

Single Photon Counting Module COUNT® Q Series

Description

Laser Components' COUNT® Q series of Single Photon Counting Modules has been developed to offer a unique combination of high quantum efficiency, wide dynamic range and ease of use for photon counting applications. Combining a low noise InGaAs/InP single photon avalanche diode with specially developed quenching and signal processing electronics developed together with AIT GmbH, the module offers everything needed for free-running single photon detection from 950 – 1600 nm. Incoming photons generate corresponding electrical pulses which may be conveniently read out at the TTL output. The FC connector provides a convenient method for connecting the module to the sample using a singlemode optical fiber.



Features

- Low dark count rates
- Low afterpulsing probability
- High detection efficiency (950 nm - 1600 nm)
- 0.1 - 5 μ s adjustable deadtime
- Free-running mode
- FC fiber connector
- TTL output pulse at SMA connector
- Single 12 V DC supply operation
- USB interface (LabVIEW)

Applications

- Quantum optics, quantum cryptography
- Fiber optics characterization
- Time Correlated Single Photon Counting (TCSPC)
- Fluorescence life time spectroscopy, Raman spectroscopy

Technical Specifications for COUNT® Q Module

Parameter	Min.	Typ.	Max.	Unit
Spectral range	950		1600	nm
Dark count rate ¹		1000		Counts/s
Photon detection efficiency at 1550 nm ²		10		%
Timing resolution		350		ps
Afterpulsing probability ¹		1		%
Dead time range ²	0.1		5	µs
TTL output pulse amplitude (into 50 Ohm)		2.5		V
Supply voltage	11.5	12.0	12.5	V
Supply current		7		A

¹ Dark count rate and afterpulsing probability vary with detection efficiency (see Fig. 2 and 3)

² Detection efficiency and dead time may be user-defined via the supplied LabView software

Absolute Maximum Ratings

	Min.	Typ.	Max.	Unit
Supply voltage	11.5	12.0	12.5	V
Operating temperature	10		30	°C
Storage temperature	-20		70	°C
Count rate			10	MCOUNTS/s

Warranty

A standard 12-month warranty following shipment applies. Any warranty is null and void if the module case has been opened. Warranty is void if the module input exceeds 12.5 V.

ESD Information

Modules should only be handled at an ESD-safe work station.

Individual Module Test Data

Each module is supplied with test data indicating the module's actual dark count, dead time, photon detection efficiency @ 1550 nm and afterpulsing probability.

Safety

The COUNT® Q Series contains a high voltage power supply. Users may be injured if the case is opened. All internal settings are pre-set; there are no user adjustments.

Units that appear defective or have suffered mechanical damage should not be used because of possible electrical shorting of the high voltage power supply. Opening the case may damage sensitive components and expose the user to the risk of electrical shock. Please contact factory for repairs.



RoHS Compliance

The COUNT® Q Series is designed and built to be fully compliant with the European Union Directive 2002/95/EC.

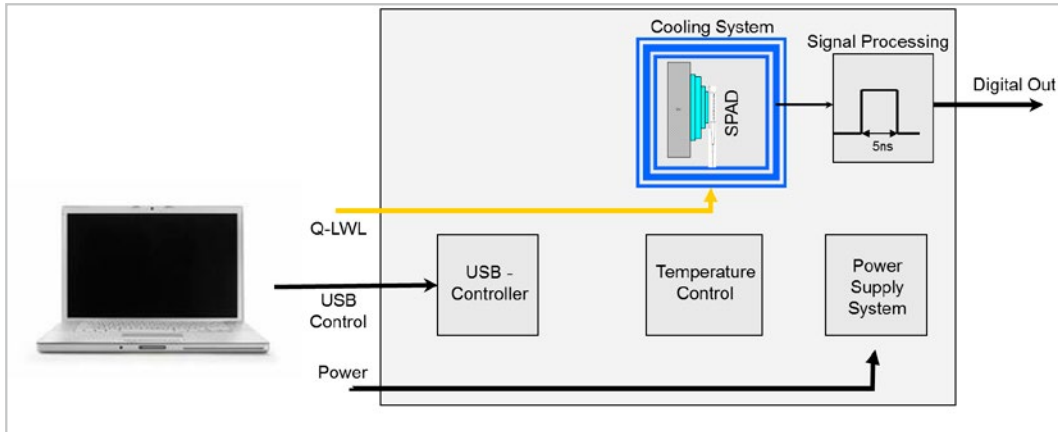


Fig. 1: Schematic block diagram of the COUNT® Q module

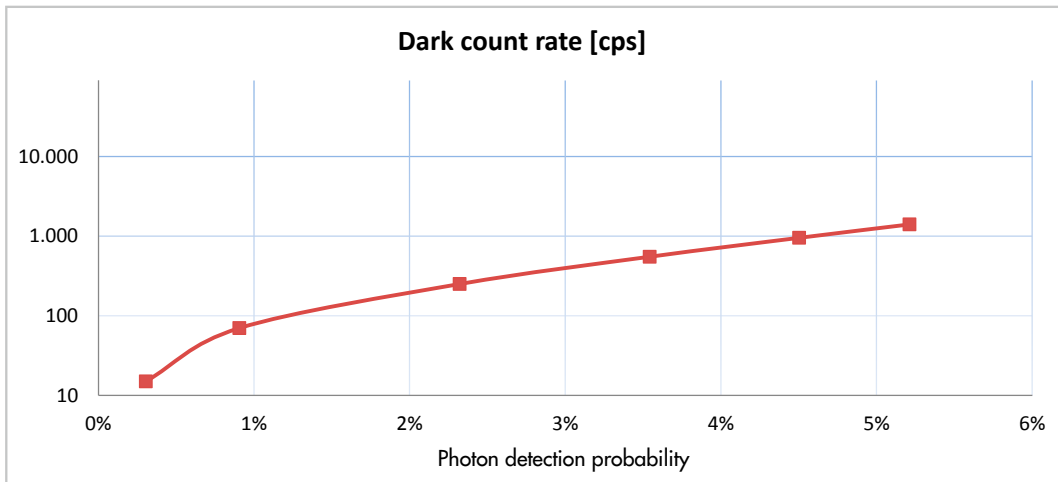


Fig. 2: Typical dark count rate vs. detection efficiency under normal operating conditions

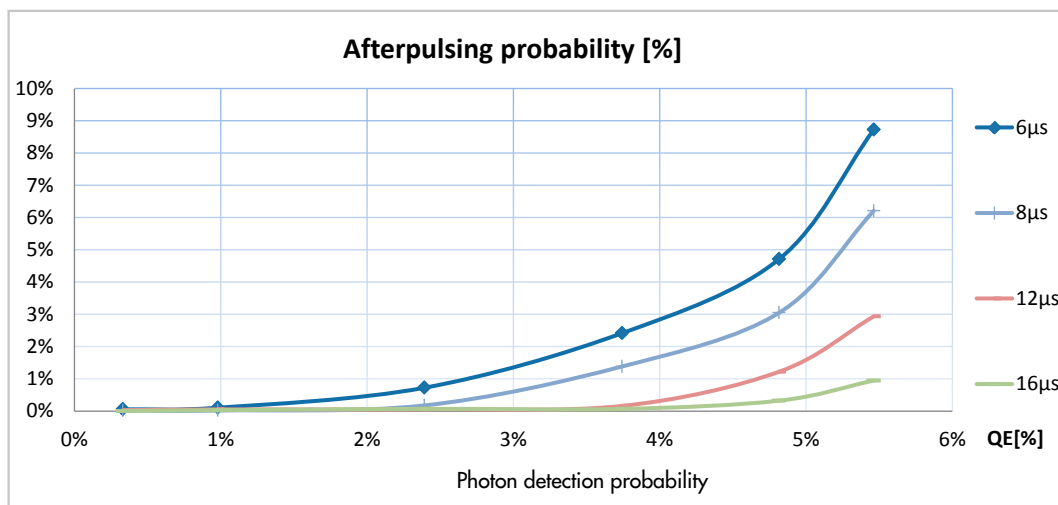


Fig. 3: Estimated afterpulsing probability vs. detection efficiency under normal operating conditions

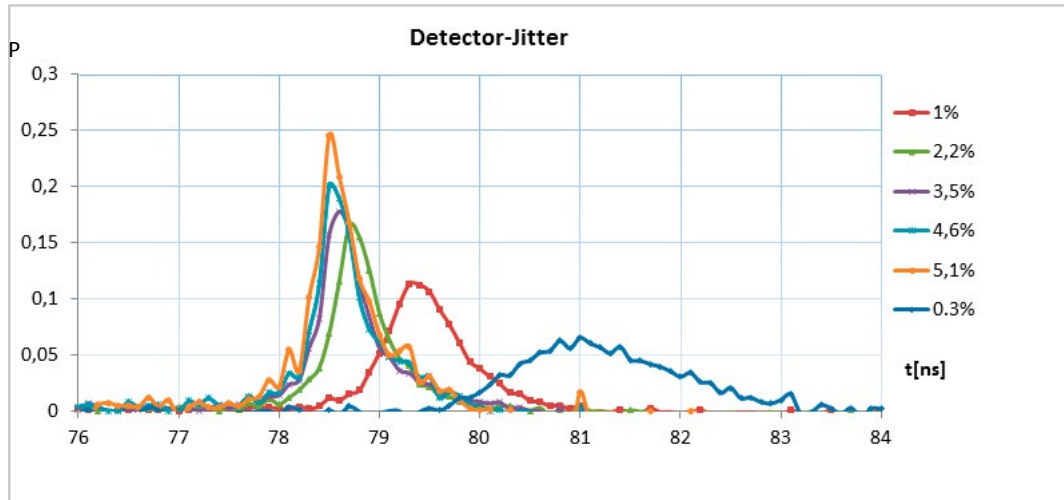
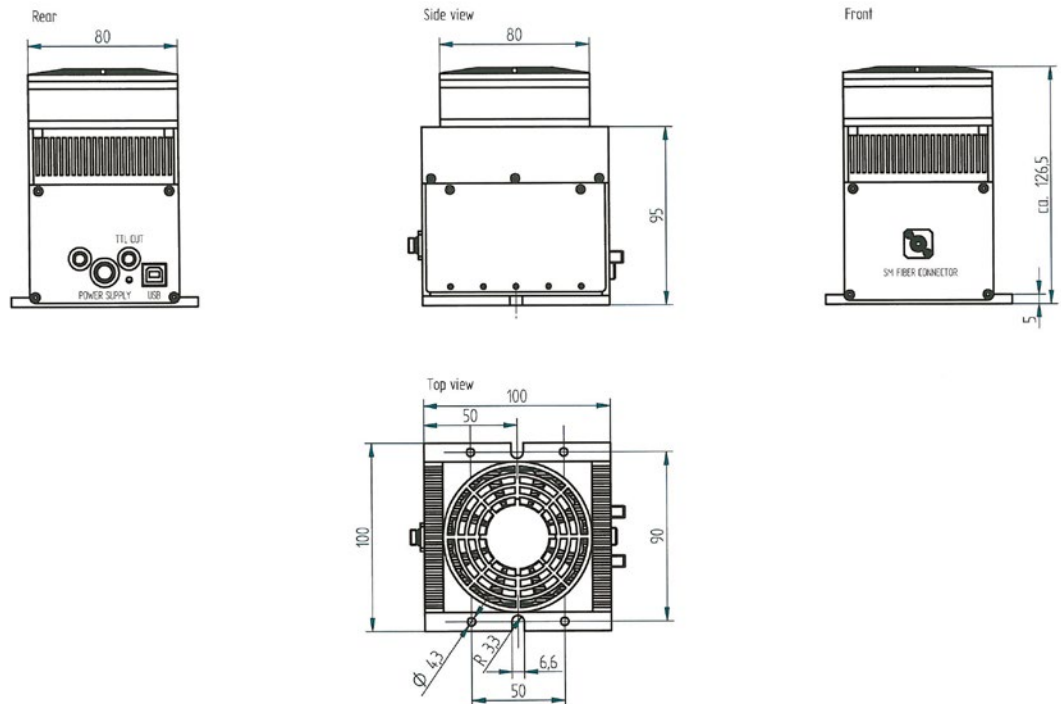


Fig. 4: Detector jitter for different quantum efficiency settings. The measurement is done with a source of correlated pairs of photons and a time tag unit plotting the histogram of the time differences.

Package Drawings



Interface Information

- Power Supply: LEMO connector
- TTL output: SMA connector
- Optical input (FC connector): compatible with standard FC/PC-connector, suitable for fiber core diameters up to 10 µm.

Product Changes

LASER COMPONENTS reserves the right to make changes to the product(s) or information contained herein without notice. No liability is assumed as a result of their use or application.

Ordering Information

Products can be ordered directly from LASER COMPONENTS or its representatives. For a complete listing of representatives, visit our website at www.lasercomponents.com

Custom designed products are available on request.