



Simple-Tau 154 Table-Top TCSPC Systems

Four-Channel Time-Correlated Single Photon Counting Systems in Lap-Top Format

Four fully parallel SPC-150 TCSPC Channels

Laptop computer with extension box
Coupled via fast bus extension interface
Four parallel SPC-150 TCSPC modules

Picosecond time resolution

Time channel width down to 813 fs

Electronic IRF (Jitter) 6.5 ps fwhm, 2.5 ps rms

Unprecedented count rate

Unprecedented timing stability

Photon distribution and time-tag modes

Standard fluorescence decay recording

Fast triggered sequential recording

Unlimited sequential recording by memory swapping

High-throughput FLIM

FLIM by bh Megapixel Technology

Mosaic FLIM, PLIM, FLITS

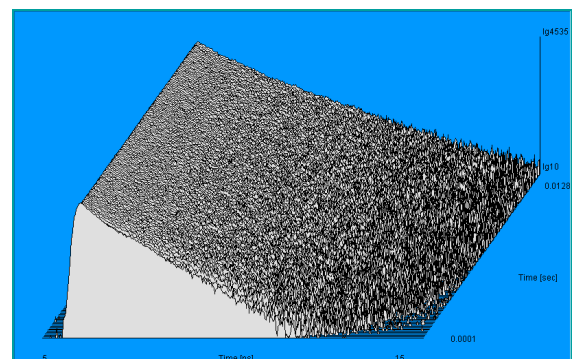
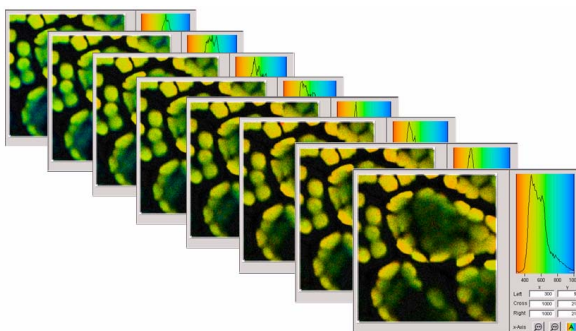
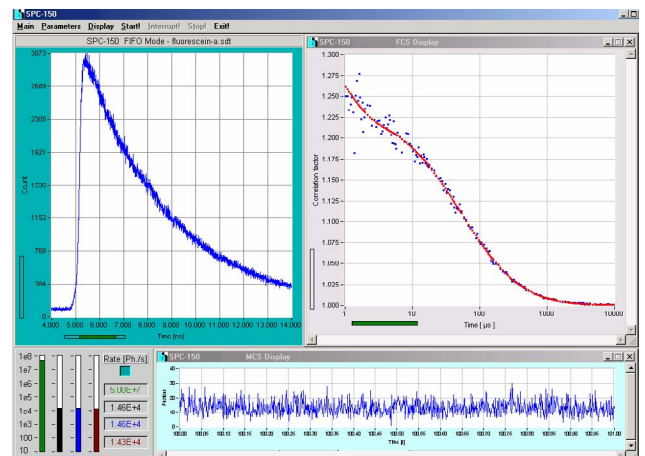
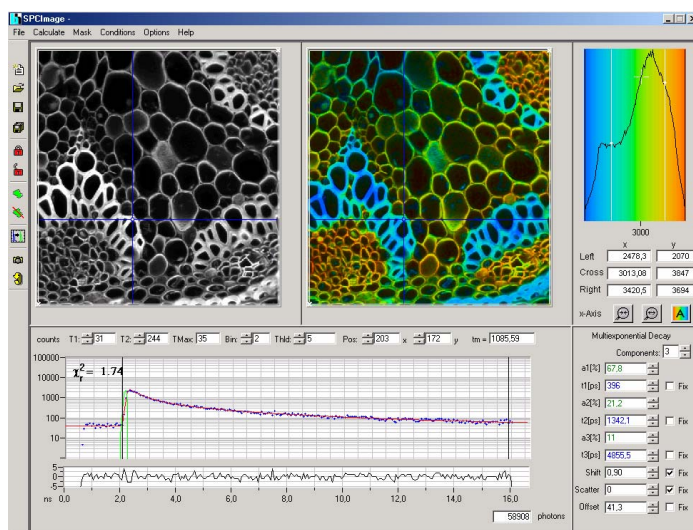
Multi-spectral FLIM

fNIRS, NIRS, diffuse optical correlation

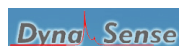
FCS, FCCS, single-molecule spectroscopy

64-bit operating software

Windows XP, Windows 7, Windows 8



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Simple-Tau 154 Table-Top TCSPC Systems

Photon Channels

Principle
Time Resolution (FWHM / RMS, electr.)
Opt. Input Voltage Range
Min. Input Pulse Width
Lower Threshold
Zero Cross Adjust

Constant Fraction Discriminator (CFD)
6.6 ps / 2.5 ps
- 30 mV to - 1 V
400 ps
0 to - 500 mV
- 100 mV to + 100 mV

Synchronisation Channels

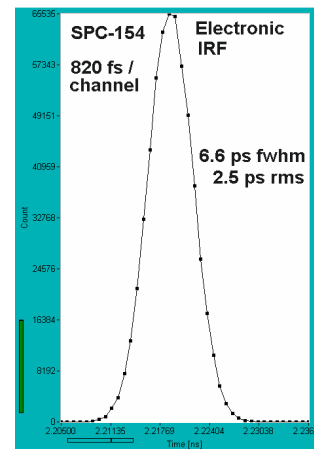
Principle
Opt. Input Voltage Range
Min. Input Pulse Width
Threshold
Frequency Range
Frequency Divider
Zero Cross Adjust

Constant Fraction Discriminator (CFD)
- 30 mV to - 1 V
400 ps
0 to - 500 mV
0 to 150 MHz
1-2-4
-100 mV to + 100 mV

Time-to-Amplitude Converters / ADCs

Principle
TAC Range
Biased Amplifier Gain
Biased Amplifier Offset
Time Range incl. Biased Amplifier
min. Time / Channel
ADC Principle
Diff. Nonlinearity

Ramp Generator / Biased Amplifier
50 ns to 5 us
1 to 15
0 to 100% of TAC Range
3.3 ns to 5 us
813 fs
50 ns Flash ADC with Error Correction
< 0.5% rms, typ. <1% peak-peak



Data Acquisition (Histogram Modes)

Method
Dead Time
Saturated Count Rate, per TCSPC channel / total
Useful count rate, per TCSPC channel / total
Number of Time Channels / Pixel
Image Resolution (pixels), 1 Detector Channel
max. Counts / Time Channel
Overflow Control
Collection Time
Display Interval Time
Repeat Time
Sequential Recording
Synchronisation with scanning
Curve Control (external Routing)
Count Enable Control
Experiment Trigger

on-board multi-dimensional histogramming process
100ns, independent of computer speed
10 MHz / 40 MHz
5 MHz / 20 MHz
1 4 16 64 256 1024 4096
2048 x 2048 1024 x 1024 512 x 512 256 x 256 128 x 128 64 x 64 32 x 32
2¹⁶-1
none / stop / repeat and correct
0.1 us to 10000 s
100ms to 1000 s
0.1 us to 1000 s
Programmable Hardware Sequencer, Unlimited recording by memory swapping, in curve mode and scan mode
pixel, line and frame clocks from scanning microscope
4 bit TTL
1 bit TTL
TTL

Data Acquisition (FIFO / Time-Tag Mode)

Method
Online Display
Waveform recording
FCS calculation
Image Acquisition in time-tag mode
Image resolution, 64-bit SPCM software, for each module
No of time channels
No. of pixels, 1 detector channel
No. of pixels, 16 detector channels
Dead Time
Output Data Format (ADC / Macrotime / Routing)
FIFO buffer capacity (photons, per TCSPC channel)
Macro Timer Resolution, internal clock
Macro Timer Resolution, clock from SYNC input
Curve Control (external Routing)
External event markers
Count Enable Control
Experiment Trigger

Time-tagging of individual photons and continuous writing to disk
Decay function, FCS, Cross-FCS, PCH, MCS traces, images
online from time-tag data, up to 16 detector channels
Multi-tau algorithm, online calculation and online fit
recording of pixel, line and frame pulses, online build-up of images by software
64 256 1024 4096
4096 x 4096 2048 x 2048 1024 x 1024 512 x 512
1024 x 1024 512 x 512 256 x 256 128 x 128
100 ns
12 / 12 / 4
2 M
25 ns, 12 bit, overflows marked by MTOF entry in data stream
10ns to 100ns, 12 bit, overflows marked by MTOF entry in data stream
4 bit TTL
4 bit, TTL
1 bit TTL
TTL

Related Products

SPC-134 EM 4-channel TCSPC modules
SPC-150 TCSPC modules
SPC-154 4-channel TCSPC modules
SPC-830 TCSPC modules
Simple-Tau 130 compact TCSPC systems
Simple-Tau 150 compact TCSPC systems
Simple-Tau 134 compact 4-channel TCSPC systems
Simple-Tau 830 TCSPC compact systems
DPC-230 16-channel ps photon correlator module

PMC-100 cooled PMT modules
HPM-100 GaAsP and GaAs hybrid detectors
PML-SPEC and MW-FLIM multi-wavelength detectors
R3809U MCP PMTs, with HVM-100 power supply module
id-100 SPAD detector modules
DCC-100 detector controller
HRT-41, HRT-81, HRT-82 routing modules
HFAC and HFAH preamplifiers
Detector / shutter assemblies

BDL-SMC picosecond diode lasers
BHL-600 picosecond diode lasers
BHL-700 picosecond diode lasers
DDG-200 laser multiplexing controller
GVD-100 scan controller
Pin-photodiode modules for sync to laser
SPCImage decay analysis
Optispec decay analysis

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.