

SIS3316 10G Switch Test

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Revision Table:

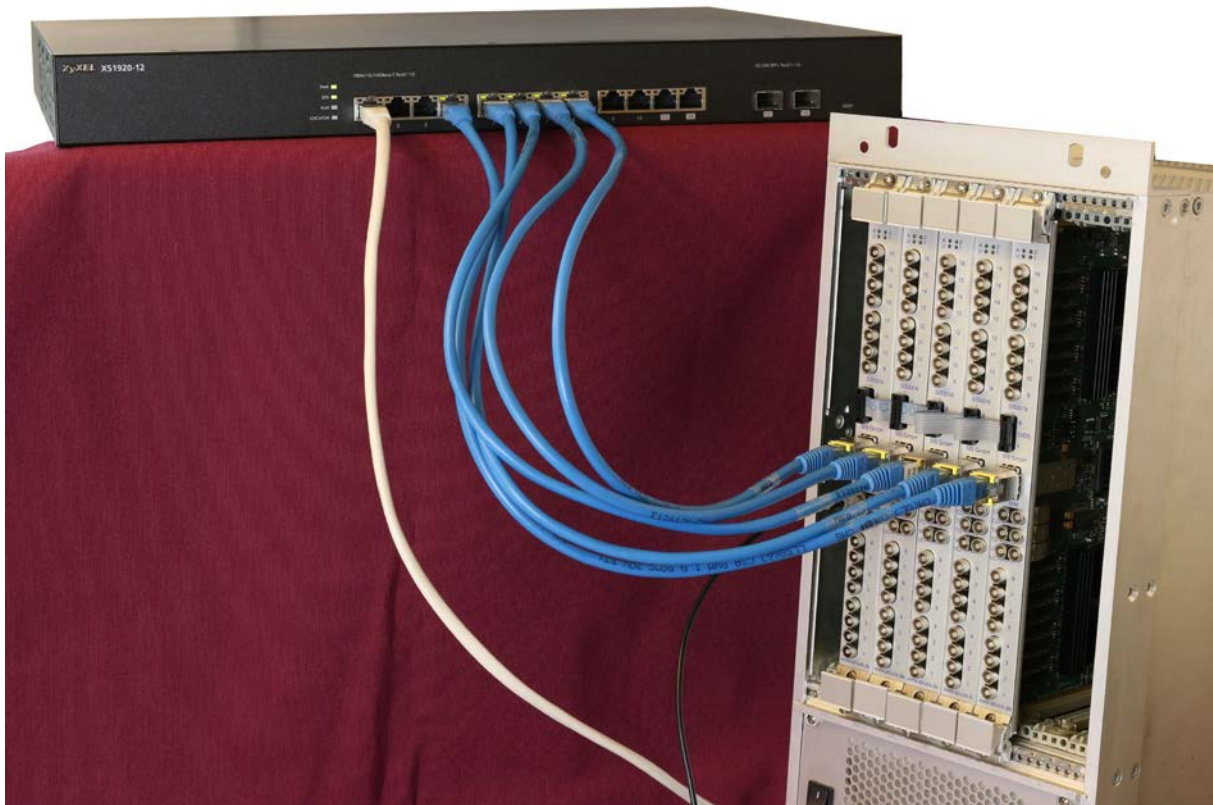
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1.00	12.07.2016	First official release

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1 SIS3316 Ethernet Readout with 10G Switch

Five SIS3316s are connected with 1G Ethernet connections to a Zyxel XS19-20 1G/10G switch. The PC is connected via a 10G Ethernet connection to the switch.



2 Normal Operation (Readout)

Five processes were started on a Linux PC to read out the 5 SIS3316 in parallel over the 10G Ethernet. Each process reads 256Kbytes continuously with appr. 80Mbyte/sec from each SIS3316.

```

th@linux-th:~/sis3316_DT/software/Eclipse_projects/sis3316_eth_read_256KB_speed_te
Datei Bearbeiten Ansicht Suchen Terminal Hilfe
Info Counter: fifo_read_bad_return_code_WRONG_PACKET_IDENTIFIER = 0
Info Counter: fifo_read_bad_return_code_WRONG_RECEIVED_PACKET_ORDER = 0

78.664 MByte/sec 78.732 MByte/sec 78.808 MByte/sec 78.477 MByte/sec 78.743 MByte/sec 78.772 MByte/sec 79.239 MByte/sec
->udp_sis3316_fifo_read cycle rate: 79.615 MByte/sec 79.540 MByte/sec 79.625 MByte/sec 79.278 MByte/sec 79.080 MByte/sec 78.1
->udp_sis3316_fifo_read cycle rate: 75.936 MByte/sec

th@linux-th:~/sis3316_DT/software/Eclipse_projects/sis3316_eth_read_256KB_speed_te
Datei Bearbeiten Ansicht Suchen Terminal Hilfe
Info Counter: fifo_read_bad_return_code_WRONG_NOF_RECEVEID_BYTES = 0
Info Counter: fifo_read_bad_return_code_WRONG_PACKET_IDENTIFIER = 0
Info Counter: fifo_read_bad_return_code_WRONG_RECEIVED_PACKET_ORDER = 0

86.040 MByte/sec 86.039 MByte/sec 85.951 MByte/sec 85.760 MByte/sec 85.974 MByte/sec 85.876 MByte/sec 85.873 MByte/sec
->udp_sis3316_fifo_read cycle rate: 83.485 MByte/sec 82.281 MByte/sec 83.452 MByte/sec 83.140 MByte/sec 82.928 MByte/sec 83.4

th@linux-th:~/sis3316_DT/software/Eclipse_projects/sis3316_eth_read_256KB_speed_te
Datei Bearbeiten Ansicht Suchen Terminal Hilfe
Info Counter: fifo_read_bad_return_code_WRONG_ACK = 0
Info Counter: fifo_read_bad_return_code_WRONG_NOF_RECEVEID_BYTES = 0
Info Counter: fifo_read_bad_return_code_WRONG_PACKET_IDENTIFIER = 0
Info Counter: fifo_read_bad_return_code_WRONG_RECEIVED_PACKET_ORDER = 0

84.086 MByte/sec 84.225 MByte/sec 84.142 MByte/sec 83.499 MByte/sec 82.402 MByte/sec 82.730 MByte/sec 80.195 MByte/sec
->udp_sis3316_fifo_read cycle rate: 79.667 MByte/sec 80.066 MByte/sec 80.003 MByte/sec

th@linux-th:~/sis3316_DT/software/Eclipse_projects/sis3316_eth_read_256KB_speed_te
Datei Bearbeiten Ansicht Suchen Terminal Hilfe
Info Counter: fifo_read_bad_return_code_TIMEOUT ..... = 0
Info Counter: fifo_read_bad_return_code_WRONG_ACK = 0
Info Counter: fifo_read_bad_return_code_WRONG_NOF_RECEVEID_BYTES = 0
Info Counter: fifo_read_bad_return_code_WRONG_PACKET_IDENTIFIER = 0
Info Counter: fifo_read_bad_return_code_WRONG_RECEIVED_PACKET_ORDER = 0

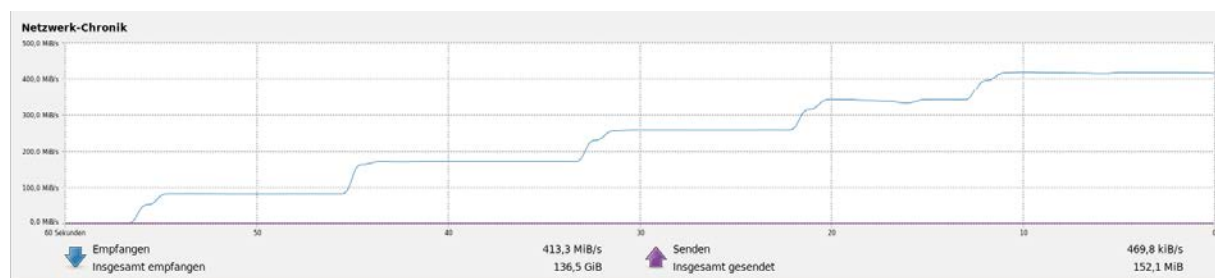
82.533 MByte/sec 83.393 MByte/sec 83.344 MByte/sec 83.232 MByte/sec 83.458 MByte/sec 83.244 MByte/sec

th@linux-th:~/sis3316_DT/software/Eclipse_projects/sis3316_eth_read_256KB_speed_te
Datei Bearbeiten Ansicht Suchen Terminal Hilfe
Info Counter: fifo_read_bad_return_code_WRONG_PACKET_IDENTIFIER = 0
Info Counter: fifo_read_bad_return_code_WRONG_RECEIVED_PACKET_ORDER = 0

79.765 MByte/sec 79.955 MByte/sec 79.796 MByte/sec

```

The system monitor shows the network performance. Each process increments the throughput by appr. 80Mbyte/sec. The average throughput of 5 SIS3316's is 480Mbyte/sec.



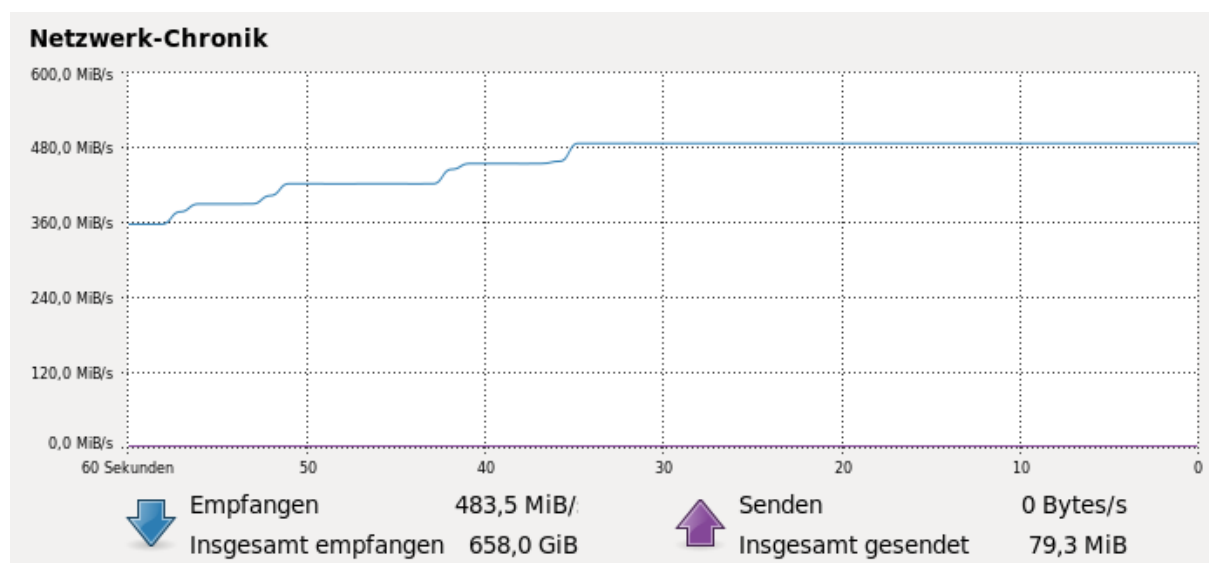
3 Special Single Event Readout Operation

It is possible to implement a special single Event readout mode. With this mode each external trigger will push the sampled data (events) immediately to the Ethernet port. A test implementation and a readout program, which reads the events from the UDP sockets, demonstrate the performance and show delay and jitter of the external trigger to the moment at which the PC has received the events.

The following table shows the result:

Transfer Length	Sample Length N channels	Sample Length/Channel 16 channels	Delay
4096 Bytes	2048	128	109 us – 210 us
16384 Bytes	8192	512	278 us – 328 us
32768 Bytes	16384	1024	488 us – 533 us
65536 Bytes	32768	2048	908 us – 1010 us

A throughput of appr. 480Mbyte/sec is reachable depending on the External Trigger rate of the 5 SIS3316 :



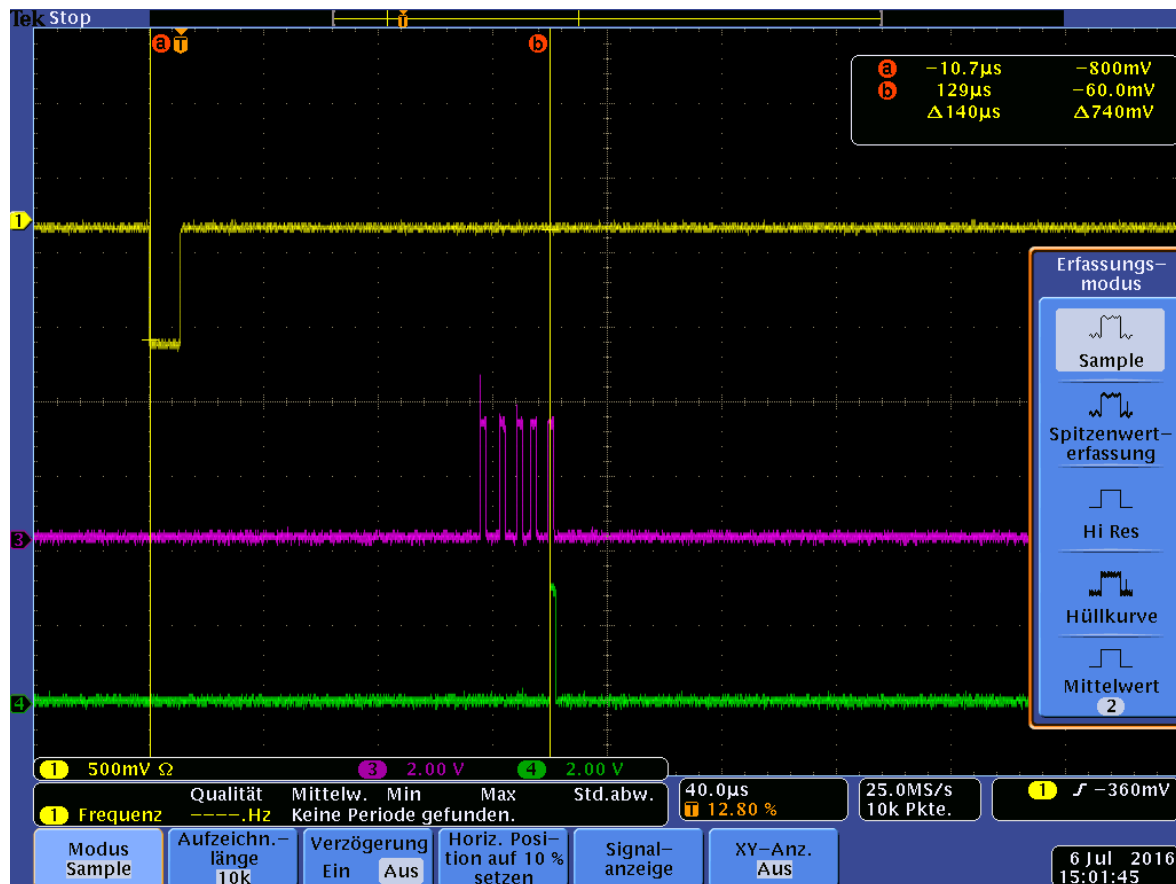
3.1 Scope measurements with a Transfer length of 4096 Bytes

Each SIS3316 pushes 4096 Bytes to the UDP port with an external Trigger.

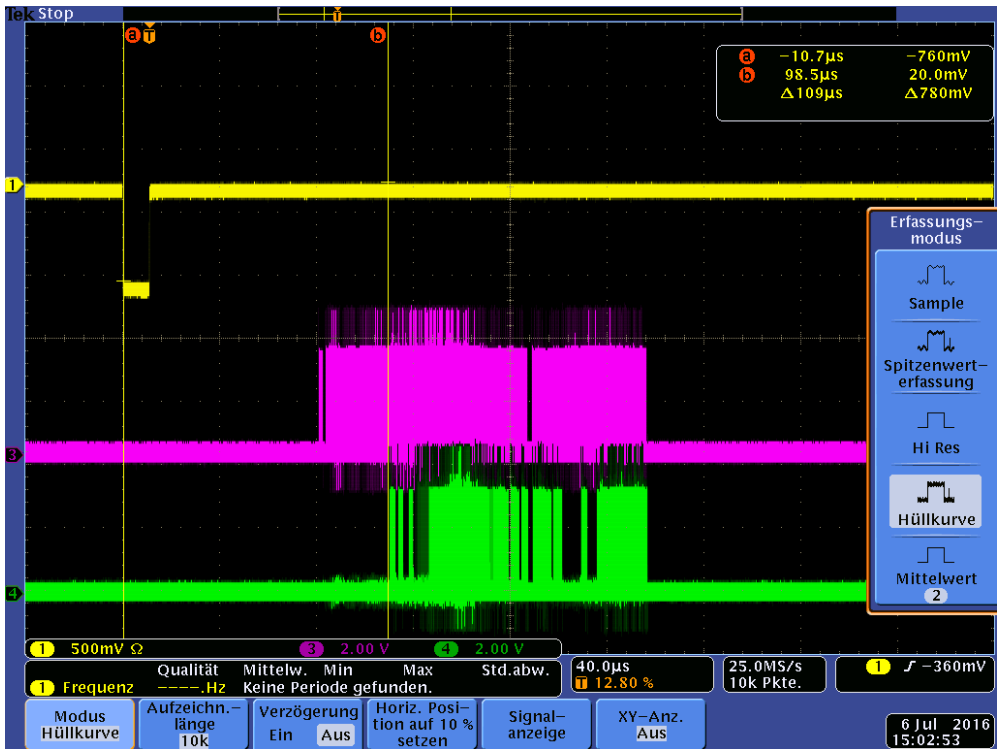
Ch1 (yellow): External Trigger

Ch3 (magenta): indicates the reception of one full packet of one SIS3316

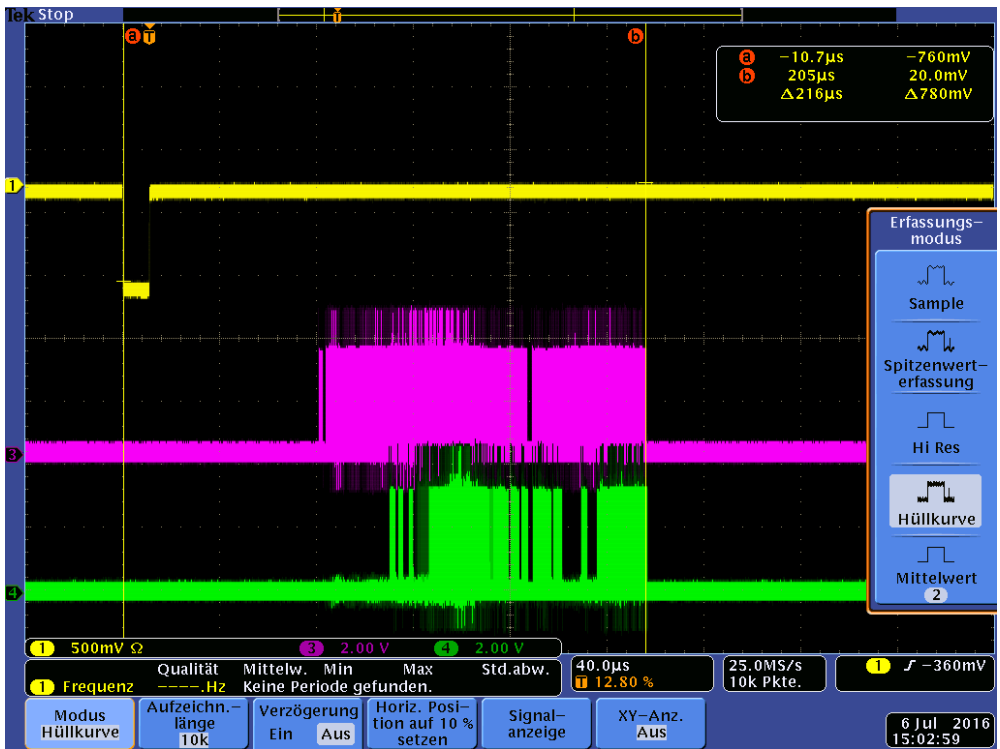
Ch4 (green): indicates the reception of all packets of the five SIS3316s



Minimum Delay:



Maximum Delay:



3.2 Scope measurements with a Transfer length of 16384 Bytes

Each SIS3316 pushes 16384 Bytes to the UDP port with an external Trigger.

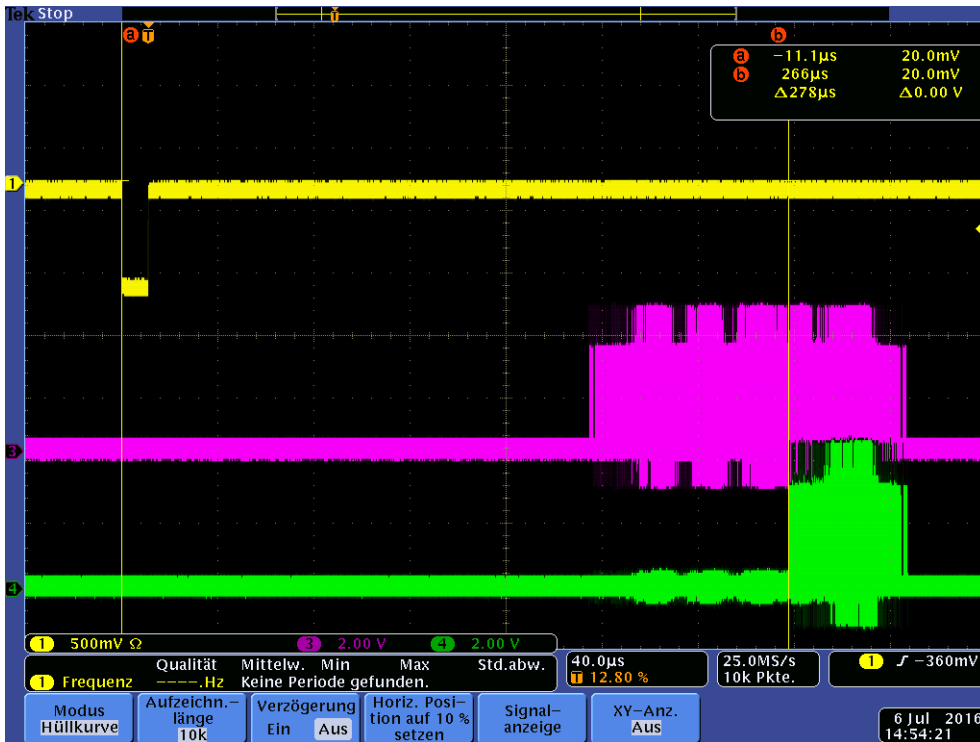
Ch1 (yellow): External Trigger

Ch3 (magenta): indicates the receipt of one full packet from one SIS3316

Ch4 (green): indicates the receipt of all packets from the five SIS3316s



Minimum Delay:



Maximum Delay:



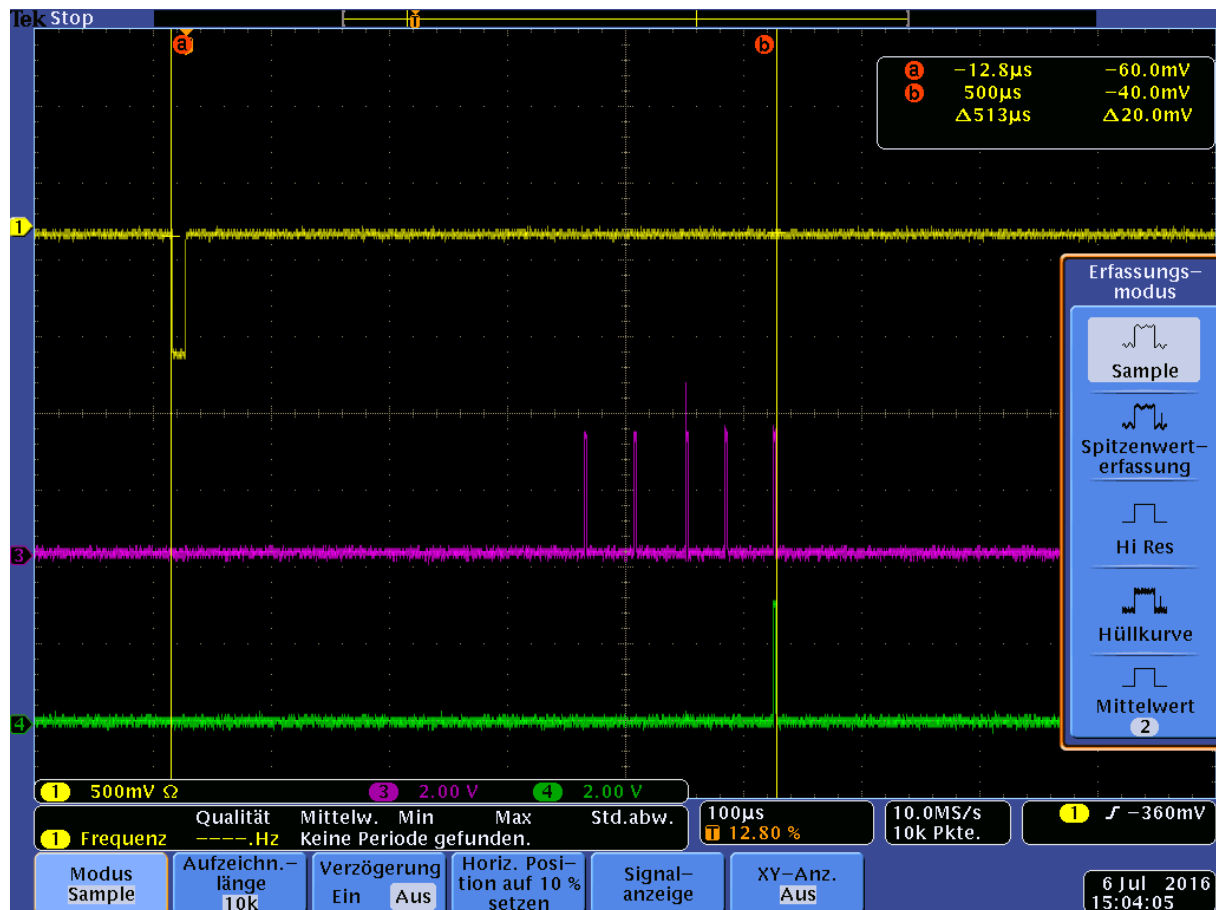
3.3 Scope measurements with a Transfer length of 32768 Bytes

Each SIS3316 pushes 32768 Bytes to the UDP port with an external Trigger.

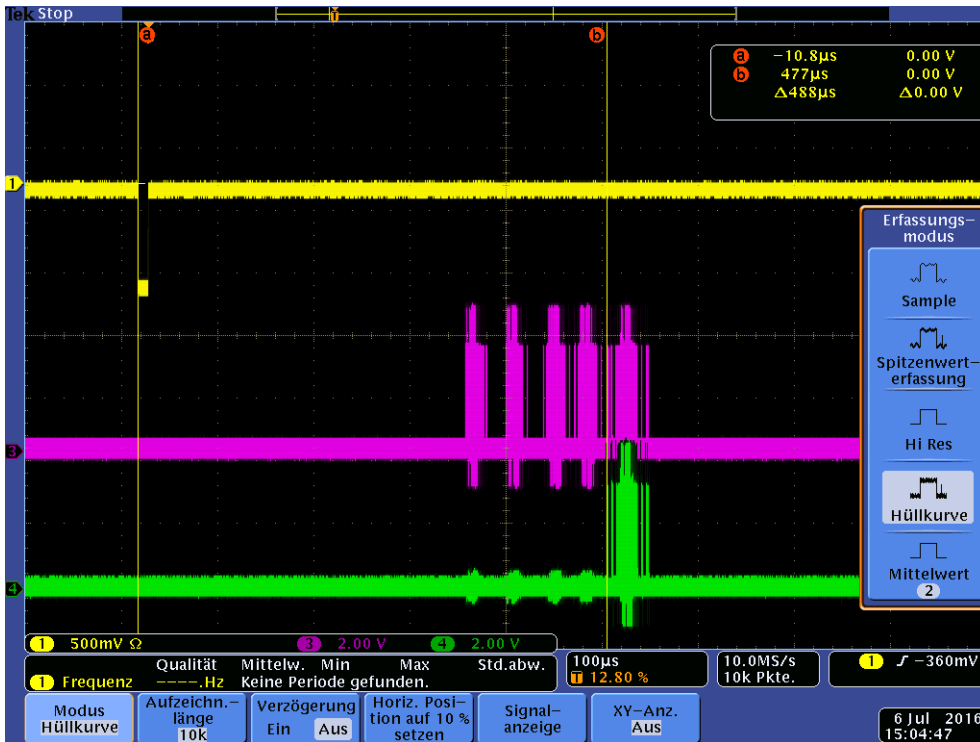
Ch1 (yellow): External Trigger

Ch3 (magenta): indicates the receipt of one full packet from one SIS3316

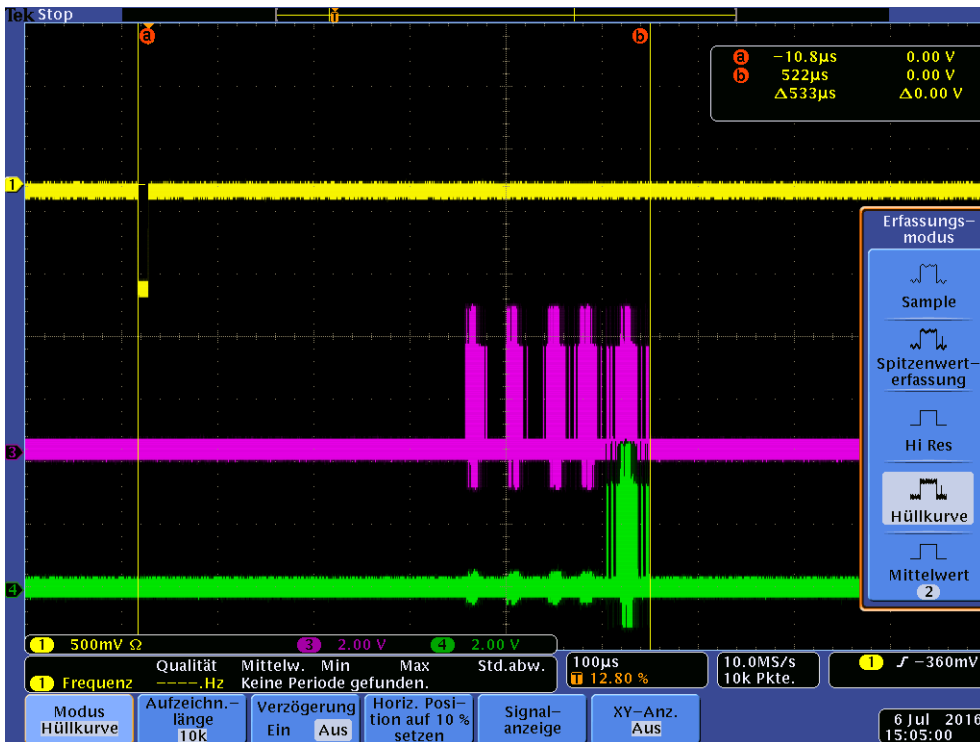
Ch4 (green): indicates the receipt of all packets from the five SIS3316s



Minimum Delay:



Maximum Delay:



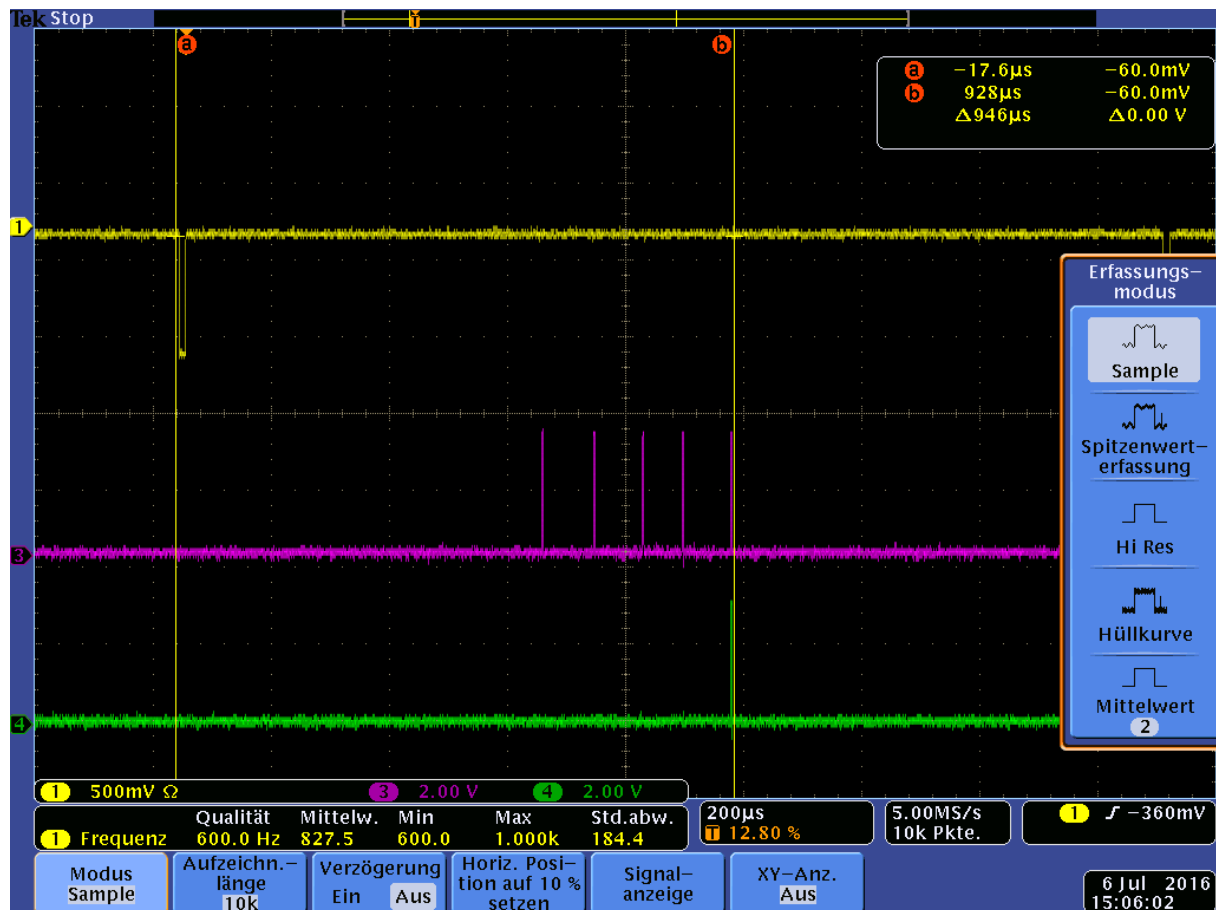
3.4 Scope measurements with a Transfer length of 65536 Bytes

Each SIS3316 pushes 65536 Bytes to the UDP port upon an external Trigger.

Ch1 (yellow): External Trigger

Ch3 (magenta): indicates the receipt of one full packet from one SIS3316

Ch4 (green): indicates the receipt of all packets from the five SIS3316s



Minimum Delay:



Maximum Delay:

