



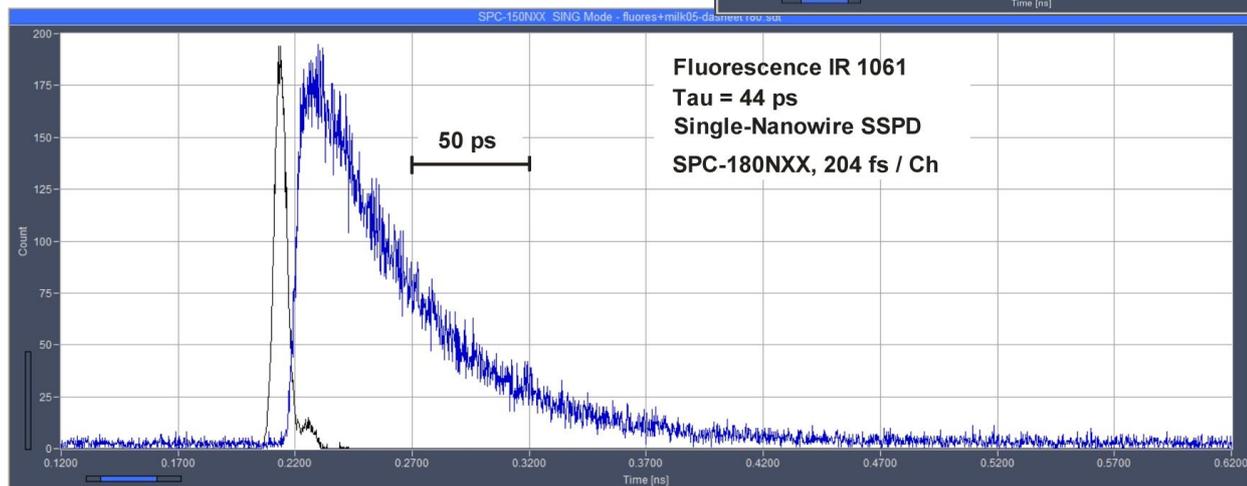
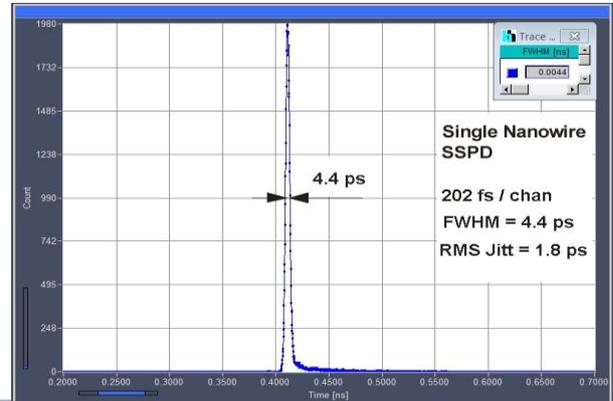
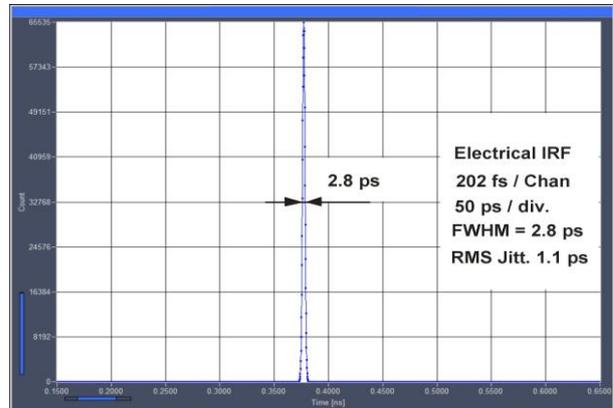
SPC-180NXX

Ultrafast TCSPC Module

Time-Correlated Single Photon Counting Module for Ultra-Fast Detectors

- High-throughput PCI-Express interface
- Ultra-fast, ultra-stable timing electronics
- Electrical IRF width < 3 ps FWHM
- Internal RMS timing jitter 1.1 ps
- Minimum time channel width 203 fs
- Ultra-high IRF stability
- Input discriminator bandwidth 4 GHz
- Photon distribution and parameter-tag modes
- Multi-detector / multi-wavelength capability
- Dual time-base operation
- Parallel operation of modules
- Laser repetition rates up to 150 MHz
- Saturated count rate 10 MHz

- Ideal for superconducting NbN detectors (SSPDs)
- Ultra-fast fluorescence lifetime experiments
- Ultra-fast light scattering experiments
- Anti-bunching experiments
- Multi-wavelength lifetime experiments
- Recording of transient fluorescence lifetime effects
- Single-wavelength FLIM, multi-wavelength FLIM
- High-resolution FLIM, time-series FLIM
- Mosaic FLIM, lateral, longitudinal, temporal mosaics
- Simultaneous PLIM and FLIM
- FLITS
- Double-exponential FRET imaging
- Recording of Ca²⁺ transients
- fNIRS and NIRS experiments
- Single-molecule spectroscopy
- FCS, FCCS, PCH



Becker & Hickl GmbH
Nunsdorfer Ring 7-9
12277 Berlin, Berlin
Tel. +49 / 30 / 212 80 02 0
Fax. +49 / 30 / 212 80 02 13
email: info@becker-hickl.com
www.becker-hickl.com



More than 28 years experience in TCSPC. More than 2500 TCSPC systems worldwide.



SPC-180NXX

Ultrafast TCSPC Module

Photon Channel

- Principle
- Discriminator Input Bandwidth
- IRF Width, FWHM
- RMS Timing Jitter
- Variance in Time of IRF Centroid
- Optimum Input Voltage Range
- Min. Input Pulse Width
- Threshold
- Zero Cross Adjust

- Constant Fraction Discriminator (CFD)
- 4 GHz
- <3 ps, FWHM
- 1.1 ps, RMS
- <0.4 ps RMS over 100 seconds
- 30 mV to - 500 mV
- 200 ps
- 0 to - 250 mV
- 100 mV to + 100 mV

Synchronisation Channel

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

- Constant Fraction Discriminator (CFD)
- 4 GHz
- 30 mV to - 500 mV
- 200 ps
- 0 to - 250 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, Electrical

- Ramp Generator / Biased Amplifier
- 12.5 ns, 25 ns, 50 ns
- 1 to 15
- 0 to 50 % of TAC Range
- 0.834 ns to 50 ns
- 203 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
- Max. Counts / Time Channel (Counting Depth)
- Overflow Control
- Collection Time
- Display Interval Time
- Repeat Time
- Sequential Recording
- Synchronisation with Scanning
- Routing
- Count Enable
- Experiment Trigger

- on-board multi-dimensional hardware histogramming process
- 100 ns, independent of computer speed
- 10 MHz
- 2¹⁶-1
- 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
- Unlimited recording by memory swapping
- pixel, line and frame clocks from scanning device
- 7 bit TTL
- 1 bit TTL
- TTL

Data Acquisition (FIFO / Parameter-Tag Mode)

- Method
- Online Display
- FCS Calculation
- Number of Counts of Decay / Waveform Recording
- Dead Time
- Saturated Count Rate, Peak
- Sustained Count Rate (Bus-transfer Limited)
- Max. Counts / Time Channel (Counting Depth)
- Output Data Format (ADC / Macrotime / Routing)
- FIFO Buffer Capacity (Photons)
- Macro Timer Resolution, Internal Clock
- Macro Timer Resolution, Clock from SYNC Input
- Routing
- Count Enable
- External Event Markers
- Experiment Trigger

- Parameter-tagging of individual photons and continuous writing to disk
- Decay function, FCS, Cross-FCS, PCH, MCS traces
- Multi-tau algorithm, online calculation and online fit
- unlimited
- 80 ns
- 10 MHz
- typ. 4 MHz
- unlimited
- 12 / 12 / 4 bit
- 2¹⁰
- 50 ns, 12 bit, overflows marked by MTOF entry in data stream
- 10 ns to 100 ns, 12 bit, overflows marked by MTOF entry in data stream
- 4 bit TTL
- 1 bit TTL
- 4 bit, TTL
- TTL

FLIM Data Acquisition, FIFO Imaging Mode

- Method
- Online Display
- Synchronisation with Scanner
- Detector / Wavelength Channels
- Image Resolution, 64-bit SPCM Software
- No. of Time Channels
- No. of Pixels, 1 Detector Channel
- No. of Pixels, 16 Detector Channels

- Buildup of images from time- and wavelength tagged data
 - up to 8 images in different time and wavelength windows or from different modules 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 |
| 1024 x 1024 | 512 x 512 | 256 x 256 | 128 x 128 |

Operation Environment

- Computer System
- Bus Connectors
- Used PCI Slots
- Total Power Consumption
- Dimensions

- PC Pentium, multi-core, >8GB RAM, Windows 10, Windows 11
- PCI-ex
- 1
- approx. 12 W from +12V
- 240 mm x 130 mm x 15 mm

Related Products

- SPC-180N, SPC-180NX TCSPC modules
- SPC-150N, SPC-150NX, SPC-150NXX TCSPC Modules
- DCS-120 FLIM Systems

- HPM-100 detectors
- PML-SPEC and MW-FLIM multi-wavelength detectors
- PMC-150 cooled PMT modules

- DCC-100 detector controller
- BDL-SMN ps diode lasers
- BDS-SM, -SMY, -MM picosecond diode lasers

Related Literature

4.4 ps IRF width of TCSPC with an NbN Superconducting Nanowire Single Photon Detector. Application note, please see www.becker-hickl.com
 W. Becker, The bh TCSPC Handbook, 9th edition (2021). Available on www.becker-hickl.com. Contact bh for printed copies.

International Sales Representatives



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



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



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



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

