Time Tagging Devices
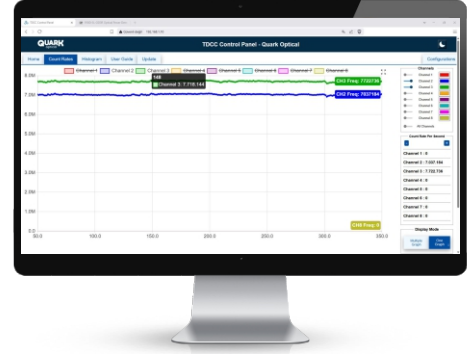
8-Channel Time to Digital Converter with Correlation / QO-TDCC8

Features

» Built-in Web Interface

» Plug-and-Play Functionality, No Drivers Required

» MicroSD - Ethernet Interfaces

» Timing Jitter <20 ps

» Data Transfer, Firmware Update and Device Control via Ethernet

Applications

» Time-Correlated Single Photon Counting (TCSPC)

» Single Photon Emitter Characterization

» Fluorescence Correlation Spectroscopy (FCS) / Imaging

» Quantum Key Distribution (QKD) / Cryptography
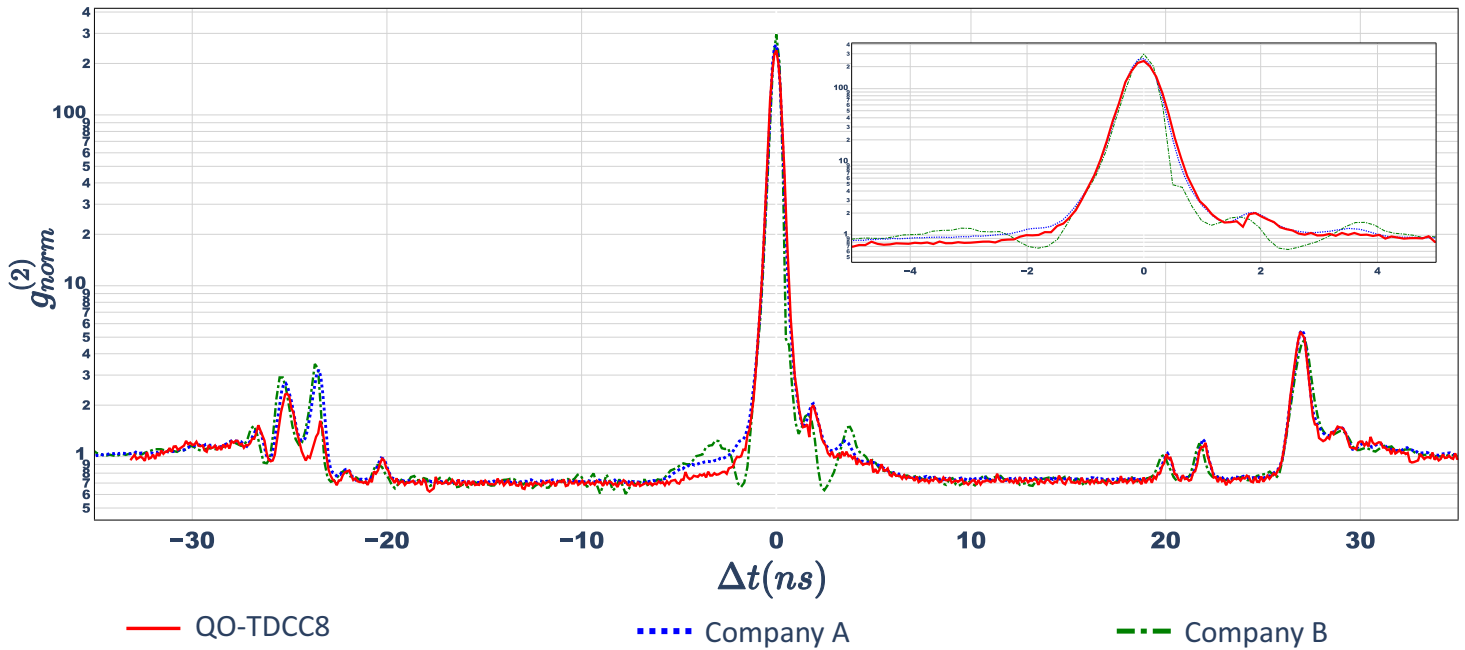
» Time of Flight Measurements (LIDAR)

Specifications

Time Tagging Capabilities	
Digital Resolution	1 ps
Timing Jitter	<20 ps
Max. Timestamp Rate to PC	40 Mcps
Max. Count Rate per Channel	100 Mcps
Max. Input Channel Pulse Width	35 ns
Max. Acquisition Time	14 Days

Inputs (Channel/Clock)	
Number of Channels	8 Stop, 1 Start
Input Connectors	SMA
Input Logic Levels	LVTTL
Max. Input Level	+3.3V
Edge	Rising, Falling
Impedance	50 Ohms

Synchronization	
Number of Synchronizable QO-TDCC8s	4
Number of Synchronizable Channels	32

Clock Input	
Frequency	10 MHz
Signal Levels	LVTTL
Max. Input Level	+3.3V
Impedance	50 Ohms/SMA

Outputs	
Number of Channels	2
Max. Rate per Channel	150 MHz
Signal Levels	LVTTL
Impedance	50 Ohms/SMA

Operation	
Interface	Ethernet
Operating Systems	All
Dimensions (in mm)	258x156x50
Weight	1 Kg
Max. Power Consumption	15 W

QO-TDCC8 (red) · Company A (blue, dotted) · Company B (green, dash-dot)

$g^2(\Delta\tau)$ measurement of signal and idler channels from a Spontaneous Parametric Down Conversion source.
Both channels had 4 Mcps. Jitter of the detectors were 330 ps.
$g^2(\Delta\tau)$ are calculated from the timetags which are obtained from three different devices.
$g^2(\Delta\tau)$ calculations are performed with same algorithm for all cases.

$g^2(\Delta\tau=0)$ peak is due to strongly correlated photon pair from a multi-mode SPDC squeezer.
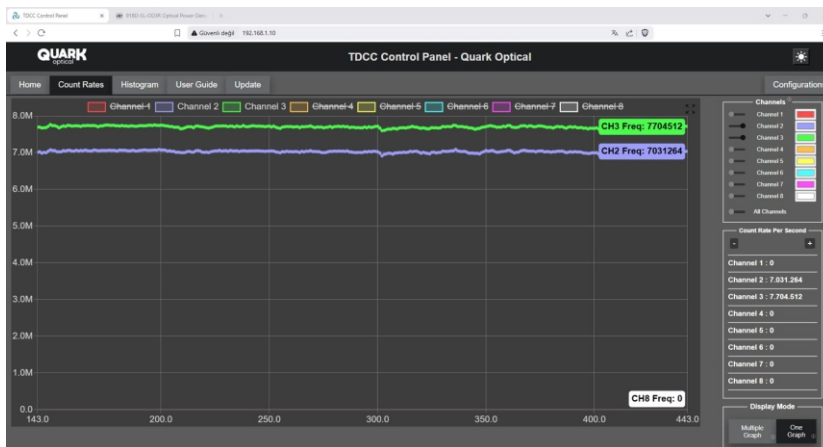Side-peaks around 20/22 ns, 28/29 ns, and -20/-27 ns range are due to the optical reflections of the experimental setup.

Quark Optical QO-TDCC8 Specs: 17 ps jitter and 106 ps bin-width.
Company A Specs: 28 ps jitter and 100 ps bin-width.
Company B Specs: 82.3 ps jitter and 164.6 ps bin-width.

🖥 Interface

The QO-TDCC8 Control Panel is a user-friendly interface for configuring and monitoring the 8-channel Time-to-Digital Converter. It provides real-time count rates, correlation histograms, precise time tagging with flexible start/stop signal selection, and an option to export time tagging data.

The user can select and upload the firmware file to update the device software. The update process can be monitored in real time. The update mechanism is secured with SHA-256 verification and enhanced by additional security layers.