

Compact, Cost-Effective Pulse Pre-amplifier for Lanthanum Halide Scintillation Detectors

Features

- DC-coupled, 50 ohm input impedance.
- Output matched to 50 ohm
- Bandwidth selected to produce clean output pulse from LaBr₃ and LaCl₃ scintillation detectors
- Very compact package.
- Gain and offset adjustment
- Inverting or non-inverting operation
- Typical pulse conversion gain 200 mV pC-1 at 50% gain setting



Applications

- Readout of lanthanum halide scintillation/photomultiplier detectors
- Pulse counting applications
- Pulse height analysis applications
- Companion pre-amplifier for C400 pulse-counting detector controller

Options

- Inverting or non-inverting (internal jumper setting)

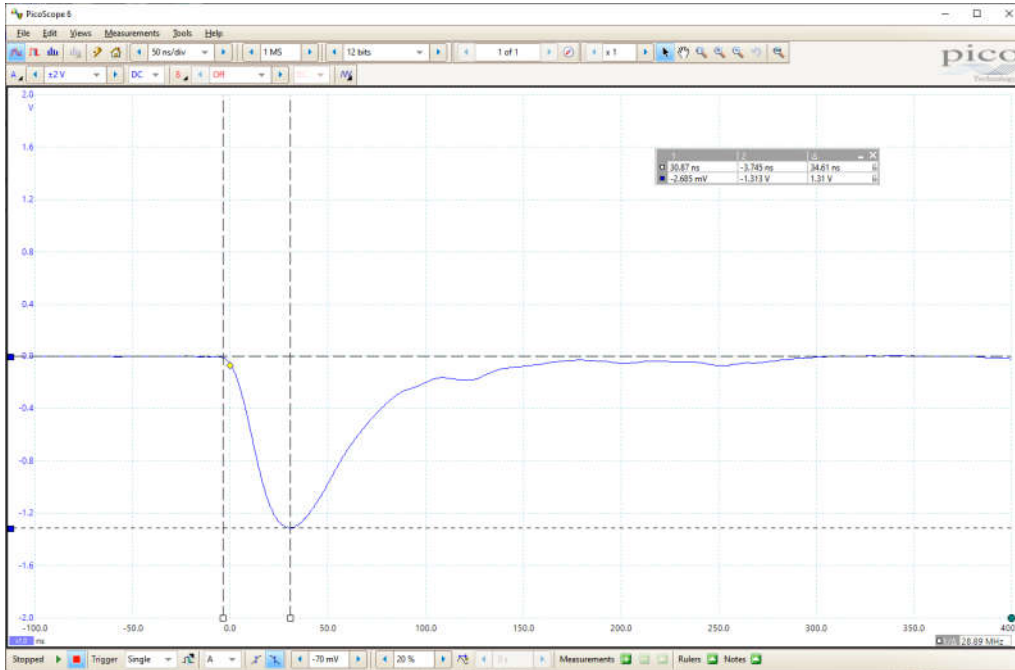
Specifications

Input impedance	50 ohms (when powered).
Voltage gain range	0 to 230 (+47.2 dB)
Conversion gain (measured with test capacitor)	Between 0.4 and 0.5 mV output pulse height into 50 ohm load per fC input pulse charge, at max gain setting
Output pulse timing (tested with LaCl ₃ scintillator)	Time to peak 25 nsec typical Full width at 10% of maximum 100 nsec typical
Linearity	Linear up to >= 1.8 V peak height (into 50 ohms) >= 3.6 V peak height (into high impedance)
Output impedance	50 ohms
Noise (50 ohm terminated)	<= 0.8 mV RMS at output, DC to 20 MHz, typical gain setting <= 1.4 mV RMS at output, DC to 20 MHz, max gain setting
Output drive capability	Up to +/- 1.8 V into 50 ohms Up to +/- 3.8 V into high impedance
Maximum output cable length	Able to drive >= 20 metre 50 ohm cable with 50 ohm termination (RG-58 (via adaptor), RG-174 or RG-316)

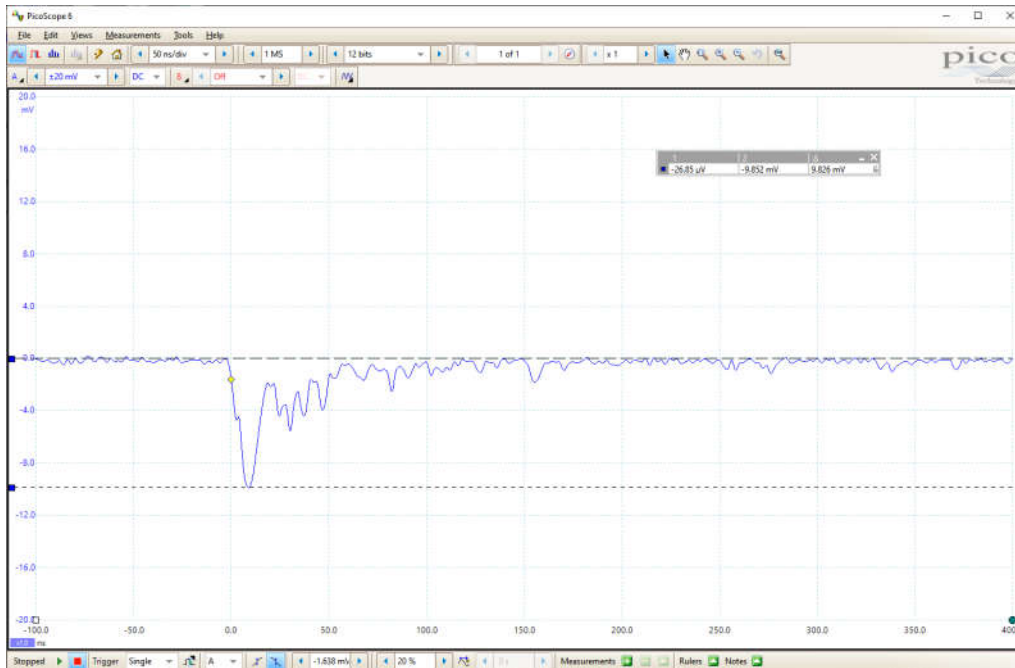


Specifications (continued)

Example output peak shape from scintillation detector, +/-2 V vertical scale (60 keV X-rays, Cyberstar C17LA lanthanum chloride scintillation detector, non-inverting, 50 ohm termination)



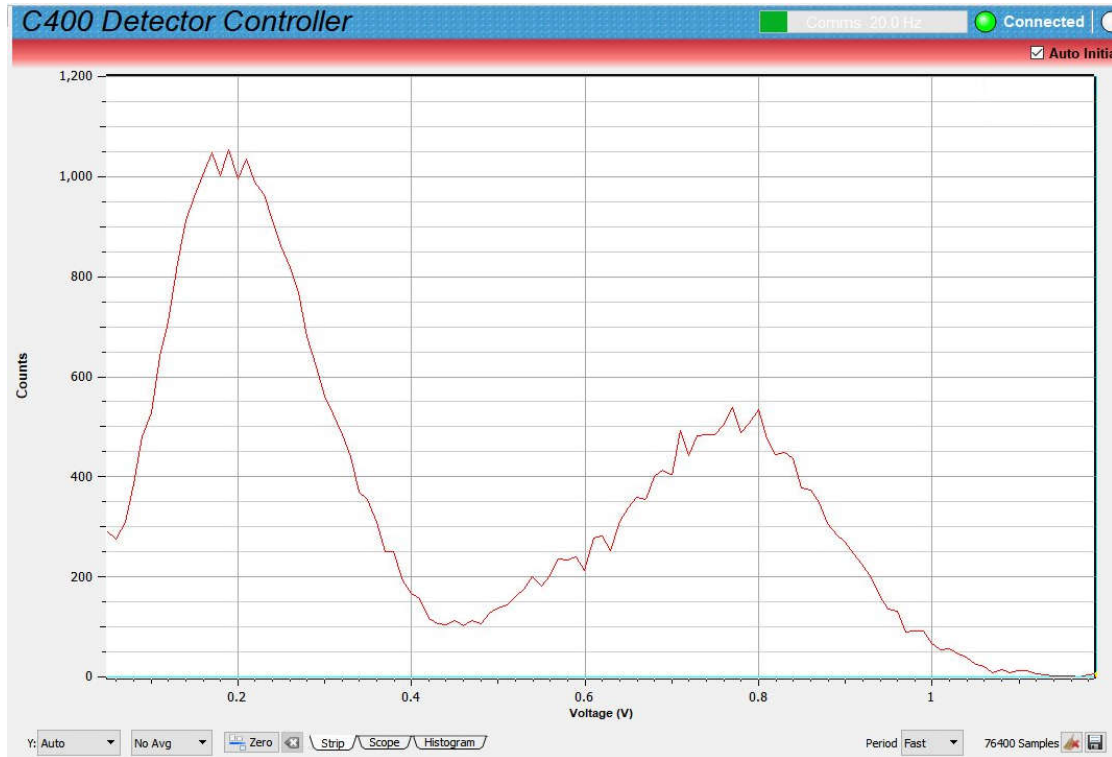
Example corresponding direct detector signal, 20 mV vertical scale (50 ohm termination)



Specifications (continued)

The CP15AL is designed with a compromise of bandwidth and gain to provide optimum pulse counting performance for fast photomultiplier-based detectors such as LaBr₃ and LaCl₃ scintillation detectors. However a pulse height analyzer that can handle the fast pulses from the C15AL can produce spectra for diagnostic purposes and photon energy analysis.

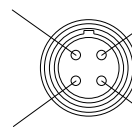
Pulse height spectrum example (Am-241 spectrum, Cyberstar C17LA lanthanum chloride scintillation detector)



Specifications (continued)

Power input	+12V (+2/-4 V) DC, 70 mA and -12V (+4/-2 V), 70 mA
Displays	Power on LED
Controls	DC offset adjust 25-turn trimpot Gain adjust 25-turn trimpot (0 - 100%)
Case	Machined Al alloy case Ni plated with tapped hole pattern for mounting.
Dimensions	79 x 35 x 24 mm (see drawing)
Weight	95 g (3.4 oz)
Operating environment	10 to 35 C (15 to 25 C recommended to reduce drift and offset) , < 70% humidity, non-condensing, vibration < 0.1g all axes (1 to 100 Hz)
Shipping and storage environment	-10 to 50 C, < 80% humidity, non-condensing, vibration < 0.5 g all axes, 1 to 100 Hz

Connectors

Signal input	Lemo coaxial size 00 receptacle (NIM-CAMAC CD/N)
Power	Lemo 0B four-pin female (mating cable connector FGG.0B.304) <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 10px;"> <div style="text-align: center;"> <p>1: -12 V</p>  <p>4: +12 V</p> </div> <div style="text-align: center;"> <p>2: AGnd (cable scrn)</p> <p>3: AGnd</p> </div> </div> <p style="text-align: center; margin-top: 10px;">(view on CP15 connector / solder side of mating cable connector)</p>
Signal output	Lemo coaxial size 00 receptacle (NIM-CAMAC CD/N)

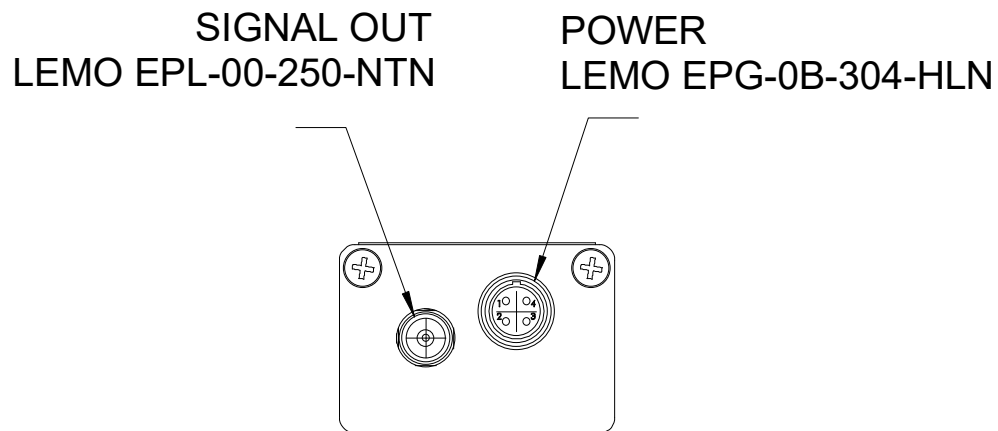
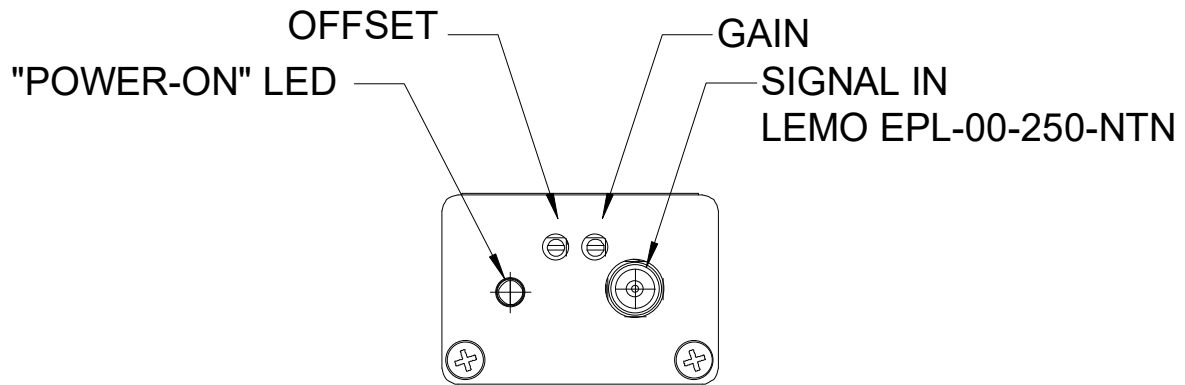
Ordering information

CP15AL	Pre-amplifier suitable for LaBr ₃ and LaCl ₃ scintillator / photomultipliers.
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Related products and accessories

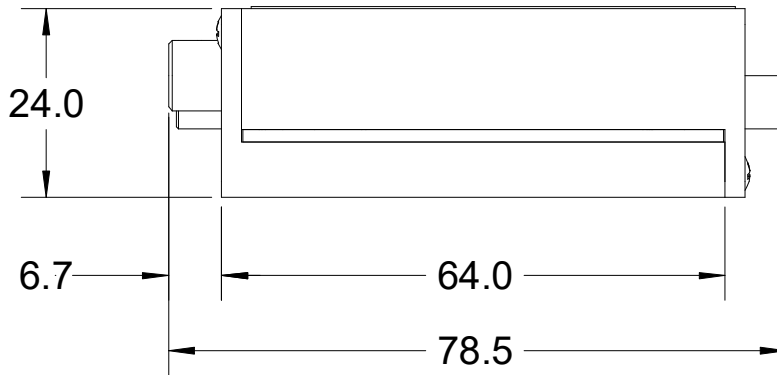
CP10A	Fast fixed gain pre-amplifier (suitable for LaCl ₃ , LaBr ₃ and plastic scintillation detectors)
CP10B	Very fast fixed gain pre-amplifier (suitable for plastic scintillation detectors, channel electron multipliers)
C400	Four channel pulse detector controller (fast window discriminators and scalers, supplies HV bias and pre-amp power).
PSU1212	+24 VDC to +/-12 VDC power converter
PSU24-25-1	+24 VDC power supply, universal, IEC C8 line connection



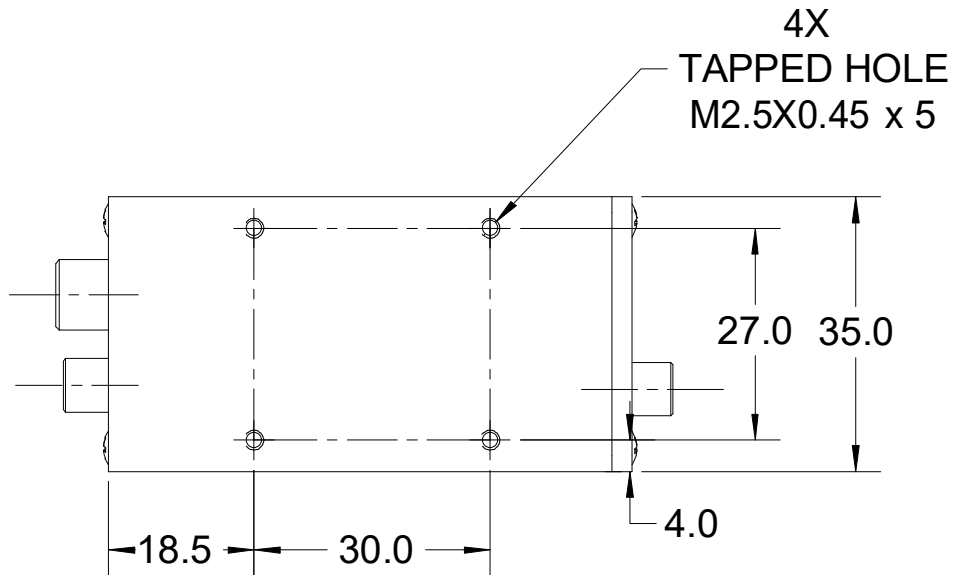


Datasheet

CP15AL



Side



Base

Dims mm

Pyramid Technical Consultants, Inc.,
135 Beaver Street Suite 102
Waltham MA 02421 USA
Tel: +1 781 402 1700 (USA),
+44 1273 492002 (UK)

Email: support@ptcusa.com

www.ptcusa.com

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All trademarks and names acknowledged.

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