ORTEC®

142PC
Preamplifier

- **Ideal for proportional counters**
- **High sensitivity and very low noise for soft x-ray and low-energy gamma spectroscopy**
- **Accepts 0 to ±3 kV bias**

The ORTEC Model 142PC Preamplifier is a low-noise charge-sensitive unit especially designed for use with proportional counters requiring up to ±3000 V detector bias.

The high sensitivity of this unit often allows operating the proportional counter at reduced voltages, thus greatly minimizing peak position shifts and peak broadening with changing count rates.

The low-noise performance for this type of preamplifier greatly improves the resolution of the spectroscopy system. The separate energy and timing outputs enhance instrument flexibility.

The Model 142PC incorporates a protection circuit for the input FET to prevent damage from inadvertently applied overvoltages. The unit is shipped with the protection circuit in place; better resolution, however, will be obtained when the protection is removed (Fig. 1).

Specifications

PERFORMANCE

Noise	Typical	Guaranteed
0 pF	295 rms electrons	<340 rms electrons
100 pF	450 rms electrons	<485 rms electrons

RISE TIME Based on a +0.5 V signal through either output into a 93-Ω circuit and measured from 10% to 90% of peak amplitude; 25 ns at 0 pF and 150 ns at 100 pF.

SENSITIVITY Nominal, measured through either output, 4 V/pC.

DYNAMIC INPUT CAPACITANCE 1000 pF.

INTEGRAL NONLINEARITY ≤±0.05% for 0 to ±7 V open circuit or ±3.5 V terminated in 93 Ω.

OUTPUT LINEAR RANGE ±7 V.

TEMPERATURE INSTABILITY ≤±50 ppm/°C, 0 to 50°C.

DETECTOR BIAS ISOLATION ±3000 V.

OPEN LOOP GAIN ≥40,000.

INPUTS

INPUT Accepts input signals from a proportional counter and extends operating bias to the proportional counter.

BIAS Accepts the bias voltage for the proportional counter from a bias supply.

TEST Accepts input voltage pulses from a pulse generator for instrument and system check and calibration; R_{in} = 93 Ω.

OUTPUTS

ENERGY AND TIMING 2 connectors furnish identical signals through 2 output paths; either or both of these outputs can be used as required, and they are interchangeable. R_0 = 93 Ω through each connector, and the output polarity is opposite from the input pulse polarity (output pulse polarity is the same as bias polarity).

CONNECTORS

INPUT AND BIAS SHV.

TEST, ENERGY, AND TIMING BNC.

POWER CABLE 3-m (10-ft) captive power cable. ORTEC 121-C1; longer lengths available on special order.

ELECTRICAL AND MECHANICAL

POWER REQUIRED +24 V, 30 mA; –24 V, 10 mA; +12 V, 15 mA; –12 V, 15 mA. Furnished from NIM bin and power supply through any ORTEC main amplifier or from an ORTEC Model 4002P Portable Power Supply; built-in captive cable is compatible with either source.

WEIGHT
Net 0.65 kg (1.5 lb).
Shipping 1.3 kg (3.0 lb).

DIMENSIONS 4.5 X 13.2 X 10.0 cm (1.75 X 5.2 X 4.0 in.) plus 3-m (10-ft) cable.

Ordering Information

To order, specify:

Model	Description
142PC	Preamplifier

Suggested cable accessories:

C-24-12	RG-62A/U 93-Ω Cable with two BNC male plugs; 12-ft length
C-36-2	RG-59A/U 75-Ω Cable with two SHV female plugs; 2-ft length
C-36-12	RG-59A/U 75-Ω Cable with two SHV female plugs; 12-ft length

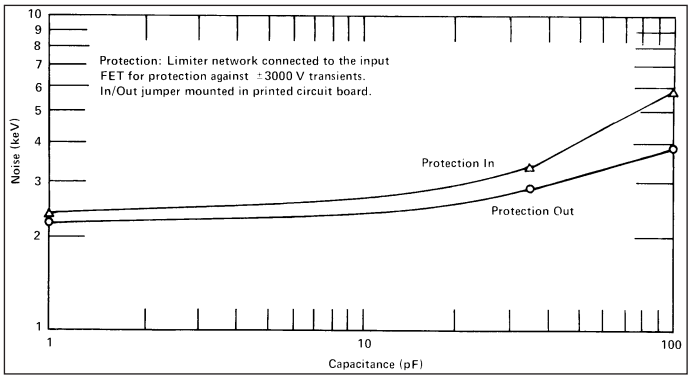

Fig. 1. Noise as a Function of Input Capacitance, Measured with an ORTEC Model 572 Amplifier and 2-µs Time Constant.

Specifications subject to change
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