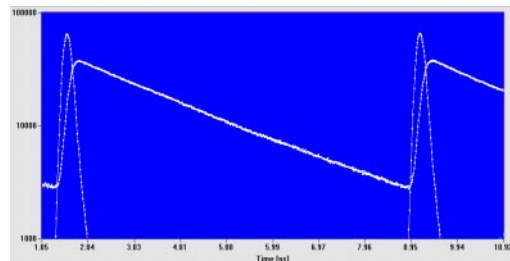


# The TCSPC General Solution

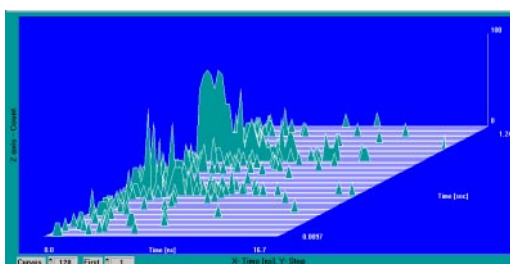
# SPC-600/630

## Time-Correlated Single Photon Counting Modules with dual Memory and PCI Bus

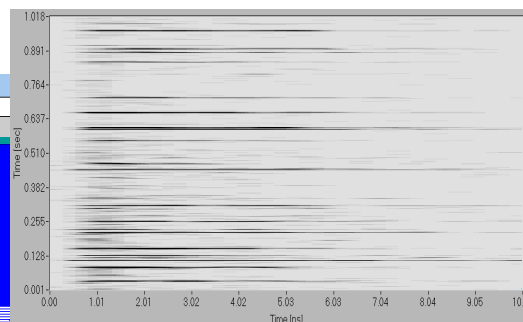
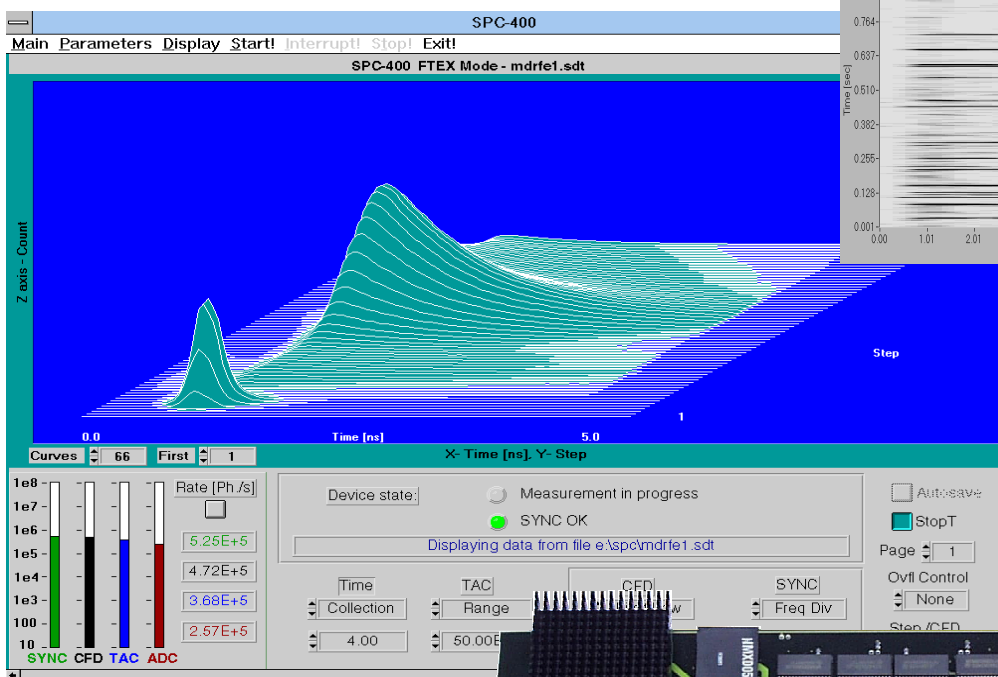
- ◆ Complete TCSPC Systems on single PC Boards
- ◆ Dual Memory Architecture: Unlimited Sequential Curve Recording
- ◆ Histogram Mode: Recording of Decay Curves
- ◆ FIFO Memory Mode: Continuous Recording by BIFL Method
- ◆ Reversed Start/Stop: Repetition Rates up to 200 MHz
- ◆ Electrical Time Resolution down to 8 ps FWHM / 5 ps rms
- ◆ Channel Resolution down to 813 fs
- ◆ Up to 4096 Time Channels / Curve
- ◆ Ultra High Count Rate: Up to 8 MHz (125 ns Dead Time)
- ◆ Measurement Times down to 0.1 ms
- ◆ Multi Detector Capability: Up to 128 Detector Channels
- ◆ Software Versions for Windows 95 / 98 / 2000 / NT
- ◆ Optional Step Motor Controller for Wavelength or Sample Scanning
- ◆ Direct Interfacing to most Detector Types
- ◆ Single Decay Curve Mode
- ◆ Oscilloscope Mode
- ◆ Multiple Decay Curve Mode (Wavelength, Time or User Defined)
- ◆ Spectrum Scan Mode with 8 Independent Time Windows
- ◆ Multichannel X-Y-t-Mode
- ◆ Continuous Flow and BIFL Mode for Single Molecule Detection



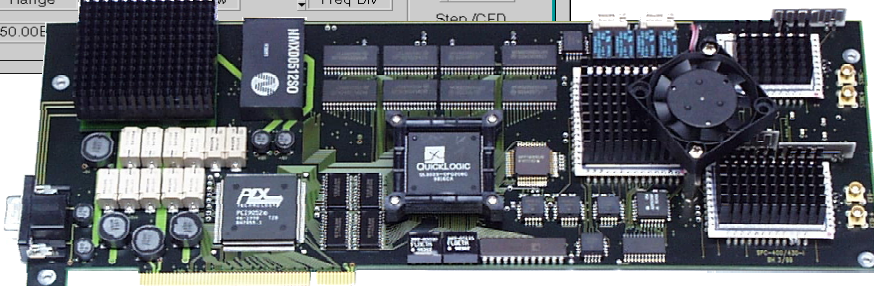
'Single' Mode: Decay curves measured within seconds



'Continuous Flow' Mode: Fluorescence decay from single molecules



'BIFL' Mode: Traces of single molecules



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Covered by patents DE 43 39 784 A1 and DE 43 39 787 A1

# SPC-600

# SPC-630

## Photon Channel

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

SPC-600	SPC-630
Constant Fraction Discriminator	Constant Fraction Discriminator
13 ps / 7 ps	8 ps / 5 ps
$\pm 10$ mV to $\pm 80$ mV	- 50 mV to - 1 V
5 mV to 80 mV	- 20 mV to - 500 mV
5 mV to 80 mV	-
-10 mV to + 10 mV	- 100 mV to + 100 mV

## Synchronisation Channel

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

SPC-600	SPC-630
Constant Fraction Discriminator	Constant Fraction Discriminator
$\pm 10$ mV to $\pm 50$ mV	- 50 mV to - 1 V
-	- 20 mV to -500 mV
	0 to 200 MHz
	1-2-4-8-16
-10 mV to + 10 mV	-100 mV to + 100 mV

## Time-to-Amplitude Converter / ADC

Principle  
TAC Range  
Biased Amplifier Gain  
Biased Amplifier Offset  
Time Range incl. Biased Amplifier  
min. Time / Channel  
TAC Window Discriminator  
ADC Principle  
Diff. Nonlinearity (dith. width 1/8)

Ramp Generator / Biased Amplifier  
50 ns to 2 us  
1 to 15  
0 to 100% of TAC Range  
3.3 ns to 2 us  
813 fs  
Any Window inside TAC Range  
50 ns Flash ADC with Error Correction  
< 0.5 % rms, typically 0.6 to 1% peak-peak

## Data Acquisition (Histogram Modes)

Method  
Dead Time  
max. Number of Curves in Memory  
max. Number of Detector Channels  
Number of Time Channels / Curve  
max. Counts / Channel  
Overflow Control  
Collection Time  
Display Interval Time  
Repeat Time  
Curve Control (internal)  
Curve Control (external Routing)  
Add/Sub (Lock-in) Control  
Count Enable Control  
Control Signal Latch Delay

on-board 2-dimensional histogramming process  
125ns, independent of computer speed

4096	1024	256	64
128	128	128	32
64	256	1024	4096

$2^{16}-1$   
none / stop / repeat and correct  
0.1 us to 10000 s  
10ms to 1000 s  
0.1 ms to 1000 s  
Programmable Hardware Sequencer  
7 bit TTL  
1 bit TTL  
1 bit TTL  
0 to 255 ns

## Data Acquisition (FIFO / BIFL Mode)

Method  
Dead Time  
Output Data Format (ADC / Macrotime / Routing)  
FIFO buffer Capacity (photons)  
Macro Timer Resolution  
Curve Control (external Routing)  
Count Enable Control  
Routing Signal Latch Delay

Time-tagging of individual photons and continuous writing to disk

150 ns	125 ns
12 / 24 / 8	8 / 17 / 3
128 k	256 k
50ns, 24 bit	50ns, 17 bit
8 bit TTL	3 bit TTL
	1 bit TTL
	0 to 255 ns

## Operation Environment

Computer System  
Bus Connector  
Power Consumption  
Dimensions

PC Pentium or 486  
PCI  
approx. 20 W at +5V, 0.7 W at +12V  
312 mm x 122 mm x 28 mm

## Multi Module Systems

Number of modules operable parallel

4

## Accessories and Associated Products

Detectors (MCPs, PMTs), Multichannel Detector Heads, Routing Devices for Multichannel Measurements, Step Motor Controllers, Preamplifiers, PIN and Avalanche Photodiode Modules, ps Diode Lasers. Also available: SPC-134, SPC-700 and SPC-730 time-correlated single photon counting modules, gated photon counters and multiscalers. Please call for individual data sheets and descriptions. For TCSPC imaging applications please see SPC-700/730 data sheets, for ultra-high count rate please see SPC-134 data sheet.

Please visit our web site to download the manual, the device software and application notes.



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