From: Steve Ross x2-9510
To: Detector Pool
Subject: Detector Pool Single Element Avalanche Photo Diode (APD) units, and associated high voltage power supply.
Date: Dec 15, 2006

DETECTOR POOL.

The following Detector Pool items are available – 2 sets of APD plus power supply. The units are fairly similar. The user sets the low voltage DC on the unit to match the label, this voltage is close to +10.5 volts, approximately 0.04 amps. The user sets the high voltage DC on the unit to match the label there, approximately +320 volts, about 2 uA.

DP00213	APD unit (8-06-1)
DP00214	APD high voltage power supply
DP00215	APD unit (8-06-2)
DP00216	APD high voltage power supply

The high voltage DC supplies have limits set. These should not be varied, but for reference they are: High voltage 340 vdc, trip current 30 uA.

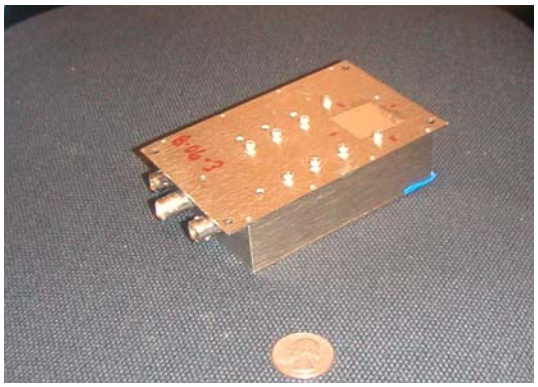
DESCRIPTION:

APD is 1 cm x 1 cm, covered with thin mylar foil (which still lets through some room light) EG&G C30703F (see also its data sheet)

APD thickness: approximately 210 um

Detector enclosure/box:

This first version consists of a 3” x 4” x 1” box.



Connections: High voltage in (SHV cable), low voltage DC in, and RF out.

USAGE:

Connect the RF out signal to your electronics through a coax cable. The electronics should have an input impedance of 50 ohms. It should ideally be as close to the APD detector as possible.

Disconnect the low voltage power supply from the APD unit. Turn it on, and set low voltage DC to the value indicated on the unit (typically about +10.5 vdc). Turn it back off again, and cable it into the APD unit. When it is turned on, the current should be about 0.04 amps.

Caution: At present there is no over or under voltage protection.

Connect the HVDC Stanford PS350 to the detector via an SHV cable. Turn on the Stanford supply unit power (on right), set the voltage to about 50 volts POSITIVE, then apply the voltage to the unit (rocker switch on left). Slowly work the voltage up to about +320 volts, watching the current into the APD. The current should stay around a few microamps, less if the room lights are off.

TYPICAL SIGNAL:

This plot shows the response to an Fe55 5.9 keV photon. The noise level is about 12 mV RMS (standard deviation of noise). The signal level is a bit more than -100 mV. The rise time is a few nanoseconds, the fall time about 15 ns. These values are approximate because things can be tweaked by varying the low voltage DC, or the high voltage DC.