EFAbus/EFEX/STANAG3910 Word Count error detection

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Terminology

For the sake of clarity we use the following terms:
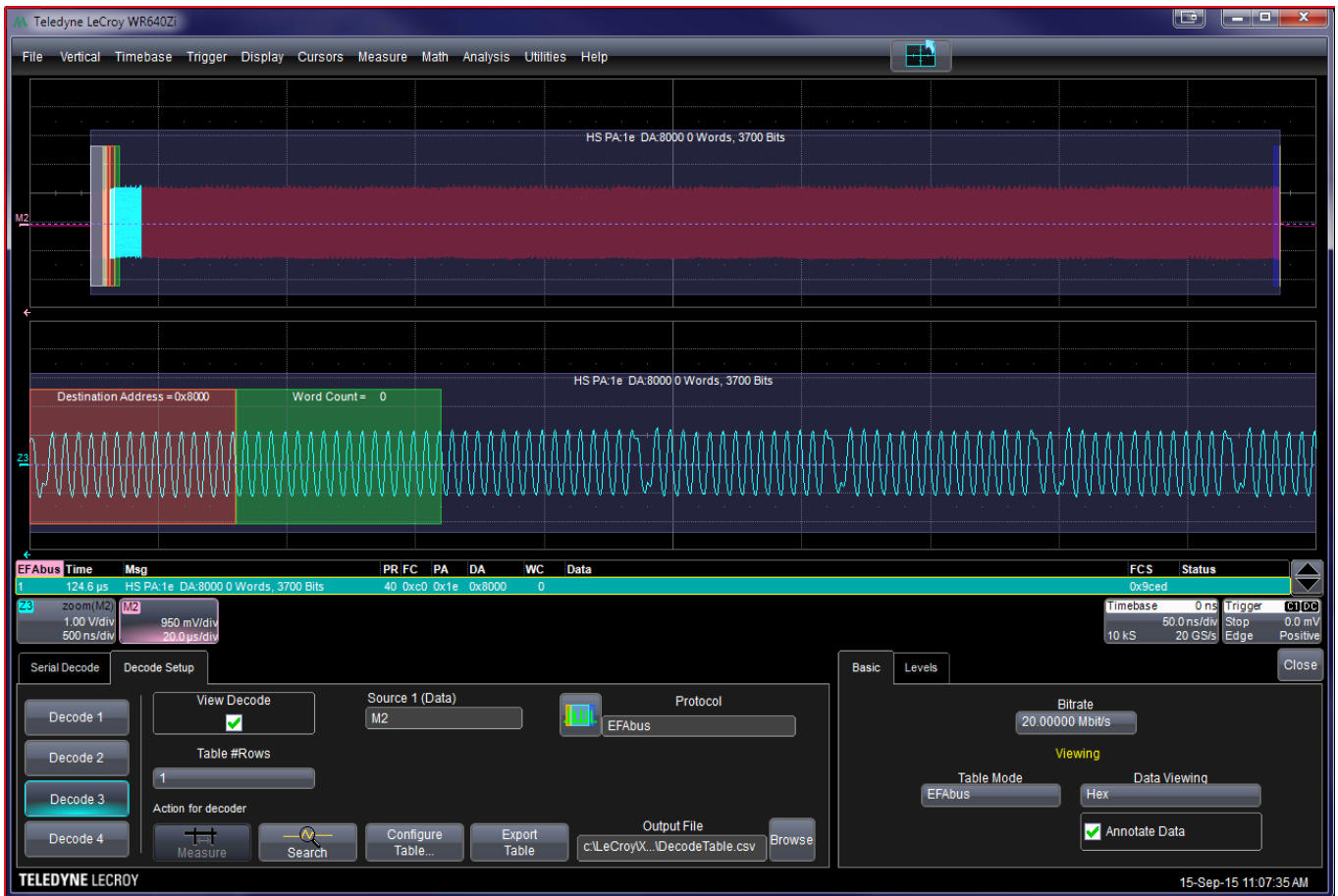
- WC means Word Count of the High Speed (HS) Frame.
- WC ^{embedded} is the WC carried by the HS Frame, and annotated in green.
- WC ^{real} is the number of 16 bit words found by the decoder in the HS Frame.

Introduction

A flaw was noticed in the EFAbus/EFAX/STANAG3910 decoder developed by Lahniss for LeCroy oscilloscopes. The flaw became apparent when a faulty unit emitted Frames with data words (WC ^{real} > 0) but a zero WC ^{embedded}. When a High Speed Frame had a zero WC ^{embedded} (or smaller than reality), but nevertheless has transmitted words, the decoder would not flag an error, and refused to decode the words of that Frame (or only decode part of them). This has been fixed, and the images below explain the improvement.

The fix will be available in release 7.9, later this year. There are no other changes to the EFAbus/EFAX/STANAG3910 decoder in 7.9.
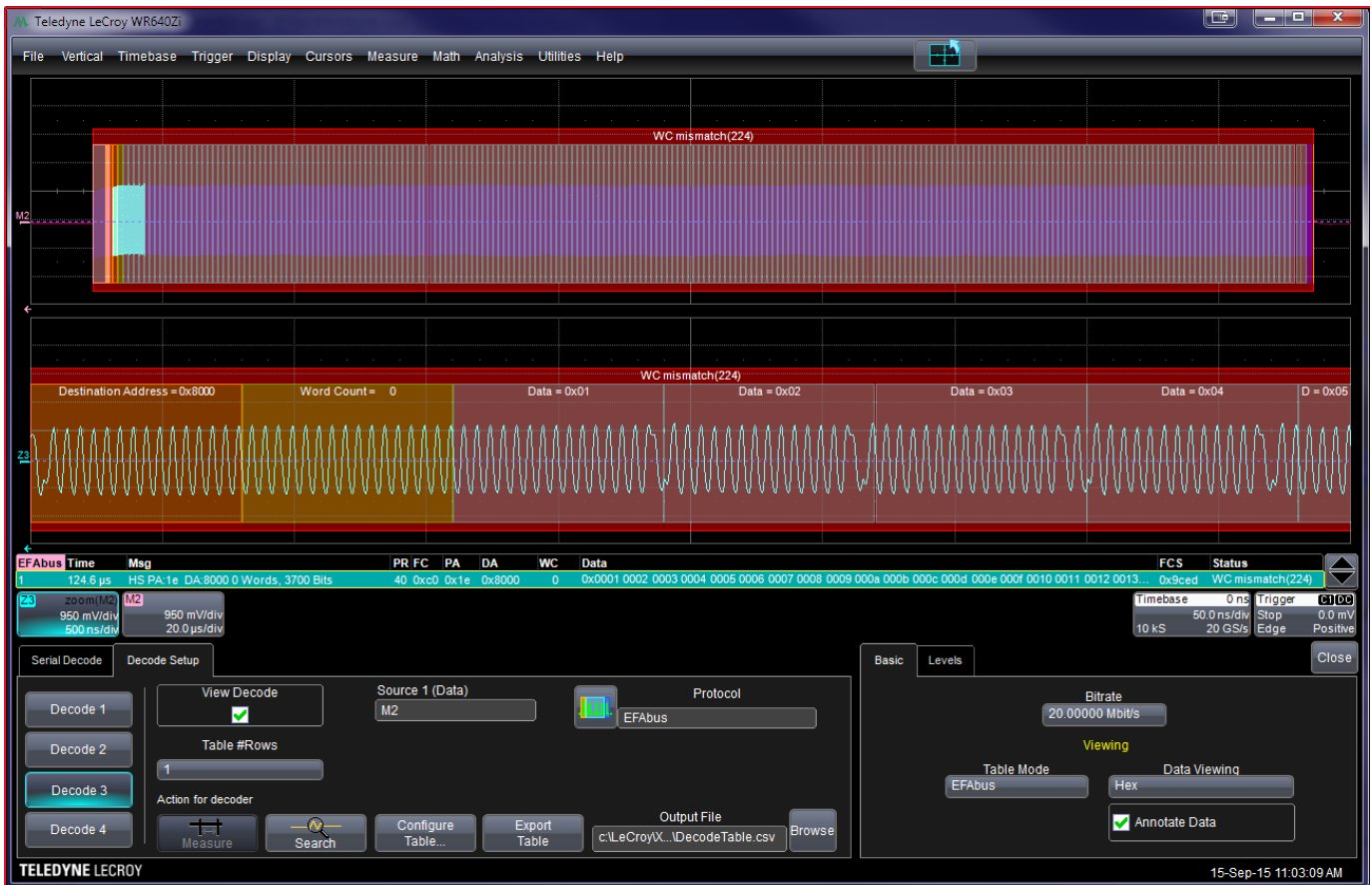
Wrong Behavior, up to 7.8 release

The header of the HS Frame is decoded, the CRC is decoded and found correct, but the **data words are NOT decoded.** The zoom shows the incorrect WC ^{embedded} of 0 causing the problem. Furthermore no error is flagged to alert the user.

By extension, a WC ^{embedded} of N (N < WC ^{real}) would have led to the decoding of only N words, but not the entire payload.

As stated above, such Frames can only be emitted by faulty units on the bus, or simulators allowing this behavior for test purposes.

Correct Behavior beginning with release 7.9

The complete Frame is now decoded, **including data words.** This is in line with the philosophy that all decoders will do their best to interpret the data, even faulty, **but** the decoder will flag errors and attempt to provide information to the engineers. This behavior helps understanding the root cause of the issue and fix it.

The algorithm now works as follows:

- All of the words of the HS Frames are always decoded, regardless of the embedded WC.
- When the embedded WC matches the number of words in the Frame, everything is deemed correct and no message at all appears in the Status column.
- When the embedded $WC^{embedded}$ does not match the number of words in the Frame (WC^{real}), the WC mismatch is flagged in the Status column, and the **entire HS Frame is colored in red**, attracting the attention to the error.
- No difference is made between $WC^{embedded} < WC^{real}$ and $WC^{embedded} > WC^{real}$
- In both cases WC^{real} is displayed in parenthesis in the Status column (here 224), allowing immediate comparison with the $WC^{embedded}$ (here 0) of the same message in the WC column.