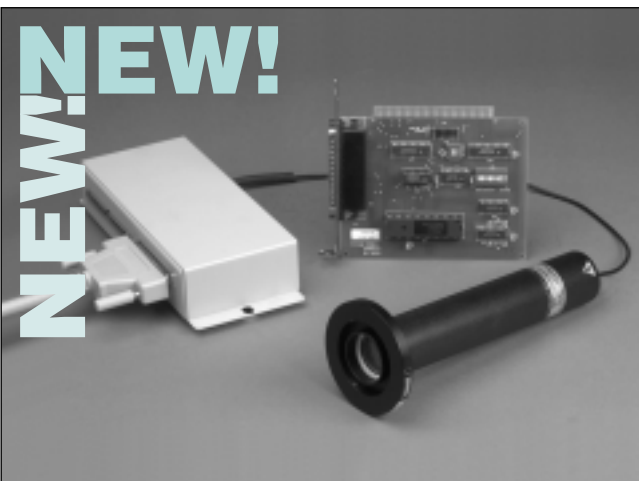




Photon Counting Detection System.

- Detect signals down to 10^{-19} W
- Complete system, ready to use
- DLLs and LabView VIs for quick integration with user data

Our **new** photon counting system is a simple, cost efficient solution for most laboratory photon counting needs. Available options cover the 165 to 850 nm spectral range. Up to two PMT tubes can be operated simultaneously.

A complete photon counting system is made up of a PC I/O board residing in an ISA slot, external counter box supporting up to two photon counting photomultiplier tubes (PMTs) and a cable connecting the counter box to the I/O board. We offer the PMTs separately so you can select the wavelength range(s) of interest to you.

THREE PMTs

We offer three photomultiplier tubes for the 76915 Photon Counting System. See Table 1 for detector specifications. Note: use care in shielding these systems from stray light, when in use, avoid swamping your signal with ambient leakage.

Table 1 PMTs for 76915 Photon Counting Detection System

Spectral Response Range (nm)	Photocathode Type	Photocathode Active Dia. inch (mm)	Peak QE @400 nm	Dark Counts @ 20 °C counts(s)	Dead Time	Warm-up Time (seconds)	Model No.
310 - 650	Bi-alkali	0.9 (23)	25%	Typical: 100 Maximum: 200	~25 ns	10	76918
310 - 850	Multi-alkali	0.9 (23)	20%	Typical: 2500 Maximum: 5000	~25 ns	10	76919
165 - 650	Bi-alkali	0.9 (23)	25%	Typical: 100 Maximum: 200	~25 ns	10	76920

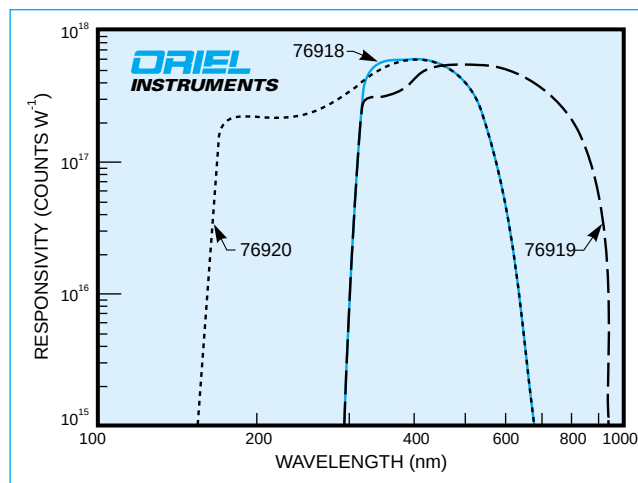


Fig. 1 Spectral responsivity of Photomultiplier Tubes.

COUNTER BOX

The external counter box can be connected to two photon counting PMTs to allow ratio or extended wavelength range measurements. It also provides BNC connectors so you can interface it with external trigger or gating sources.

The counter box has a power switch so you can turn off the PMT bias, to prevent potential damage to the detector when it is exposed to light.

DETECT RAMAN SCATTERING

Our Photon Counting System is sensitive enough to detect even very weak Raman scattering. See page 6-46 for a typical Raman measurement. We also offer packaged Raman Instruments on page 7-12.

SOFTWARE

We provide LabView Virtual Instruments drivers, DLLs for Windows™ 3.X, '95, '98, and NT, and TRACQ32™ drivers to integrate the 76915 with our Cornerstone™ and MS257™ Monochromators. A simple executable application is also shipped with the detection system to help you test your data collection system. Optionally, you can purchase the complete TRACQ32™ Data Acquisition and Radiometry software. See page 4-51 for information on TRACQ32™.

DYNAMIC RANGE

Even in the complete absence of radiation, the photon counting PMTs produce a finite count rate, which is caused mainly by the thermal emission of electrons from the photo cathode. The signal is usually referred to as “dark count.” The dark count strongly depends on the temperature at which the PMT is operated, as well as on other factors such as the presence of ionizing radiation, or excessive light exposure in the previous few hours.

At higher optical signal levels, the detector saturates. The saturation is caused by the finite response time of the detector. When two photons arrive in a time interval shorter than the response time of the system, the counter treats them as a signal photon. In the saturation region, the true count rate can be estimated using the formula:

$$N = n / (1 - nT)$$

Where:

- N = true PMT count rate
- n = measured count rate
- T = correction factor equal to 23 ns, the “dead” time of the electronic counter.

MODES OF OPERATION

This photon counting system can be used in several different triggering modes, which are selected via software.

- Software triggered operation**
The counter starts counting when triggered by the PC, and counts for a prescribed data acquisition time.
- Hardware triggered operation**
Data acquisition is triggered by external TTL signals for more accurate timing control.
- Gated acquisition operation**
Data is collected during a time interval defined by an external TTL gate signal.
- Absolute mode**
Counts are accumulated during software or external gate controlled acquisition time.
- Relative mode**
This is the photon counting equivalent of lock-in detection. Counts are added during ON times, and subtracted during OFF times (this may at times lead to “negative” signal values).

SPECIFICATIONS

Interface:	16 bit ISA (PC/AT)
Power needed from PC:	+12 V, 70 mA +5 V, 500 mA
Counting range:	
Relative mode:	-8,388,608 to 8,388,607
Absolute mode:	0 to 16,777,125
Measuring time range:	5.12 μs to 85.899346 s
Cable:	
PC connection:	DB 37 data cable
Detector connection:	6 foot cable assembly
Dark counts at 20 °C:	tube dependent - see tube specifications
Warm up time:	10 s
Temperature:	
Operating:	+5 °C to 55 °C
Storage:	-40 °C to +55 °C

ORDERING INFORMATION

76915	Photon Counting System Order PMTs separately
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Photomultiplier Tubes

Spectral Response Range (nm)	Model No.	Price
310 - 650	76918	
310 - 850	76919	
165 - 650	76920	

Light Sources

Photolithography

Lasers

Monochromators & Spectrographs

FT-IR Spectrometers

Detection Equipment

Instruments

Fiber Optics