



Specifications subject to change without notice

NDL developed a Time Correlated Photon Counter (TCPC) for the accurate and easy measurement of ultra-low level light, such as compact and cost-effective fluorescence measurement, LiDAR (light detection and ranging) application and point-of-care testing (POCT), etc.

TCPC01 can be switched to one of the three operating modes: free photon counting and Poisson statistics counting with internal or external light sources. A conventional and fast photon counting is performed in the free photon counting mode. Regarding Poisson statistics counting with an internal light source, an internal electrical pulse source is provided to drive LED, the Poisson statistics algorithm and double time gate windows technique are applied, which reduce bad effects associated with correlated noise, dark count fluctuation and temperature shift for SiPMs; both the number and arriving time of incident photons can be obtained. For Poisson statistics counting with an external light source, because a narrower pulsed light source and a narrower time gate can be adopted, lower detection limit and higher time resolution can be achieved.

It is composed of three building blocks: Bias & DAQ, Preamplifier and Detector Boards, from which users can conveniently reassemble and develop other special function instruments according to different needs. A user's manual is provided for operation guidelines.

Features and Applications

- Measure both the number and arrival time of photons
- Multi-mode alternative and cost effective
- Compatible with most commercial SiPMs
- Compatible with the TCPC technique

- ♦ POCT, LiDAR
- SiPM characterizing
- Polymerase chain reaction (PCR)
- Fluorescence lifetime and intensity measurement

Specifications

Blocks	Parameters	Value
Bias & DAQ Board	Supply Voltage	+5 V (USB/Terminal type-2.54-2Pin)
	Supply Current	150 mA
	Bias Voltage Range	20 ~ 55 V
	Adjustable Resolution of Bias Voltage	100 mV
	Threshold Voltage Range	$0 \sim 2.5 \text{ V}$
	Adjustable Resolution of Threshold Voltage	0.6 mV
	Time Resolution	87 ps
	Dynamic Range	<1E-4 p.e. ~ 10 p.e. (Poisson Counting) < 1 kHz ~ 10 MHz (Free Counting)
	Communication Protocol	UART
	Communication Connector	USB/ Terminal type-1.5-3Pin
Preamplifier Board	Gain	52 dB (20000 V/A)
	Amplifier Output Max Vpp	2 V
	Comparator Input Frequency	100 MHz
Detection Board	Specifications	Same as the employed SiPM



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Block diagram & Characteristic curves



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