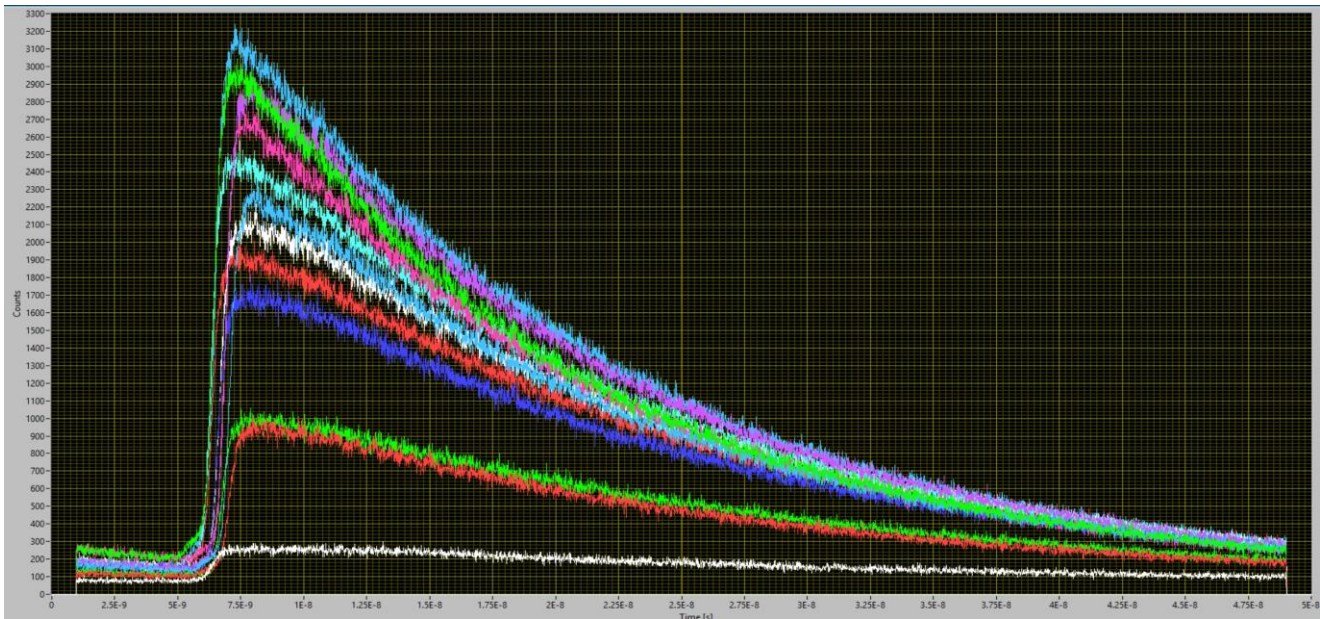
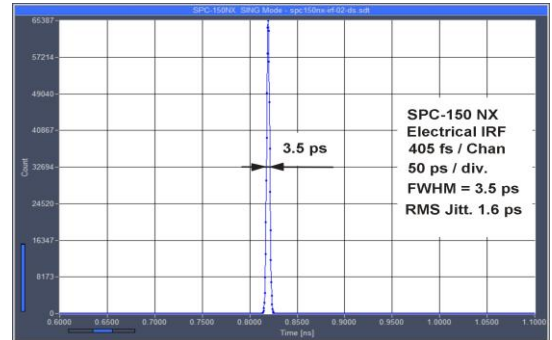




# Max-Tau 12-Channel TCSPC System

## 12-Channel Fully Parallel TCSPC System

- 12 SPC-150NX modules in 19" Case
- High throughput rate
- No crosstalk between channels
- Excellent time resolution
- Internal timing jitter 1.6 ps RMS (3.5 ps FWHM)
- Minimum time channel width 407 fs
- Ultra-high IRF stability
- Input discriminator bandwidth 4 GHz
- Saturated count rate 10 MHz per channel



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More than 25 years experience in multi-dimensional TCSPC. More than 2000 TCSPC systems worldwide.

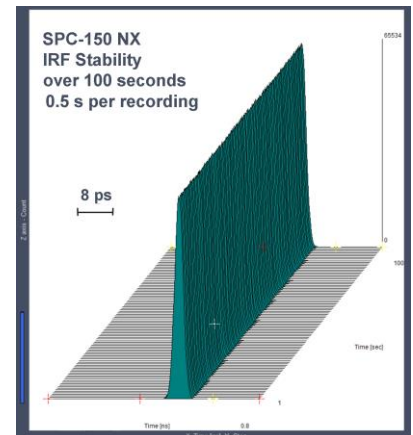


# Max-Tau 12-Channel TCSPC System

## 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  
 <3.5 ps, FWHM  
 1.6 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

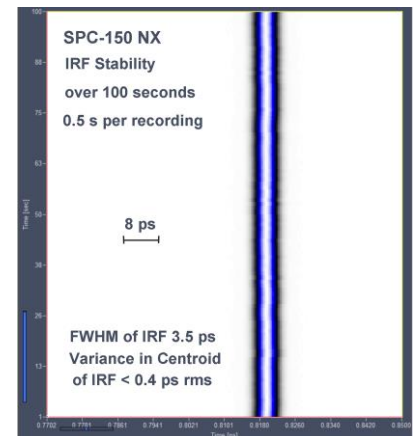
Principle  
 Discriminator Input Bandwidth  
 Optimal Input Voltage Range  
 Min. Input Pulse Width  
 Threshold  
 Frequency Range  
 SYNC Frequency Divider  
 Zero Cross Adjust

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  
 25 ns to 2.5 us  
 1 to 15  
 0 to 50 % of TAC Range  
 1.67 ns to 2.5 us  
 407 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 (each channel)  
 Useful count rate (each channel)  
 max. Counts / Time Channel (counting depth)  
 Overflow Control  
 Collection Time  
 Display Interval Time  
 Repeat Time  
 Sequential Recording  
 Synchronisation with Scanners  
 Routing  
 Count Enable  
 Experiment Trigger

on-board multi-dimensional hardware histogramming process  
 100 ns, independent of computer speed  
 10 MHz  
 5 MHz  
 $2^{16}-1$   
 none / stop / repeat and correct  
 0.1 us to 100,000 s  
 10 ms to 100,000 s  
 1 ms 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 (each channel)  
 max. counts / time cChannel (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  
 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  
 100 ns  
 10 MHz  
 unlimited  
 12 / 12 / 4 bit  
 $2 \cdot 10^6$   
 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  
 4 bit, TTL  
 TTL

## Computer Interface

Principle

High-speed parallel Interface

## Related Literature

W. Becker, The bh TCSPC Handbook, 7th edition (2017). Available on [www.becker-hickl.com](http://www.becker-hickl.com). Contact bh for printed copies.

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