142IH
Preamplifier

- **Charge-sensitive for universal applications**
- **Economical and general purpose**
- **Accepts 0 to ±3 kV bias**
- **Low noise and fast rise time**
- **Built-in protection network**
- **Small size**
- **Operates in vacuum**





The ORTEC Model 142IH Charge-Sensitive Preamplifier is an economical and general purpose instrument that can be used for universal applications such as x-ray, low and high-energy gamma-ray spectroscopy, and also for alpha and other charged-particle spectroscopy.

The Model 142IH may be used with semiconductor radiation detectors, proportional counters, ionization chambers, and low-gain photomultiplier tubes.

It will accommodate any detector capacitance up to 2000 pF. Thus the unit is ideally suited for high resolution spectroscopy applications.

The preamplifier includes a built-in protection network to prevent damage to the input FET from inadvertently applied overvoltages. Its small size also allows it to operate in experimental vacuum enclosures when required.

Specifications

PERFORMANCE

NOISE Increases with increasing input capacitance. Typical slope, 0 to 100 pF = 27 eV/pF; 100 pF to 1000 pF = 34 eV/pF. Typical performance values, based on silicon equivalent of ε = 3.6 eV at τ = 2 µs, are 1.9 keV at 0 pF; these become 4.6 keV at 100 pF and 35 keV at 1000 pF.

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; <20 ns at 0 pF and <50 ns at 100 pF.

SENSITIVITY Nominal, measured through either output, 15 mV/MeV Si.

ENERGY RANGE 0 to 100 MeV Si.

E^2CRP Maximum energy-squared count-rate product: 8 X 10^7 MeV^2/s.

DYNAMIC INPUT CAPACITANCE 10,000 pF.

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

TEMPERATURE INSTABILITY ≤±100 ppm/°C, 0 to 50°C.

DETECTOR BIAS ISOLATION ±3000 V.

OPEN LOOP GAIN ≥40,000.

INPUTS

INPUT Accepts input signal from a detector and extends operating bias to the detector.

BIAS Accepts the bias voltage for the detector 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

E AND T (for 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_o = 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, E, AND T 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 0.45 kg (1 lb).
Shipping 1.3 kg (3 lb).

DIMENSIONS 3.8 X 6.1 X 13.3 cm (1.5 X 2.4 X 5.25 in.) plus 3-m (10-ft) cable.

Ordering Information

To order, specify:

Model	Description
142IH	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

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Specifications subject to change
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