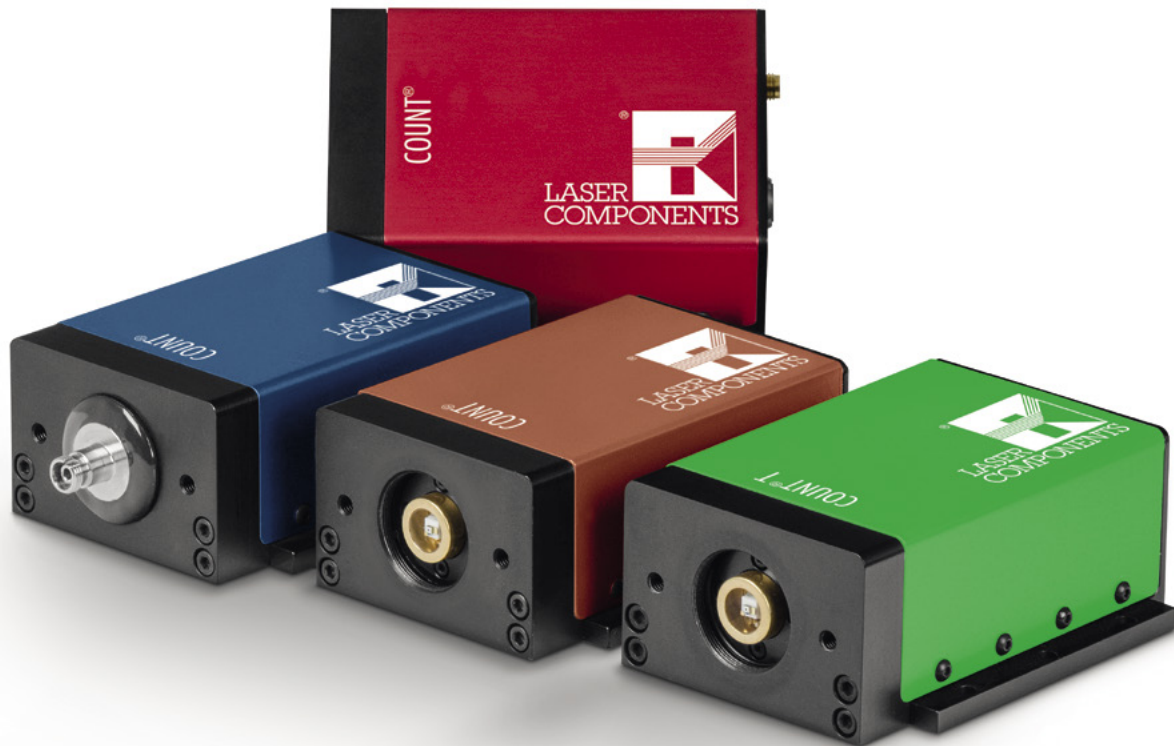


# DETECTORS

## COUNT<sup>®</sup> Single Photon Counting Modules





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 with specially developed quenching and signal processing electronics, the COUNT® Series offers everything needed for single photon detection from 350–1000nm. 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

- **Single Molecule Analysis**  
Dynamic Single Molecule (DSM) analysis reveals very complex details of the binding kinetics, dynamic and functional mechanistic information, such as underlying dynamic processes for DNA-protein interaction and protein conformational changes.
- **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.
- **Time Correlated Single Photon Counting (TCSPC)**  
Spectroscopy that uses ultrashort pulse lasers for the study of dynamics on extremely short time scales.
- **Fluorescence Lifetime Imaging (FLIM)**  
Imaging technique for producing an image based on the differences in the exponential decay rate of the fluorescence from a fluorescent sample.



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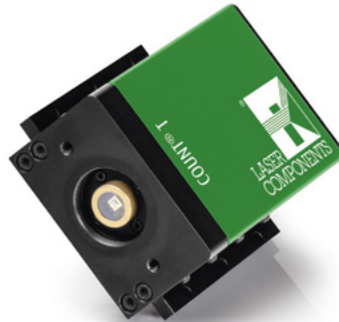


## COUNT®

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
- Detection efficiency: > 70 % in red range
- Fiber-coupled or free space
- Gating function
- Single 12V DC supply operation



## COUNT® T

In time-correlated single photon counting (TCSPC), single photons are counted and the time of detection is determined based on a reference signal. This method is a statistical counting method.

### Specifications

- Wavelength range: 400–1000 nm
- Dark count rate: < 100 cps or < 250 cps
- Detection efficiency: typ. 75 % at 670 nm
- Active area: 100  $\mu$ m
- Timing resolution: 350 ps
- Afterpulsing probability: 1 %
- Fiber-coupled or free space
- Single 12V DC supply operation

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# SINGLE PHOTON COUNTING MODULES

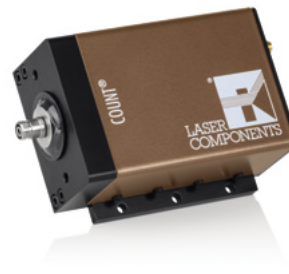


## COUNT® BLUE

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 12V DC supply operation



## COUNT® NIR

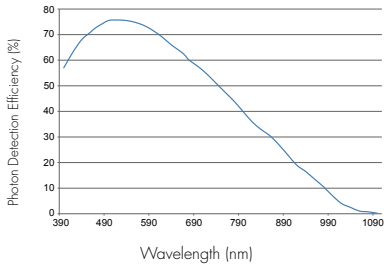
Developed for quantum optics and quantum information experiments with optimized detection efficiency at 810nm.

### 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 12V DC supply operation

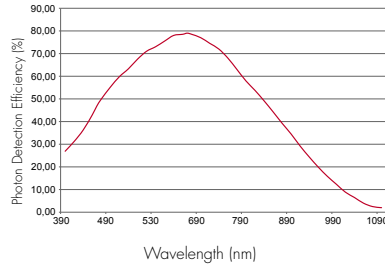
! Detailed datasheets of each COUNT® module can be found on our website!

## COUNT® BLUE



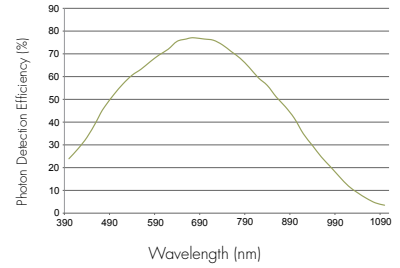
Typical photon detection efficiency

## COUNT®



Typical photon detection efficiency

## COUNT® NIR



Typical photon detection efficiency

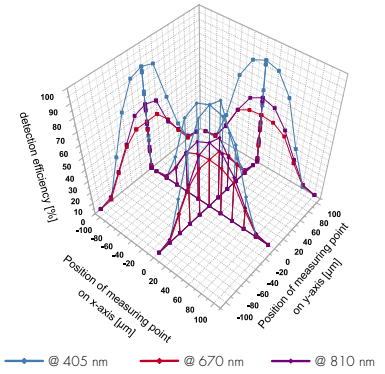
# Photon Detection Efficiency

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 pre-aligned 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.



Measuring points along the detector surface



## Fiber Connection

### Available for all COUNT® Modules

- FC/PC style receptacle pre-aligned to detector surface
- AR coated Grin lens:
  - 400–1100nm coating for COUNT®, COUNT® NIR, COUNT® S and COUNT® T
  - 350–700nm coating for COUNT® BLUE

**!** To remove/add a fiber connector from/to your module please contact us!



## Accessories

### Readout Electronics - 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



### Power Supply 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: 90–264V 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

# Get in Contact

Electronics

VIS Photodiodes  
Photon Counters

Pulsed Laser  
Diodes

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