Avalanche Photodiode Detector heads

The Cyberstar APD (avalanche photodiode) system is an ultra fast detector suitable for experiments up to 20 keV with a large dynamic ranges, time resolved measurements and where fast photon counting are required.

Specifications

Maximum count rate	100 MHz *
Window	70 µm Kapton
Photon efficiency	50% that of NaI up to 10keV *
Noise	below 1Hz *
Diode gain	200x at 370 V bias
Preamplifier gain	60 dB per stage at 100 MHz
Rise time 10%-90%	<2 ns *
FWHM	<4 ns *

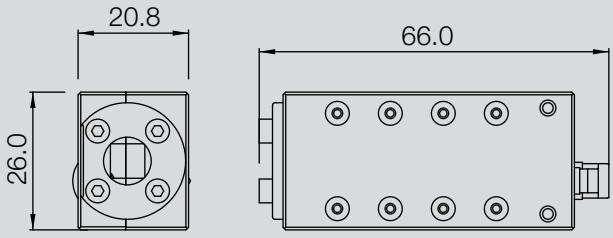
**Indicative performance figures obtained at the National Synchrotron Light Source, Brookhaven National Laboratory*

Features*

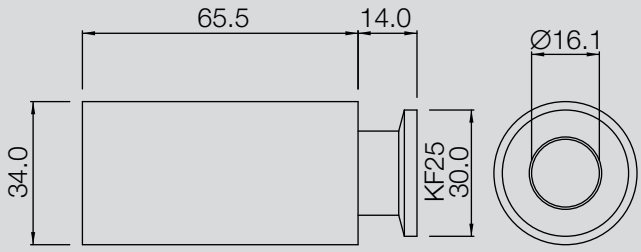
- excellent pulse pair time resolution - 5.6 ns
- very low noise
- wide dynamic range and linearity - seven decades
- rapid recovery from pulses
- high photon efficiency - 95% at 6 keV; 45% at 12 keV

APD Bodies

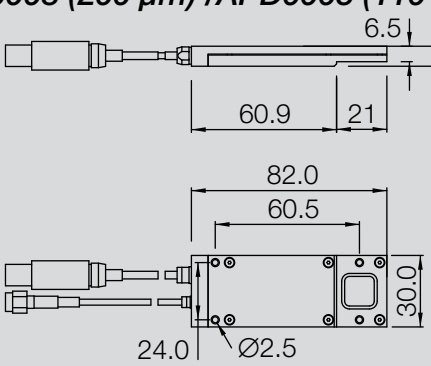
APD0001



APD0007



APD0008 (200 µm) /APD0005 (110 µm)



APD Electronics

APD Prime

The Prime electronics package, built to a design developed at the Brookhaven National Laboratory, offers the user a basic electronics package to use with the APD detector. The unit supplies the bias voltage for the APD head and a constant fraction discriminator output.

Specifications

NIM module	one unit wide
HV APD bias output	0 – 400 V
Constant fraction discriminator	TTL output into 50 Ω
Amplifier output	0 to -4 V
Maximum count rate	100 MHz

APD ACE

The ACE electronics package, built to a design developed at the European Synchrotron Radiation Facility offers the user maximum flexibility; it supplies the bias voltage to the detector head, and has an integrated counter/timer which can be operated in local (front panel) or remote (computer controlled) mode.

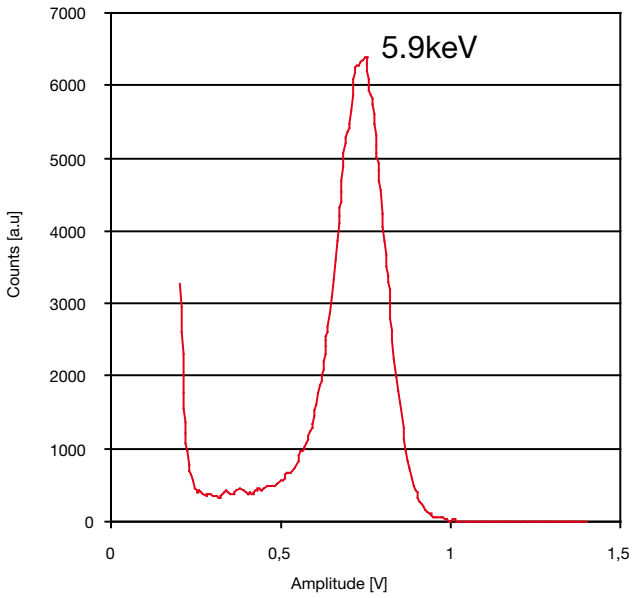
Features

- front panel operation through a user-friendly LCD graphic display with touch panel
- easy user interface for remote operation mode
- up to 500 V diode bias
- very low noise
- rugged, reliable package
- wide dynamic range and linearity - seven decades
- Labview software is provided and can be utilised with the rs232 communication port for remote configuration and data retrieval

Specifications

NIM module	two units wide
Selectable modes	local (front panel,) remote
Remote connection	serial or parallel
Maximum count rate	up to 100 MHz
HV APD bias	up to 500 V
Remote mode	software included
Energy resolution	20% to 35% at 25 keV

APD Performance



The graph to the left shows a pulse height distribution of a 55Fe source (5.9 KeV) recorded using the ACE APD electronics.

The electronics module was set in window mode - to resolve the distribution a window of 10 mV was used for a good compromise between count rate and resolution. The high voltage photodiode bias was set to 300 V, the integration time 1 s and the lower level discriminator threshold 0.2 V.

APD Ordering information

APD Detector Heads

5x5 mm 110 µm sensor, 26x21x60 mm body	APD0001
10x10 mm 110 µm sensor, Transmissive	APD0005
5x5 mm 110 µm sensor, Ø34x80 mm, Vacuum compatible head DN KF16	APD0007
10x10 mm 200 µm sensor, Transmissive	APD0008

APD Electronics

APD pulse processing unit ACE, NIM 1 channel	APD0002
APD pulse processing unit PRIME, NIM 1 channel	APD0003

APD PPU Cables

5 m APD PPU cable	CBY01501
10 m APD PPU cable	CBY01502
15 m APD PPU cable	CBY01503
20 m APD PPU cable	CBY01507