

# DETECTORS

# COUNT® Single Photon Counting Modules



www.lasercomponents.com



LASER COMPONENTS' COUNT® 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 LASER COMPONENTS' ultra-low-noise VLoK silicon avalanche photodiode or state-of-the-art InGaAs APDs (depending on the version) with specially developed quenching and signal processing electronics, the COUNT® Series offers everything needed for single photon detection from 350 – 1600 nm. Incoming photons generate corresponding electrical pulses which may be conveniently read out at the TTL output. The gating function allows the module to be disabled between measurements to provide protection against accidental overload. The optional FC connector provides a convenient method for connecting the module to the sample using a multimode optical fiber.

## **Applications**

Confocal Microscopy

Use of point illumination and a pinhole in an optically conjugate plane in front of the detector in order to eliminate out-of-focus signal.

Fluorescence Correlation Spectroscopy

Observation of fluorescence emitted from a very small space in solution containing only a very small number of molecules.

Particle Sizing

Determination of size distribution profile of small particles in suspensions or solutions.

Quantum Cryptography

Exchange of secure key between two parties using quantum properties of light.

Atomic Physics

Single photon emission from isolated atoms, molecules or ions in traps.

LIDAR

Distance measurement by illumination of target with a laser and analysis of reflected light.



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## COUNT®

The allrounder: With high detection efficiencies in the red wavelength range and very low dark count rates the COUNT® module is used in applications including spectroscopy, quantum optics, LIDAR and particle sizing.

#### **Specifications**

- Wavelength range: 350 – 1000 nm
- Dark count rates:
  < 10 cps</li>
- Detection efficiency:
  > 70% in red range
- Fiber-coupled or free space
- Gating function
- Single 12 V DC supply operation



## COUNT<sup>®</sup> BLUE

FLIM, STED, FCS or even quantum information experiments – the COUNT® BLUE offers high detection efficiencies and very low dark count rates in the blue and green range.

#### **Specifications**

- Wavelength range: 350 – 1000 nm
- Dark count rates:
  - < 10 cps
- Detection efficiency:
- > 50% in blue range,
- > 65% in green and yellow range
- Fiber-coupled or free space
- Gating function
- Single 12 V DC supply operation



## COUNT® NIR

Developed for quantum optics and quantum information experiments with optimized detection efficiency at 810 nm.

#### Specifications

- Wavelength range: 350 – 1000 nm
- Dark count rates:
- < 50 cps • Detection efficiency:
  - > 50% at 810 nm
- Fiber-coupled or free space
- Gating function
- Single 12 V DC supply operation



## COUNT<sup>®</sup> S

This passively quenched module features a larger active area and is the low-cost alternative to the COUNT® particularly suited for undergraduates and their experiments in the lab.

#### Specifications

- Wavelength range: 350-1000 nm
- Dark count rate:
  < 1000 cps</li>
- Detection efficiency:
- > 60% in red range
- Active area: 500 µm
- Fiber-coupled or free space
- Single 12 V DC supply operation





## COUNT® Q

The COUNT® Q is an InGaAs-based single photon detector whose most important field of application is the detection of single photons at 1550 nm.

#### Specifications

- Wavelength range:
  900 1600 nm
- Dark count rate:
  - < 1000 cps
- Detection efficiency: variable up to 20%
- Fiber-coupled
- Single 12 V DC supply operation

#### Fiber Connection

- FC/PC style receptacle pre-aligned to detector surface
- AR coated Grin lens:
  400 1100 nm coating for COUNT®, COUNT® NIR and COUNT® S
  - 350 700 nm coating for COUNT® BLUE
- To remove/add a fiber connector from/to your module please contact us!

Detailed datasheets of each COUNT<sup>®</sup> module can be found on our website!

www.lasercomponents.com/lc/photon-counter/





## Accessories

#### quTAU

This sophisticated time-to-digital converter offers everything needed for the readout of TTL pulses from detectors. Applications include quantum optics, high energy physics, time correlated photon counting and fluorescence microscopy.

#### Specifications

- 8 input channels
- 81 ps timing resolution
- Coincidence counting
- Time-tagging mode
- USB 2.0, Windows and Linux
- Example software: GUI, DLL, C/C++, LabView

#### COUNT® PSU

The COUNT® PSU with EURO plug is the ideal power supply for every COUNT® module. Special connectors for UK, USA and Japan plugs are available upon request. Plug and play!

#### Specifications

- Universal input range:
  90–264 V AC
- Input frequency: 47-63 Hz
- Input connector:
  3 Pin IEC 320/C14
- Output connector:
  LEMO, FGG.0B.302.CLAD42
- Output cable length < 1200 mm
- RoHS and CE compliant







#### **COUNT® NIR**



Typical photon detection efficiency

Typical photon detection efficiency



## Photon Detection Efficiency

The typical photon detection efficiency for the COUNT®, COUNT® BLUE and COUNT® NIR modules can be seen in fig. 1–3.

For the actively quenched COUNT modules COUNT®, COUNT® BLUE and COUNT® NIR the photon detection efficiency across the active area of the module is of Gaussian shape (fig. 4). Therefore, the detection efficiency has its maximum in the center of the active area. The fiber-coupled modules are prealigned to achieve optimum focusing when using multi-mode or single-mode fibers.

Each COUNT® module is delivered with a spec sheet containing the most important data of the individual module such as detection efficiency at wavelengths 405 nm, 670 nm and 810 nm, dark count rate, afterpulsing probability and dead time.





# Get in Contact

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