



quTAU

Time-to-Digital Converter



Hardware

The quTAU is an 8-channel time-to-digital converter with a time bin width of typ. 81ps. 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 included in the quTAU(H) allows the input of signals other than (LV)TTL and software add-ons evaluate lifetime or Hanbury Brown-Twiss experiments.

quTAU Specifications

Number of channels	8
Bin width	81 ps (typ.)
Input connectors	BNC
Input pulses width	min. 4 ns
Input pulses separation	min. 5.5ns
Max. event rates (Mcps)	
1 channel	counting 10
8 channels	counting 25
8 channels	time tags 3
Software delay	-50 ... +50 ns
Interface	USB 2.0
Power supply voltage	90 ... 240 V
Power supply frequency	50 ... 60 Hz
Power consumption	30 W
Power connector	IEC inlet
Dimensions (mm)	340 x 240 x 90
Weight	4 kg
Operating systems	Windows / Linux

	quTAU	quTAU(H)
Input pulses high level (V)	2.4V (LV)TTL	-2 ... +3 V / NIM / (LV)TTL
Input impedance selectable	50 / 5000 Ohms	50 / 5000 Ohms
Edge	rising	rising / falling
Comparator threshold	n.a.	-2 ... +3 V
Divider (1 channel)	n.a.	yes

Applications

- Time-correlated Single Photon Counting
- Quantum Optics / Information / Communication
- Fluorescence / Phosphorescence Lifetime Imaging
- Fluorescence Correlation Spectroscopy
- Single Photon Emitter Characterization
- LIDAR
- Hanbury Brown-Twiss experiments
- High precision time measurements

Software Extensions

• Lifetime Feature

This software extension enables the user to analyze lifetime measurements on the fly. It calculates the histograms and fits exponential decreases.

• HBT Feature

This software extension calculates the $g^{(2)}(t)$ function from the detection times of two inputs. Standard functions can be fitted to assess the relevant parameters.

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