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ICX924  
Three Output Ionization Chamber  
Calibration Procedure for Pre-Amplifier board 61188C

The following adjustments apply to the calibration of a 61188C pre-amplifier board for an ICX924 stationary three output 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 three air-mounted field inputs. Oils from your fingers on the air-mounts or their components can cause performance degradation.

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.

**Calibration/Test Set Up:**

Your X-Ray Generator/AEC Manual should cover this subject. Calibration procedures are specific to the X-Ray Generator/AEC. The Following is provided as additional information only.

Set the generator for 100 kVp and maximum backup time. For 100 kVp use 8 to 10 inches (20 to 25cm) 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 both fields equally. Center the x-ray beam on the center field. Collimate the x-ray beam so that it completely covers all three fields but does not extend beyond the limits of the phantom.

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Field Selection:

For normal operation with all fields active, see the table below for all three switch settings (SW1, SW2 & SW3).

FIELD	FIELD A (FIELD 1)	FIELD B (FIELD 2)	FIELD C (FIELD 3)
FIELD GAIN POT	R1	R2	R3
SWITCH POSITION	SW1-1 OFF SW1-2 ON	SW2-1 OFF SW2-2 ON	SW3-1 OFF SW3-2 ON



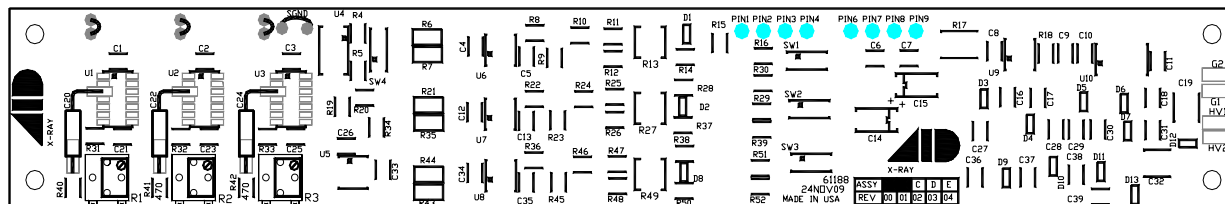
Balance Check:

Using the AEC post-exposure mAs display or other calibrated mAs meter check the individual fields to see that they are balanced, that is, that they produce the same mAs reading. If mAs readings are not stable from exposure to exposure for an individual field, then it will be necessary to expose films and make these adjustments based upon optical density.

If necessary, adjust the individual gain potentiometers to balance the outputs to give the same mAs reading for each field. Note that individual gain adjustments are multi-turn potentiometers. A clockwise adjustment to a gain potentiometer will increase the sensitivity of a field, causing the length of the exposure (mAs) to decrease.

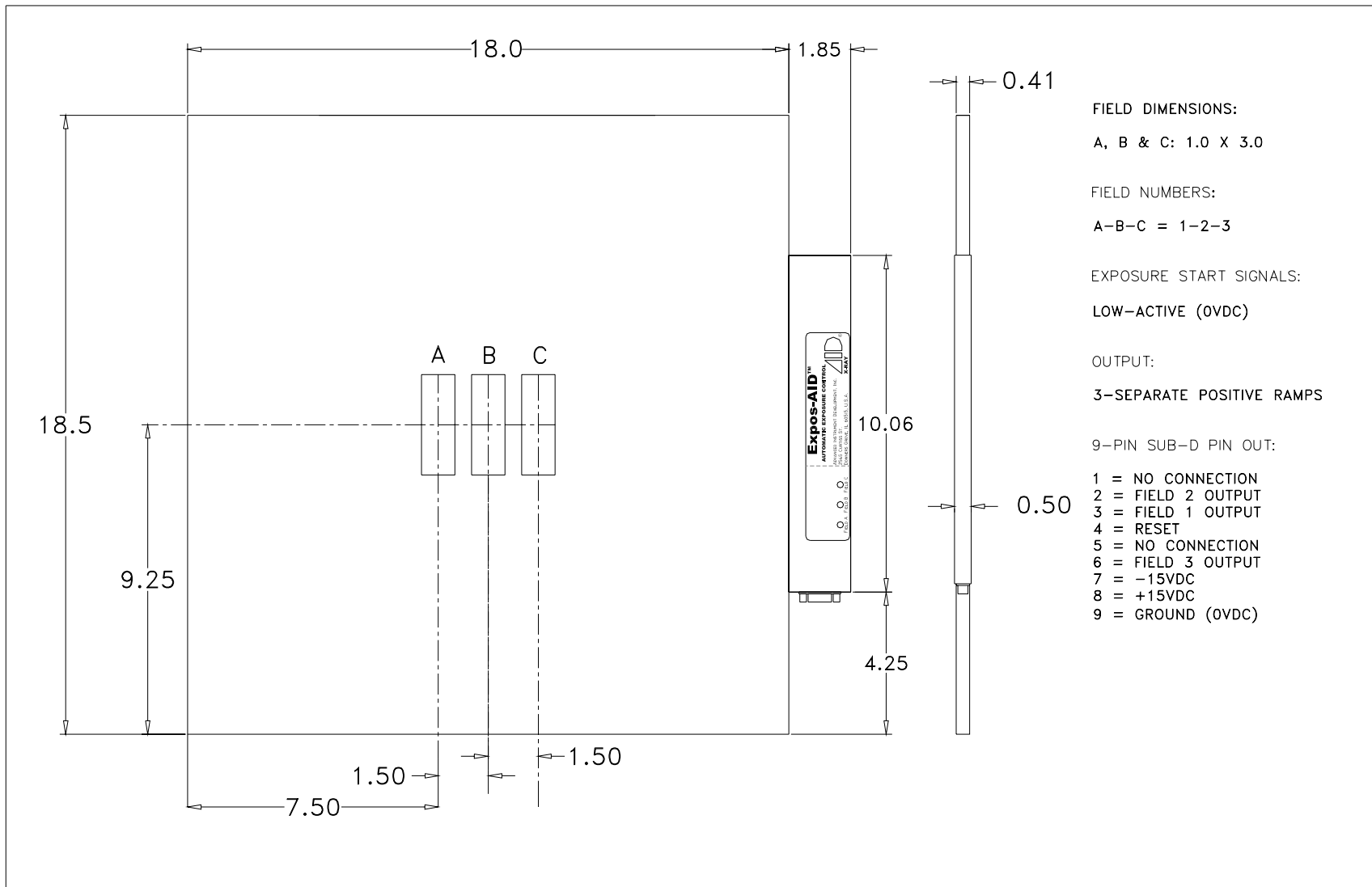
Ionization Chamber Pin outs:

PIN NUMBER	FUNCTION	DESCRIPTION	SWITCH POSITION
1	No Connection	None	None
2	Field 2 Output	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.	SW2-1 OFF SW2-2 ON
3	Field 1 Output	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.	SW1-1 OFF SW1-2 ON
4	RESET	Low-Active. Pulling this line to ground ( $\leq 8VDC$ ) beginning at exposure start and lasting for the entire duration of the exposure allows the integrator to operate.	SW4-1 ON SW4-2 OFF
5	No Connection	None	None
6	Field 3 Output	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.	SW3-1 OFF SW3-2 ON
7	-12VDC	-11.4VDC to -15.75VDC less than 15 mA.	None
8	+12VDC	+11.4VDC to +15.75VDC less than 85 mA.	None
9	Ground	0VDC	None



Acceptable Power Supply Ranges for 61188C Pre-amp:

Supply Voltage	Measurement Point	Acceptable Range
+12VDC Pos. Input Supply Voltage	61188C pin 8 Referenced to 61188C pin 9	From +11.4VDC to +12.6VDC
-12VDC Neg. Input Supply Voltage	61188C pin 7 Referenced to 61188C pin 9	From -11.4VDC to -12.6VDC
+5VDC Regulated on board	61188C C26 (positive lead) Referenced to 61188C pin 9	From +4.7VDC to +5.3VDC
+75VDC Internal Bias Voltage Regulated on board	61188C C19 at the cathode of D15 Referenced to 61188C pin 9	From -65VDC to -85VDC



FIELD DIMENSIONS:  
 A, B & C: 1.0 X 3.0


FIELD NUMBERS:  
 A-B-C = 1-2-3

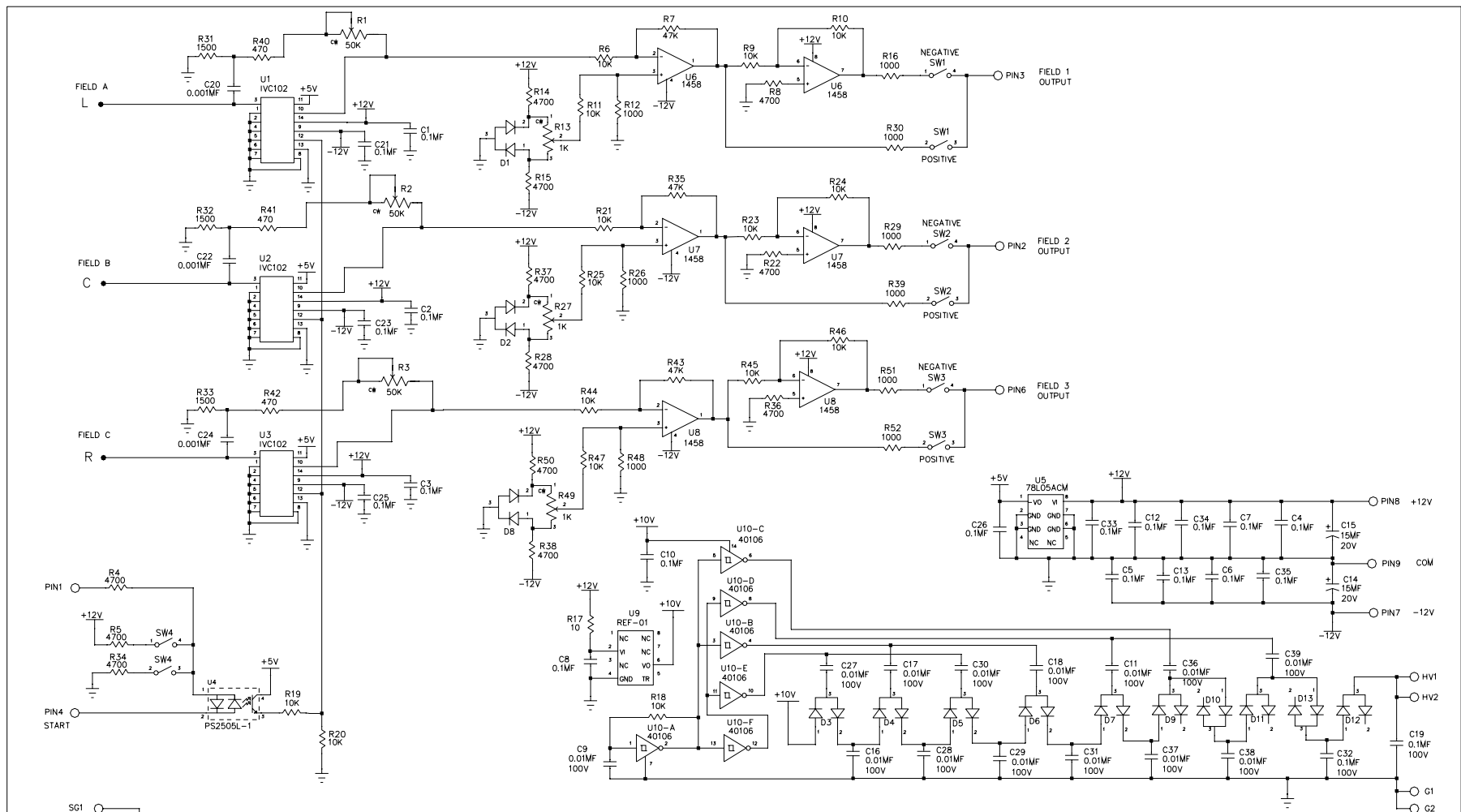
EXPOSURE START SIGNALS:  
 LOW-ACTIVE (0VDC)

OUTPUT:  
 3-SEPARATE POSITIVE RAMPS


9-PIN SUB-D PIN OUT:

- 1 = NO CONNECTION
- 2 = FIELD 2 OUTPUT
- 3 = FIELD 1 OUTPUT
- 4 = RESET
- 5 = NO CONNECTION
- 6 = FIELD 3 OUTPUT
- 7 = -15VDC
- 8 = +15VDC
- 9 = GROUND (0VDC)

					DO NOT SCALE		ADVANCED INSTRUMENT DEVELOPMENT, INC.  2545 CURTISS ST. DOWNERS GROVE, IL. 60515			
					UNLESS SPECIFIED OTHERWISE; DIMENSIONS ARE IN INCHES. FRACTIONS DECIMALS ANGLES $\pm 1/64$ $\pm 0.010$ $\pm 1^\circ$					
					SCALE	NONE	DRAWN BY	JC	DATE	08FEB96
					MATERIAL		CHECKED BY		ION CHAMBER DIMENSIONS	
					FINISH		APPROVED BY			
					REV.	ECN NO.	DATE	REVISIONS	BY	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'S BUSINESS.
					---	1876	14MAR00	POTS FROM SIDE-TURN TO TOP-TURN	BRP	USED ON
					---	1843	10DEC99	PRE-AMP WIDTH FROM 2.25 TO 1.85	BRP	ICX924
					---	1843	10DEC99	PRE-AMP LENGTH FROM 9.82 TO 10.06	BRP	NEXT ASSY.
										DRAWING NO.
										ICX924
										REV.



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: FRACTIONS: 1/64 DEC: +/- 0.010 ANGLES: +/- 1 DEGREE					
				SCALE: NONE	DRAWN BY: CJL	DATE: 24NOV09			
				MATERIAL: NONE			USED ON: ICX 924		
				FINISH: NONE			NEXT ASSY: 61188C		
				APPROVED BY: [Signature]			DRAWING NO: 61188C		
				REV: [Blank]			REV: 00		
				EON NO. [Blank]					
				DATE: [Blank]					
				REVISIONS: [Blank]					
				BY: [Blank]					
				THE DRAWING REPRESENTS PROPRIETARY AND CONFIDENTIAL INFORMATION ORIGINATED BY ADVANCED INSTRUMENT DEVELOPMENT, INC. AND WHICH SHALL NOT BE					