

- Charge-sensitive for universal applications
- Economical and general purpose
- Accepts 0 to  $\pm 3$  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  $\epsilon = 3.6$  eV at  $\tau = 2$   $\mu$ s, 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- $\Omega$  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<sup>2</sup>CRP** Maximum energy-squared count-rate product:  $8 \times 10^7$  MeV<sup>2</sup>/s.

**DYNAMIC INPUT CAPACITANCE** 10,000 pF.

**INTEGRAL NONLINEARITY**  $\leq \pm 0.05\%$  for 0 to  $\pm 7$  V open circuit or  $\pm 3.5$  V terminated in 93  $\Omega$ .

**TEMPERATURE INSTABILITY**  $\leq \pm 100$  ppm/ $^{\circ}$ C, 0 to 50 $^{\circ}$ C.

**DETECTOR BIAS ISOLATION**  $\pm 3000$  V.

**OPEN LOOP GAIN**  $\geq 40,000$ .

### 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;  $R_{in} = 93 \Omega$ .

### 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.  $R_o = 93 \Omega$  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:

<b>C-24-12</b>	RG-62A/U 93- $\Omega$ Cable with two BNC male plugs, 12-ft length
<b>C-36-2</b>	RG-59A/U 75- $\Omega$ Cable with two SHV female plugs, 2-ft length
<b>C-36-12</b>	RG-59A/U 75- $\Omega$ Cable with two SHV female plugs, 12-ft length

Specifications subject to change  
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