



## 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

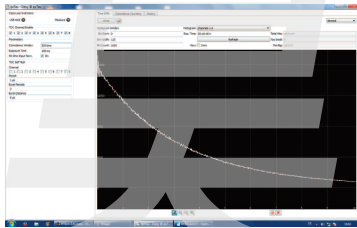
- 8 channels
- High timing resolution (bin size 81 ps)
- Easy-to-use
- High event rates
- Coincidence counting integrated
- USB 2.0 interface

### Applications

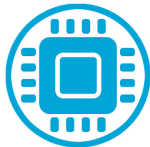
- Time correlated single photon counting (TCSPC)
- Fluorescence lifetime imaging
- Quantum information experiments
- LIDAR
- High energy/ accelerator physics
- High precision time measurements

### 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 decays 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.



## Key Features

- 1 ps digital resolution
- < 10 ps timing jitter (RMS)
- 100 MEvents/s max. rate
- 4 stop channels, 1 start channel



quTAU



Input Hardware Extension



quTAU (H)



Lifetime Software Extension



quTAU (H+)



quPSI Software Extension

● 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	Min	Max	Min	Min	(LV) TTL	1 ch counting	8 ch counting	8 ch time tags	Min	Max	● GUI ● DLL ● Labview VI
Bin width (ps)	2.4	5	4	5.5	50/1000	10	25	3	-50	50	
81											

## 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	1, 8, 16, 32, 64, 128
-2	3/5	-2	3	0,01		50/1000    50/5000	

## 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

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## Related product

quTAG



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- 1 ps digital resolution
- < 10 ps timing jitter (RMS)
- 100 MEvents/s max. rate
- 4 stop channels, 1 start channel