



**Description:**

The PA-9 preamplifier is ideal for high-impedance photodiodes such as cryogenically cooled InSb, Ge and InAs. It offers superior high-frequency performance, with low current noise and ultra-low voltage noise. When ordered with a detector, the preamp is matched for maximum gain and sensitivity. Alternatively, the customer may specify gain and/or minimum required bandwidth. Bandwidth is a function of detector resistance and capacitance as well as preamp gain, as shown on the reverse side of this bulletin.

**Gain Stages:**

The PA-9 has a first stage transimpedance gain and a second stage voltage gain. Output from both stages are accessible to the user.

Normal gain for the first stage is  $10^7$ ,  $10^6$ , or  $10^5$  V/A. For lowest noise, choose the highest gain possible to achieve the desired bandwidth.

The second stage is set for a 10 V/V gain. Choosing 10 V/V results in lower bandwidth for the second stage. The second stage is normally AC coupled but can be DC coupled per customer specifications.

**Connections:**

Input and output connections are BNC feed-throughs. The power jack is a 5-pin male Lemo connector; the mating female Lemo connector is included with the preamp.

**Specifications:**

- Bandwidth (maximum)<sup>1</sup>.....DC to 750 KHz
- First Stage Gain..... $10^7$ ,  $10^6$  or  $10^5$  V/A
- Voltage Noise Density @1 KHz..... 6.5 nV Hz<sup>-1/2</sup>
- Current Noise Density @1 KHz.....0.04 pA Hz<sup>-1/2</sup>
- Input Offset Voltage .....  $\pm 10$  mV Typ.
- Input Bias Current .....  $\pm 1$  pA Typ.
- Maximum Output (First Stage).....6 V P-P  
(Second Stage) .....10 V P-P
- Power Requirements.... $\pm 12$ VDC or  $\pm 15$ VDC, 20 mA
- Size..... 3" x 4.5" x 1"

<sup>1</sup> Using a 100K feedback resistor

**Cautions:**

**Do not turn on the preamp power supply unless the detector is connected.**

**Assure that the power supply is +12V to ground and -12V to ground (NOT  $\pm 24$ V).**

**Observe correct power supply polarity (see drawing on the reverse side of this bulletin). Improper polarity will damage the preamplifier.**

**Preamplifier/Detector Matching Information for PA-9-\_\_\_\_\_**

Preamplifier Serial # \_\_\_\_\_

Matched to:

Detector Model# \_\_\_\_\_

Detector Serial # \_\_\_\_\_

Detector Impedance  $R_D$  \_\_\_\_\_

Detector Capacitance  $C_D$  \_\_\_\_\_

Customer Name: \_\_\_\_\_

S/O #: \_\_\_\_\_

First Stage  
Gain: \_\_\_\_\_ x 10E \_\_\_\_\_ V/A

Bandwidth: DC to \_\_\_\_\_ kHz

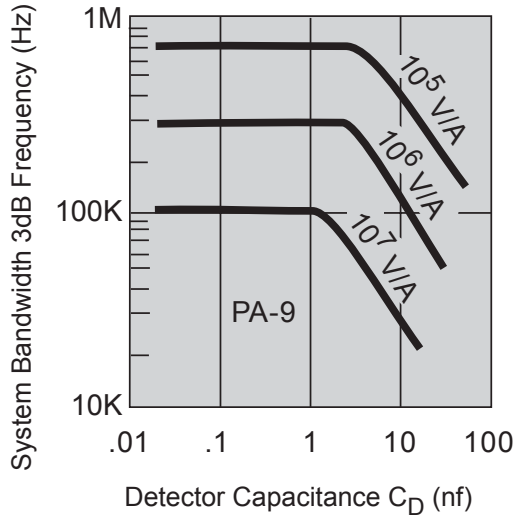
Second Stage  
Gain: \_\_\_\_\_ V/V

Bandwidth: \_\_\_\_\_ Hz to \_\_\_\_\_ kHz

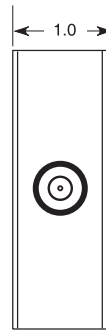
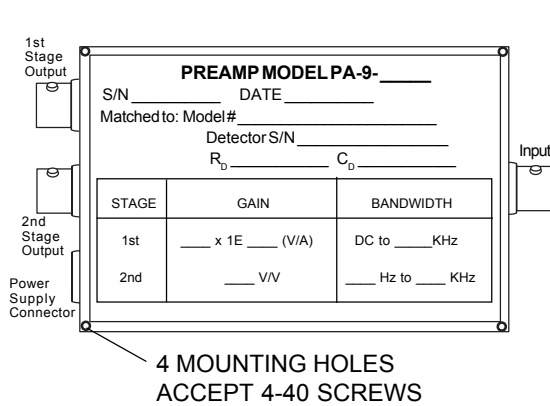
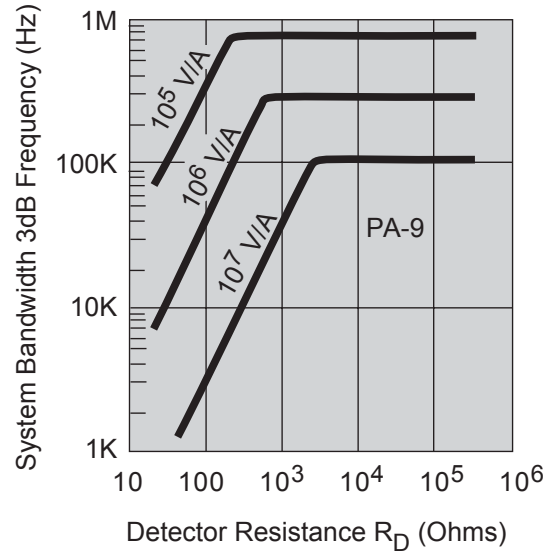
Tested by: \_\_\_\_\_ Date: \_\_\_\_\_

Approved by: \_\_\_\_\_ Date: \_\_\_\_\_

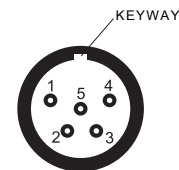
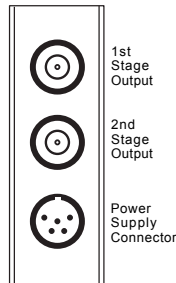
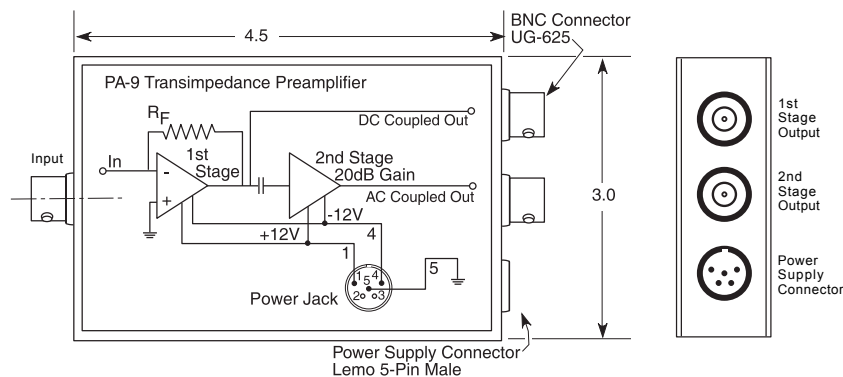
PA-9 Bandwidth vs Detector Capacitance



PA-9 Bandwidth vs Detector Resistance



PIN	DESIGNATION
1	+12V or +15V
2	NC
3	NC
4	-12V or -15V
5	GROUND



Power Supply Connector  
Pin Orientation

Information in this document is believed to be reliable. However, no responsibility is assumed for possible inaccuracies or omission. Specifications are subject to change without notice.