Redefining Measurement
ID900 Time Controller Series

3 different versions: ID900-TCSPC, ID900-DG and ID900-MASTER

The combination of high resolution event timing & correlation, time-to-digital conversion with multi-trigger delay generator is nowadays widely used in physics, bio and material science experiments. The ID900 Time Controller Series is an ideal central platform for such experiments. It combines the functionalities of several electronic devices into a single and flexible one: time-tagger, TCSPC module, delay generator, digital conditional filters and counters.

A comprehensive, affordable, versatile and scalable series of instruments composed of 3 different main versions:

- **The ID900-TCSPC** (Time-correlated single-photon counting) offers time-tagging, counting and histograming continuously on 4 input channels, ideal for all applications requiring time resolved and picosecond event tagging.
- **The ID900-DG** (Delay generator) version offers 4 independent programmable output pulse generators with configurable digital delays and up to 125 MHz repetition rate.
- **The ID900-MASTER** provides full TCSPC functionalities with on-board processing and programmable conditional outputs.

The 3 Versions are fully upgradable from one to the other and add-on functionalities are available.

Applications

 Quantum communication

 Quantum physics and optics

 Fluorescence lifetime measurement

 Time of flight measurement (OTDR, LiDAR)

Key Benefits

 Fast data processing Up to 100 Mevents/ch

 Conditional programmable outputs

 Picosecond timing

 Cost effective solution for mutiple channels

ID900 TIME CONTROLLER HARDWARE PLATFORM

The hardware platform consists of 4 input and 4 output signals that are interconnected internally via a fast FPGA circuit, easily programmable via a dedicated user-friendly interface. This unique architecture allows the user to configure customized logical operations between input signals and generate pulsed signals according to programmed rules and send them back to the experimental setup in real time via the available output ports.

250 Mev/s Sync/start channel

0-100 Mev/s input channels
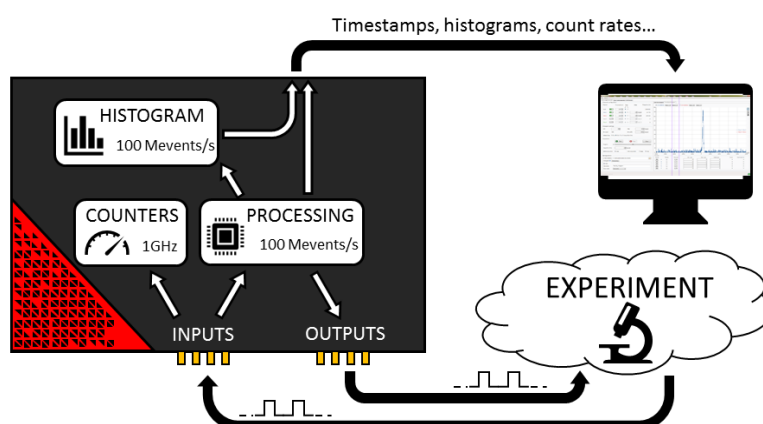
0-125 MHz output channels

PRINCIPLE OF OPERATION

Figure 1: ID900-Master Time Controller functional scheme

BUILT-IN DATA PROCESSING

Avoiding heavy data transfer to PC

The Time Controller allows the user to perform the maximum amount of data processing between the inputs (conditional filter, start-stop histogram, coincidence extraction, count rate) thanks to its unique built-in computing power.

With a processing rate of up to 100 Mevents/s on each of the 4 input channels, it guarantees outstanding signal processing performance without having to transfer large amount of data to computers.

Full processing capability is included in the ID900-MASTER version and is available as an add-on on the ID900-TCSPC version (PRCSG add-on).

REAL-TIME CONDITIONAL OUTPUTS

On-demand optical gates and measurements

The Time Controller also offers programmable output signal generation (via its 4 output ports) resulting from logical operation between the input signals. (see figure 2)
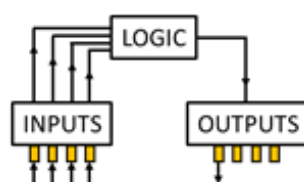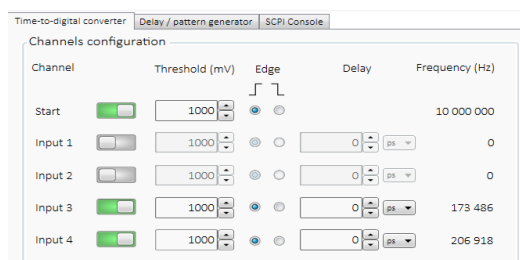
▶ Low input/output latency (as low as 400ns)
▶ Perform high-rate, precision logical operations

Figure 2: Conditional output

This feature is included in the ID900-MASTER version.

ID900

User-friendly software
Control device parameters, change configuration, display and analyze data

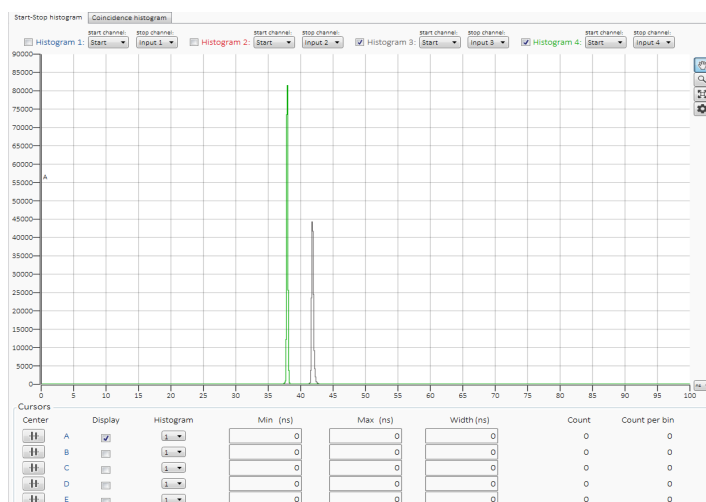## CONTROL THE PARAMETERS AND SETTINGS

▶ Visualize and control device parameters

▶ Versatile output pulse generation

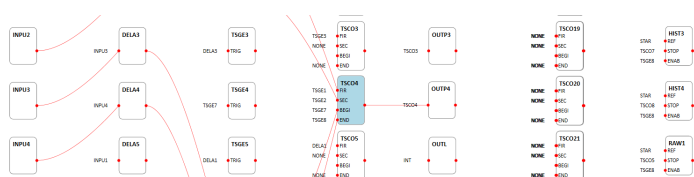## DISPLAY AND ANALYZE THE DATA

▶ Real-time histogram display

▶ Complete and versatile histogram analysis

▶ Full control of histogram and data transfer settings

CONFIGURE THE ID900 VIA STANDARD COMMANDS FOR PROGRAMMABLE INSTRUMENTS (SCPI)

▶ Visualize the ID900 configuration with a clear and simple interface

▶ Configure customized features (multi-photon coincidence filter, conditional outputs)

SPECIFICATIONS ID900 TIME CONTROLLER SERIES

Parameter	High Speed mode	High Resolution mode	Units	Versions
Input channels	4 + Start	4		
Bin width	100	13	ps	
Timing jitter (per channel[1])	28	5.7	ps rms	
Dead-time	<4	5	ns	
Maximum processing rate (per channel)	100	25	Mevents/s	
Max input voltage range	-3	3	V	TCSPC & MASTER
Input delay range	1 ps to 4 ms			
Input delay steps	1		ps	
Count rate	1		GHz	
Discriminator range	-2 to 2		V	
Discriminator steps	1		mV	
Maximum transfer rate to PC	10[2]		Mevents/s	
Output channel number	4			
Output pulse format	NIM or TTL			
Output max frequency	125		MHz	
Output pulse min width (TTL)	6		ns	DG & MASTER
Output pulse min width (NIM)	1		ns	
Output delay steps	100		ps	
Maximum delay generation	4		ms	
Input - output latency	400	1000	ns	MASTER
Power Supply	100-240V; 1-2.5A; 50-60Hz			
Operating conditions	5°-40° ; 80% humidity up to 31°C and 50% up to 40°C			DG & TCSPC & MASTER
Applicable standards	Safety: EN 61010-1:2010, AMD1:2016 CSA C22.2 61010-1-12/UL 61010-1:2012 EMC: EN 61000-6-2:2005, EN 61000-6-3:2007+A1:2011 EN 61326-1:2013			

[1] Start-stop or channel-to-channel timing jitter corresponds to sqrt(2) times single channel jitter because of the error propagation law

[2] Hardware ready for 100 Mevent/s

The ID900 Time Controller is available in 3 versions (MASTER, TCSPC, DG) offering different add-on functionalities which can all be remotely implemented upon customer request:

- 4IN (4 input channels): histogramming, time-tagging, counting inputs
- PRCSG (processing): on-board timestamps processing, incl. filtering and logical gating operation
- 4OUT (4 output channels): pulse generator with configurable delay frequency, pulse width and external trigger
- HR (high resolution): upgrade to 4 high resolution inputs (5.7 ps RMS)

Adds on \ Version	ID900-MASTER	ID900-TCSPC	ID900-DG
4IN	√	√	○
PRCSG	√	○	○
4OUT	√	○	√
HR	○	○	○

√ Included   ○ Optional

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