

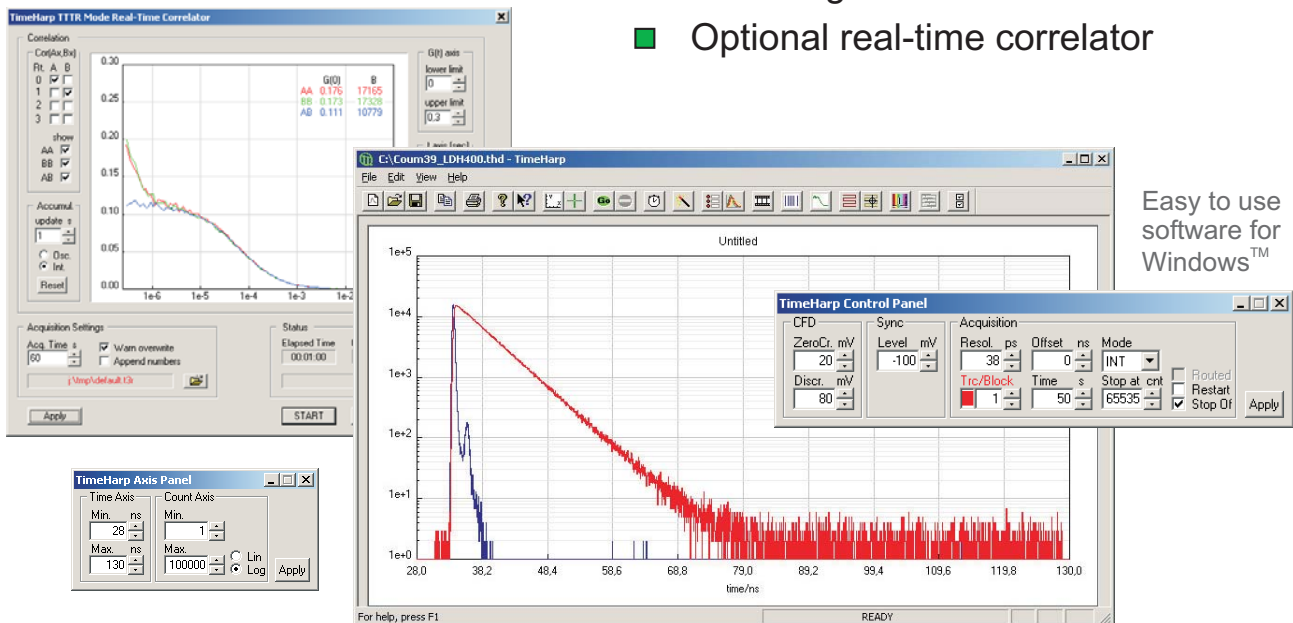
TimeHarp 200



Allround PCI-board for Time-Correlated Single Photon Counting



- Minimum time bin width < 40 ps
- 6 measurement ranges
- Up to 4096 time bins per range
- Count rate up to 3 million counts/sec
- Continuous mode for unlimited sequential curve recording
- 4 channel routing capability
- Optional time-tagged mode for recording of individual events
- Optional real-time correlator



Applications

- Time-resolved fluorescence and luminescence spectroscopy
- Fluorescence Lifetime Imaging (FLIM), Fluorescence Correlation Spectroscopy (FCS), Förster Resonance Energy Transfer (FRET)
- Single Molecule Spectroscopy (SMS)
- Time response characterization of optoelectronic devices
- Time-of-Flight (ToF) measurements

PCI-board for Single Photon Counting

The TimeHarp 200 is a compact and easy to use Time-Correlated Single Photon Counting (TCSPC) system on a single PCI-board. An integrated design keeps cost down and improves reliability. The system works in reversed start-stop mode allowing operation at the full repetition rate of mode locked lasers. The design allows high measurement rates up to 3×10^6 counts/sec and provides a time resolution of < 40 ps. The time resolution is well matched to Photomultiplier Tube (PMT) modules and Single Photon Avalanche Photodiodes (SPADs). Similarly, inexpensive and easy to use diode lasers from PicoQuant such as the PDL 800-B can be used as an excitation source. Overall IRFs of 300 ps FWHM at average count rates as high as 2×10^6 counts/sec can be achieved with inexpensive PMTs and diode lasers. Due to a dual memory architecture the continuous flow mode allows an unlimited sequential decay curve recording down to 1 ms per curve, which is invaluable in Single Molecule Spectroscopy (SMS). The continuous mode can also be synchronized with other hardware such as scanners. A Time-Tagged Time-Resolved (TTTR) mode for recording of individual photon events with their arrival time is available, allowing the most sophisticated offline analysis of the photon dynamics. TTTR data can be correlated in real-time for monitoring of FCS experiments. As accessories, an external router for connection of up to four detectors as well as a Fluorescence Lifetime Imaging Controller are available. The TimeHarp software for Windows™ provides functions such as the setting of measurement parameters, display of results, loading and saving of measurement parameters and measurement curves. Important measurement characteristics such as count rate, count maximum, position and peak width are displayed continuously. An automatic setup function is provided to adjust the system to an initial optimum display range setting for the histogram. A comprehensive online help function shortens the user's learning curve. A DLL for custom programming e.g. with LabVIEW™ is also available. Software upgrades for extended functionality will be available with further product development.

Operation Modes

Integration mode, oscilloscope mode, continuous mode f(t,T) (dual memory structure), externally clocked continuous mode (scanning, imaging), Time-Tagged Time-Resolved (TTTR) mode (listing each event pair arrival time)*

*available as an option

Specifications

Detector Channel	Constant Fraction Discriminator
Input voltage range	50 to 1500 mV
Input range with PAM 102-T preamp	-5 to -150 mV
Trigger point	rising edge of positive going pulse
Detector pulse width	0.5 to 30 ns
Sync Channel	Constant Level Trigger
Input voltage range	-1500 to +500 mV
Trigger point	falling edge of negative going pulse
Sync pulse width	0.5 to 5 ns
Max. sync rate	125 MHz
Time to Digital Converter	
Minimum time bin width (base resolution)	< 40 ps
Full scale range	120 ns to 4.5 μ s (dependent on base resolution)
Dead time	< 350 ns
Max. conversion rate	3 MHz
Differential non-linearity	< 5 % pp, < 0.5 % rms
Histogrammer	
Count depth	16 bit
Max. number of time bins	4096
Bin width	base resolution x1, x2, x4, x8 x16 and x32
Operation	
PC interface	32 bit/33 MHz PCI
PC requirements	500 MHz min. CPU clock, 512 MB memory
Operating system	Windows™ 2000/XP/Vista/7
Power consumption	typ. 0.8 A at +5 V, 0.4 A at +12 V
Dimensions w/o slot bracket	PCI slot card 185 × 115 × 25 mm

Further available are PC Modules for TCSPC (PCI-board Multichannel Scaler / Photon Counter, the NanoHarp 250, and the High-end Photon Counting Module with USB 2.0 Interface, the PicoHarp 300), Fluorescence Lifetime Spectrometer, Time-resolved Fluorescence Microscopes; Upgrade kit for Laser Scanning Microscopes; Picosecond / Nanosecond Pulsed, Modulated and Fast Switched Diode Lasers. To learn more about Time-Correlated Single Photon Counting please request our Technical Note on TCSPC. **Please check our website for updated information.**

All Information given here is reliable to our best knowledge. However, no responsibility is assumed for possible inaccuracies or omissions. Specifications and external appearances are subject to change without notice. Trademarks or corporate names are used for explanation and identification, to the owner's benefit and without intent to infringe.

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