SIS3316
10G Switch Test

SIS GmbH
Harksheider Str. 102A
22399 Hamburg
Germany

Phone: ++49 (0) 40 60 87 305 0
Fax: ++49 (0) 40 60 87 305 20

e-mail: info@struck.de
http://www.struck.de

Version: SIS3316-M-0101-1-V100-10G-Switch-Test as of 12.07.2016
Revision Table:

<table>
<thead>
<tr>
<th>Revision</th>
<th>Date</th>
<th>Modification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.00</td>
<td>12.07.2016</td>
<td>First official release</td>
</tr>
</tbody>
</table>
Table of contents

1 SIS3316 Ethernet Readout with 10G Switch ................................................................. 4
2 Normal Operation (Readout) ......................................................................................... 5
3 Special Single Event Readout Operation ................................................................... 6
   3.1 Scope measurements with a Transfer length of 4096 Bytes.............................. 7
   3.2 Scope measurements with a Transfer length of 16384 Bytes......................... 9
   3.3 Scope measurements with a Transfer length of 32768 Bytes....................... 11
   3.4 Scope measurements with a Transfer length of 65536 Bytes....................... 13
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.

```plaintext
<table>
<thead>
<tr>
<th>Date</th>
<th>Bearbeiten</th>
<th>Ansicht</th>
<th>Suchen</th>
<th>Terminal</th>
<th>Hilfe</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

```plaintext

```
70.664 Mbyte/sec 78.732 Mbyte/sec 78.808 Mbyte/sec 79.747 Mbyte/sec 78.772 Mbyte/sec 79.223 Mbyte/sec 79.774 Mbyte/sec 79.330 Mbyte/sec 79.380 Mbyte/sec
```

```
86.048 Mbyte/sec 86.039 Mbyte/sec 85.951 Mbyte/sec 85.768 Mbyte/sec 85.974 Mbyte/sec 85.876 Mbyte/sec 85.473 Mbyte/sec
```

```
04.006 Mbyte/sec 04.225 Mbyte/sec 04.142 Mbyte/sec 03.499 Mbyte/sec 02.402 Mbyte/sec 02.730 Mbyte/sec 02.195 Mbyte/sec
```

```
82.533 Mbyte/sec 83.392 Mbyte/sec 83.344 Mbyte/sec 83.232 Mbyte/sec 83.458 Mbyte/sec 83.244 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:

<table>
<thead>
<tr>
<th>Transfer Length</th>
<th>Sample Length N channels</th>
<th>Sample Length/Channel 16 channels</th>
<th>Delay</th>
</tr>
</thead>
<tbody>
<tr>
<td>4096 Bytes</td>
<td>2048</td>
<td>128</td>
<td>109 us – 210 us</td>
</tr>
<tr>
<td>16384 Bytes</td>
<td>8192</td>
<td>512</td>
<td>278 us – 328 us</td>
</tr>
<tr>
<td>32768 Bytes</td>
<td>16384</td>
<td>1024</td>
<td>488 us – 533 us</td>
</tr>
<tr>
<td>65536 Bytes</td>
<td>32768</td>
<td>2048</td>
<td>908 us – 1010 us</td>
</tr>
</tbody>
</table>

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:

![Minimum Delay Graph]

Maximum Delay:

![Maximum Delay Graph]
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:

![Minimum Delay Graph]

Maximum Delay:

![Maximum Delay Graph]