

Simple-Tau 130 Table-Top TCSPC Systems

Time-correlated single photon counting systems in lap-top format

Based on bh SPC-130 or SPC-130EM TCSPC modules

Compact TCSPC system

Laptop computer with extension box

Coupled via fast bus extension interface

SPC-130 TCSPC module, DCC-100 detector controller

Picosecond time resolution

Time channel width down to 813 fs

Electronic IRF 7 ps fwhm, 2.5 ps rms

25 ps fwhm with MCP PMT

High count rate

Excellent timing stability

Photon distribution and parameter-tag modes

Standard fluorescence decay recording

Fast triggered sequential recording

Unlimited sequential recording by memory swapping

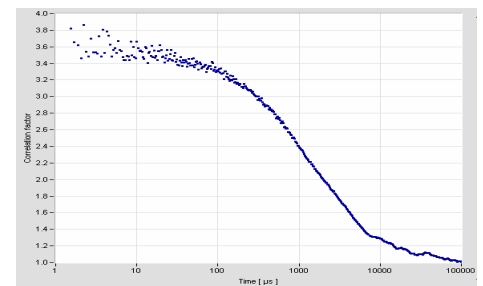
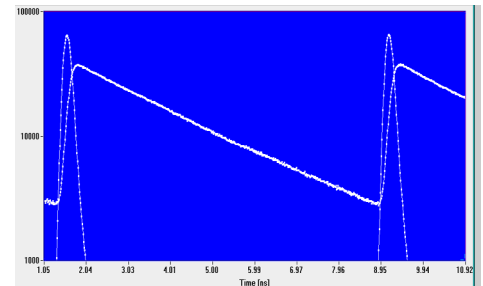
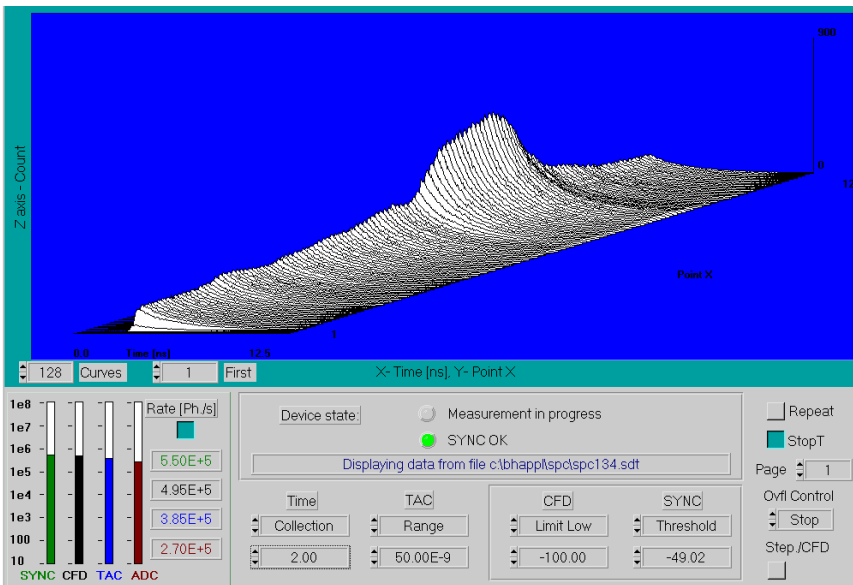
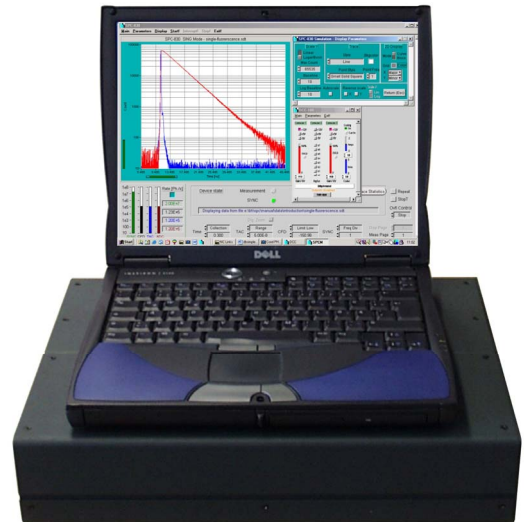
NIRS

Detection up to 1700 nm with id 220 InGaAs SPAD

FCS recording, single-molecule spectroscopy

64-bit operating software

Windows XP, Windows 7, Windows 8



Covered by patents DE 43 39 784 and DE 43 39 787



Becker & Hickl GmbH
 Nahmitzer Damm 30
 12277 Berlin, Berlin
 Tel. +49 / 30 / 787 56 32
 Fax. +49 / 30 / 787 57 34
 email: info@becker-hickl.com
 www.becker-hickl.com



Japan:
Tokyo Instruments Inc.
 sales@tokyoinst.co.jp
 www.tokyoinst.co.jp



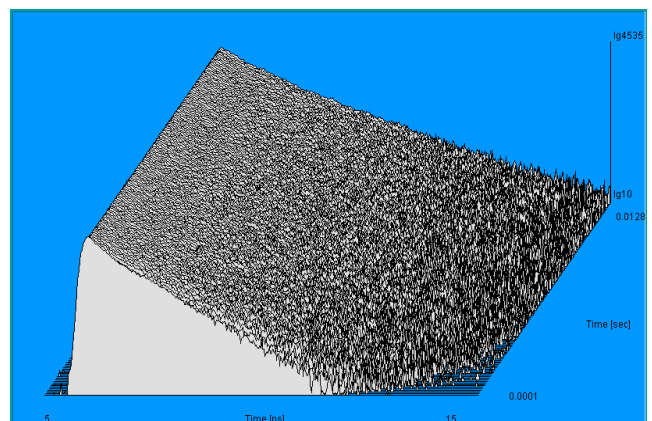
US Representative:
Boston Electronics Corp
 tcspc@boselec.com
 www.boselec.com



China:
DynaSense Photonics Co. Ltd.
 info@dyna-sense.com
 www.dyna-sense.com



UK Representative:
Photonic Solutions PLC
 sales@psplc.com
 www.psplc.com



Simple-Tau 130 Table-Top TCSPC Systems

Photon Channel

Principle	Constant Fraction Discriminator (CFD)
Time Resolution (FWHM / RMS, electr.)	8 ps / 5 ps
Opt. Input Voltage Range	- 50 mV to - 1 V
Min. Input Pulse Width	400 ps
Threshold	- 20 mV to - 500 mV
Zero Cross Adjust	- 100 mV to + 100 mV

Synchronisation Channel

Principle	Constant Fraction Discriminator (CFD)
Opt. Input Voltage Range	- 50 mV to - 1 V
Min. Input Pulse Width	400 ps
Threshold	- 20 mV to -500 mV
Frequency Range	0 to 200 MHz
Frequency Divider	1-2-4
Zero Cross Adjust	-100 mV to + 100 mV

Time-to-Amplitude Converters / ADCs

Principle	Ramp Generator / Biased Amplifier
TAC Range	50 ns to 2 us
Biased Amplifier Gain	1 to 15
Biased Amplifier Offset	0 to 100% of TAC Range
Time Range incl. Biased Amplifier	3.3 ns to 2 us
min. Time / Channel	813 fs
ADC Principle	50 ns Flash ADC with Error Correction
Diff. Nonlinearity	< 0.5% rms, typ. <1% peak-peak

Data Acquisition (Histogram Mode)

Method	on-board multi-dimensional histogramming process
Dead Time	100ns, independent of computer speed
Saturated Count Rate, per TCSPC channel / total	10 MHz
Useful count rate, per TCSPC channel / total	5 MHz
max. Number of Curves in Memory	4096 1024 256 64
Number of Time Channels / Curve	64 256 1024 4096
max. Counts / Time Channel	$2^{16}-1$
Overflow Control	none / stop / repeat and correct
Collection Time	0.1 us to 10000 s
Display Interval Time	100ms to 1000 s
Repeat Time	0.1 us to 1000 s
Sequential recording	Programmable Hardware Sequencer
Synchronisation with scanning	pixel, line and frame clocks from scanning microscope
Count Enable Control	1 bit TTL
Experiment Trigger	TTL

Data Acquisition (FIFO / Time-Tag Mode)

Method	Time-tagging of individual photons and continuous writing to disk
Dead Time	100 ns
Output Data Format (ADC / Macrotime / Routing)	12 / 12 / 3
FIFO buffer Capacity (photons)	128 k
Macro Timer Resolution, internal clock	50ns
Macro Timer Resolution, clock from SYNC input	10ns to 100ns
Curve Control (external Routing)	3 bit TTL
Count Enable Control	1 bit TTL
Waveform recording	online from time-tag data, up to 16 detector channels
No of counts per time channel	unlimited
FCS calculation	Multi-tau algorithm, online calculation and online fit

Detector control

Number of independently controlled detectors	one or two
Resolution of gain control	12 bit
Voltage Range Pin 12 of connector 1 and 3	0 to +10 V
Voltage Range Pin 13 of connector 1 and 3	0 to +0.9 V
Output Time Constant	100 ms
Detector overload shutdown	via TTL signal from PMC-100 detector module or preamplifier
Reset of overload shutdown	By Software and at Power-ON
Shutter control	8 independent high-current switches
Max. Switch Current, Single Switch	2 A
Max. Switch Current, Sum of all Switches	5 A
Max. turn-off Voltage at Switches	20 V
Control of thermoelectric coolers	for one or two detectors
Total output voltage	0 to 5 V
Output Current	0 to 2 A
Resolution of Output Voltage and Current	12 bit

Detectors, see individual data sheets

Standard detector	PMC-100-1 cooled PMT module
Optional	PMC-100-20 cooled NIR PMT module
Optional	HPM-100-40 and -50 GaAsP and GaAs hybrid detectors
Optional	R3809U MCP PMT, HVM-100 power supply module and HFA26-01 preamplifier
Optional	id100-20 and id100-50 single-photon APD modules
Optional	id220 InGaAs SPAD

Related Products

SPC-130 through SPC-830 TCSPC boards, Simple-Tau 150, 152, 154 systems, FLIM systems, MCPs, PMT modules, SPAD modules, multi-spectral detector assemblies, routing devices for multichannel TCSPC, preamplifiers, PIN and avalanche photodiode modules, ps diode lasers.

Related Literature

W. Becker, Advanced time-correlated single photon counting techniques. Springer 2005. Please contact bh for availability.
 W. Becker, The bh TCSPC Handbook, 6th edition. Available on www.becker-hickl.com
 PML-16-C 16 channel detector head for time-correlated single photon counting. User handbook. Available on www.becker-hickl.com
 DCS-120 Confocal Scanning FLIM Systems, handbook. Available on www.becker-hickl.com
 Modular FLIM systems for Zeiss LSM 510 and LSM 710 laser scanning microscopes, handbook. Available on www.becker-hickl.com
 BDL-SMN series picosecond diode lasers, user handbook. Available on www.becker-hickl.com
 Please see also www.becker-hickl.com, 'Literature', 'Application notes'



More than 20 years experience in multi-dimensional TCSPC. More than 1500 TCSPC systems worldwide.