

Advanced Instrument Development, Inc.  
2545 Curtiss St.  
Downers Grove, IL 60515 U.S.A.

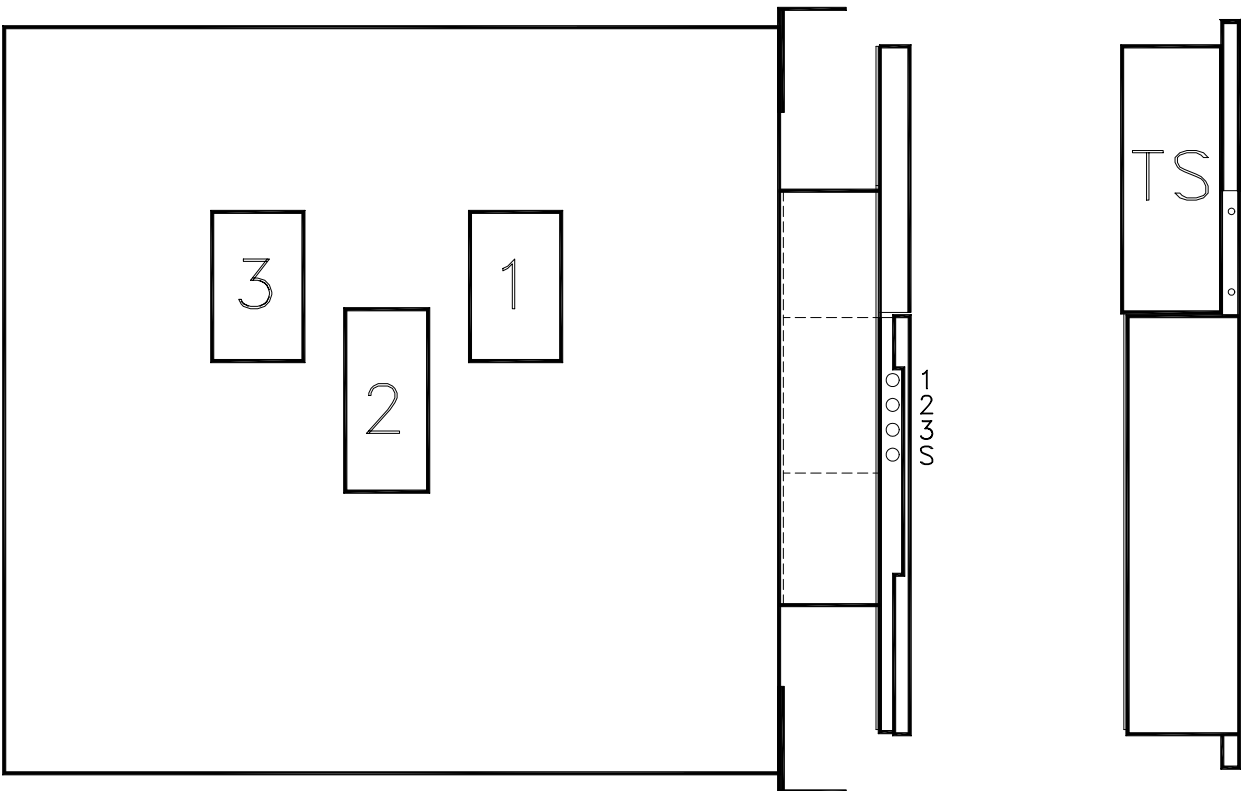
Phone: (630) 271-9729

[www.aidxray.com](http://www.aidxray.com)

Fax: (630) 271-9995

Model ICX211R (GEHC P/N 2331092-2 and 2331097)  
Three-field Ionization Chamber  
Calibration Procedure for Pre-Amplifier board 61154L

The model ICX211R is intended for use in a right hand vertical Bucky stand when replacing GEMS P/N 2331092-2, 2331097, 2224771, 2225327-2, 46-158297, 46-178529G2, 46-303847G2 or 46-316727G1.



ICX211R for right hand (R.H.) vertical Bucky stand  
as viewed from the adjustment side (non-tube-side).  
"TS" denotes the location of the terminal strip.

**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

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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 61154L 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.

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The following adjustments apply to the calibration of a 61154L pre-amplifier board for a stationary 3-field ion chamber, e.g. for chest or table use.

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:

Select the center field of the ion chamber. Set the generator for 100 kVp and maximum backup time. For 100 kVp use 8 to 10 inches 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 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.

Note: The pre-amp chassis and terminal strip covers should remain in place during all calibration steps.

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Master Chamber Gain Adjustment (61154L R4):

The master chamber gain adjustment is labelled "S" in the diagram above. Typically, the master chamber gain adjustment is the only adjustment needed when installing an ICX series ion chamber. Use the chamber gain adjustment to match the overall chamber sensitivity to that of the other stationary chambers connected to the system. Note that the master chamber gain adjustment is a multi-turn potentiometer accessible through the pre-amp chassis cover. A clockwise adjustment to the chamber 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 chamber gain for the desired optical density. Make the chamber gain adjustment for each stationary chamber being installed.

Balance Check:

Using the Expos-AID 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.

For the GEMS compatible ICX211R the individual gain potentiometers (61154L R1, R2 and R3) correspond to Field 1, Field 2 and Field 3 respectively. 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:

TERMINAL STRIP POSITION	FUNCTION	WIRE COLOR	61154L PIN OUTS
1	+15VDC	ORANGE	8
2	-15VDC	BLUE	7
3	RESET	GRAY	4
4	FIELD 1 SELECT	PURPLE	3
5	FIELD 2 SELECT	YELLOW	2
6	FIELD 3 SELECT	BROWN	6
7	OUTPUT	WHITE	5
8	GND	BLACK	9

**NOTE:** Cable wire colors do not match those inside the pre-amp chassis. Cable pin-out details are available on-line at <http://www.aidxray.com> or by contacting Advanced Instrument Development, Inc.

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Pre-amplifier Switch Settings:

Unless specified otherwise, the ICX211R ion chambers are delivered with a GEMS compatible jumper configuration.

GE, Fischer, Varian Compatible jumper configuration:

Function	Switch Setting
Defeat: Power Supply Isolation	SW1-1 ON
Enable: Alternate Field Selection	SW1-2 OFF
High-Active Commands: Start Integrate & Field Selects	SW1-3 ON SW1-4 OFF
Field Configuration: A=1, B=2, C=3	SW2-1,5 & 8 ON SW2-2,3,4, 6 & 7 OFF
Positive Output	SW3-1 ON SW3-2 OFF

AID Compatible jumper configuration:

Function	Switch Setting
Defeat: Power Supply Isolation	SW1-1 ON
Enable: Alternate Field Selection	SW1-2 OFF
Low-Active Commands: Start Integrate & Field Selects	SW1-3 OFF SW1-4 ON
Field Configuration: A=2, B=1, C=3	SW2-2,4 & 8 ON SW2-1,3,5, 6 & 7 OFF
Positive Output	SW3-1 ON SW3-2 OFF

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), OEC, Quantum Medical Imaging, Sedecal (Innerscan), Summit Industries, etc.

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

Function	Switch Setting
Defeat: Power Supply Isolation	SW1-1 ON
Enable: Alternate Field Selection	SW1-2 OFF
Low-Active Commands: Start Integrate & Field Selects	SW1-3 OFF SW1-4 ON
Field Configuration: A=1, B=2, C=3	SW2-1,5 & 8 ON SW2-2,3,4, 6 & 7 OFF
Positive Output	SW3-1 ON SW3-2 OFF

Trex - Bennett Compatible jumper configuration:

Function	Switch Setting
Defeat: Power Supply Isolation	SW1-1 ON
Enable: Alternate Field Selection	SW1-2 OFF
Low-Active Commands: Start Integrate & Field Selects	SW1-3 OFF SW1-4 ON
Field Configuration: A=1, B=2, C=3	SW2-1,5 & 8 ON SW2-2,3,4, 6 & 7 OFF
Negative Output	SW3-1 OFF SW3-2 ON

Picker Compatible jumper configuration:

Function	Switch Setting
Defeat: Power Supply Isolation	SW1-1 ON
Enable: Alternate Field Selection	SW1-2 OFF
Low-Active Commands: Start Integrate & Field Selects	SW1-3 OFF SW1-4 ON
Field Configuration: A=2, B=1, C=3	SW2-2,4 & 8 ON SW2-1,3,5, 6 & 7 OFF
Negative Output	SW3-1 OFF SW3-2 ON

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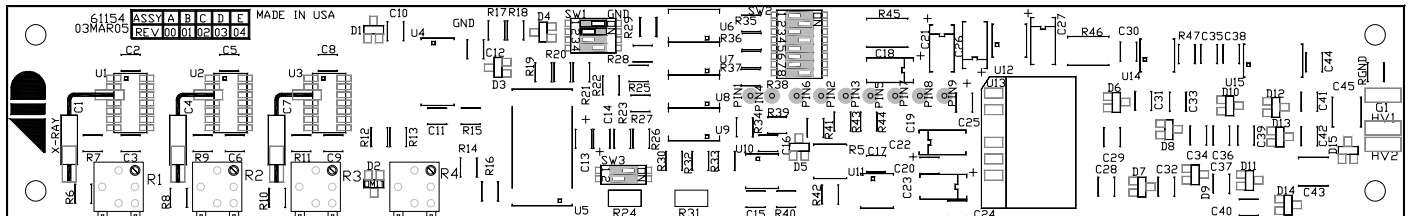
Fax: (630) 271-9995

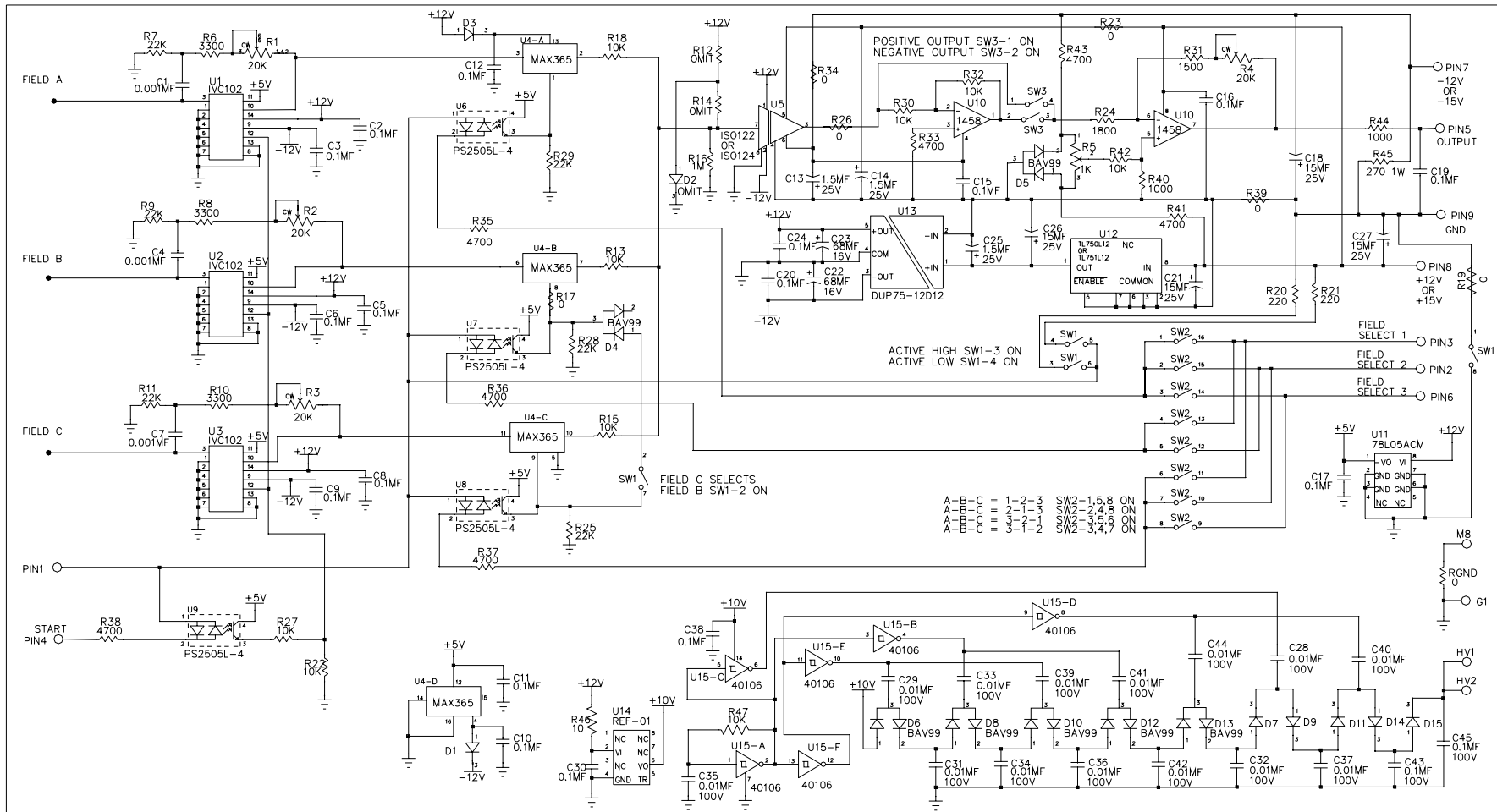
GTR Labs Compatible jumper configuration:

Function	Switch Setting
Defeat: Power Supply Isolation	SW1-1 ON
Enable: Alternate Field Selection	SW1-2 OFF
Low-Active Commands: Start Integrate & Field Selects	SW1-3 OFF SW1-4 ON
Field Configuration: A=3, B=1, C=2 (= GTR Labs fields 1-2-3)	SW2-3,4 & 7 ON SW2-1,2,5, 6 & 8 OFF
Positive Output	SW3-1 ON SW3-2 OFF

Acceptable Power Supply Ranges for 61154L Pre-amp:

Supply Voltage	Measurement Point	Acceptable Range
External +15VDC	61154L pin 8	+11.4VDC to +15.8VDC
External -15VDC	61154L pin 7	-11.4VDC to -15.8VDC
Internal +12VDC	Measure across 61154L C23	+10.8VDC to +12.5VDC
Internal -12VDC	Measure across 61154L C22	-10.8VDC to -12.5VDC
Internal +5VDC	61154L C17 (positive lead)	+4.7VDC to +5.3VDC
Internal +75VDC	61154L HV1	+65VDC to +85.0VDC





- NOTES:
- MANUFACTURER MAY USE ALTERNATE COMPONENTS UNLESS NOTED OTHERWISE.
  - ALL SWITCHES OFF UNLESS OTHERWISE NOTED.
  - U6, U7, U8, AND U9 MAY BE (4) SINGLE, (2) DUAL, OR (1) QUAD DEVICES.

DO NOT SCALE				ADVANCED INSTRUMENT DEVELOPMENT, INC.	
UNLESS SPECIFIED OTHERWISE: DIMENSIONS ARE IN INCHES				1011 N. 25TH AVE.	
FRACTIONS +/- 1/84				MELROSE PARK, IL 60160	
DEC. +/- 0.010				X-RAY	
ANGLES +/- 1 DEGREE				3-FIELD ISOLATED PRE-AMP	
SCALE NONE				CALCULATED GAIN RANGE 0.83 TO 11.94	
MATERIAL NONE				12T SIDE-TURN POIS	
FINISH NONE				USED ON	
DRAWN BY TRW				NEXT ASSY.	
CHECKED BY				DRAWING NO.	
DATE 09FEB05				REV	
APPROVED BY				ICX SERIES	
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.				61154L	
REV	ECH NO.	DATE	REVISIONS	BY	00
00	2326	11NOV05	MAKE FROM 61154 X SAME AS 61154A-02 EXCEPT: R24=1800, R31=1500, SIDE-TURN POIS	SO	00