

S O U T H W E S T R E S E A R C H I N S T I T U T E

Department of Quality Assurance
Calibration Laboratory

CERTIFICATE OF CALIBRATION

Issued to: DIV20 B57 NARASI SRIDHAR

Device No: 1948

Manufacturer: ORION

Model: EA 940

Nomenclature: EXPANDABLE ION ANALYZER

Serial Number: 2330

SwRI No:

Remarks

Accuracy:

Procedure:

ENVIRONMENT

Temperature: 70 Humidity: 44 Location: ROOM A11 B68 SWRI

CONCLUSION

Tolerance/Remarks: Received into the system, introduced or reactivated

Calibration limited to millivolts only (+/- .2 millivolts).

Standard	Reading for input 1	Reading for input 2
1mv	.9mv	.9
10mv	9.9	9.9
100mv	99.9	99.8
1v	999.9	999.8
1.5v	1500.0	1499.9
1.9v	1900.0	1900.0

Calibration was in accord with requirements of MIL-STD-45662A. Measurements are traceable to the National Institute of Standards and Technology. Inspection and test data are on file and available for inspection.

Signed



Calibration Date: 12/21/92

Record Number: 00010175

Next Calibration Due: 12/21/93

S O U T H W E S T R E S E A R C H I N S T I T U T E

Department of Quality Assurance
Calibration Laboratory

Device Serial No: 2330

Calibration Date: 12/21/92

STANDARDS

Standard No: 132 Manufacturer: JOHN FLUKE Model: 5100B

Nomenclature: CALIBRATOR

Serial No: 2730017

Cal.Due: 04/08/93

Cal.Rec.No: 00009975

S O U T H W E S T R E S E A R C H I N S T I T U T E

Department of Quality Assurance
Calibration Laboratory

CERTIFICATE OF CALIBRATION

Issued to: DIV20 B57 NARASI SRIDHAR

Device No: 1948

Manufacturer: ORION

Model: EA 940

Nomenclature: EXPANDABLE ION ANALYZER

Serial Number: 2330

SwRI No:

Cal interval 12 Mo.

Remarks

*Accuracy= +/- 0.1mV or +/-0.05%

Accuracy: *

Procedure: MFGR

ENVIRONMENT

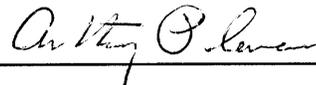
Temperature: 73 Humidity: 38 Location: ROOM A11 B68 SWRI

CONCLUSION

Tolerance/Remarks: Received in tolerance, no adjustments made

Calibration was in accord with requirements of MIL-STD-45662A. Measurements are traceable to the National Institute of Standards and Technology. Inspection and test data are on file and available for inspection.

Signed



Calibration Date: 12/27/93

Cal interval: 12 Months

Record Number: 00012981

Next Calibration Due: 12/27/94

S O U T H W E S T R E S E A R C H I N S T I T U T E

Department of Quality Assurance
Calibration Laboratory

Device Serial No: 2330

Calibration Date: 12/27/93

STANDARDS

Standard No: 132 Manufacturer: JOHN FLUKE

Model: 5100B

Nomenclature: CALIBRATOR

Serial No: 2730017

Cal.Due: 05/04/94

Cal.Rec.No: 00012641

SOUTHWEST RESEARCH INSTITUTE

Department of Quality Assurance
Calibration Laboratory

CERTIFICATE OF CALIBRATION
01/10/95

Issued to: NARASI SRIDHAR DIV20 ,B57
Manufacturer: ORION
Nomenclature: EXPANDABLE ION ANALYZER
Serial Number: 2330

Asset Number: 001948
Model Number: EA 940

SwRI Capital Number: UNKWN

ENVIRONMENTAL CONDITIONS

Temperature: 69.0F

Relative Humidity: 39 %

CALIBRATION INFORMATION

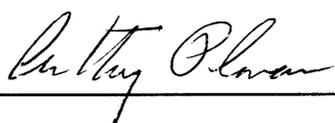
Location: CAL1
Procedure Number: MFGR
Remarks:

Technician: 5952
Accuracy: *
Received IN Tolerance

Calibration was in accordance with requirements of MIL-STD-45662A.
Measurements are traceable to the National Institute of Standards and Technology. Inspection and test data are on file and available for inspection.

STANDARDS USED FOR CERTIFICATION

Asset #	Serial #	Mfg	Model #	Nomenclature	Cal Date	Int.	Cal Due
000168	775024	FLUKE	335A	DC VOLTAGE STANDARD/DIFFERENTIAL VO	11/01/94	6	05/01/95

Certified by : 

Certificate#: 15964

Calibration Date: 01/10/95
Interval: 12 months
Next Calibration Due: 01/10/96

SOUTHWEST RESEARCH INSTITUTE

Department of Quality Assurance
Calibration Laboratory

CERTIFICATE OF CALIBRATION
01/15/96

Issued to: DARRELL DUNN DIV20 ,B57
Manufacturer/Model: ORION/EA 940
Nomenclature: EXPANDABLE ION ANALYZER
Serial Number: 2330
Asset Number: 001948
Notes: *ACCURACY= +/- 0.1MV OR +/-0.0

ENVIRONMENTAL CONDITIONS

Temperature: 75.0F

Relative Humidity: 32%

CALIBRATION INFORMATION

Procedure Number: MFGR
Remarks:

Accuracy: MFG
Received IN Tolerance

Calibration was in accordance with requirements of MIL-STD-45662A.
Measurements are traceable to the National Institute of Standards and Technology. Inspection and test data are on file and available for inspection.

STANDARDS USED FOR CERTIFICATION

Asset #	Serial #	Mfg	Model #	Nomenclature	Cal Date	Int.	Cal Due
000132	2730017	FLUKE	5100B	CALIBRATOR	12/05/95	6	06/05/96

Certified by : Arthur Plummer

Certificate#: 19795

Calibration Date: 01/15/96
Interval: 12 months
Next Calibration Due: 01/15/97



Southwest Research Institute
6220 Culebra Road
San Antonio, TX 78238
Department of Quality Assurance
Calibration Laboratory

Certificate of Calibration

2 April 1997

Issued to: DARRELL DUNN DIV20 B57
Manufacturer/Model: ORION EA 940
Description: EXPANDABLE ION ANALYZER
Serial Number: 2330
Asset Number: 001948

Environmental Conditions

Temperature: 74.0 Deg. F Humidity: 48%

Calibration Information

Calibration was in accordance with requirements of MIL-STD-45662A and ANSI/NCSS Z540-1-1994. Measurements are traceable to the National Institute of Standards and Technology (NIST). This report may not be reproduced except in full without written approval of the originator. Inspection and test data are on file and available for inspection.

Calibration Date: 2 Apr 97 Calibration Procedure: 5352
Interval: 12 months Accuracy: MFG
Next Calibration Due: 2 Apr 98 Received: In Tolerance

Remarks:

Standards Used

Asset	MFR	Model	Description	Serial No.	Due Cal
000115	HEWLETT-PA	3456A	DIGITAL VOLTMETER	2201A08306	9 Jul 97
000168	FLUKE	335A	DC VOLTAGE STANDARD/D	775024	4 Aug 97

Certificate # 24751

Signed: 

LAST PAGE OF REPORT
Total Pages Printed: 1



Southwest Research Institute
6220 Culebra Road
San Antonio, TX 78238
Department of Quality Assurance
Calibration Laboratory

Certificate of Calibration

6 March 1998

Issued to: DARRELL DUNN DIV20 B57
Manufacturer/Model: ORION EA 940
Description: EXPANDABLE IONANALYZER
Serial Number: 2330
Asset Number: 001948

Environmental Conditions

Temperature: 75.00 Deg. F

Humidity: 35 % RH

Calibration Information

Calibration was in accordance with requirements of MIL-STD-45662A and ANSI/NCSL Z540-1-1994. Measurements are traceable to the National Institute of Standards and Technology (NIST). This report may not be reproduced except in full without written approval of the originator. Inspection and test data are on file and available for inspection.

The uncertainty of the calibration was sufficient to determine that the instrument met the manufacturer's specifications.

Calibration Date: 6 Mar 98

Calibration Procedure: CLCP-IA-001

Interval: 12 months

Next Calibration Due: 6 Mar 99

Received: In Tolerance

Remarks: LIMITED CALIBRATION: ONLY MILLIVOLTS
FUNCTION IS CALIBRATED

Standards Used

Asset	MFR	Model	Description	Serial No.	Due Cal
000182	FLUKE	5700A	CALIBRATOR	5200003	2 Jul 99

Signed:

Title:

LAST PAGE OF REPORT
Total Pages Printed: 1

Certificate # 28770



Southwest Research Institute
6220 Culebra Road
San Antonio, TX 78238
(210) 522-5215
Department of Quality Assurance
Calibration Laboratory



Certificate #
0972-01

Certificate of Calibration

25 March 1999

Issued to: DARRELL DUNN DIV20 B57
Manufacturer/Model: ORION EA 940
Description: EXPANDABLE IONANALYZER
Serial Number: 2330
Asset Number: 001948

This certifies the above item was calibrated in compliance with MIL-STD-45662A and ANSI/NCSL Z540-1-1994. Standards used in this calibration, described in the referenced calibration procedure with associated uncertainties or tolerances, are traceable to the National Institute of Standards and Technology (NIST). Supporting documentation relative to traceability is on file and is available for examination upon request. This certificate is not to be reproduced, except in full, without the written approval of the Southwest Research Institute Department of Quality Assurance Calibration Laboratory.

This laboratory is accredited by the American Association for Laboratory Accreditation (A2LA) and the results of this calibration certificate were determined in accordance with the terms of accreditation unless stated otherwise below.

The uncertainty of the calibration was sufficient to determine that the item met the manufacturer's published specifications unless stated otherwise below.

Ambient Conditions: Temperature: 74.0 Degrees Fahrenheit Humidity: 40 % RH

Calibration Date: 25 Mar 99

Calibration Procedure: CLCP-EL-001 3/99

Condition as Received: IN TOLERANCE

Condition as Released: IN TOLERANCE

Remarks: LIMITED: CAL MV USE ONLY

Approved by:


Jim Patterson, Supervisor or Walt Hill, Metrologist

Measurements performed by:


Vince Morales, Technician

Certificate # 33576

Page 1 of 1



SOUTHWEST RESEARCH INSTITUTE™

6220 Culebra Road, P.O. Drawer 28510
Institute Quality Systems
Institute Calibration Laboratory
Phone: 210-522-5215 Fax 210-522-3692

Certificate of Calibration

Submitted By: DIV20
Address: B57
Contact: DARRELL DUNN
Manufacturer Model: ORION EA 940
Description: EXPANDABLE IONANALYZER
Serial No: 2330
Asset No: 001948
Procedure: CL-363, 12/99

Work Order: 444054476
Date Issued: Jul 15, 2003
Calibration Date: Jul 15, 2003
****Calibration Due:** Jul 15, 2004
Calibration Location: Bldg. 64
Environment: Temp. 72.0°F Hum. 36 %RH
***As Found:** LIMITED CALIBRATION
***As Left:** LIMITED CALIBRATION

This certificate documents traceability to the National Institute of Standards and Technology (NIST) and the International System of Units (SI). The Laboratory quality system conforms to ISO/IEC 17025, 1999 and ANSI/NC SL Z540-1-1994 which are equivalent to relevant requirements of the ISO 9000-1994 series of standards. This certificate may not be reproduced, except in full, without the written approval of the Southwest Research Institute Calibration Laboratory. The results of this calibration relate only to the individual instrument described above. This certificate shall not be used to claim product endorsement by the American Association for Laboratory Accreditation (A2LA) or any agency of the U. S. Government.

Uncertainty evaluation includes the item under test and is calculated in accordance with the ISO "Guide to the Expression of Uncertainty in Measurement" (GUM). The uncertainty represents an expanded uncertainty using a coverage factor of $k=2$ to approximate a 95% confidence level. The calibration process provides a Test Uncertainty Ratio (TUR) of less than or equal to 25% (4:1) of the test limit unless otherwise stated in remarks or an attachment.

*The client has sole responsibility for determination of in/out of tolerance or compliance/noncompliance. An in/out of tolerance opinion is provided for your convenience based only on the Test Instrument (TI) reading(s) and limits as reported. The reported uncertainty relates only to the results at the time of calibration and does not imply any short or long term stability of the TI.

**Calibration interval is determined by the client and does not assure the instrument will remain within tolerance until this date. Any number of factors may cause the instrument to be out of tolerance before the next calibration date.

Remarks: Limited Calibration: Millivolt Use Only

Standards Used

Asset	Manufacturer	Model	Description	Cal Due
000182	FLUKE	5700A/EP	CALIBRATOR	Aug 19, 03

Approved by: Walt Hill
Metrology Group Leader
m:\Non21a1.rpt Rev date 15, August 02

Measurements by: Tom Hannon
Metrology Technician

Southwest Research Institute
Calibration Laboratory
Calibration Report

Work Order:	444054476	Mfr.	ORION	Technician	TJH
Asset No.	001948	Model		Cal Date.	15-Jul-03
Serial No.	2330	Type.	ION ANALYZER		
Remarks:					
LIMITED CAL: mVolts Only					

Function/Range	Test Point	TI Reading	Difference	+/-Limit	+/-Uncertainty	Found/Left
Ch 1	mVolts	mVolts	mVolts	mVolts	mVolts	Result
	1000.0	999.7	-0.3	1.0	0.12	Pass
	-1000.0	-1000.0	0.0	1.0	0.12	Pass
Ch 2	mVolts	mVolts	mVolts	mVolts	mVolts	
	1000.0	999.8	-0.2	1.0	0.12	Pass
	-1000.0	-1000.0	0.0	1.0	0.12	Pass

END OF REPORT



SOUTHWEST RESEARCH INSTITUTE™

6220 Culebra Road, P.O. Drawer 28510
Institute Quality Systems
Institute Calibration Laboratory
Phone: 210-522-5215 Fax 210-522-3692



Certificate of Calibration

0972-01

Submitted By: DIV20

Address: B57

Contact: DARRELL DUNN

Manufacturer Model: ORION EA 940

Description: EXPANDABLE IONANALYZER

Serial No: 2330

Asset No: 001948

Procedure: CL-79, JUN/99

Work Order: 444060010

Date Issued: Jul 21, 2004

Calibration Date: Jul 21, 2004

****Calibration Due:** Jul 21, 2005

Calibration Location: Bldg. 64

Environment: Temp. 73.0°F Hum. 38 %RH

***As Found:** LIMITED CALIBRATION

***As Left:** LIMITED CALIBRATION

This certificate documents traceability to the National Institute of Standards and Technology (NIST) and the International System of Units (SI). The Laboratory quality system conforms to ISO/IEC 17025, 1999 and ANSI/NCCL Z540-1-1994 which are equivalent to relevant requirements of the ISO 9000-1994 series of standards. This certificate may not be reproduced, except in full, without the written approval of the Southwest Research Institute Calibration Laboratory. The results of this calibration relate only to the individual instrument described above. This certificate shall not be used to claim product endorsement by the American Association for Laboratory Accreditation (A2LA) or any agency of the U. S. Government.

Uncertainty evaluation includes the item under test and is calculated in accordance with the ISO "Guide to the Expression of Uncertainty in Measurement" (GUM). The uncertainty represents an expanded uncertainty using a coverage factor of k=2 to approximate a 95% confidence level. See Remarks or attached Calibration Report with the same Work Order number for calibration data.

*The client has sole responsibility for determination of in/out of tolerance or compliance/noncompliance. An in/out of tolerance opinion is provided for your convenience based only on the Test Instrument (TI) reading(s) and limits as reported. The reported uncertainty relates only to the results at the time of calibration and does not imply any short or long term stability of the TI.

**Calibration interval is determined by the client and does not assure the instrument will remain within tolerance until this date. Any number of factors may cause the instrument to be out of tolerance before the next calibration date.

Remarks: Limited Calibration: Millivolt Use Only

Standards Used

Asset	Manufacturer	Model	Description	Cal Due
000182	FLUKE	5700A/EP	CALIBRATOR	Sep 08, 04

Approved by: Walt Hill
Metrology Group Leader
m:\a2la1.rpt Rev date 11, May 04

Measurements by: Tom Hannon
Metrology Technician

Southwest Research Institute
 Calibration Laboratory
 Calibration Report

Work Order:	444060010	Mfr.	ORION	Technician	TJH
Asset No.	001948	Model	EA 940	Cal Date.	21-Jul-04
Serial No.	2330	Type.	ION ANALYZER		
Remarks:					
LIMITED CAL: mVolts Only					

Function/Range	Test Point	TI Reading	Difference	+/-Limit	+/-Uncertainty	Found/Left
Ch 1	mVolts	mVolts	mVolts	mVolts	mVolts	Result
	1000.0	999.9	-0.1	1.0	0.12	Pass
	-1000.0	-1000.0	0.0	1.0	0.12	Pass
Ch 2	mVolts	mVolts	mVolts	mVolts	mVolts	
	1000.0	999.7	-0.3	1.0	0.12	Pass
	-1000.0	-1000.1	-0.1	1.0	0.12	Pass

END OF REPORT