



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

Accredited

Certificate #
0972-01

Certificate of Calibration

9 June 1999

Issued to: DARRELL DUNN DIV20 B57
Manufacturer/Model: SWRI 10K-100M OHMS
Description: RESISTOR BOX
Serial Number: 7243
Asset Number: 007243

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: 75.0 Degrees Fahrenheit Humidity: 39 % RH

Calibration Date: 9 Jun 99

Calibration Procedure: CLCP-OR-001 APRIL,1997

Condition as Received: IN TOLERANCE

Condition as Released: IN TOLERANCE

Remarks:

Approved by:

Jim Patterson, Supervisor or Walt Hill, Metrologist

Certificate # 33940

m:\a2la.rpt Rev date 10 Mar 99

Measurements performed by:

Tony Planas, Technician

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Southwest Research Institute
6220 Culebra Road
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Certificate #
0972-01

Certificate of Calibration

9 December 1999

Issued to: DARRELL DUNN DIV20 B57
Manufacturer/Model: SWRI 10K-100M OHMS
Description: RESISTOR BOX
Serial Number: 7243
Asset Number: 007243

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.

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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: 70.0 Degrees Fahrenheit Humidity: 40 % RH


Calibration Date: 9 Dec 99 **Calibration Procedure:** CL70 JUNE99

Condition as Received: IN TOLERANCE

Condition as Released: IN TOLERANCE

Remarks:

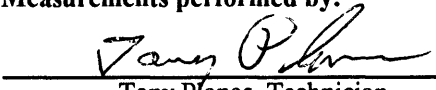
Approved by:


Jim Patterson, Supervisor or Walt Hill, Metrologist

Certificate # 37059

m:\a2la.rpt Rev date 10 Mar 99

Measurements performed by:


Tony Planas, Technician

Page 1 of 1



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



Certificate #
0972-01

Certificate of Calibration

9 August 2000

Issued to: DARRELL DUNN DIV20 B57
Manufacturer/Model: SWRI 10K-100M OHMS
Description: RESISTOR BOX
Serial Number: 7243
Asset Number: 007243

This certifies the above item was calibrated in compliance with MIL-STD-45662A and ANSI/NCSL Z540-1-1994. The results of this calibration relate only to the individual item as described above. 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 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.

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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: 9 Aug 00 **Calibration Procedure:** CL70JUN99

Condition as Received: IN TOLERANCE

Condition as Released: IN TOLERANCE

Remarks:

Approved by:



Jim Patterson, Supervisor, or Walt Hill, Metrologist

Certificate # 39643

m:\a2la.rpt Rev date 22 May 00

Measurements performed by:



Tony Planas, Technician



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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: SWRI 100K-10M OHMS

Description: RESISTOR BOX

Serial No: 7243

Asset No: 007243

Procedure: CL-70, JUN99

Work Order: 444050664

Date Issued: Oct 15, 2002

Calibration Date: Oct 15, 2002

****Calibration Due:** Apr 15, 2003

Calibration Location: N/A

Environment: Temp. 72.0°F Hum. 40 %RH

***As Found:** IN TOLERANCE

***As Left:** IN TOLERANCE

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/NCSL 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: None

Standards Used

Asset	Manufacturer	Model	Description	Cal Due
007001	HEWLETT-PACKARD	3458A/OPT-002	MULTIMETER	Jan 06, 03

Approved by: Walt Hill
Metrology Group Leader
m:\Nona21a1.rpt Rev date 15, August 02

Measurements by: Tony Planas
Metrology Technician

Southwest Research Institute
Calibration Laboratory
Calibration Sheet

Work Order:	444050664	Mfr.	SWRI	Technician	Tplanas
Asset No.	7243	Model	100k-10M OHM	Procedure	CL-70 06/99
Serial No.	7243	Type.	Resistors	Cal Date.	15-Oct-02
Remarks:					

Function/Range	Test Point	TI Reading	Difference	Test Limits+/-	Uncertainty	Found/Left
Resistance	kOhm	kOhm	kOhm	kOhm	kOhm	Results
	100.00	99.71	-0.29	1.00	>4:1	Pass
	MOhm	MOhm	MOhm	MOhm	MOhm	Results
	10.00	9.96	-0.04	0.10	>4:1	Pass



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Institute Calibration Laboratory
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Certificate of Calibration

Submitted By: DIV20

Address: B57

Contact: DARRELL DUNN

Manufacturer Model: SWRI 100K-10M OHMS

Description: RESISTOR BOX

Serial No: 7243

Asset No: 007243

Procedure: CL-70, JUN99

Work Order: 444053025

Date Issued: Apr 3, 2003

Calibration Date: Apr 3, 2003

****Calibration Due:** Oct 3, 2003

Calibration Location: Bldg. 64

Environment: Temp. 68.0°F Hum. 42 %RH

***As Found:** IN TOLERANCE

***As Left:** IN TOLERANCE

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/NCSL 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.

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**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: None

Standards Used

Asset	Manufacturer	Model	Description	Cal Due
007001	HEWLETT-PACKARD	3458A/OPT-002	MULTIMETER	Jan 17, 04

Approved by: Walt Hill
Metrology Group Leader
m:\Nona21a1.rpt Rev date 15, August 02

Measurements by: Tom Hannon
Metrology Technician

Southwest Research Institute
Calibration Laboratory
Measurement Report

Work Order: 444053025	Mfr. SWRI	Technician Thomas Hannon
Asset No. 007243	Model 100k-10M OHM	
Serial No. 7243	Type. Resistors	Cal Date. 3-Apr-03
Remarks:		

Function/Range	Test Point	TI Reading	Difference	Test Limits+/-	Uncertainty	Found/Left
Resistance	kOhm	kOhm	kOhm	kOhm	kOhm	Results
	100.00	99.71	-0.29	1.00	0.0002	Pass
	MOhm	MOhm	MOhm	MOhm	MOhm	Results
	10.00	9.96	-0.04	0.10	0.059	Pass

END OF REPORT



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Certificate #

0972-01

Certificate of Calibration

Submitted By: DIV20

Address: B57

Contact: DARRELL DUNN

Manufacturer Model: SWRI 100K-10M OHMS

Description: RESISTOR BOX

Serial No: 7243

Asset No: 007243

Procedure: CL-70, JUN/99

Work Order: 444055693

Date Issued: Oct 7, 2003

Calibration Date: Oct 3, 2003

****Calibration Due:** Apr 3, 2004

Calibration Location: Bldg. 64

Environment: Temp. 70.0°F Hum. 40 %RH

***As Found:** IN TOLERANCE

***As Left:** IN TOLERANCE

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/NCSL 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.

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**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: None

Standards Used

Asset	Manufacturer	Model	Description	Cal Due
001505	HEWLETT-PACKARD	3458A/OPT-002	MULTIMETER	Apr 14, 04

Approved by: Walt Hill
Metrology Group Leader
m:\a2la\l.rpt Rev date 15, August 02

Measurements by: Vince Morales
Metrology Technician

Southwest Research Institute
Calibration Laboratory
Calibration Report

Work Order:	444055693	Mfr.	SWRI	Technician	Vmorales
Asset No.	7243	Model	100k-10M OHM		
Serial No.	7243	Type.	Resistors	Cal Date.	3-Oct-03
Remarks:					

Function/Range	Test Point	TI Reading	Difference	+/-Limit	+/-Uncertainty	Found/Left
Resistance	kOhm	kOhm	kOhm	kOhm	kOhm	Results
	100.00	99.71	-0.29	1.00	0.0002	Pass
	MOhm	MOhm	MOhm	MOhm	MOhm	
	10.00	9.95	-0.05	0.10	0.059	Pass
END OF REPORT						



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Institute Quality Systems
Institute Calibration Laboratory
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Certificate #

0972-01

Certificate of Calibration

Submitted By: DIV20

Address: B57

Contact: DARRELL DUNN

Manufacturer Model: SWRI 100K-10M OHMS

Description: RESISTOR BOX

Serial No: 7243

Asset No: 007243

Procedure: RESISTORS JAN/04

Work Order: 444058432

Date Issued: Apr 7, 2004

Calibration Date: Apr 7, 2004

****Calibration Due:** Oct 7, 2004

Calibration Location: Bldg. 64

Environment: Temp. 73.0°F Hum. 45 %RH

***As Found:** IN TOLERANCE

***As Left:** IN TOLERANCE

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/NCSL 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.

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**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: None

Standards Used

Asset	Manufacturer	Model	Description	Cal Due
010465	FLUKE	8508A-01	MULTIMETER	Aug 27, 04

Approved by: Walt Hill

Metrology Group Leader

m:\a2la1.rpt Rev date 15, August 02

Measurements by: Bob Trollinger

Metrology Technician

Southwest Research Institute
Calibration Laboratory
Calibration Report

Work Order:	444058432	Mfr.	SWRI	Technician	blt
Asset No.	007243	Model	100k-10M OHM		
Serial No.	7243	Type.	Resistors	Cal Date.	7-Apr-04
Remarks:					

Function/Range	Test Point	TI Reading	Difference	+/-Limit	+/-Uncertainty	Found/Left
Resistance	kOhm	kOhm	kOhm	kOhm	kOhm	Results
	100.00	99.71	-0.29	1.00	0.0002	Pass
	MOhm	MOhm	MOhm	MOhm	MOhm	
	10.00	9.96	-0.04	0.10	0.059	Pass
END OF REPORT						



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Certificate of Calibration

Submitted By: DIV20

Address: B57

Contact: DARRELL DUNN

Manufacturer Model: SWRI 100K-10M OHMS

Description: RESISTOR BOX

Serial No: 7243

Asset No: 007243

Procedure: RESISTORS JAN/04

Work Order: 444061102

Date Issued: Oct 14, 2004

Calibration Date: Oct 14, 2004

****Calibration Due:** Apr 14, 2005

Calibration Location: Bldg. 64

Environment: Temp. 73.0°F Hum. 40 %RH

***As Found:** IN TOLERANCE

***As Left:** IN TOLERANCE

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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.

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Remarks: None

Standards Used

Asset	Manufacturer	Model	Description	Cal Due
007001	HEWLETT-PACKARD	3458A/OPT-002	MULTIMETER	Feb 19, 05

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

Measurements by: Scott Kester
Metrology Technician

Southwest Research Institute
Calibration Laboratory
Calibration Report

Work Order:	444061102	Mfr.	SWRI	Technician	SRK
Asset No.	007243	Model	100k-10M OHM		
Serial No.	7243	Type.	Resistors	Cal Date.	14-Oct-04
Remarks:					

Function/Range	Test Point	TI Reading	Difference	+/-Limit	+/-Uncertainty	Found/Left
Resistance	kOhm	kOhm	kOhm	kOhm	kOhm	Results
	100.00	99.72	-0.28	1.00	0.00016	Pass
	MOhm	MOhm	MOhm	MOhm	MOhm	
	10.00	9.96	-0.04	0.10	0.059	Pass
END OF REPORT						