

## PULSE STREAMER 8/2

### Synchronous digital pattern generator and arbitrary waveform generator

The Pulse Streamer 8/2 is a synchronous digital pattern and arbitrary waveform generator with 8 digital and 2 analog output channels. Its versatile user interface allows you to define complex pulse sequences and arbitrary waveforms efficiently.

**1 GSa/s**  
digital  
sampling rate

**125 MSa/s**  
analog  
sampling rate

**1 M pulses**  
pattern memory

#### Implement your ideas within minutes

An intuitive encoding lets you design digital patterns and analog waveforms of any complexity within minutes. Instead of just sample points, it allows you to define segments.

#### Be synchronous to start with

The Pulse Streamer's digital and analog outputs are always synchronous. Skip all efforts with synchronization across distinct hardware. Instead, output precisely timed synchronous digital and analog signals right away.

#### Stick to your favorite programming language

Control your experiment in your preferred programming language with our included native software libraries covering Python, Matlab, and LabVIEW.

#### Set your Pulse Streamer anywhere in your lab

You talk to your Pulse Streamer via Ethernet. Set it anywhere in your lab and use it from anywhere.

#### Segments instead of sample points

Work with segments instead of sample points to describe complex digital patterns intuitively and efficiently.

#### Low-latency trigger input

Start pulse sequences with a low latency external trigger.

#### Reference or sampling clock input

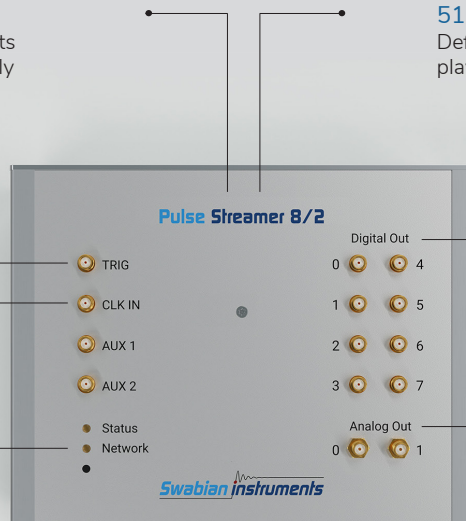
Synchronize your output signals to external hardware.

#### 1 Gbit/s network

Upload and run your patterns and waveforms within milliseconds.

#### 512 MB internal memory and 3 repetition modes

Define digital patterns with up to 1 million segments and play them once, N times, or with indefinite repetition.



#### 8 digital outputs

Generate complex digital patterns with 1 ns timing resolution.

#### 2 analog outputs

Generate arbitrary waveforms with 14 bit vertical resolution and 8 ns timing resolution.



Digital output

|                                   |             |
|-----------------------------------|-------------|
| output channels                   | 8 x SMA     |
| sampling rate                     | 1 GSa/s     |
| voltage levels (into 50 Ω)        | 0 and 2.6 V |
| rise and fall time (20%-80%)      | < 300 ps    |
| minimum pulse width <sup>1)</sup> | 2 ns        |
| RMS jitter                        | < 50 ps     |

Analog output

|                                |               |
|--------------------------------|---------------|
| output channels                | 2 x SMA       |
| sampling rate                  | 125 MSa/s     |
| voltage range                  | -1.0 to 1.0 V |
| bandwidth (-3 dB)              | 50 MHz        |
| resolution                     | 14 bit        |
| offset error                   | < 2 mV        |
| gain error                     | < 1%          |
| rise and fall time (20%-80%)   | < 7 ns        |
| step response overshoot (typ.) | 25 %          |
| output settling time (1%)      | < 100 ns      |

<sup>1)</sup> a nominal 1 ns pulse with rising edge first will output an approx. 1 ns wide pulse; a nominal 1 ns wide pulse with falling edge first will output no pulse (see typical pulse response figures below)

<sup>2)</sup> a trigger-to-data jitter below 100 ps can be achieved with an external sampling clock and a synchronous trigger (see Documentation for details)

Pattern generation

|                     |                    |
|---------------------|--------------------|
| max. pattern length | 1 M pulses         |
| repeat modes        | 1, N, infinite     |
| trigger modes       | external, internal |

Trigger input

|                                      |               |
|--------------------------------------|---------------|
| max. voltage range (no damage)       | -0.3 to 5.3 V |
| voltage range                        | 0 to 5 V      |
| trigger level                        | 0.5 V         |
| minimum pulse width                  | 5 ns          |
| trigger-to-data delay (typ.)         | 65 ns         |
| trigger-to-data jitter <sup>2)</sup> | ±4 ns         |

External clock input

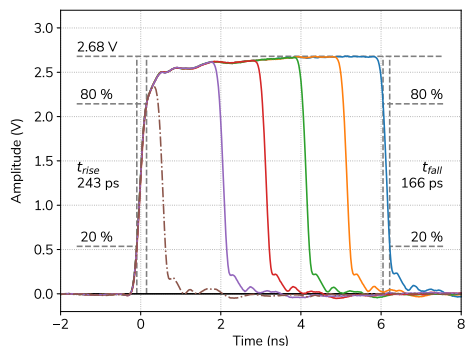
|           |   |
|-----------|---|
| coupling  | AC  |
| amplitude | 0.2 to 5 Vpp                              |
| frequency | 10 MHz ref. clock or 125 MHz sample clock |

General parameters

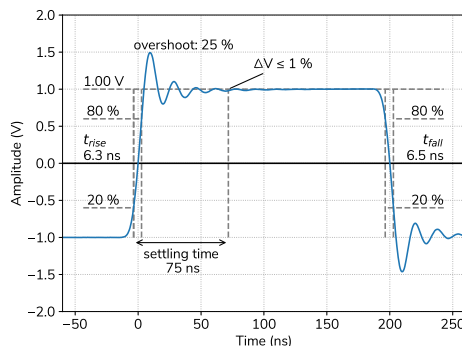
|                        |                     |
|------------------------|---------------------|
| data interface         | Ethernet (1 Gbit/s) |
| size (L x W x H) in mm | 185 x 145 x 65      |

Specification values are given for hardware version 3.1, the values for older hardware may differ.

Typical pulse response (digital output)



Typical pulse response (analog output)



Waveform examples (analog output)

