

# SpaceWire (SpW) Decoder, Examples

Lahniss, Geneva, Switzerland, July 2014

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# Explanation of the document

## ***Context***

The SpaceWire Trigger Decoder on LeCroy oscilloscopes has many ways of presenting the results. The rendering depends mostly on the signal observed, the user selected settings and the horizontal scale. This documents shows examples. Users familiar with other decoders will recognize similitudes in the algorithmic behavior, as well as in the settings, albeit sometimes under other names.

## ***Organization of this document***

The order followed in this document reflects the order of test Procedure executed by the test environment. This method allows an easy match between the document and the test. The format of the document is elected to be “Landscape” for better readability of the decoded images, especially when the SpaceWire Packets are long. The captions of the images outline the contents. The paragraph list will yield the Table of Contents

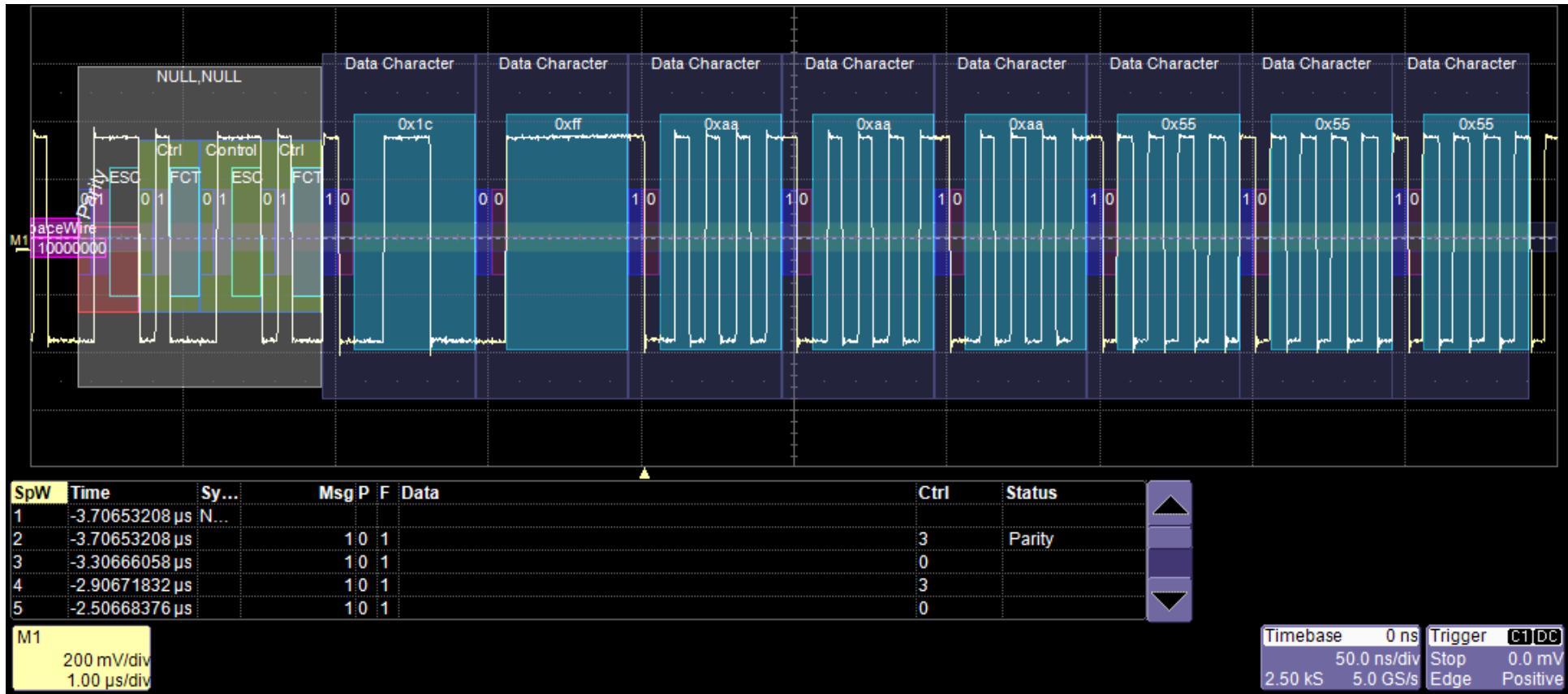
The Landscape Format has been chosen on purpose, so that more decoded details appear on the image. Sometime the image is slightly distorted, with respect to the real oscilloscope image, because it needs to show some more details.

On all of the images, only the Scales mentioned for the memories are relevant. The Timebase and Trigger settings of the Acquisition (bottom right of the screen) are irrelevant since the decoding is performed on the memory traces.

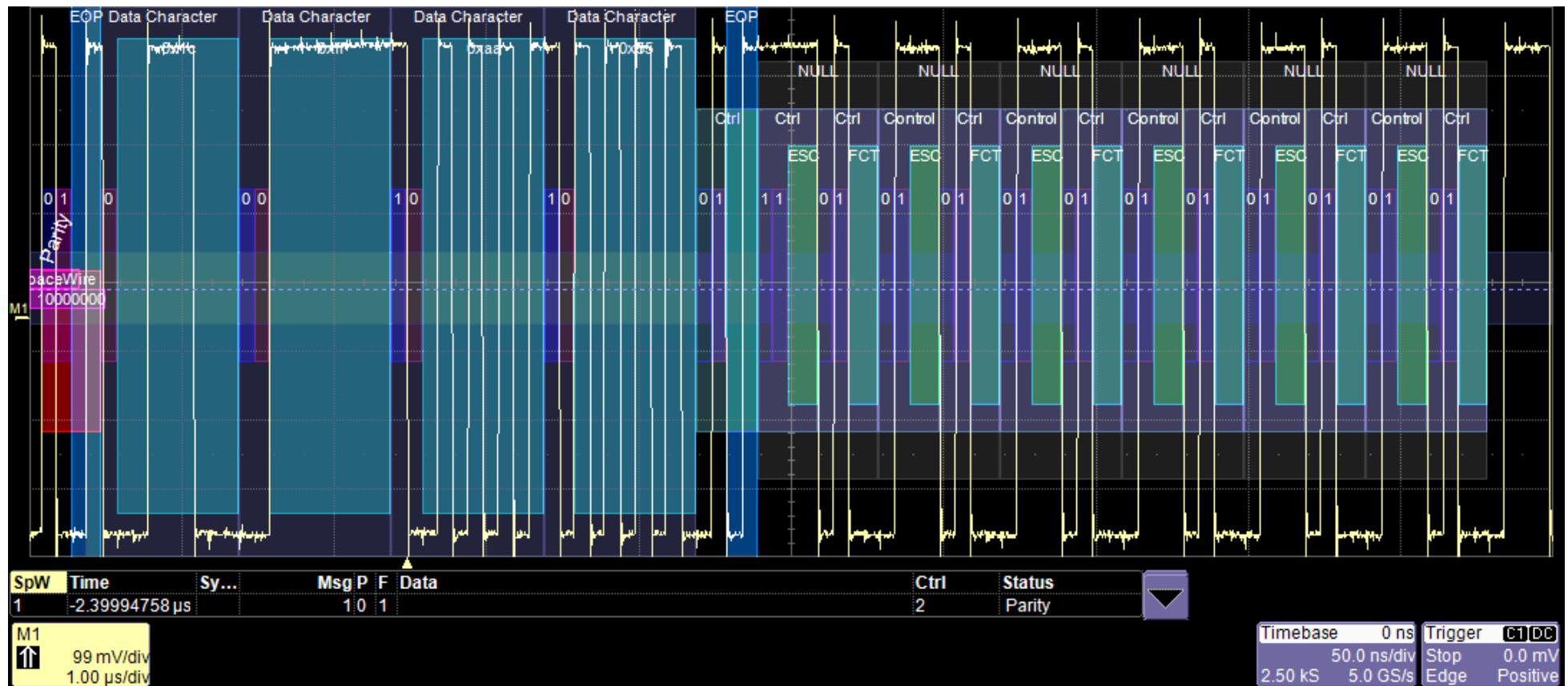
The mix of traces covers cases with or without strobe, short and long Packets, various rendering types and various Bitrates.

## Examples

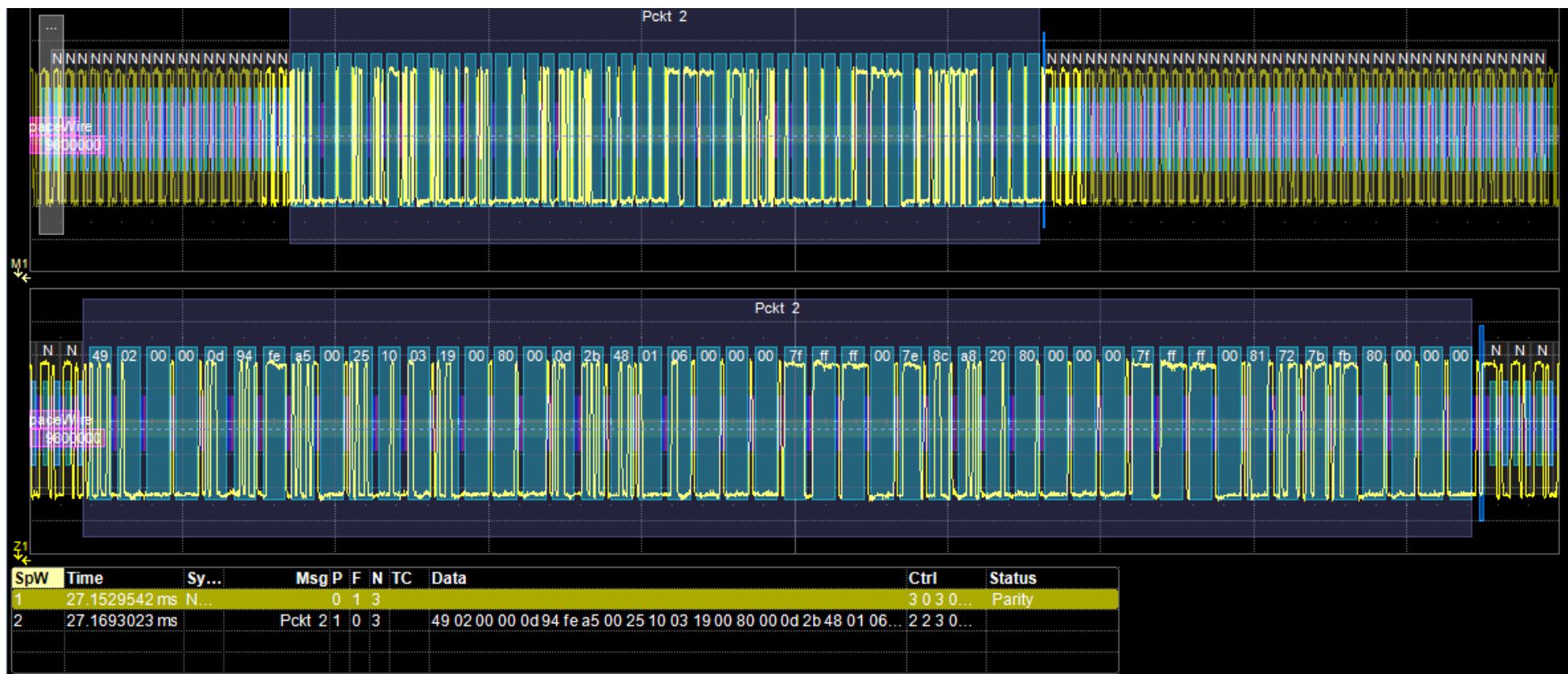
**Decoding NULLs and a 8 Normal Characters (0x1C, 0xFF, 0xAA ,0xAA,0xAA,0x55,0x55,0x55)**



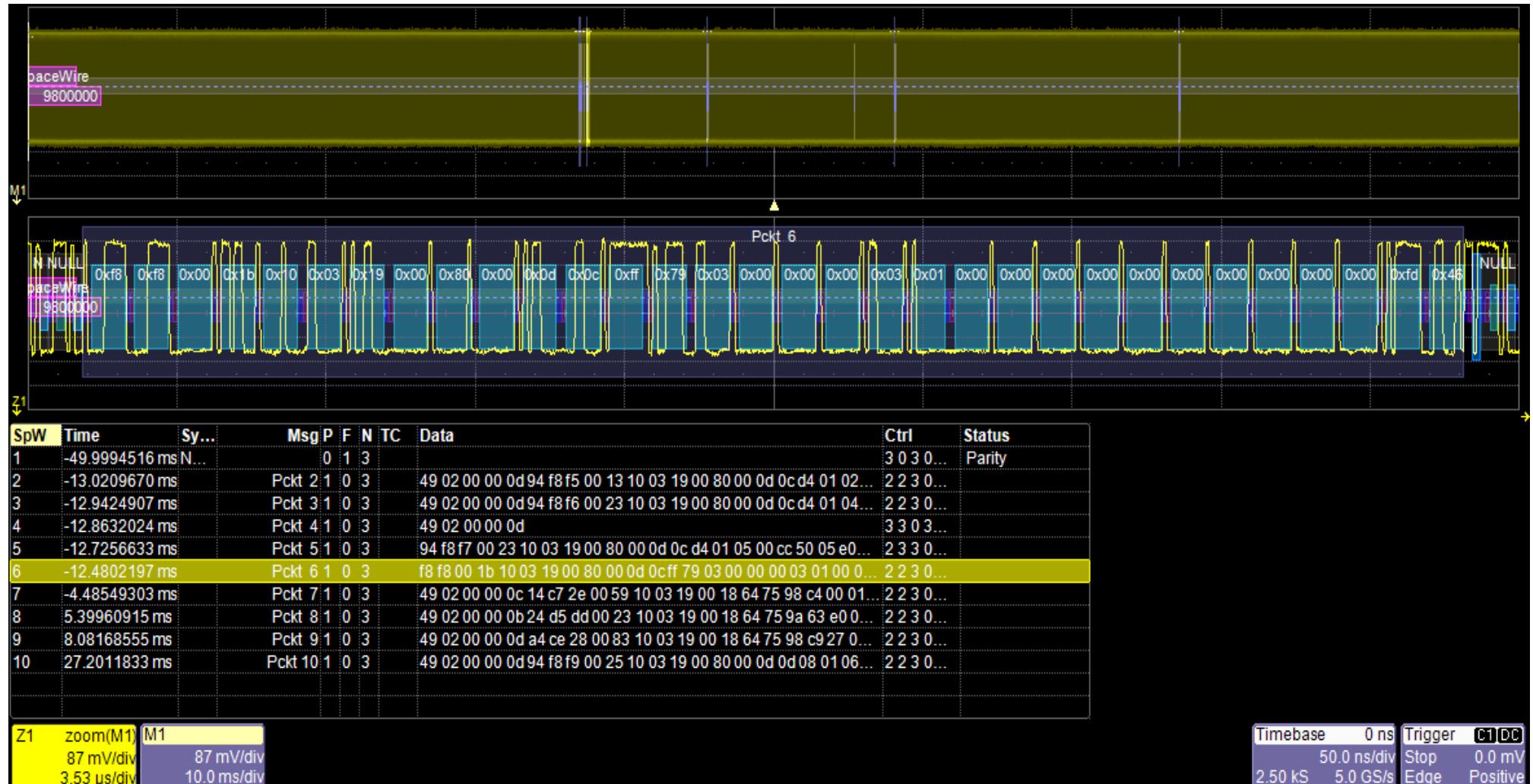
## *Decoding of a few characters followed by NULLs*



## *Hexadecimal Decoding of a Packet of 48 characters, with NULLs before and after, main trace and zoom*

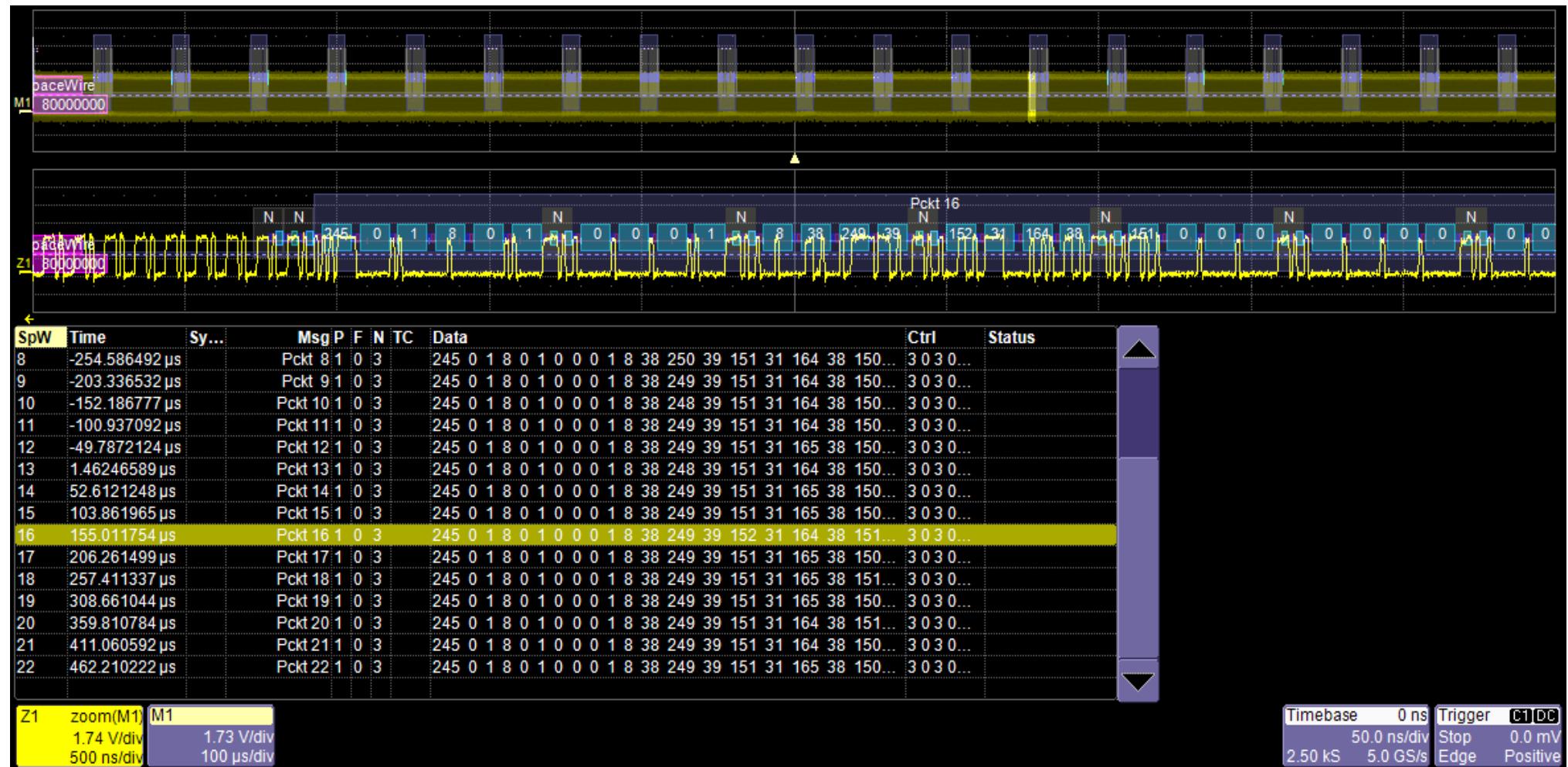


*Decoding of 10 different Packets of about 100 characters, over 100 ms of NULLs, with zoom on packet #6*



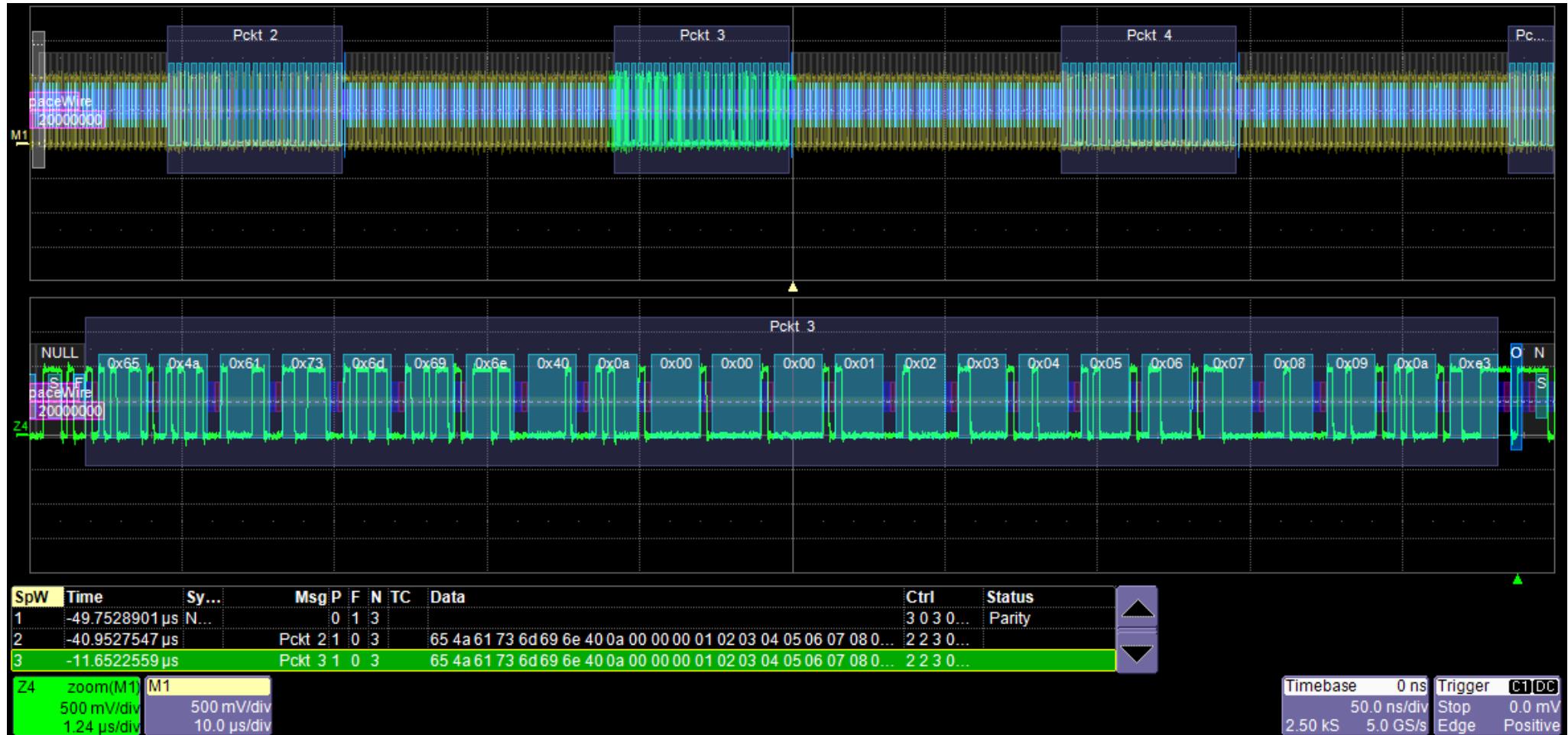
The table shows the detailed packet contents. The highlighted line of the table corresponds to the zoomed Packet (in Z1)

## Decoding of 22 similar Packets separated by holes over 5 ms

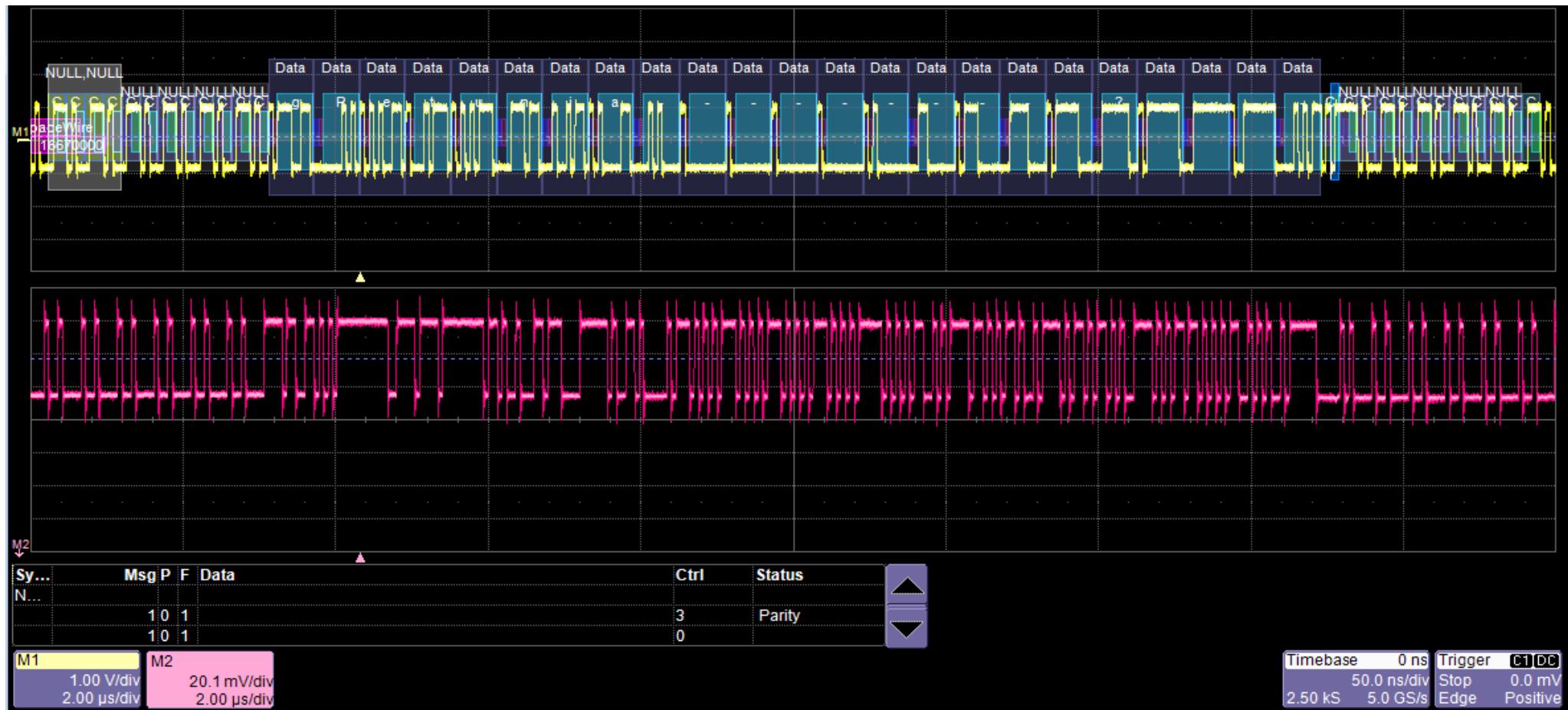


These Packets are evenly spaced, with equal Packet length, but slightly different contents towards the end of the packet

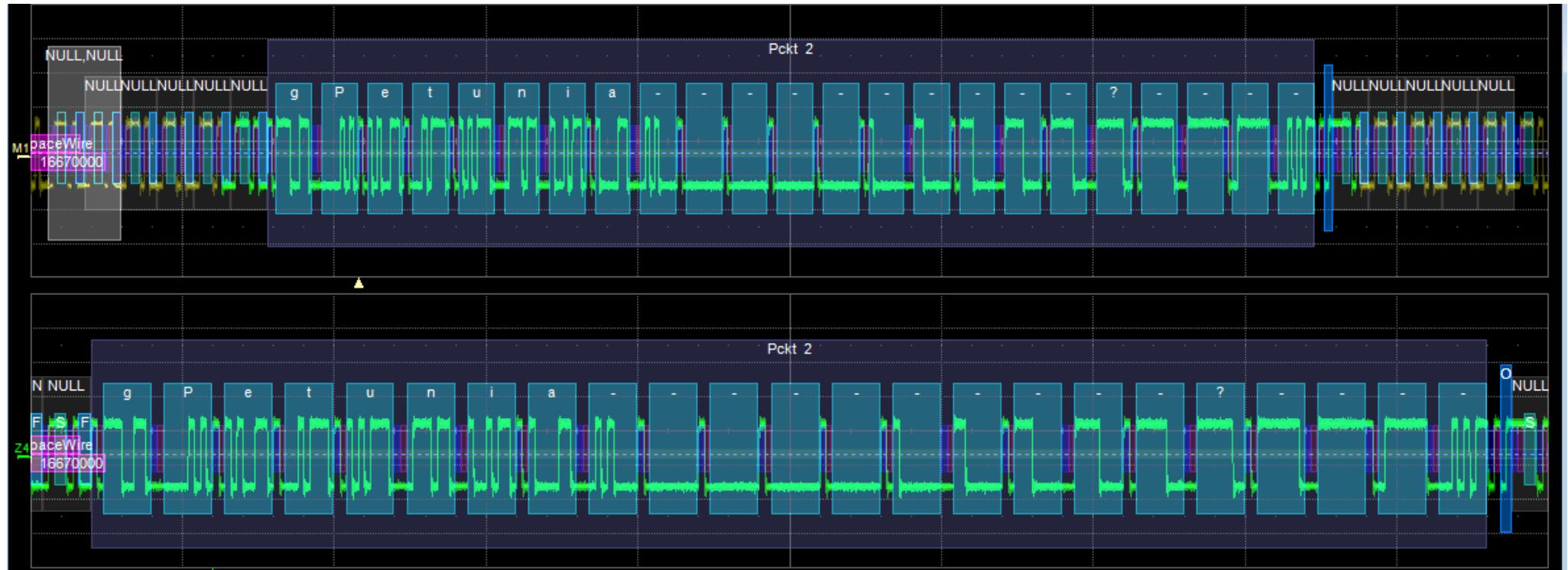
## Decoding of 3 Packets over 100us, Packet 3 zoomed into



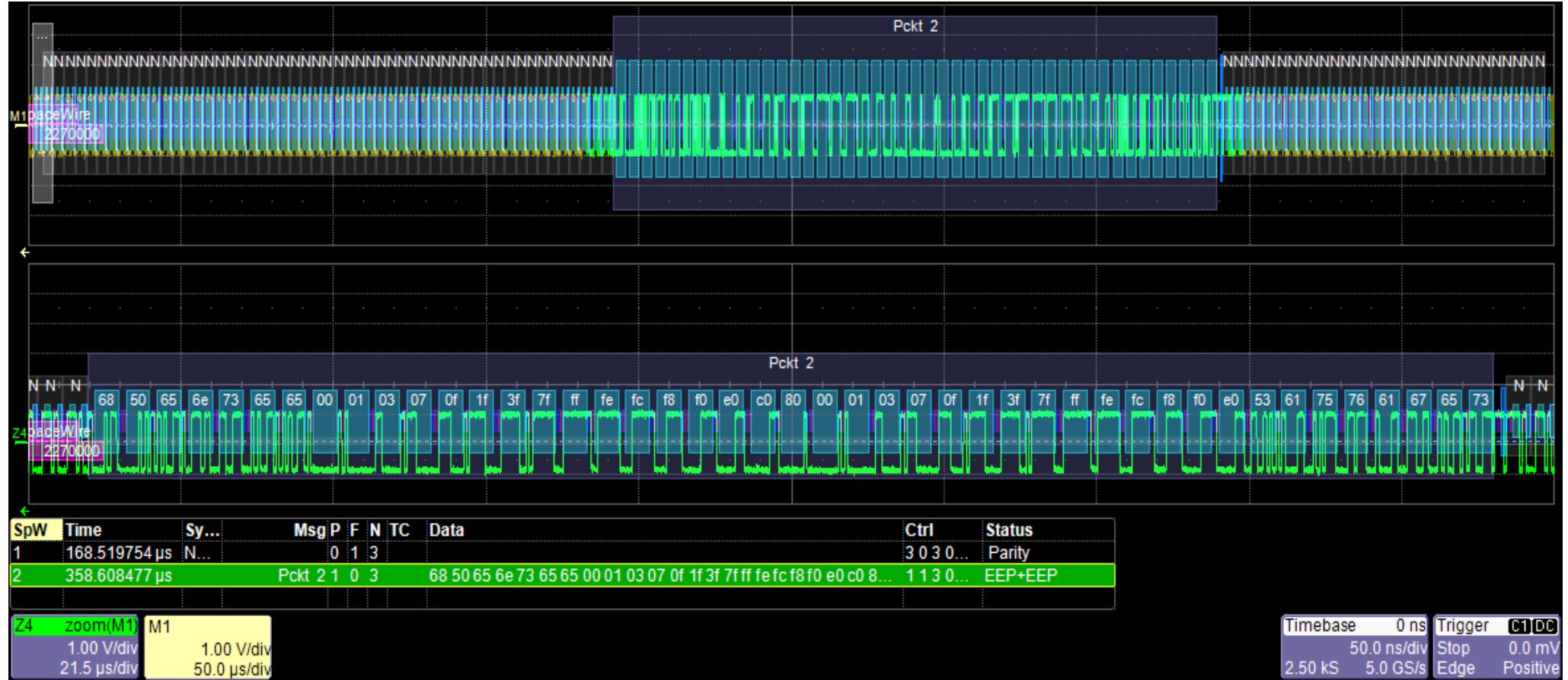
## *Character transmission, with Strobe and Synchronization on 2 NULLs*



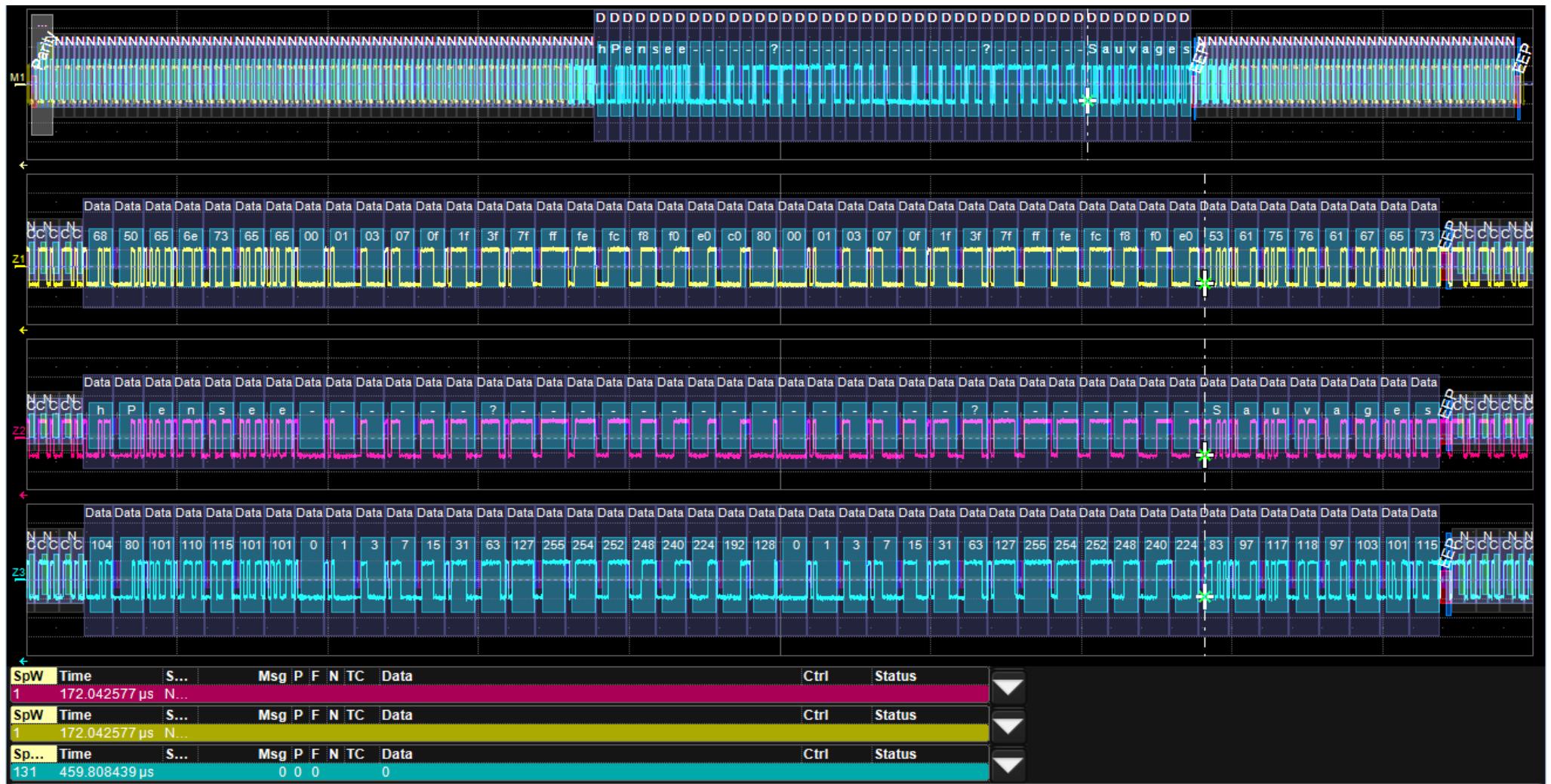
## *Short ACSII (Petunia) and random data Packet decoded in ASCII*



**Packet of binary patterns, in main trace and its zoom, with EEP at end**

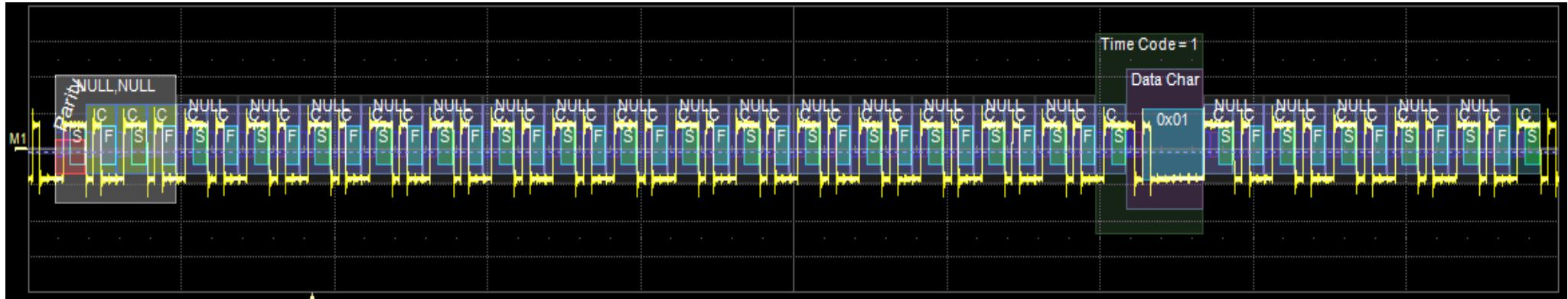


*Decode of same Signal using 3 different renderings (Hexadecimal, ASCII, Decimal) using Clock on a Packet of 45 characters, with ASCII contents (Pensee Sauvages), binary pattern shifted step by step.*

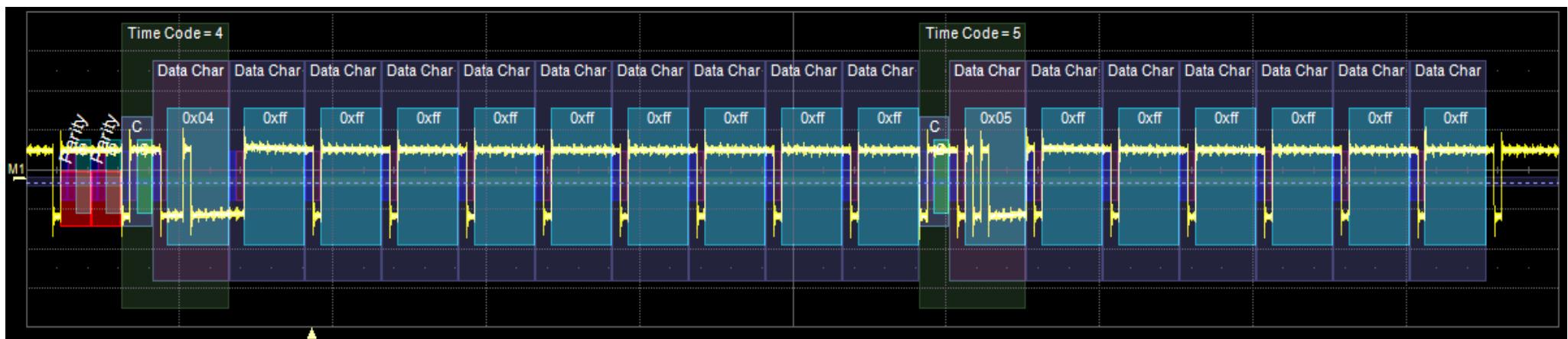


In this case we use 3 decoders on the same source (M1). Each decoder has the same settings, except for the viewing mode (Hex, ASCII, Decimal)

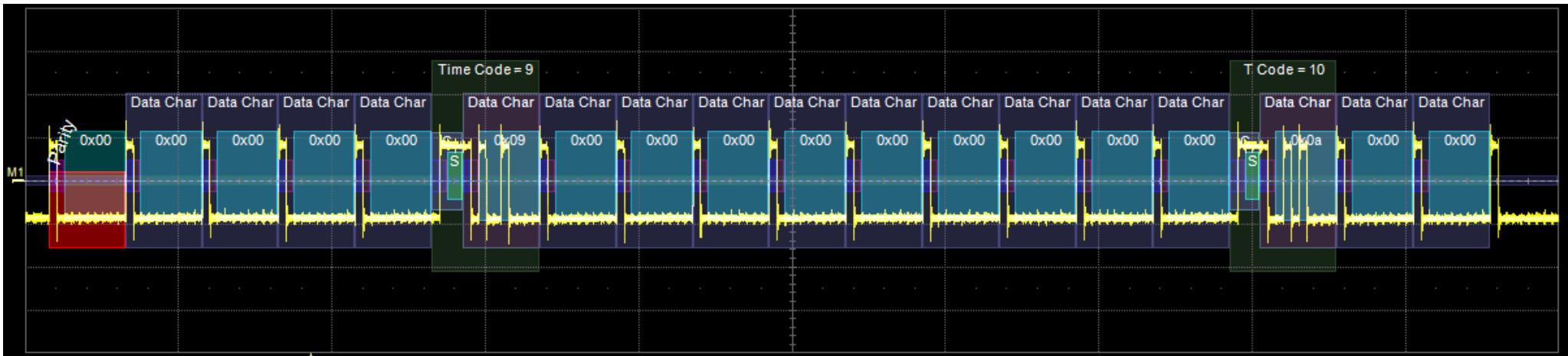
### *Case 1 Timecode: Time Code 1 in many NULLS*



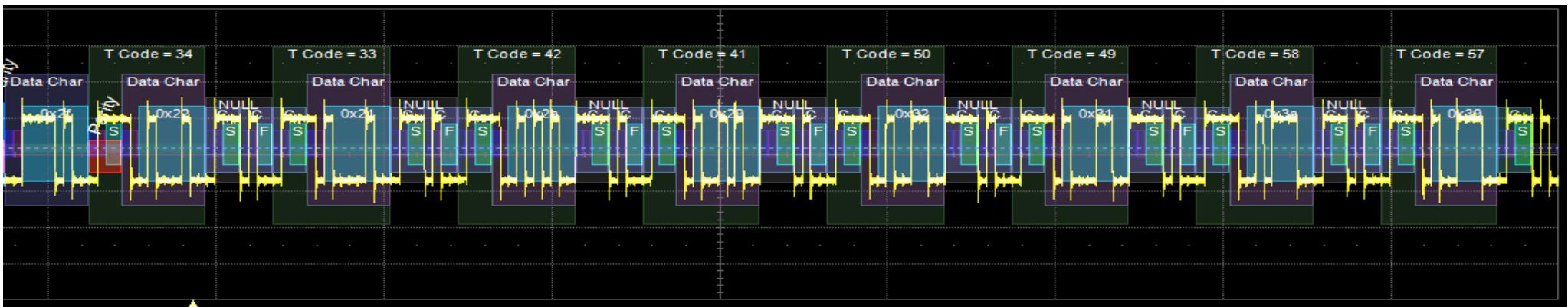
### *Case 2 Timecode: TC 4 and 5 in stream of 0xFF*



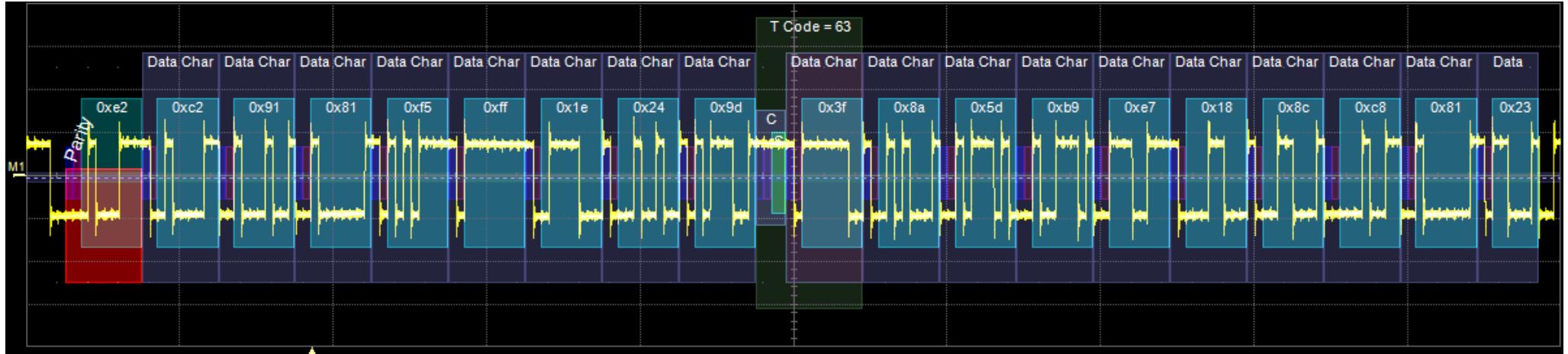
### Case 3 Timecodes: TC 9 and 10 in stream of 0x00



### Case 4 Timecodes : Several 2 step Ramps interspersed with 2 NULLs



## *Case 5 Timecodes: TC 63 in stream of random data*



## Router IN 200 Mb/s-OUT 200 Mb/s, Packet as a ramp of 50 chars

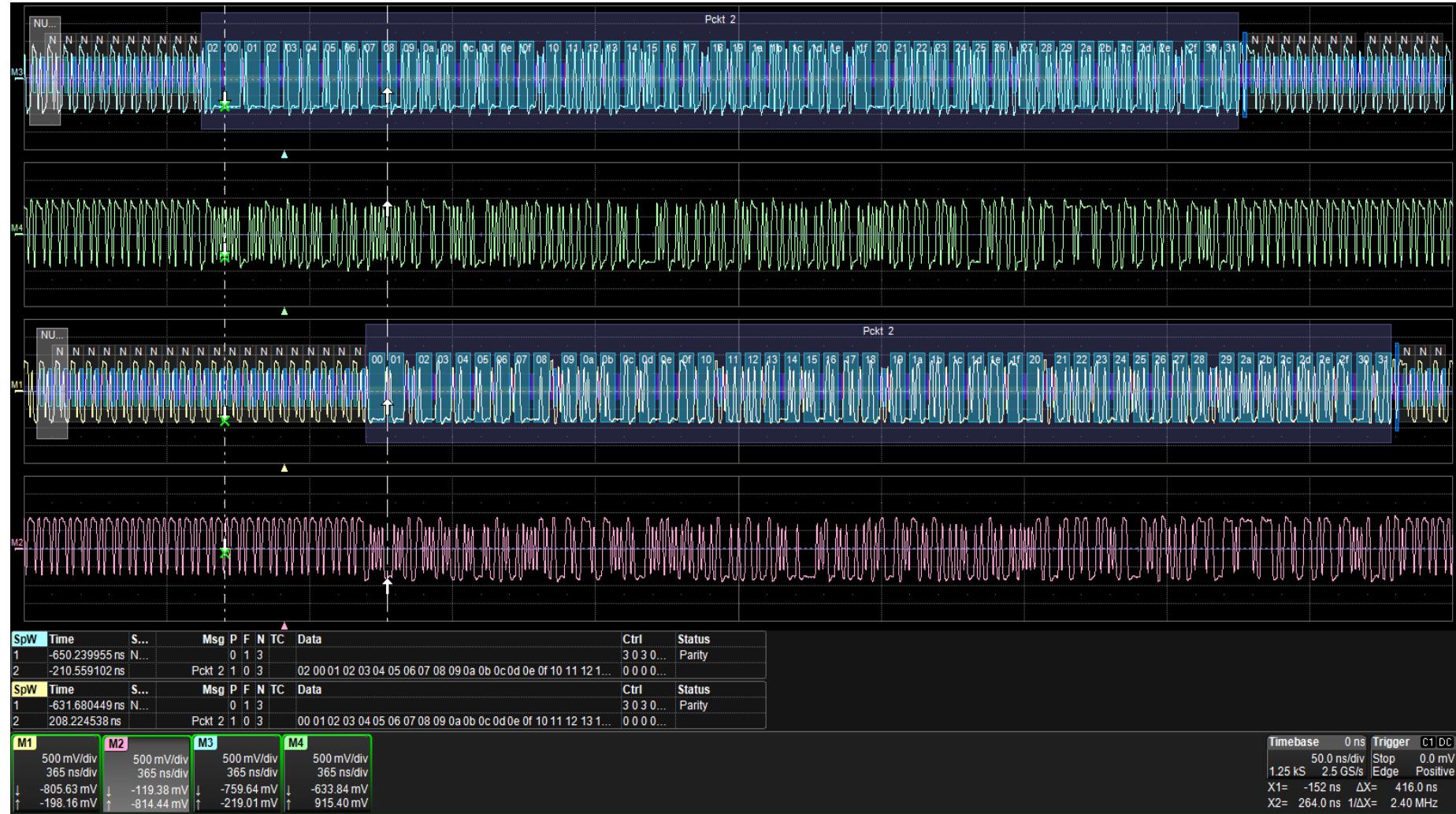
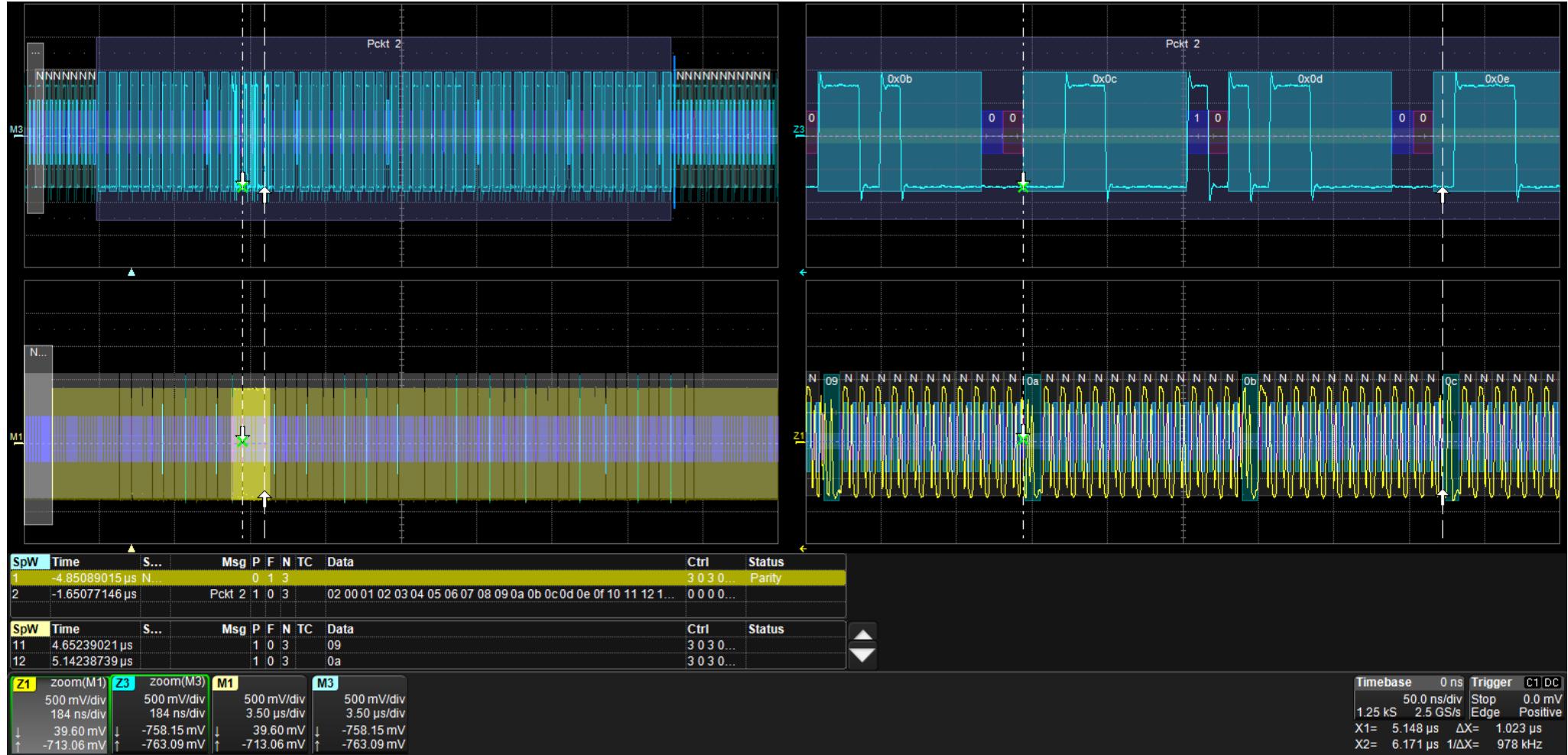


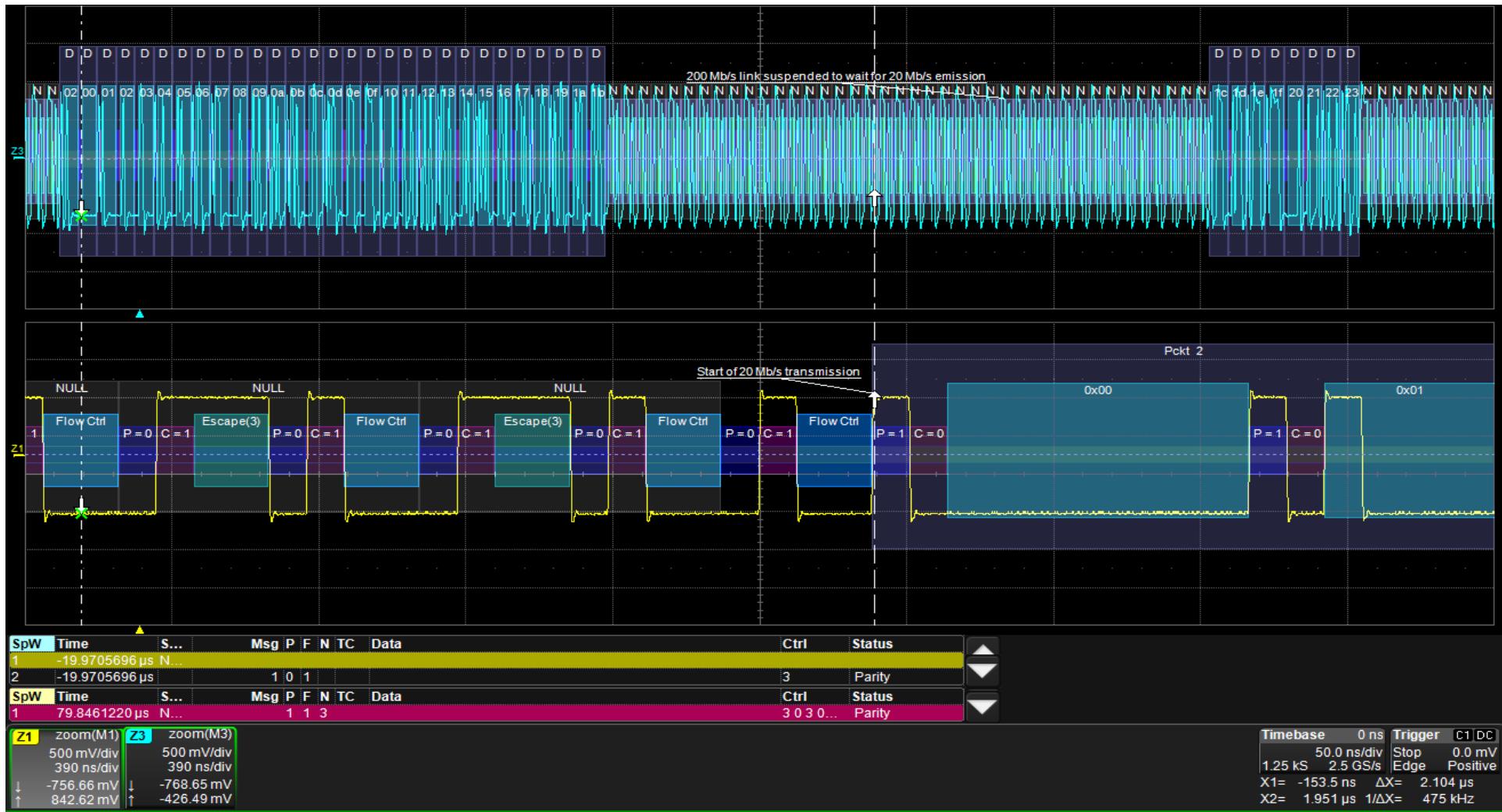
Image shows a stream incoming into the router, and outgoing, at 200 Mb/s The cursors quantify the routes latency, here 416 ns. The packet routed consists of a ramp of 50 chars, from value 0x00 to value 0x31

## Router IN 20 Mb/s -OUT 200 Mb/s showing buffering mechanism on Packet as a ramp of 50 chars



Close observation of the zooms on the right show character 0x0c at 20 Mb/s in the upper Zoom Z1, marked with cursor, and its transmission at 200 Mb/s on Z1 with a latency of 1.023 µs, also marked with a cursor.

## Router IN 200 Mb/s -OUT 20 Mb/s showing buffering mechanism on Packet as a ramp of 50 chars



This case is reversed from previous case. The fast link is suspended to allow the slow output. When sufficient characters have been emitted, another slice of 8 characters is emitted