quTAU

Time-to Digital Converter

Hardware

The **quTAU** is an 8-channel time-to-digital converter with a time bin width of 81 ps. The arrival time of incoming signals is recorded, pre-processed (count rates are computed) and transferred to a PC via USB 2.0 for further analysis. The user can read out raw time tags as well as calculated start-stop histograms. The hardware extension allows the input of signals other than (LV)TTL and software add-ons evaluate lifetime or Hanbury-Brown Twiss experiments.

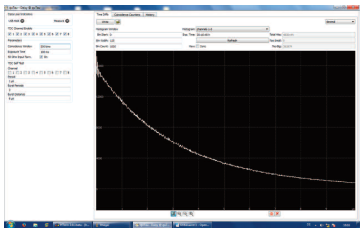
Basics

Key features

- 8 channels
- High timing resolution (bin size 81 ps)
- Easy-to-use
- High event rates
- Coincidence counting integrated
- USB 2.0 interface

Applications

- Time correlated single photon counting (TCSPC)
- Fluorescence lifetime imaging
- Quantum information experiments
- LIDAR
- High energy/ accelerator physics
- High precision time measurements



Easy-To-Use Software

The system can be controlled via a graphical user interface (GUI) that gives access to all parameters, shows current (coincidence) count rates and evaluates time-difference histograms (start-stop). To integrate the system in your measurement setup, a DLL and example software for LabVIEW and C/C++ are available.

New Extensions

Input Hardware Extension

The input extension widens the range of processable signals, with regard to signal levels and maximum rate.
Adjustable threshold comparators at each channel allow the quTAU to process NIM and user defined signals as well as (LV)TTL. One channel additionally features a divider so that high frequency periodic signals can be used as triggers.

Lifetime Software Extension

This software addon enables the user to analyse lifetime measurements on the fly. Together with the input hardware extension, high frequency trigger signals can be used. The software calculates the required histograms, fits exponential decreases and takes response functions of the system into account.

quPSI Software Extension

This software extension is intended for Hanbury-Brown Twiss experiments. It calculates the $g^{(2)}(\tau)$ function from the detection times of two inputs. Standard functions can be fitted to assess the relevant parameters.

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Models

	Input Hardware Extension	Lifetime Software Extension	quPSI Software Extension
quTAU	●	○	○
quTAU (H)	◉	○	○
quTAU (H+)	◉	◉	◉

● not recommended ○ upgradable ◉ integrated

quTAU Specifications

# Channels	Input pulse high level (V)		Input pulse width (ns)	Input pulse separation (same channel, ns)	Input Impedance (Ohm, Software) selectable	Max. event rates (Mevents/s)			Software delay (ns)		Software included
8											
Bin width (ps)	Min	Max	Min	Min	(LV) TTL	1 ch counting	8 ch counting	8 ch time tags	Min	Max	◉ GUI
81	2.4	5	4	5.5	50/1000	10	25	3	-50	50	◉ DLL ◉ Labview VI

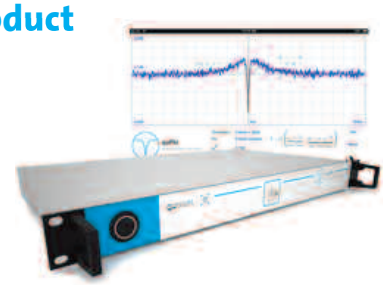
quTAU Input Hardware Extension Specifications

Input pulse high level (V)		Comparator Threshold (V)			Edge rising/falling selectable	Input Impedance (Ohm, Software selectable)		Divider (1 channel)
Min	Max	Min	Max	Step		(LV) TTL	Other	
-2	3/5	-2	3	0,01	◉	50/1000	50/5000	1, 8, 16, 32, 64, 128

quTAU General Specifications

USB Interface		USB 2.0
Power supply voltage (VAC)	Min	90
	Max	240
Power supply frequency (Hz)	Min	50
	Max	60
Power consumption (W)	Max	30
Power connector		IEC Inlet
Dimensions (cm)		34 x 24 x 9
Weight (kg)		4
Operating Systems		Windows XP, Vista, 7, Linux

Related product



quPSI

Integrated Hanbury Brown & Twiss Interferometer

The quPSI is composed of a (fiber based) beam splitter, two single photon detectors and a time-to-digital converter (TDC). The TDC records arrival times of detection events which are then evaluated to calculate the second order correlation function $g^{(2)}(\tau)$.