1553 Transfer Trigger Manual

Lahniss, September 2014

Contents

1 Introduction

This partial manual describes the MIL STD 1553 trigger in more details, in particular for the Transfer trigger. For all other trigger features, please refer to the Teledyne LeCroy avionics TD manual.

2 The User Interface concept of the Transfer Type Trigger

When using the Transfer trigger Mode, the possible trigger conditions are presented to the user according to the structure of the selected transfer. (It is assumed here that the reader is familiar with the Transfer types specified by MIL-STD-1553B.) This means that if a Transfer only has one type of words, only one tab will appear on the right. Conversely if a Transfer Type has a structure with a command word and a data word, 2 tabs will appear on the right, one to describe the trigger condition on the command word and another one to describe the condition on the data word.

The logical binding between the tabs is an AND condition. The trigger occurs when the condition described in tab 1 **AND** the condition in tab 2 are met on the same Transfer. This logic extends to the number of tabs shown.

3 RHS tabs corresponding to each Transfer mode

The following table lists the 10 Transfer Modes specified by MIL-STD-1553. Note that the First item in the list is “All” and does not correspond to a Transfer Mode. It is explained in the Table below

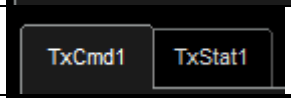
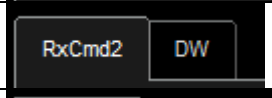
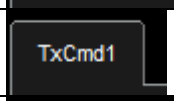
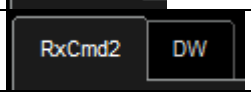
Index	Transfer Type	RHS tabs corresponding to the selected Transfer	Comments
0	"All",		Triggers on any Transfer type, without exercining conditions on the contents
1	"BC-RT (Rcv)",		
2	"RT-BC (Xmit)",		
3	"RT-RT",		
4	"Cmd",		Mode command
5	"Cmd (Xmit)",		Mode command with data from RT
6	"Cmd (Rcv)",		Mode command with data to RT
7	"BC-RT(S)",		Broadcast
8	"RT-RT(S)",		Broadcast
9	"Cmd(S)",		Broadcast
10	"Cmd(S)",		Broadcast

Figure 1: List of all Transfers as per MIL-STD-1553B and the corresponding trigger types

4 Examples

The following paragraphs show detailed examples for 2 selected cases of Transfer Mode trigger, a RT to BC Transfer as well as a Mode Command. All other modes operate in the same spirit. In both cases at least 2 variations of the same trigger are shown.

4.1 Triggering on a RT to BC Transfer

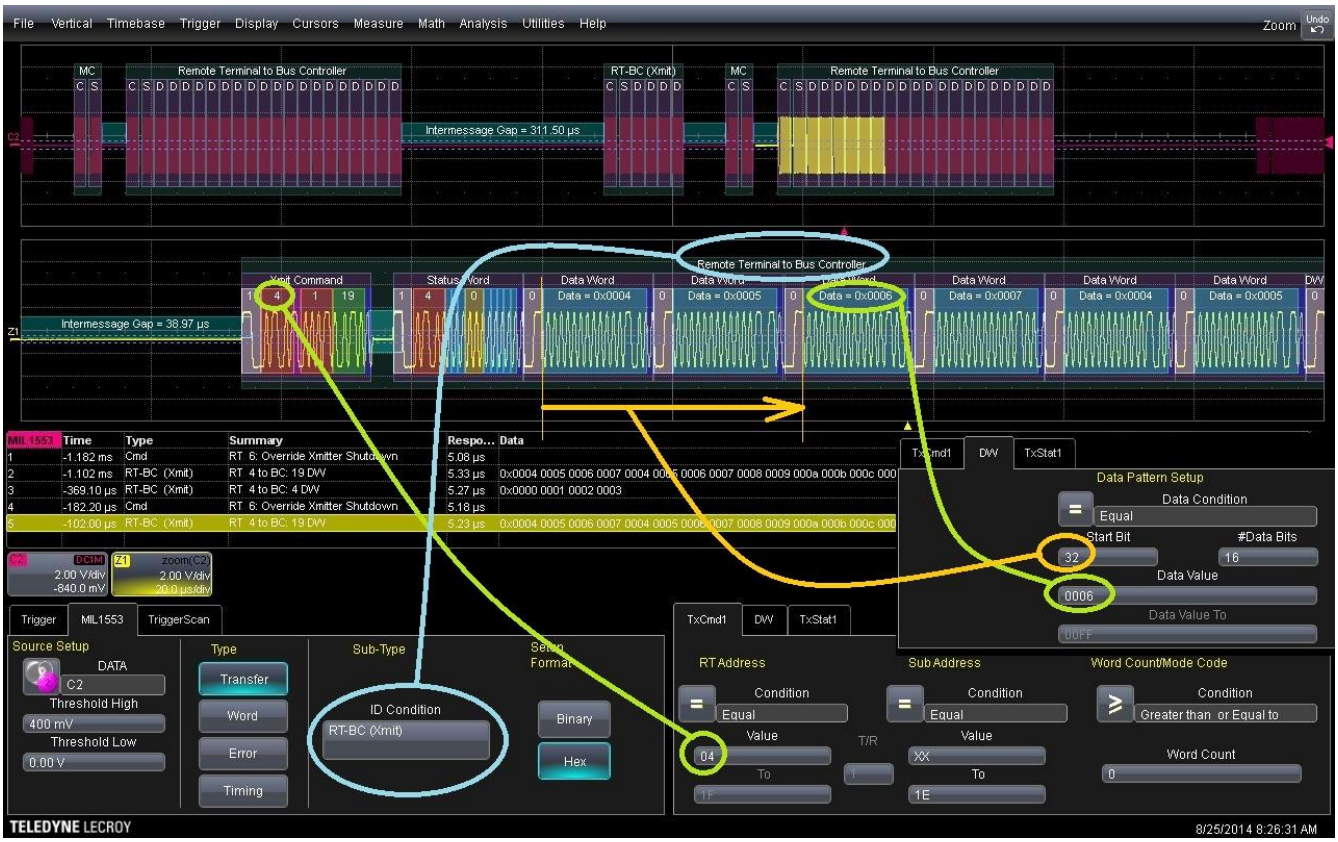


Figure 2: The trigger catches RT to BC Transfers from RT 4, containing DW=0006 at Bit Offset 32

There are several points worth noticing on this detailed example. The image above is a composite one, showing the contents of both relevant trigger tabs. Firstly, the tab set in the RHS section of the trigger dialog matches the constitution of the RT to BC Transfer: 1 TxCmd, 1 Data and 1 TxStatus. Here we have elected to trigger when RT address=4 AND DW in position 32 = 0006. This exact condition has been detected by the hardware trigger exactly where the yellow trigger arrow occurs. Note that the trigger arrow is placed chronologically exactly AFTER the occurrence of the DW=0006 condition. This reflects the fact that the trigger, if it occurs, can only be emitted after all of the conditions have been met.

What would happen when one and only one of the triggering condition was changed? This experiment is shown in the next page, with only the DW value changed from 0006 to 0002.

Figure 3: The trigger catches RT to BC Transfers from RT 4, containing DW=0002 at Bit Offset 32

The image only shows the DW tab, in which the Data Value has been decreased from 0006 to 002. The impact on the trigger point is visible in the image. The trigger still occurs on the same Transfer Type (RT to BC) for the same RT Address (RT=4) and at the same Bit Offset (32) but for a DW Value of 0002. The trigger arrow is now observed AFTER DW = 0002, and lies in fact in another Transfer (the zoom Z1 is positioned differently on C2 then it was in the first image)

4.2 Triggering on a Mode Command

The following examples are shown without comments, based on the logic exposed previously.

Figure 1: The Trigger catches the Mode Command "Override Transmitter Shutdown", regardless of the Status Word Value. This is the fourth Transfer in the stream captured on C2

Figure 2: The Trigger catches the Mode Command "Dynamic Bus Control", regardless of the Status Word Value. This is the third Transfer in the stream captured on C2