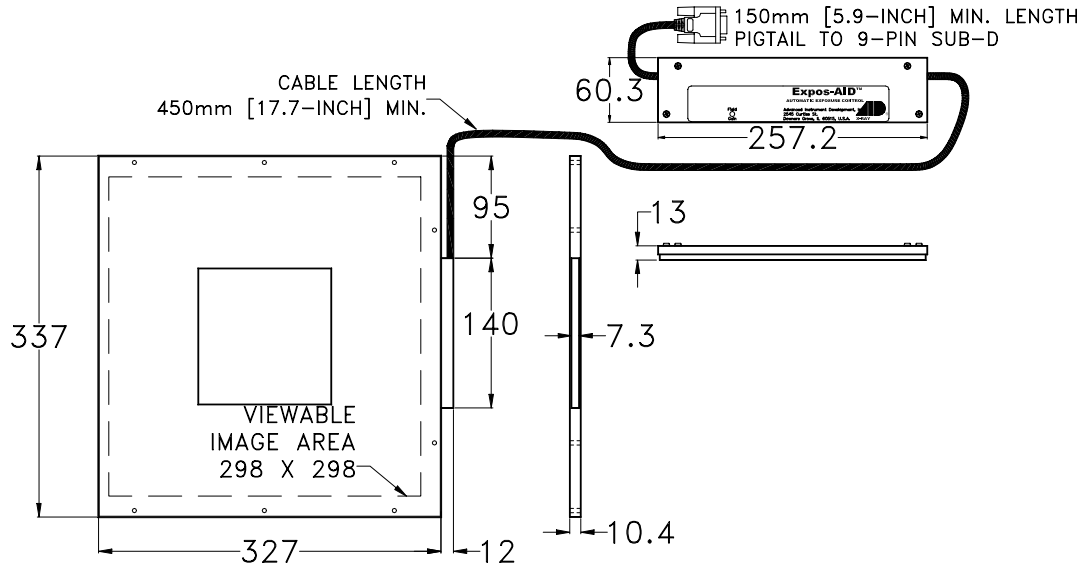


Spot-field ICX1998/ICX1999 Ionization Chamber
Calibration Procedure
Using the Pre-Amplifier Board Assembly
Note: ICX1998 uses 61188A, ICX1999 uses 61188B



The following adjustments apply to the calibration of a 61188B pre-amplifier board for a stationary spot-field ion chamber.

WARNING:

- Do not attempt to service the equipment unless this service manual has been consulted and is understood.
- Failure to heed this warning may result in injury to the service provider, operator or patient from electric shock and mechanical or other hazards.

Note: When working with the pre-amplifier assembly it is important that electrostatic discharge (ESD) prevention techniques be observed. Before touching the pre-amp assembly, attach an ESD wrist strap to yourself. Be sure to ground yourself and the ion chamber frame to dissipate static charges.

Note: The pre-amp assembly is a very delicate and sensitive device. It is important to keep it as clean as possible. Wash and dry your hands thoroughly before working with it and, when possible, use unpowdered latex or cotton gloves. Take care to touch the pre-amp board as little as possible. Take extra care to avoid touching the air-mounted field input. Oils from your fingers on the air-mounts or their components can cause performance degradation.

The 61188B pre-amplifier board can be configured to operate with several different AEC systems. If specified at the time of purchase, the ion chamber will be delivered with the pre-amplifier board already configured for a particular application. To reconfigure an ion chamber for a different configuration, see the section on Ion Chamber Inputs and Output and the section on Specific Configurations at the end of this document.

The procedure assumes that the installation of the Automatic Exposure Control (AEC) is complete and that the AEC and x-ray generator are in proper working condition. After making the necessary interconnections between the ion chamber and the AEC, power up the system.

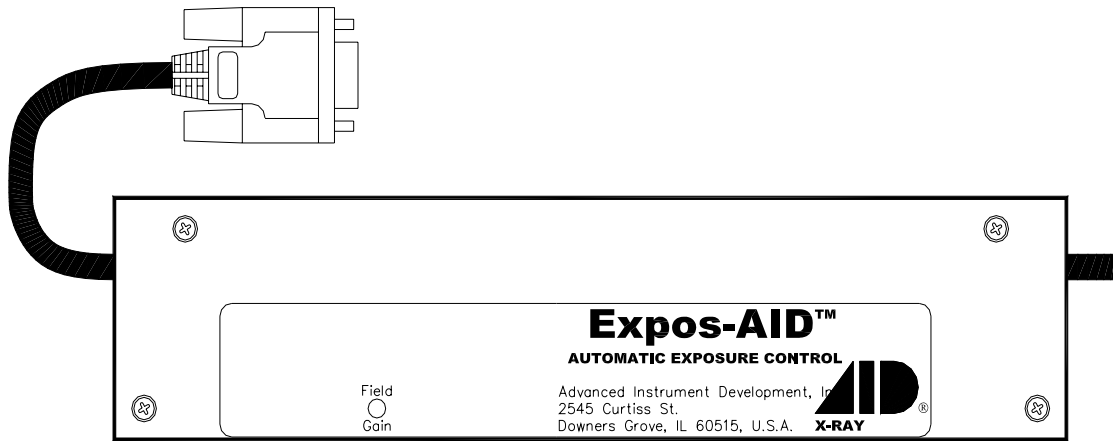
This document represents proprietary information originated by Advanced Instrument Development, Inc. and which shall not be disclosed or utilized in any manner detrimental to the company's business.

This document describes the calibration of split-spot ion chambers used in medical radiographic-fluoroscopic equipment.

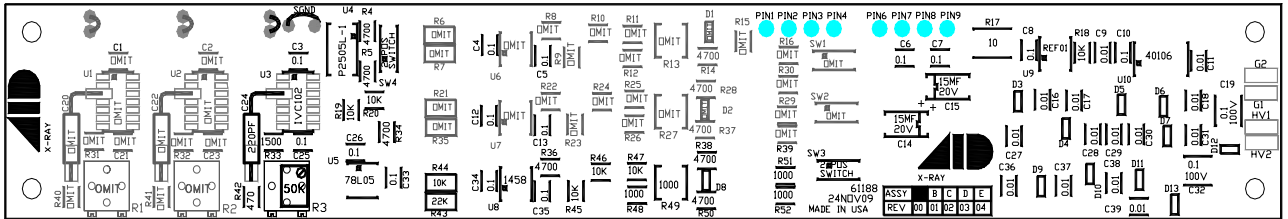
Calibration/Test Set Up:

Select the appropriate field of the ion chamber. Set the generator for 100 kVp and maximum backup time. For 100 kVp use 8 to 10 inches (20 to 25 cm) of water or plastic for a phantom. Metals such as copper, aluminum or lead are not suitable for use as phantoms. Make sure the phantom is homogeneous and completely covers all fields equally. Center the x-ray beam on the ion chamber field. Collimate the x-ray beam so that it completely covers the field but does not extend beyond the limits of the phantom.

Adjustment Potentiometers:



All necessary adjustment potentiometers are accessible through the pre-amp chassis cover. There is no need to open the pre-amp cover during normal calibration procedures.



Field Gain Adjustment:

Use the field gain adjustment to match the overall chamber sensitivity to that of the other stationary chambers connected to the system. Note that the field gain adjustment is a multi-turn potentiometer. A clockwise adjustment to the field gain potentiometer will increase the sensitivity of the chamber, causing the length of the exposure (mAs) to decrease.

Make exposures and process the films. Adjust the field gain for the desired optical density. Make the field gain adjustment for each stationary chamber being installed.

Ionization Chamber Pin-outs:

61188A/61188B Pre-amp Board Pin-out	Function	9-Pin Sub-D Pin-Out
1	NONE	1
2	NONE	2
3	NONE	3
4	RESET	4
5	NONE	5
6	OUTPUT	6
7	NEGATIVE SUPPLY	7
8	POSITIVE SUPPLY	8
9	GROUND	9

Acceptable Power Supply Ranges for 61188B Pre-amp:

Supply Voltage	Measurement Point	Acceptable Range
+12VDC Pos. Input Supply Voltage	61188A/61188B pin 8 Referenced to 61188D pin 9	From +11.4VDC to +12.6VDC
-12VDC Neg. Input Supply Voltage	61188A/61188B pin 7 Referenced to 61188D pin 9	From -11.4VDC to -12.6VDC
+5VDC Regulated on board	61188A/61188B C26 (positive lead) Referenced to 61188D pin 9	+4.7VDC to +5.3VDC
+75VDC Internal Bias Voltage Regulated on board	61188A/61188B C19 at the cathode of D12 Referenced to 61188D pin 9	+65VDC to +85.0VDC

Ionization Chamber Inputs and Output:

Signal	Switch	Comments
Positive Supply +12VDC	None	+11.4VDC to +15.75VDC less than 85 mA.
Negative Supply -12VDC	None	-11.4VDC to -15.75VDC less than 85 mA.
Low-Active Commands Reset	SW4-1 ON SW4-2 OFF	Pulling the Reset line to ground (≤ 6 VDC) beginning at exposure start and lasting for the entire duration of the exposure allows the integrator to operate.
High-Active Commands Reset	SW4-1 OFF SW4-2 ON	Driving the Reset line high (≥ 8 VDC) beginning at exposure start and lasting for the entire duration of the exposure allows the integrator to operate.
Positive Output	SW3-1 OFF SW3-2 ON	Time integrated signal ramping from 0VDC to a maximum of at least 80% of the supply voltage (+9.6VDC for +12VDC supply). The slope of this signal is directly proportional to the amount of x-ray flux received.
Negative Output	SW3-1 ON SW3-2 OFF	Time integrated signal ramping from 0VDC to a maximum of at least 80% of the supply voltage (-9.6VDC for -12VDC supply). The slope of this signal is directly proportional to the amount of x-ray flux received.

Specific Configurations:

Unless specified otherwise, ICX ion chambers are delivered with an AID compatible jumper configuration. AID compatible means that the input and output signals will interface with Advanced Instrument Development, Inc's Expos-AID™ Automatic Exposure Control. This same configuration will also interface with Acoma, Control-X, CPI, Del Medical (Gendex), Electromed (EMD, Triton), Hitachi Medical, K&S Röntgenwerk, OEC, Quantum Medical Imaging, Sedecal (Innerscan), Shimadzu (with PH CONT-2002 AEC board), Summit Industries, etc.

AID Compatible jumper configuration:

Function	Switch Setting
Low-Active Commands: Start Integrate	SW4-1 ON SW4-2 OFF
Positive Output	SW3-1 OFF SW3-2 ON

Alternate configurations are listed below.

GE, Fischer, Varian Compatible jumper configuration:

Function	Switch Setting
High-Active Commands: Start Integrate & Field Selects	SW4-1 OFF SW4-2 ON
Positive Output	SW3-1 OFF

	SW3-2 ON
--	----------

GTR Labs Compatible jumper configuration:

Function	Switch Setting
Low-Active Commands: Start Integrate & Field Selects	SW4-1 ON SW4-2 OFF
Positive Output	SW3-1 OFF SW3-2 ON

Trex Medical - Continental, Keithley, Ratheon, Xonics Compatible jumper configuration:

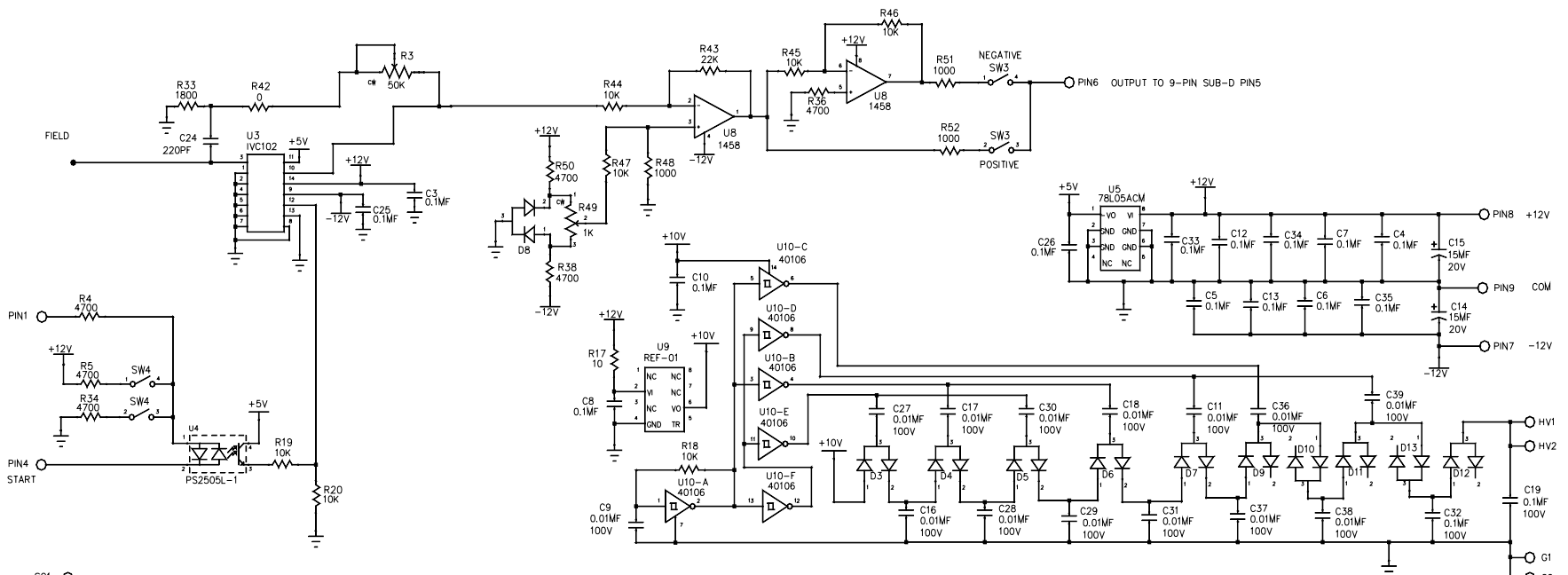
Function	Switch Setting
Low-Active Commands: Start Integrate & Field Selects	SW4-1 ON SW4-2 OFF
Positive Output	SW3-1 OFF SW3-2 ON

Trex Medical - Bennett, Health Care Manufacturing Compatible jumper configuration:

Function	Switch Setting
Low-Active Commands: Start Integrate & Field Selects	SW4-1 ON SW4-2 OFF
Negative Output	SW3-1 ON SW3-2 OFF

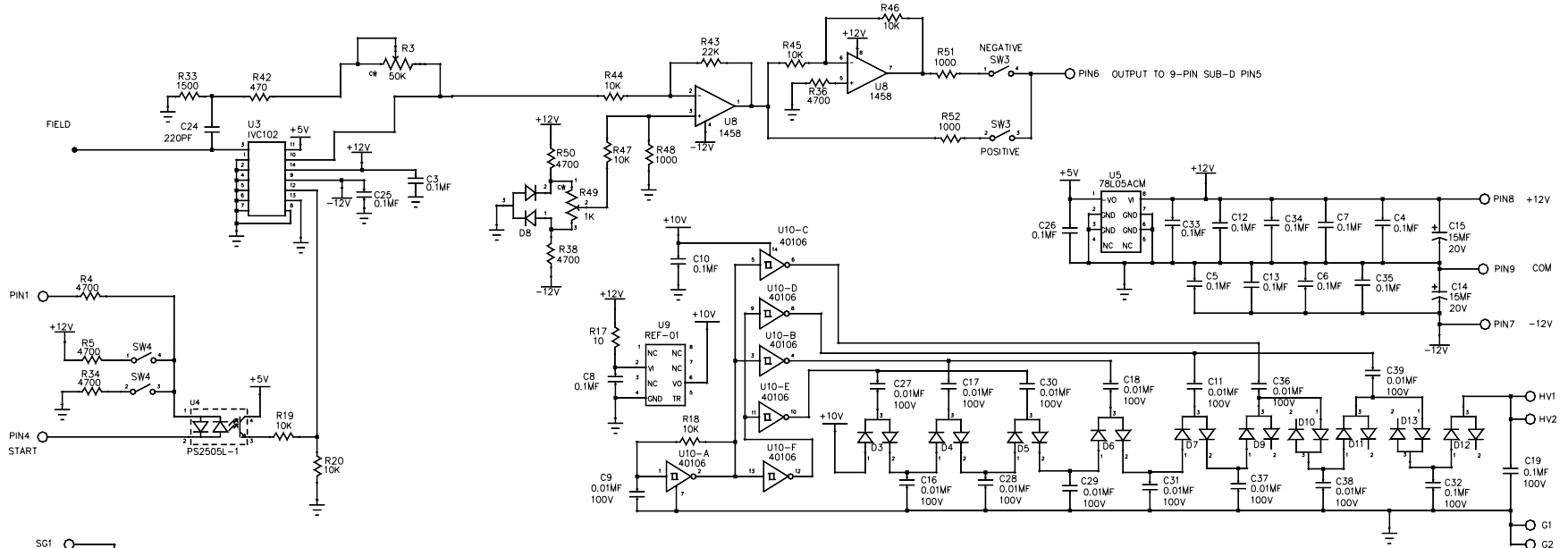
Picker Compatible jumper configuration:

Function	Switch Setting
Low-Active Commands: Start Integrate & Field Selects	SW4-1 ON SW4-2 OFF
Negative Output	SW3-1 ON SW3-2 OFF




- NOTES:
- * MANUFACTURER MAY USE ALTERNATE COMPONENTS UNLESS NOTED OTHERWISE.
 - ALL DIODES ARE TYPE BAV99, P/N 31102.

					DO NOT SCALE			ADVANCED INSTRUMENT DEVELOPMENT, INC. 2545 CURTISS ST. DOWNERS GROVE, IL 60515					
					UNLESS SPECIFIED OTHERWISE: DIMENSIONS ARE IN INCHES			X-RAY					
					FRACTIONS +/- 1/64	DEC. +/- 0.010	ANGLES +/- 1 DEGREE						
00	2880	27OCT11	NEW	SO	SCALE	NONE	DRAWN BY	SO	DATE	27OCT11	1-OUTPUT CALCULATED GAIN RANGE: 2.2 TO 61.1 TOP-TURN POTS		
REV	EON NO.	DATE	REVISIONS	BY	MATERIAL	CHECKED BY	APPROVED BY	USED ON	NEXT ASSY.	DRAWING NO.	61188A	REV	00
					THIS DRAWING REPRESENTS PROPRIETARY AND CONFIDENTIAL INFORMATION ORIGINATED BY ADVANCED INSTRUMENT DEVELOPMENT, INC. AND WHICH SHALL NOT BE DISCLOSED OR UTILIZED IN ANY MANNER DETRIMENTAL TO THE COMPANY BUSINESS.			ICX1998					



NOTES:
 1. * MANUFACTURER MAY USE ALTERNATE COMPONENTS UNLESS NOTED OTHERWISE.
 2. ALL DIODES ARE TYPE BAV99, P/N 31102.

DO NOT SCALE					ADVANCED INSTRUMENT DEVELOPMENT, INC. 2545 CURTISS ST. DOWNERS GROVE, IL 60515	
UNLESS SPECIFIED OTHERWISE: DIMENSIONS ARE IN INCHES						
FRACTIONS +/- 1/64 DEC. +/- 0.010 ANGLES +/- 1 DEGREE						
SCALE	NONE		DRAWN BY	SO	DATE	20MAY11
MATERIAL			CHECKED BY			
FINISH			APPROVED BY			
<small>THIS DRAWING REPRESENTS PROPRIETARY AND CONFIDENTIAL INFORMATION ORIGINATED BY ADVANCED INSTRUMENT DEVELOPMENT, INC. AND WHICH SHALL NOT BE DISCLOSED OR UTILIZED IN ANY MANNER DETRIMENTAL TO THE COMPANY BUSINESS.</small>						
REV	ECH NO.	DATE	REVISIONS	BY	USED ON	NEXT ASSY.
00	2851	20MAY11	NEW	SO	ICX1999	DRAWING NO. 61188B
						REV 00