

ERRA INDUSTRIES, INC. SCIENTIFIC INSTRUMENTS  
STATE STREET MERIDEN CONN. 06450 U.S.A.

1/22/88 PACKING SLIP

BILL - TO

SHIP - TO

ELEKTRONIK IMPORT  
PL. 13  
NNA

FORWARDER INTEREUROPA 64210  
BRNIK, ARPT LJUBLJANA POS.N.R.  
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JOZEF STEFAN JAMOVA 39,  
61000 LJUBLJANA

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ORDER NUMBER	ORDER DATE	CUSTOMER P.O.	VOL/HZ	FOB	SHIP VIA	PPD/ COL	PAGE
79851	12/07/87	87/YU/0667	220 50	MER AF	PPD		1

CARRIER BILL OF LADING

KAMINO COMP

QTY	BAL	MODEL	***** DESCRIPTION *****
SHIP	DUE	NUMBER	

1		802-4	NAI DETECTOR 3 X 3
1		2007P	PMT BASE/PREAMPLIFIER (14-PIN)
1		3102	0-2 KV H.V. POWER SUPPLY
			GENERAL LICENSE; G-DEST

THESE COMMODITIES LICENSED BY THE UNITED STATES FOR  
ULTIMATE DESTINATION YUGOSLAVIA  
DIVERSION CONTRARY TO U.S. LAW PROHIBITED.

MADE IN U.S.A.



802-4  
QUALITY ASSURANCE

SIN 10873601

**BICRON CORPORATION**

12345 Kinsman Road, Newbury, Ohio 44065  
Telephone (216) 564-2251 Telex 980474

CUSTOMER Canberra Industries, Incorporated	CUSTOMER ORDER NUMBER 926	Q- 31185
MODEL 3m3/3	SCINTILLATOR NaI (TI)	PMT TYPE 9838(EMI)
		TEST VOLTAGE Vdc +1000V.

PERFORMANCE PARAMETERS (ALL PARAMETERS CHECKED USING A 1024 CHANNEL ANALYZER)

TEST	PHR				
SOURCE	Cs-137				
CUSTOMER SPECIFICATION	±7.5%				

DETECTOR  
SERIAL NO.

PMT  
SERIAL NO.

1	FF-881	6.9%				42-2408	1
2							2
3		6.7%					3
4							4
5							5
6							6
7							7
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SHIPPING AUTHORIZATION

MONTH DAY YEAR

Karen

9 30 87



CUSTOMER:	CUSTOMER P.O. #:	CANBERRA ACK #:	CARRIER:	* CINS:	TOT WGT:	S.S. DATE:					
QTY	MODEL #	SERIAL #	MANUALS	SCHEMATICS	TEST DATA	CABLES	VOLTAGE: _____ REMARKS	CTN #:	NET WT:	GRS WT:	DIM:
								CTN #:	NET WT:	GRS WT:	DIM:
								CTN #:	NET WT:	GRS WT:	DIM:
								CTN #:	NET WT:	GRS WT:	DIM:
								CTN #:	NET WT:	GRS WT:	DIM:

Staging - Goldenrod

Sales - Pink

File - Canary

Customer - White

## Section 1. Introduction

The Model 802 Scintillation Detector is a Monoline Crystal Assembly which includes a high resolution NaI(Tl) crystal, a photomultiplier tube, an internal magnetic/light shield, and a chrome-plated aluminum housing.

Any Model 802 Detector Assembly plugs directly into the Model 2007 Tube Base, which provides bias for the photomultiplier tube, or into the Model 2007P, which combines the bias network with a built-in preamplifier.

Three crystal sizes are available, either with or without a well:

Model	Crystal Size
802-1	3.8 x 2.5 cm (1.5 x 1 in.)
802-3 802-3W	5 x 5 cm (2 x 2 in.) Same, with a well.
802-4 802-4W	7.6 x 7.6 cm (3 x 3 in.) Same, with a well.

## Section 2. Specifications

RESOLUTION - Typically 7.5% - 8.5%; specified at 662 keV peak of <sup>137</sup>Cs; refer to the Specification Sheet packed with each detector.

WINDOW - 0.05 mm (0.02 in.) aluminum; density: 147.9 mg/cm<sup>2</sup>.

REFLECTOR - Oxide, 1.6 mm (0.625 in.) thick; density: 88 mg/cm<sup>2</sup>.

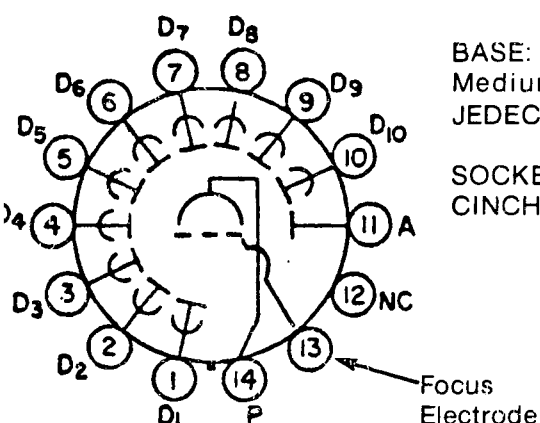
MAGNETIC/LIGHT SHIELD - Conetic lined steel.

TYPICAL BIAS - +800 to +1100 V dc; refer to the Specification Sheet packed with each detector.



## Section 3. Tube Base

Pin Configuration



BASE:  
Medium-shell Diheptal 14-pin  
JEDEC NO. B14-38

SOCKET:  
CINCH No. 3M-14

D - DYNODE  
A - ANODE  
P - PHOTOCATHODE  
NC - NO CONNECTION

## Section 4. Operating Instructions

Model 802 series NaI photomultiplier tubes (PMTs) designed to be operated with a Model 2007 Tube Base/Model 2007P Tube Base/Preamplifier, or equivalent, which provide the PMT with its operating bias. The bias is derived from a high voltage power supply such as Model 3002 or the Model 3102, or equivalent.

Model 2007 Tube Base is used with an external amplifier, such as the Model 2005, or with the built-in voltage-to-current converter and preamplifier in the Series 15, 35 PLUS, and 40 MCAs.

Model 2007P Tube Base/Preamplifier is used with an external amplifier which is connected directly either to the internal ADC in any Canberra MCA or to an external ADC.

### SETUP

When installing a Model 802 series detector to either the Model 2007 or the Model 2007P Tube Base, use care in aligning

the pins of the Model 802 with the sockets of the Tube Base. A key is provided on the Model 802 and a keyway on the Tube Base to ensure correct alignment.

When applying the High Voltage bias to the Model 802, good operating practice requires that the full bias not be applied immediately; it should be raised or lowered over a period of several seconds. The Model 2007P is diode-protected for occasional faults and for high-voltage arcing. The Model 2007 has no diode protection.

Refer to the Model 2007 or Model 2007P manual for system interconnections.

## BASIC WARRANTY

Equipment manufactured by Canberra Industries, Inc. is warranted against defects in materials and workmanship for a period of twelve months from date of shipment, provided that the equipment has been used in a proper manner as detailed in the instruction manuals. During the warranty period, repairs or replacement will be made at Canberra's option on a return to factory basis. The transportation cost, including insurance to and from Canberra, is the responsibility of the Customer except for defects discovered within 30 days after receipt of equipment where shipping expense will be paid by Canberra to and from Canberra.

The customer must obtain an authorized customer service return number before returning any equipment to the Canberra factory. *Compliance with this provision by the customer shall be a condition of this warranty.* In giving shipping instructions, Canberra shall not be deemed to have assumed any responsibility or liability in connection with the shipment.

The Canberra Basic Warranty applies only to equipment manufactured by Canberra which is returned to the factory. If equipment must be repaired at the customer's site, the actual repair labor and parts will be provided at no charge during the warranty period. However, travel expenses to and from the customer's site, (travel time labor, and living expenses while on site), shall be paid by the customer unless an On-Site Warranty Option has been purchased. This option may only be purchased prior to shipment of the equipment to the customer.

The express warranties set forth herein are the only warranties with respect to the products, or any materials or components purchased from others and furnished by Canberra, and there are no other warranties, expressed or implied. The warranty of merchantability is expressly limited as herein provided and all warranties of fitness are expressly disclaimed and excluded. Canberra shall have no liability for any special, indirect or consequential damages, whether from loss of production or otherwise, arising from any breach of warranty hereunder or defect or failure of any product or products sold hereunder.

### EXCLUSIONS

Warranty service is contingent upon the proper use of all equipment and does not cover equipment which has been modified without Canberra's written approval or which has been subjected to unusual physical or electrical stress as determined by Canberra Service personnel. Canberra Industries shall be under no obligation to furnish warranty service (preventive or remedial): (1) if adjustment, repair or parts replacement is required because of accident, neglect, misuse, failure of electrical power, air conditioning, humidity control, transportation, or causes other than ordinary use; (2) if the equipment is maintained or repaired or if attempts to repair or service equipment are made by other than Canberra personnel without the prior approval of Canberra.

This warranty does not cover detector damage caused by warm-up or by neutrons or heavy charged particles. Damage from these causes is readily identifiable as described in the manual accompanying each detector.

Although Canberra may frequently supply, as part of systems, equipment manufactured by other companies, the only warranty that shall apply to such non-Canberra equipment is that warranty offered by the original manufacturer, if any.

Canberra will, upon request, offer, as an option, warranty coverage for non-Canberra equipment such as computers and peripherals sold as part of a system supplied by Canberra. Quotations on this coverage may be obtained by contacting Canberra Customer Service or any of our sales staff.

### SOFTWARE

Canberra warrants software media from defects discovered within 30 days after receipt.

Canberra assumes no responsibility for user-written programs or programs published as part of information exchange in Canberra periodicals.

Engineering assistance for software development is available and can be contracted through the Sales Department.

### INSTALLATION

Installation of equipment purchased from Canberra shall be the sole responsibility of the customer unless the installation is specifically contracted for at the prevailing Canberra field service rates. To insure timely installation after receipt of equipment, it is recommended that installation be contracted for at the time the equipment is ordered.

### ON-SITE WARRANTY OPTION

The On-Site Warranty Option provides for free on-site warranty work (Canberra pays all travel and living expenses) within the first 90 days after delivery of equipment to the customer. If installation is ordered from Canberra, the 90 day period commences upon completion of the initial installation. After the 90 day period, labor and materials used on site will still be covered by the basic warranty, but the customer shall pay for all travel expenses—travel time labor and living expenses incurred for any on-site service.

A maintenance contract may be purchased covering the period after the 90 days on-site warranty period, or after initial installation of the equipment. This is to be contracted through Canberra Customer Service.

### REPAIRS

Any Canberra-manufactured instrument no longer in its warranty period may be returned, freight prepaid, to our factory for repair and realignment. When returning instruments for repair, contact the Customer Service Department for shipping instructions and an Authorized Customer Service Return Number.

All correspondence concerning repairs should include the Model number and a description of the problem observed.

Once repaired, all equipment passes through our normal preshipment checkout procedure. Return shipping expense on out-of-warranty repairs will be charged to the customer.

For instruments out of warranty, the customer must supply a purchase order number for the repair before the item will be returned.

### SHIPPING DAMAGE

Shipments should be carefully examined when received for evidence of damage caused by shipping. If damage is found, immediately notify Canberra and the carrier making delivery, as the carrier is normally responsible for damage caused in shipment. Carefully preserve all documentation to establish your claim. Canberra will provide all possible assistance in processing damage claims.

**Due to the delicate nature of cooled detectors (Ge and Si(Li)), Canberra requires that delivery to and from air freight terminals be handled with special care. Do not ship such Detectors without first obtaining advice from our Traffic Department.**

### RETURN SHIPMENTS

Canberra Customer Service Department must be notified in advance if equipment is to be returned for any reason. Canberra can suggest the best means of shipping and will be able to expedite the shipment in case it is lost or delayed in transit.

The customer must obtain an authorized customer service return number before returning any equipment to the Canberra factory. *Compliance with this provision by the customer shall be a condition of this warranty.* In giving shipping instructions, Canberra shall not be deemed to have assumed any responsibility or liability in connection with the shipment.

Equipment should be returned to your area service center or to Canberra, Meriden. For shipment from outside the U.S., our shipping address is:

Canberra Industries, Inc.  
c/o EMO-TRANS, Inc.  
Bradley International Airport  
Windsor Locks, CT 06096 U.S.A.

### SERVICE AND SERVICEABILITY

Canberra has gone to great lengths to insure that the instruments provided are functionally modular and therefore easy to service. In addition to modularity, Canberra has embarked on an extensive System Service Program to provide a totally responsive service capability. Complete Service Contracts with special arrangements for 24 hour response and weekend standby services are available from Canberra. For a detailed description of our Customer Service Program, please contact our Systems Service Department in Meriden, Connecticut, U.S.A.