INFRARED SYSTEMS DEVELOPMENT CORPORATION

INSB-1000 Preamplifier
For
Photovoltaic InSb Detectors

- The INSB-1000 was specifically designed to operate with Photovoltaic Indium Antimonide detectors. The low noise and high gain aspects, together with a zero volt bias, provide an ideal complement to these detectors.

- The INSB-1000 preamplifier provides the InSb detector with all of the interface circuitry required for optimum operation. No external bias or load resistors are required. The preamplifier is detector noise limited. Low 6 fa/Hz$^{1/2}$ Input Noise and High Gain - typically 10 x 10^6 to 30 x 10^6 Volts/Amp.

- The InSb detector is connected to the input BNC connector with an SMA – BNC cable typically supplied with the detector. Positive and Negative 15 Volt DC power supplies with at least 100-milliampere output (100 ma for -15V) are required. The electrical bandwidth is internally set to 1.5Hz to 150Khz; other bandwidths (up to 5 MHz) are available. Adjustable gain provides variable signal amplitude typically from 5 to 100 times.

- Special configurations for high speed and reverse biasing are available.

7319 SANDSCOVE COURT #4 • WINTER PARK FLORIDA 32792 • PHONE: (407) 679-5101 FAX: (407) 679-5520
email: sales@infraredsystems.com

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Operating Instructions:

!!!! CAUTION !!!!

DO NOT CONNECT THE DETECTOR TO THE PREAMPLIFIER WHEN POWER IN ON. SEVERE DAMAGE TO THE DETECTOR MAY OCCUR, AND THE WARRANTY WILL BE VOIDED.

1.) Set the InSb Detector at its proper operating temperature by filling the Dewar with liquid nitrogen or applying TE cooler power. Wait for detector to come to operating temperature before proceeding.

2.) Connect the SMA to BNC connector from the detector to the preamplifier input. Refer to figure 1 below for locations of connectors and controls.

3.) Be sure power supply is off and run wires from the power supply to the +15V, -15V and Common/Ground terminals on the preamplifier. It is very important to connect the power supply common, not only Earth ground to the Common terminal on the preamp.

4.) Apply power to the preamplifier and adjust gain, if desired by carefully inserting a small screwdriver into the GAIN potentiometer access port in the preamplifier case and turn clockwise to increase gain and counter-clockwise to decrease. The INSB-1000 Preamp will produce a positive going signal with increases in detector energy.

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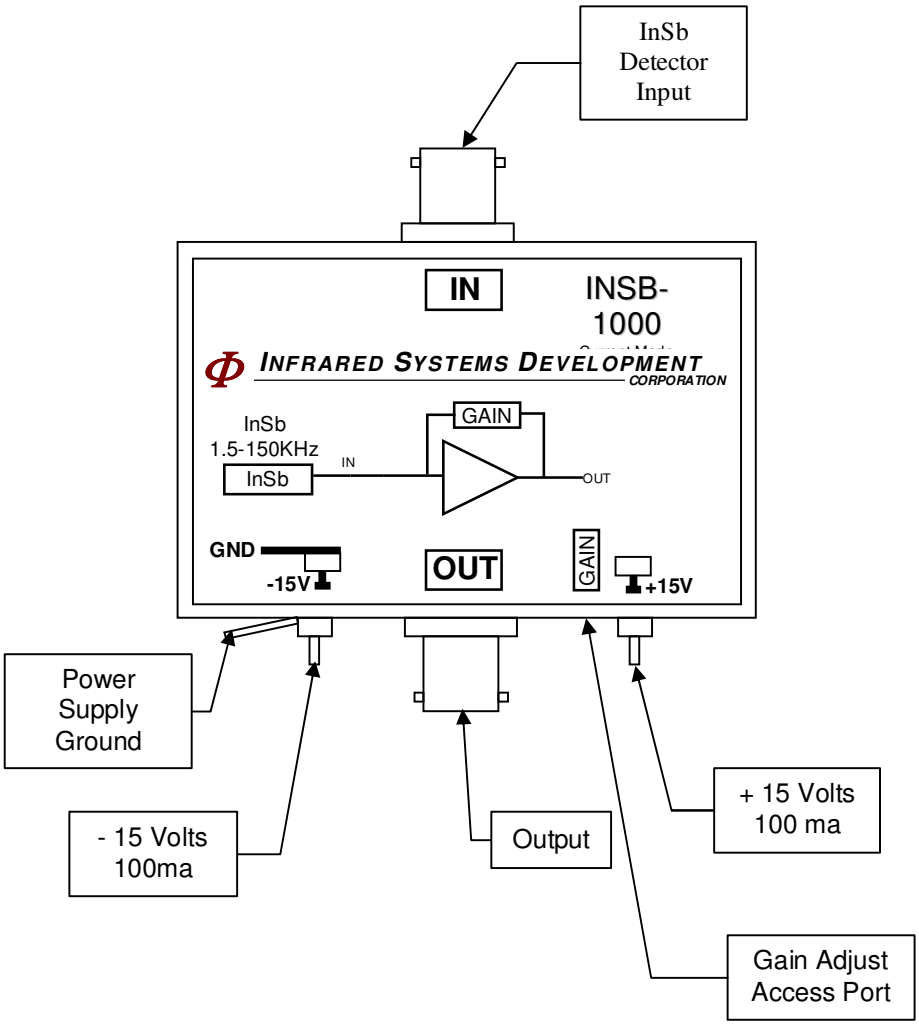

INSB-1000 Preamplifier
Figure 1

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Detector Wiring:

The detector should be connected to the preamp with the cable that came with the detector. Typically, the detector is supplied with an SMA connector on the dewar and a SMA to BNC cable. Connect the SMA connector to the dewar connector marked INSB, be sure to hand tighten this connector. **DO NOT OVERTIGHTEN** or damage to the dewar may result.

Connect the other end of the SMA-BNC cable to the preamp INPUT BNC connector.

Dewar Ground:

A separate dewar ground pin is provided on the detector dewar. This pin is connected to the dewar's metal housing. It is a solder type terminal that is next to the SMA detector connector. In almost all cases the dewar must be connected top power supply common and ultimately ground. If this ground pin is left open, the dewar will be floating and extremely susceptible to external EMI/RFI noise. This noise will be coupled into the detector and preamp causing wild variations in the preamp output signal.

The dewar ground should be connected to either the preamp common ground or the ground of your system. In no cases should the dewar case be left unconnected. If your system does not incorporate wiring to connect the dewar ground pin to ground, the ground wire on the SMA-BNC cable must be soldered to the dewar ground pin. **BE SURE TO OBSERVE CAUTION AND DO NOT OVERHEAT** this terminal while soldering or damage to the dewar may occur. In most configurations, this ground wire will be already be soldered to the ground terminal and should not be removed. In cases of an extremely noisy EMI/RFI environment or where ground loops exist a different path to ground may be needed to eliminate noise pickup from the dewar case.

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INSB DEWARS WITH GROUNDED SMA CABLES

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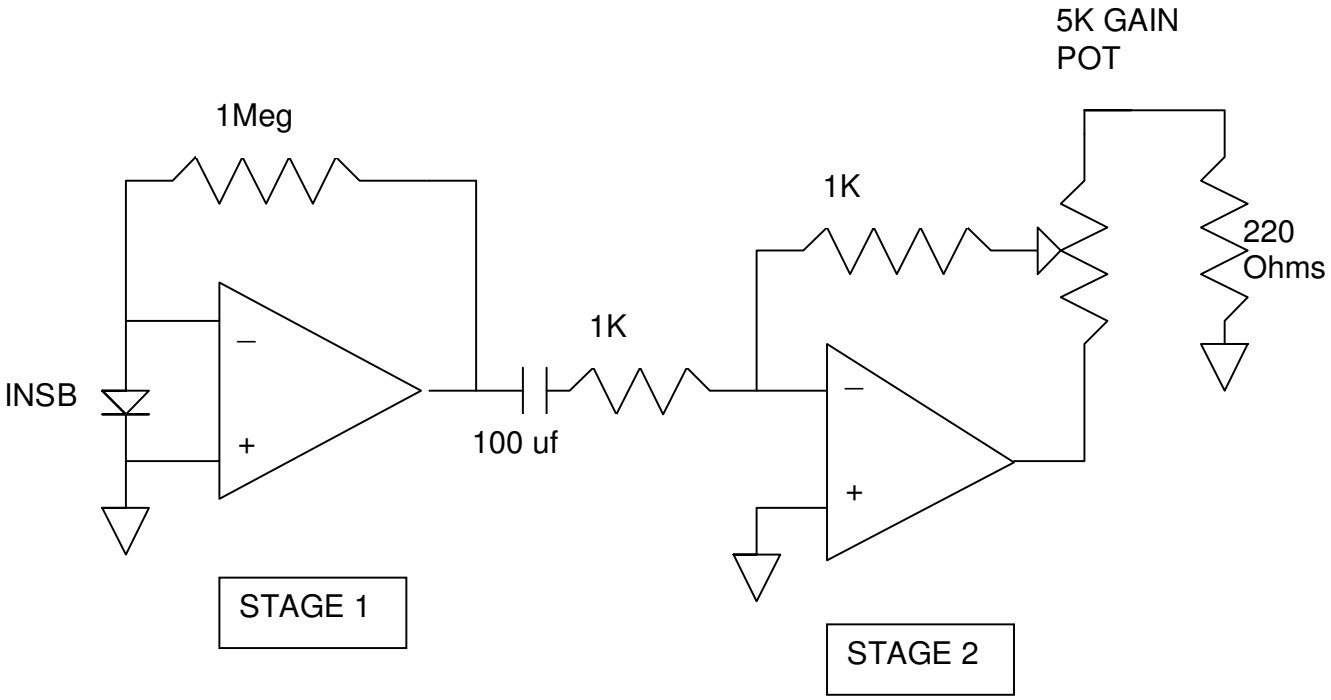
Simplified Schematic:



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