Command System Proposal - Code 5170

The command sequence proposed for 7105 considers the possibility of as many as 12 D. L. bands subdivided into three groups of four each. The groups are defined as Primary, Secondary and Tertiary. The system provides the capability of commanding anyone or any combination of the 12 bands into operation. The "price" paid for this added flexibility is in the increased number of commands which must be sent. The total number of commands which must be sent for typical situations is tabulated below:

	Function	Total Commands
1.	PRI 1	7
6.	PRI 1, 2, 3 and 4	13
2.	PRI 1, SEC 1, TER 1	9
4.	PRI 1, 2, SEC 1, 2	11
3.	SEC 1, 2, TER 3, 4	9
5.	PRI 4, SEC 3, TER 1	12
7.	PRI 1, 2, 3, 4, SEC 1, 2, 3, 4, TER 1, 2, 3, 4 (Max)	21

The minimum number of commands for a single D. L. function is 7 while the maximum is 21. Note that consideration has not yet been given to R&D.

To perform a command function efficiently, the proper sequence must be chosen. A nomograph has been developed for this purpose and will be made available. Several possibilities exist for the R&D functions. Considering 7105-A, the most attractive arrangement is the condition where the payload operates with only one band on with the R&D. The b nds normal data would be produced on its assigned transmitter and the R&D data would be transmitted by the other transmitter. This can be done with one R&D stack and a means of switching the modulation output. The system would be capable of providing pulse width data about any one of the ten bands but only on the basis of one band at a time. It should be pointed out that the circuit would perform properly if more than band were turned on if the allowable duty cycle (1 Kc) is not exceeded. In addition, consideration must be given to the fact that if more than one band is turned on, they should be selected such that their normal data is all on the same transmitter.

The R&D "on" command would be accomplished by the transmission of a single tone pair immediately after the address function. This would be followed by a normal D. L. command selecting the proper band for the experiment. Considering 7105-B, three possibilities exist with the present command system. They are as follows:

1. Select Hi sensitivity for all seven bands or Low sensitivity for all seven bands. Select Hi and Low sensitivity for all seven bands. (3 command possibilities)

2. Select Hi or Low for each of the seven bands. Select Hi and Low for each or all seven bands.

3. Select Hi for all seven bands or Low for all seven bands but not Hi and Low for any bands.

It is anticipated selection number two is the most desirable but it is also the most difficult to obtain. Consideration will not be given at this time to the added complexity of the crystal video system but it is worth mentioning. In any system where the selection of Hi and Low sensitivity is required, it is also required that two complete systems consisting of filters, crystal detectors, video amplifiers, etc. be incorporated. On the other hand, selection three of the above possibilities provides a system that can be greatly simplified. Only one command function is required and only one receiving system.

From the command standpoint, the following information is useful:

Selection one requires two commands.-- one for Hi, one for Low and both for Hi and Low. These commands would be inserted after the address function and prior to the selection of the D. L. bands.

Selection two requires seven commands (one for each band). The system would come on in the Hi (or Low as may be desired) sensitivity condition. The command would be sent for each band to select the alternate sensitivity condition. The command would be repeated (sent twice) to get into the Hi and Low sensitivity condition. I should note that an idea exists on how this might be done but an idea is all that exists. It is my feeling that this is the least reliable system from the command standpoint and should be rejected on that basis.

Selection three is the simplest and consequently the most reliable. One command would be required. The systems would activate in the Low sensitivity mode and the Hi condition would be selected by command. As Hi and Low would not exist simultaneously, the complexity exhibited by selection two would not exist.

Only fleeting consideration has been given to 7105-C & D but it appears the command system described will accommodate them with ease.

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