Error Injection on the RT Status Word using Alta 1553 Products

Errors can be injected on the RT status word using the ADT_L1_1553_RT_InjStsWordError function. This function allows the user to inject **allowed errors** in the RT Status Response word. The allowed errors are **Sync Error, Manchester Encoding Error, and Parity Error ONLY**. The Message Error (ME) bit is not allowed because doing so would be in direct violation of the Mil-Std-1553 specification. These paragraphs from that standard will help to understand how the ME bit is used and when the bit is set.

The Mil-Std-1553 manual and the MIL-HDBK-1553A are each available for download on the Alta Data web site and are distributed in the manual set of installed Alta drivers for Windows.

4.3.3.5.3.3 Message error bit

The status word bit at bit time nine (see Figure 3) shall be utilized to indicate that one or more of the data words associated with the preceding receive command word from the bus controller has failed to pass the RT's validity tests as specified in 4.4.1.1. The bit shall also be set under the conditions specified in 4.4.1.2., 4.4.3.4 and 4.4.3.6. A logic one shall indicate the presence of a message error, and a logic zero shall show its absence. All RT's shall implement the message error bit.

4.4.1.1 Word validation

The terminal shall insure that each word conforms to the following minimum criteria:

a. The word begins with valid sync field.

b. The bits are in a valid Manchester II code.

c. The information field has 16 bits plus parity.

d. The word parity is odd.

When a word fails to conform to the preceding criteria, the word shall be considered invalid.

4.4.1.2 Transmission continuity

The terminal shall verify that the message is contiguous as defined in 4.3.3.6. Improperly timed data syncs shall be considered a message error.

4.4.3.4 Illegal command

An illegal command is a valid command as specified in 4.4.3.1, where the bits in the subaddress/mode field, data word count/mode code field, and the T/R bit indicate a mode command, subaddress, or word count that has not been implemented in the RT. It is the responsibility of the bus controller to assure that no illegal commands are sent out. The RT designer has the option of monitoring for illegal commands. If an RT that is designed with this option detects an illegal command and the proper number of contiguous valid data words as specified by the illegal command word, it shall respond with a status word only, setting the message error bit, and not use the information received.

4.4.3.6 Invalid data reception

Any data word(s) associated with a valid receive command that does not meet the criteria specified in 4.4.1.1 and 4.4.1.2 or an error in the data word count shall cause the remote terminal to set the message error bit in the status word to a logic one and suppress the transmission of the status word. If a message error has occurred, then the entire message shall be considered invalid.

Summary from the MIL-HDBK-1553A dated 1 November 1988

The key to understanding the message error (ME) bit lies in 4.4.3.6. First, the command word must be valid and have the RT's assigned address. Then, if there is a data word validity problem or any words are not contiguous, the ME bit is set to a logic 1 in the status word but the status word is not transmitted. The ME bit can be obtained by using either of the two mode commands: transmit status or transmit last command. The only time the ME bit is set and the status word is transmitted in response to valid receive or transmit commands is per the illegal command detection response of 4.4.3.4.