



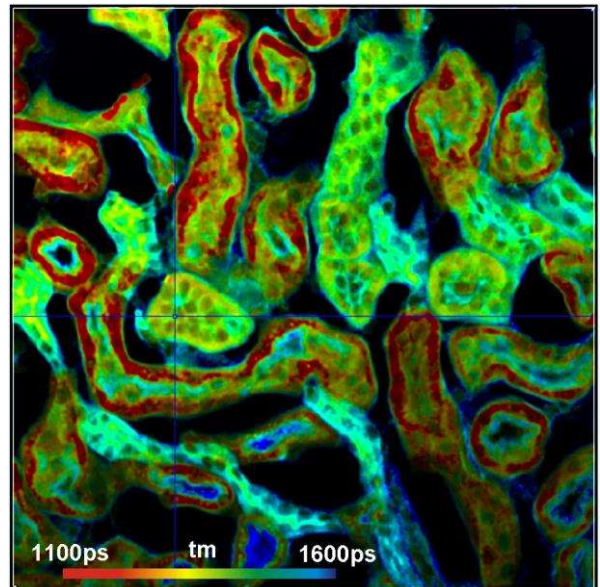
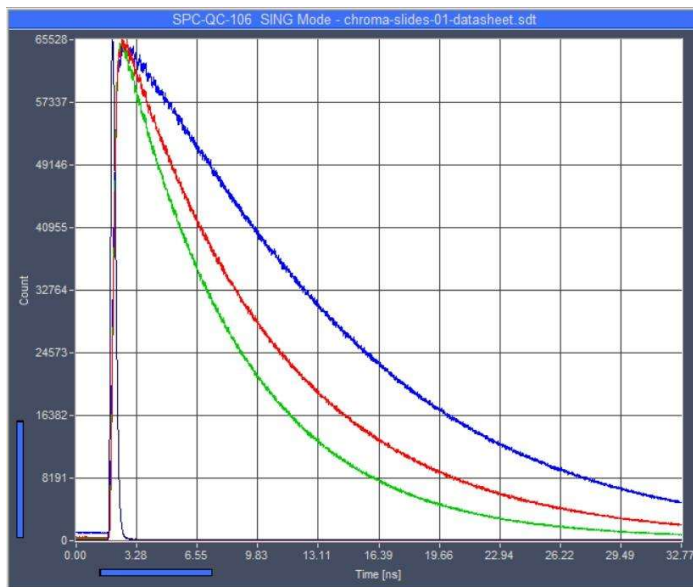
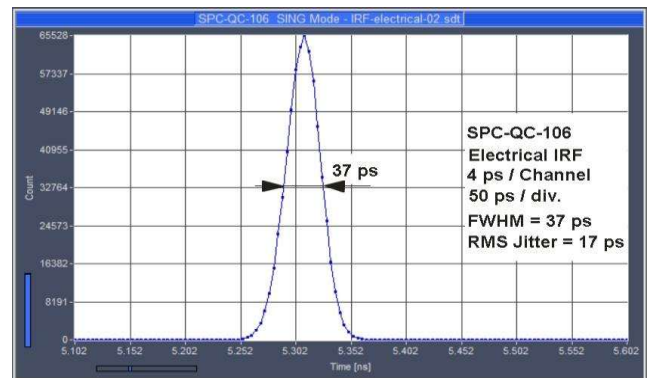
SPC-QC-106

TCSPC / FLIM Module

5 Channel Time-Correlated Single Photon Counting Module 6-Channel Time-Tagger Module

Five parallel TCSPC / FLIM channels plus
one synchronisation / reference channel or
Six parallel absolute timing channels
Constant-fraction discriminators in all inputs
Ultra-high discriminator bandwidth
Excellent timing stability
Low dead time
High peak count rate

Recording of optical waveforms
Parallel-Channel FLIM
Fast-acquisition FLIM
Excitation-multiplexed FLIM
Multi-wavelength FLIM
Photon time and parameter tagging
Fluorescence decay measurement
LIDAR
Antibunching experiments
Quantum correlation experiments
Molecular imaging
FRET experiments
Metabolic imaging
fNIRS and NIRS experiments
Single-molecule spectroscopy
Fluorescence correlation



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SPC-QC-103 TCSPC/FILIM Module

Photon Channels

No. of channels
Discriminator Principle
Discriminator Input Bandwidth
Optimum Input Voltage Range
Min. Input Pulse Width
Threshold
Zero Cross Adjust

5 or 6
Constant Fraction Discriminators (CFDs)
4 GHz
- 30 mV to - 500 mV
200 ps
0 to - 250 mV
- 100 mV to + 100 mV

Synchronisation Channel / Fourth Photon Channel

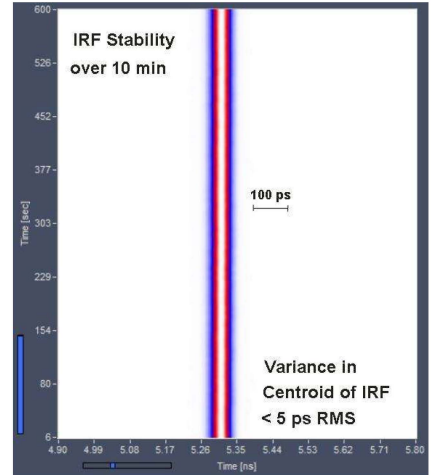
Discriminator Principle
Discriminator Input Bandwidth
Optimal Input Voltage Range
Min. Input Pulse Width
Discriminator Threshold
Zero Cross Adjust
Adjustable Delay
Frequency Range
SYNC Frequency Divider

Constant Fraction Discriminator (CFD)
4 GHz
- 30 mV to - 500 mV
200 ps
0 to - 250 mV
-100 mV to + 100 mV
 ± 128 ns
0 to 120 MHz
1 - 2 - 4

Time-Measurement Circuitry

Principle
IRF Width, FWHM
RMS Timing Jitter, typical
Time Range, at 4096 time channels
Min. Time Channel Width
Timing stability, range 16 ns, over 10 minutes
Diff. Nonlinearity
Dead Time

Time-to-Digital Converter
< 38 ps, FWHM
17 ps
16 ns to 68 us
4 ps
< 5 ps RMS
< 1 % RMS
8 ns

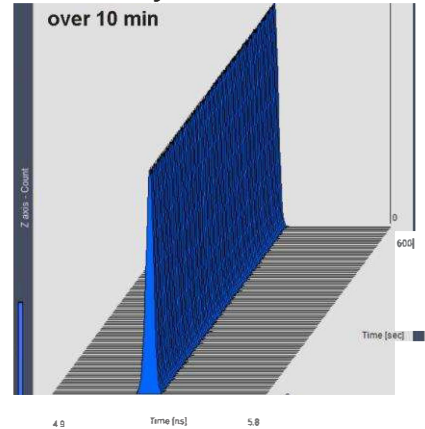


Data Acquisition (Histogram Modes)

Method
Peak Count Rate, each channel
Saturated count rate, continuous
Max. Counts / Time Channel (Counting Depth)
Max. No. of Time Channels
Min. Time Channel Width
Overflow Control
Collection Time
Display Interval Time
Repeat Time
Synchronisation with Scanning (Imaging Mode)
Routing
Count Enable
Experiment Trigger

on-board multi-dimensional hardware histogramming process
120 MHz
40 MHz
 $2^{16}-1$
65,536
4 ps
none / stop / repeat and correct
0.1 us to 100,000 s
10 ms to 100,000 s
0.1 us to 100,000 s
pixel, line and frame clocks from scanning device
4 bit TTL
1 bit TTL
TTL

IRF Stability over 10 min



Data Acquisition (FIFO / Parameter-Tag and Absolute-Time Mode)

Method
Online Display
FCS Calculation
Number of Counts of Decay / Waveform Recording
Peak Count Rate
Sustained Count Rate (Bus-Transfer Limited)
Max. Counts / Time Channel (Counting Depth)
Max. No. of Time Channels
On-board FIFO Buffer Capacity (Photons, per Channel)
Macro Timer Resolution, Internal Clock
Micro Time Resolution / min. Time Channel Width
Routing
External Event Markers
Experiment Trigger

Parameter-tagging of individual photons, continuous writing to disk
Decay function, FCS, Cross-FCS, PCH, MCS traces
Multi-tau algorithm, online calculation and online fit
unlimited
120 MHz
40 MHz
unlimited
4096
1,750,000
2 ns, overflows marked by MTOF entry in data stream
4 ps
4 bit, TTL/CMOS
4 bit, TTL/CMOS
TTL/CMOS

Data Acquisition, FIFO Imaging

Method
Min. Time Channel Width
Online Display

Synchronisation with Scanner
Routing / Wavelength / Laser-Multiplexing Channels
Image Format, 1 Image per Channel
No. of Time Channels
No. of Pixels

Buildup of images from time- and wavelength tagged data
4 ps
Intensity images or lifetime images, simultaneous FLIM / PLIM
Decay curves in regions of interest
via Frame Clock, Line Clock, and Pixel Clock pulses
1 to 16

64	256	1024	4096
4096 x 4096	2048 x 2048	1024 x 1024	512 x 512

Operation Environment

Operating System
Bus Connector (Slot type)
Total Power Consumption
Dimensions

Windows 10, Windows 11
PCI-ex
approx. 15 W from +12V
250 mm x 110 mm x 15 mm

Related Products

SPC-QC-104 three/four-channel TCSPC module, SPC-QC-008 seven / eight-channel TCSPC module, SPC-180N, SPC-180NX, SPC-180NXX TCSPC modules, HPM-100 hybrid detectors, DCC-100PCIe detector controller, BDS-SM ps diode lasers, BDS-MM picosecond diode lasers, SPCImage NG data analysis software

Related Literature

SPC-QC-104, user manual. 92 pages, available on <https://www.becker-hickl.com>
W. Becker, The bh TCSPC Handbook, 10th edition (2023). 1030 pages, available on <https://www.becker-hickl.com>. Please contact bh for printed copies
The bh TCSPC Technique, Principles and Applications. Overview brochure, 27 pages, available on <https://www.becker-hickl.com>

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超高真空・極低温走査型プローブ顕微鏡
高速分光測定装置、クライオスタット



Nd:YAGレーザー、Ti:Sレーザー
QPOレーザー

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