply value, or for testing that the controllers are all alive, by sensing that one or more of them did not transmit the correct reply.

2. Broadcast mode with only one controller replying: All controllers will execute the command, but only one of them will send a reply, the one designated by having been previously sent an 'SMC' = "specify master controller" command. This will cut back on the number of replies that need to be processed, which will be most useful during routine operation for commands that reply with a simple 'DON' or 'ERR'.

4. **Range of controllers:** Only controllers within a range m1 to m2 will execute the command, and each of them will reply. This might be useful for enabling or disabling readout from a bank of controllers, or testing if they are alive and well. The range of controllers can consist of a single controller, in which case a single reply will be sent by the designated controller.

In all cases, the controller number executing the command or sending the reply will be within the range $8 <= m <= 255$. The numbers 0 to 7 are reserved for other entities within the system, such as the host computer, the MUX and a command mode. The controller number will be read by each controller from one of its serial ID chips, either on the Flex cable, on the spectrograph slot, or on the timing board.

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