EP-AP2109 PMT Tube Holder Type

Fast Current Front End Readout Circuits

1.Overview

The EP-AP2109 is an all-in-one tube holder type readout circuit with an integrated adjustable high voltage, voltage divider and current preamplifier, which is compatible with various types of photomultiplier tubes with different voltage divider options. The amplifier has a bandwidth of 350MHz and is widely used in nuclear radiation detection with high energy and time resolution.

2.Functional indicators

- 1 ····· Integration of adjustable high voltage, voltage divider blocks, current sensitive amplifiers high signal-to-noise ratio applications
- 2 ····· Complete with all types of manifold holders
- 3 ····· Extremely high PSRR power chip filtered power supply
- 4 ····· Used in conjunction with photomultiplier tubes in energy and time spectrum measurement applications

3.Performance parameter

Power supply	Output swing	Power	Analog bandwidth	High Voltage Output Voltage	Output resistance	Gain Linearity	Gain Temperature Stability	I/V conversion ratio	Operating temperature	Rising time	Storage temperature
+12V	±4V	105mW	350MHz	±2000V MAX	50Ω	<0.02%	±0.01%/℃	100mV/1μA	0℃~+50℃	<12ns	-40℃~+125℃

4.Electromechanical interface

- Power Input ····· LEMO(3 electric core)
- HV Adjust ····· High pressure adjustment knob
- HV testing ····· High Voltage Test Port
- Dynode Output ····· Dynode signal output
- Amplified output ····· Preamplifier signal output

Figure 1 Connection method

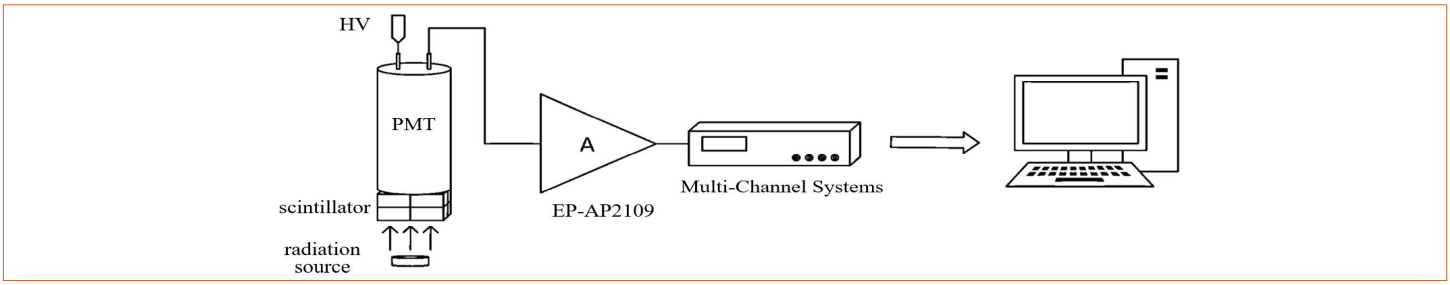
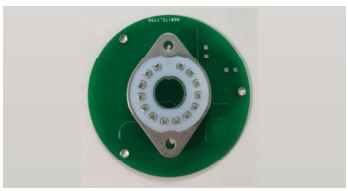


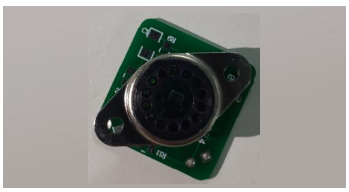
Figure 2 Physical drawing of compatible PMT

4 in. PMT (level 10)



3 in. PMT (level 11)

2 in. PMT (level 10)



1 in. PMT (level 10)

* The default is a standard 14-pin socket Class 8 PMT header, which can be replaced with various types of PMT headers (including but not limited to the following types of headers) according to the user's needs.

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5.Performance testing

Figure 3 NaI scintillator test for ^{137}Cs signal plot

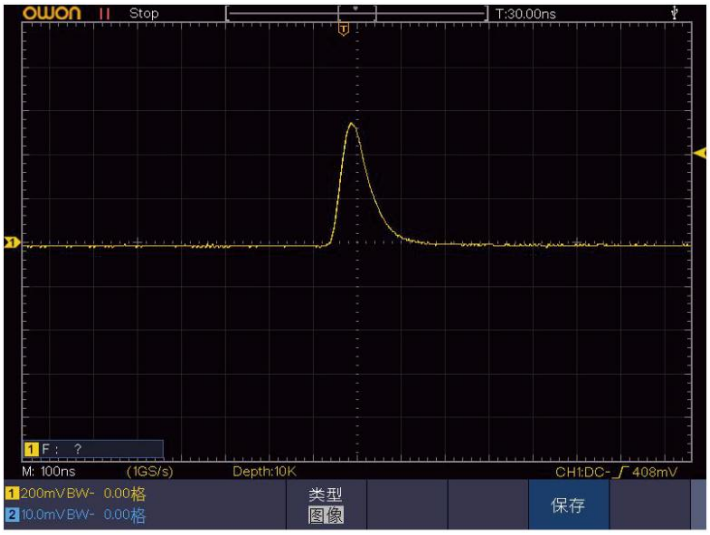
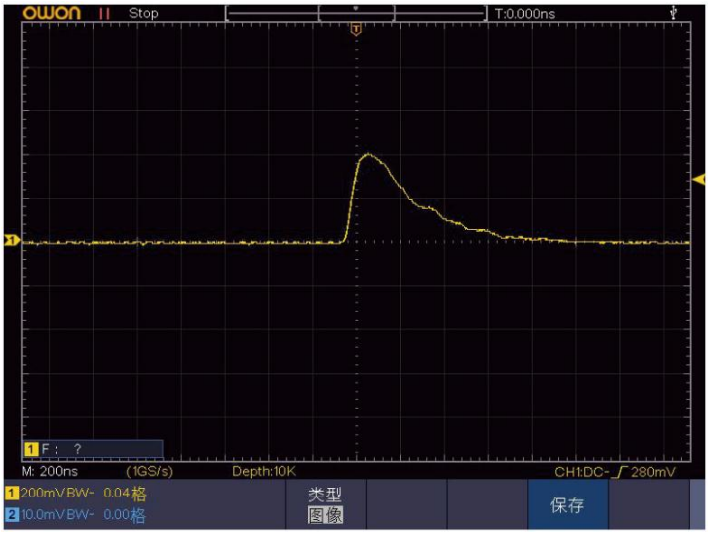


Figure 4 $LaBr_3$ scintillator test for ^{137}Cs signal plot



6.Applications

Figure 5 Measured energy spectrum of ^{137}Cs using NaI

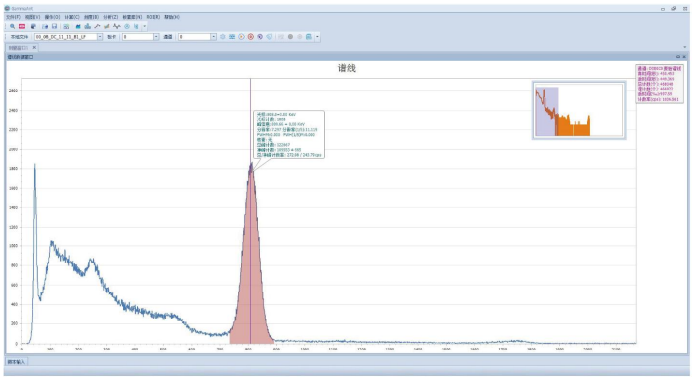
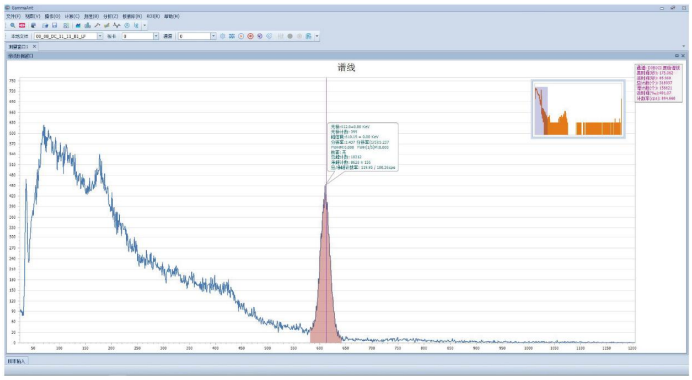


Figure 6 Measured energy spectrum of ^{137}Cs using $LaBr_3$



1.Using a NaI crystal-coupled fast-type photomultiplier R6231, a PMT fast-current preamplifier of type EP-AP2109 for signal amplification, and a digitized multi-channel of type EP-PD1102 for energy spectrum readout (Figure 5), the measured resolution of 662 keV gamma rays for ^{137}Cs is 7.3%.

2.Using $LaBr_3$ crystal-coupled fast-type photomultiplier R6231, the signal amplification was realized by a PMT fast-current preamplifier of type EP-AP2109, and the energy spectrum readout was realized by a digitized multi-channel of type EP-PD1102 (Figure 6), with a measured resolution of 3.4% for the 662 keV gamma rays of ^{137}Cs.