

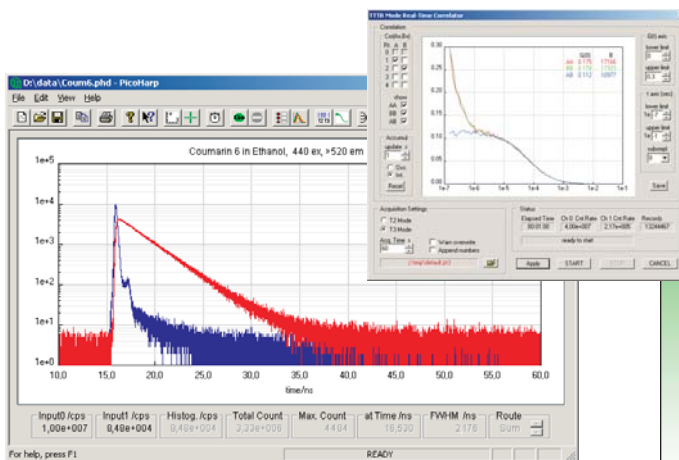
# PicoHarp 300



## Stand Alone TCSPC Module with USB Interface

- Two identical synchronized but independent input channels
- 65536 histogram time bins, minimum width 4 ps
- Count rate up to 10 million counts/sec
- Multi-stop capability for efficiency at low repetition rates
- Histogrammer measurement range from 260 ns to 33  $\mu$ s
- Multichannel routing capability\*
- Online Fluorescence Correlation Spectroscopy (FCS)\*
- Time-Tagged Time-Resolved (TTTR) mode\*
- External sync signals for imaging or other control\*

\* add-on option



## Applications

- Time-resolved fluorescence and luminescence spectroscopy
- Fluorescence Lifetime Imaging (FLIM)
- Single Molecule Spectroscopy (SMS)
- Quantum optics
- Time response characterization of optoelectronic devices
- Time-of-Flight (ToF) measurements
- Diffuse optical molecular imaging, optical tomography

# Stand Alone TCSPC Module with USB Interface

The PicoHarp 300 is a high-end, easy to use, plug and play Time-Correlated Single Photon Counting (TCSPC) system. It is connected to a PC through a USB 2.0 high speed interface. A new design approach provides identical synchronized but independent input channels. They can be used as detector inputs for coincidence correlation experiments or as a pair of start and stop inputs for TCSPC. It allows a forward start-stop operation even at full repetition rate of mode locked lasers with stable repetition rate up to 84 MHz. Experiments with low repetition rate benefit from the PicoHarp's multi-stop capability. The design allows high measurement rates up to 10 million counts/sec and provides a highly stable, crystal calibrated time resolution of 4 ps. This time resolution is well matched to the SPADs of the PDM series or micro-channel plate photomultiplier tubes. Overall IRF widths down to 50 ps can be achieved even with pulsed diode lasers. Both input channels are equipped with Constant Fraction Discriminators (CFD), sensitive on the falling edge.

A time-tagged mode for recording of individual photon events with their arrival time on both channels is available as an option, allowing the most sophisticated offline analysis of the photon dynamics. TTTR data can also be correlated in real-time for monitoring of FCS experiments at count rates up to 500.000 counts/sec. In TTTR mode, the device can be synchronized with other hardware such as scanners. As accessories external routers for connection of up to four detectors are available. External hardware such as monochromators can be controlled via CAN-bus.

The PicoHarp 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. A comprehensive online help function shortens the users' learning curve. A driver library for custom programming e.g. with LabVIEW™ is also available as an option. Software upgrades for extended functionality will be available with further product development.

## Options

Time-Tagged Time-Resolved (TTTR) mode  
DLL for custom programming  
4-channel router for PMTs / SPADs  
Data analysis software: FluoFit, SymPhoTime

## Specifications

<b>Measurement Channels</b> .....	Constant Fraction Discriminator
Input voltage range .....	0 to -800 mV, optimum: -200 mV to -400 mV
Trigger point .....	falling edge
Trigger pulse width .....	0.5 to 30 ns
Trigger pulse rise/fall time .....	2 ns max.
<b>Time to Digital Converter</b>	
Minimum time bin width .....	4 ps
Electrical time resolution .....	< 12 ps rms
Full scale range - histogram mode .....	260 ns to 33 $\mu$ s (depending on chosen resolution)
Full scale range - time-tagged mode .....	infinite
Maximum count rate .....	$10 \times 10^6$ counts/sec
Maximum sync rate .....	84 MHz
Sustained throughput time-tagged mode .....	typ. $5 \times 10^6$ events/sec
Dead time .....	< 95 ns
Differential non-linearity .....	< 5 % peak, < 1 % rms
<b>Histogrammer</b>	
Count depth .....	16 bit
Maximum number of time bins .....	65536
Collection time .....	1 ms to 100 hours
<b>Operation</b>	
PC interface .....	USB 2.0 high speed
PC requirements .....	1 GHz min. CPU clock, 512 MB memory
Operating system .....	Windows™ 2000/XP/Vista/7
Power consumption .....	25 W at 100 to 240 VAC

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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