Redefining Measurement

ID900 Time Controller Series

TCSPC, built-in data processing and real-time programmable input/output logic

The IDQ Time Controller is an ideal central platform for many laboratory experiments. It combines the functionality of several electronic devices in a single and flexible platform: time-tagger, TCSPC module, delay generator, conditional filter and counter are its main functions.

The hardware consists of 4 inputs and 4 outputs that are interconnected internally via a fast FPGA circuit, which is easily re-programmable via a user-friendly interface. This unique architecture allows the user to configure customized logical operations between the input signals and send the results back to the experimental setup in real time via the available output ports.

Overall, the ID900 series offers a comprehensive, versatile and scalable series of instruments. In addition, several Time Controllers can be daisy-chained to offer a larger number of input or output channels.

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

At the heart of the lab

ID900 Time Controller is the central device of an experimental setup, performing measurements, data processing and synchronization with all instrumentation

PRINCIPLE OF OPERATION

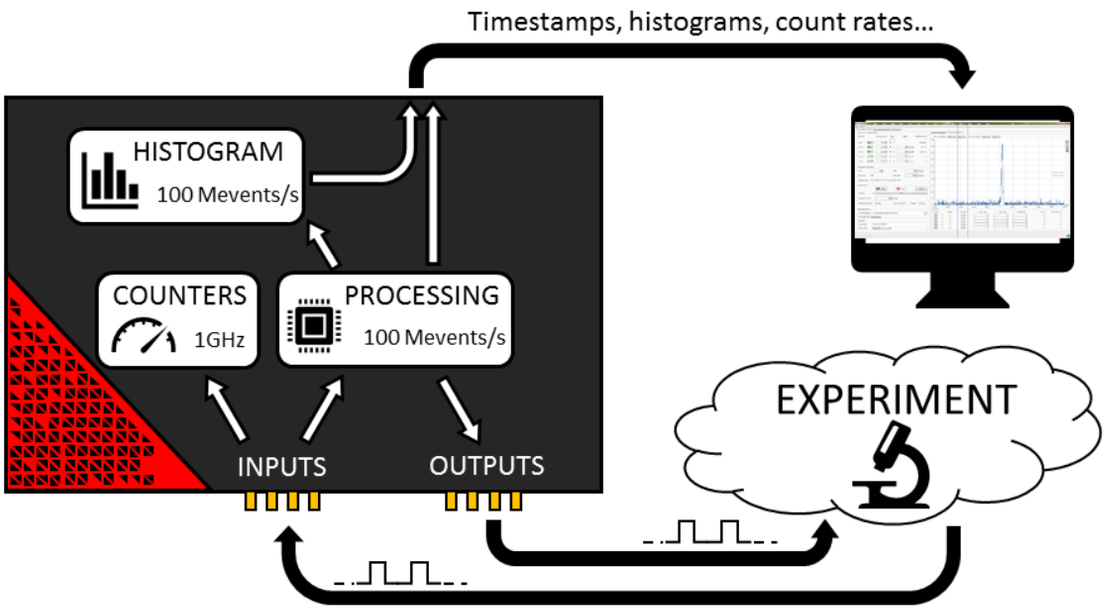


Figure 1: Time Controller functional scheme

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

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

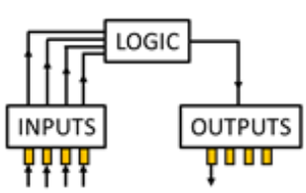
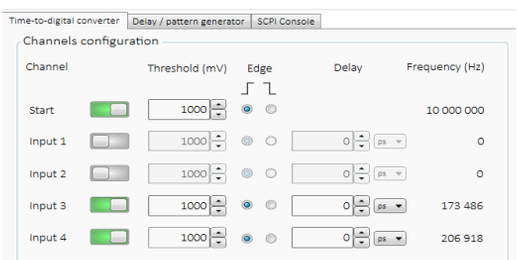


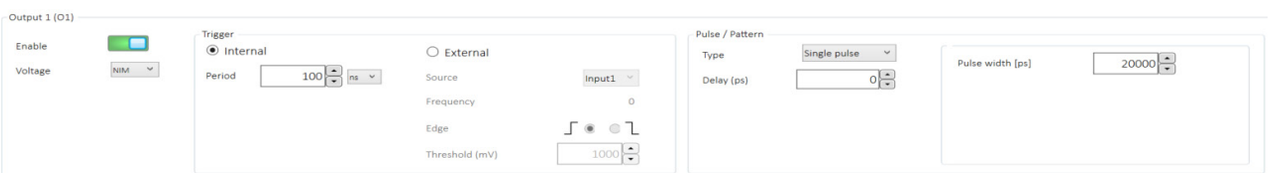
Figure 2: Conditional output

User-friendly software

Control device parameters, change configuration, display and analyze data

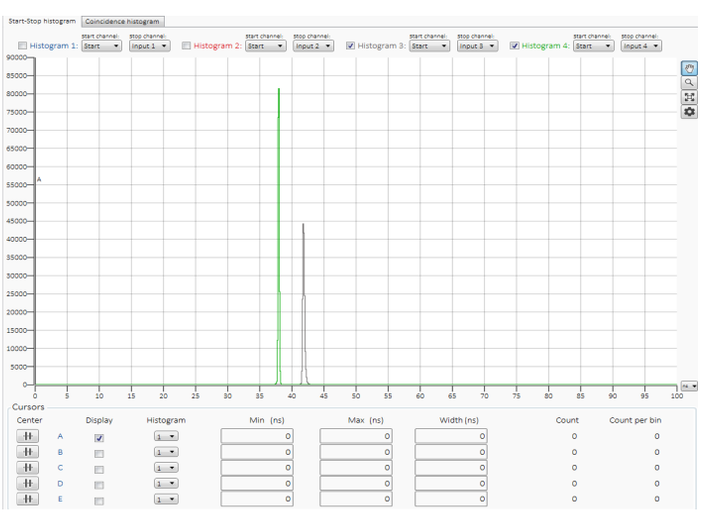
CONTROL THE PARAMETERS AND SETTINGS





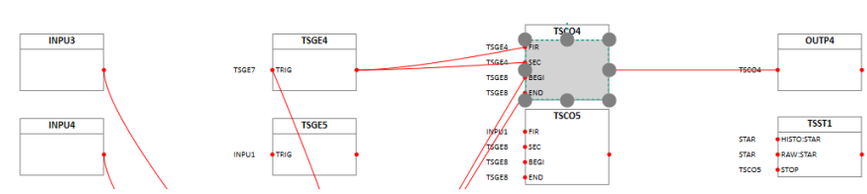
- Visualize and control device parameters
- Versatile output pulse generation

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

Parameter	High Speed mode	High Resolution mode	Units
Input channels	4 + Start	4	
Bin width	100	13	ps
Time jitter (RMS)	<100	8	ps
Dead-time	<4	5	ns
Maximum processing rate (per channel)	100	25	Mevents/s
Max input voltage range	-3	3	V
Output delay steps	100		ps
Count rate	1		GHz
Discriminator range	-2 to 2		V
Discriminator steps	1		mV
Output channel number	4		
Output pulse format	NIM or TTL		
Output max frequency	125		MHz
Output pulse min width (TTL)	6		ns
Output pulse min width (NIM)	1		ns
Maximum transfer rate to PC	10*		Mevents/s
Maximum delay generation (typical)	1		ms
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		
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		
* Hardware ready for 100 Mevent/s			

The ID900 Time Controller is available in 3 versions offering different add-on functionalities which can all be remotely implemented upon customer request.

Adds on \ Version	TCSPC	Master	Delay generator
Input ports x4	√	√	
High resolution mode		√	
Histogramming	√	√	
Time-tagging	√	√	
Built-in processing		√	
Output ports x4		√	√
Delay generation		√	√
Conditional outputs		√	

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