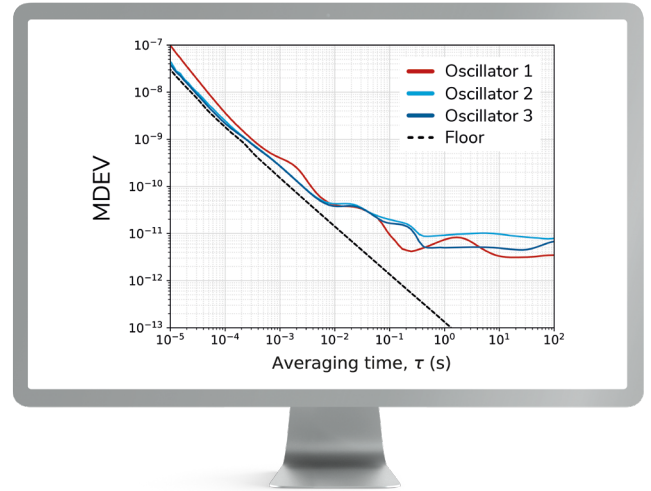


Time Tagger Series

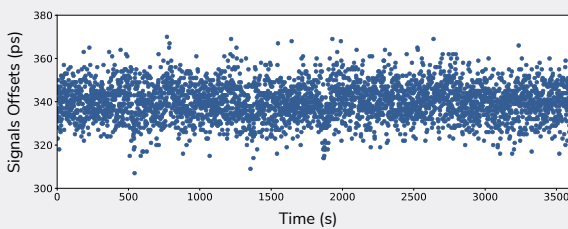
Timing & Frequency Measurements made easy

The Time Tagger Series combines **multichannel frequency counting**, **continuous time-interval analysis**, **frequency-stability metrics**, and **phase-noise analysis** into a single platform.



Measurements

- » Frequency-stability metrics: ADEV, MDEV, HDEV
- » Phase and frequency error traces
- » Phase-noise analysis
- » Frequency counting
- » **1 PPS monitoring**



Features

- » Up to 160 inputs simultaneously
- » Input frequency up to 700 MHz per channel
- » Log and post-process your raw data



- » **Software-based acquisition and analysis**
Acquire time tags and process them in real time using Python, MATLAB, LabVIEW, C#, or C++. Built-in workflows support standard analyses and can be adapted to application-specific measurements.

- » **Versatile input clock**
Define an input as the base clock in software, and incoming time tags will be rescaled accordingly. Clocks with an arbitrary reference can be used beyond 10 MHz and 500 MHz.

- » **Network streaming and remote processing**
Stream time tags over the network and process them on client computers as if they had a hardware Time Tagger connected.

- » **Parallel measurements across multiple channels**

Run multiple timing and frequency analyses in parallel on the same signal or across multiple signals, using either the internal clock or an arbitrary reference, without gating.

- » **High data transfer rate**

The 90 Mtags/s transfer rate to your computer over USB 3.0 enables on-the-fly processing of large event streams. Leverage the event filter for high repetition rate periodic signals.

Specifications



Key metrics	Time Tagger Ultra	Time Tagger X
noise floor ADEV @ t = 1 s	4E-13	4E-13
noise floor ADEV @ t = 1000 s	4E-16	4E-16
noise floor TDEV	200 fs	200 fs
single-shot RMS jitter	42 ps (Value) 8 ps (Performance)	2 ps
RMS jitter (HighRes)*	down to 3 ps	down to 1.5 ps
digital resolution	1 ps	1 ps

Hardware features	Time Tagger Ultra	Time Tagger X
input channels	4 to 18 on a single system (up to 144 on synchronized systems)	4 to 20 on a single system (up to 160 on synchronized systems)
data transfer rate (USB 3.0, to PC)	90 Mtags/s	90 Mtags/s
data transfer rate (SFP+, QSFP+, to FPGA)	-	300, 1200 Mtags/s
onboard memory	512 Mtags	512 Mtags
timescale accuracy	± 20 ppm initial (+400 ppb/year aging)	± 300 ppb initial (+ 110 ppb/year aging)

Input signals	Time Tagger Ultra	Time Tagger X
recommended waveforms	rectangular, clipped sinewave	rectangular, clipped sinewave
maximum input frequency (per channel)	475 MHz	700 MHz
minimum pulse width	500 ps	350 ps
input impedance	50 Ω	50 Ω / 1 MΩ
recommended input signal range	-3 to 3 V	-1.5 to 1.5 V
absolute safe input range	-5 to 5 V	-3 to 3 V

External clock	Time Tagger Ultra	Time Tagger X
frequency (software clock , via any input channel)	100 kHz to 475 MHz	100 kHz to 700 MHz
frequency (CLK IN, dedicated hardware input)	10, 500 MHz	10, 500 MHz
amplitude (CLK IN, dedicated hardware input)	1 to 3 Vpp	0.5 to 4 Vpp

General parameters	Time Tagger Ultra	Time Tagger X
data interface	USB 3.0	USB 3.0, SFP+, QSFP+
size (L x W x H) in mm	190 x 140 x 60	380 x 480 x 90 (2U)
power consumption (max)	30W	60 W

* HighRes jitter achieved by channel aggregation. See documentation for details.

Endless processing capabilities

Learn more at:
swabianinstruments.com/static/documentation/TimeTagger/