

**SOUTHWEST RESEARCH INSTITUTE
CALIBRATION LABORATORY
MEMORANDUM**

August 3, 2005

To: DON BANNON DIV20 B57

From: Institute Calibration Laboratory *MA*

Subject: Status of Calibration Supplier

Manufacturer/Model: QUADTECH 7600

Description: LCR METER

Serial Number: 5158146

Asset Number: 011742

Work Order Number: 303065147

Date Calibrated: July 28, 2005

Supplier: HAYES INSTRUMENTS, BILLERICA MA - A2LA - 978 663-4800

Remarks: Hayes Instruments WO # 401156.

Supplier is on the Approved Suppliers List (ASL).

Supplier is not on the Approved Suppliers List.

Calibration is ISO 17025 accredited.

Calibration is not ISO 17025 accredited.

There is no known supplier to meet ISO 17025 accreditation at this time.

Please contact the Institute Calibration Laboratory, extension 5215, if you have any questions about the condition of this equipment or calibration documentation. Please do not remove or damage any of the calibration seals.

Attachment(s) 2

ISO CERTIFIED



Certificate Of Calibration

Submitted by: SOUTHWEST RESEARCH INSTITUTE
Calibration Date: JULY 28, 2005
Manufacturer: QUADTECH/GR
Model: 7600
Description: PRECISION RLC METER
Serial Number: 5158146
Property Number: CE032711

The above unit was calibrated in accordance with purchase order requirements on the date noted above and was performing in accordance with the manufacturer's specifications at the time of release from this laboratory. This certification was performed using standards maintained by this laboratory, which are periodically certified traceable to the National Institute of Standards and Technology. The cycling and certification of all standards of measurement used by Hayes Instrument service meet the requirements of ISO-9001:2000, MIL-STD-45662A, ISO-10012:1992 and ANSI/NCSL Z540-1-1994. The calibration standards used have an uncertainty error of no more than 1/4 of the tolerance of the equipment being calibrated, or have an accuracy that ensures the equipment being calibrated will be within required tolerances. (Accomplished under quality system manual, QM-100 dated 04/06/04 Rev. D 2004)

STANDARD	N.I.S.T	CERT#
DC Voltage	VIA JOSEPHSON ARRAY	
AC Voltage		266615
Resistance		270155
Frequency	VLF Transmission	
	ON WWVB & LORAN C	
Mass		256080
Dimensional		267216

Authorized Signature

Temperature & Humidity

72 °F 45% ± 15% RH.Received in tol 5 out tol _____
Returned in tol _____ out tol _____

101 f1/02

Hayes Instrument Service, Inc.

W.O. NO. 401156

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SUBMITTED BY SOUTHWEST RESEARCH CALIBRATION DATE July 28, 05
 MANUFACTURER QUADTECH DUE DATE July 28, 06
 MODEL NO. 7600 CALIBRATION ENGINEER 101
 DESCRIPTION PRECISION RLC METER CAL. PROCEDURE MFG MANUAL
 SERIAL NO. 5158146 PROPERTY NO. CEO 32711

H.I.S. REF# 775, 716, 471, 1079, 1281

TEMP & HUMIDITY
72° 55%

APPROVED BY 77

CALIBRATION RECORD

FUNCTION TESTED	RANGE	STANDARD VALUE	ACTUAL MEAS. VALUE	AFTER ADJUST MEAS. VALUE	TOLERANCE
SELF TEST		CHECK	PASS TEST	NO ADJ	PASS TEST
TEST FREQUENCY		PASS	PASS TEST	↓	PASS TEST
TEST LEVEL		PASS	PASS TEST		PASS TEST
INDUCTANCE		100.00uH	100.01		99.90 - 100.10
		1.0000mH	1.0001		.9990 - 1.0010
		10.000mH	10.001		9.990 - 10.010
		100.00mH	100.02		99.90 - 100.10
		1.0000H	1.0000		.9990 - 1.0010
		10.000H	10.000		9.990 - 10.010
"Q"		CHECK	PASS TEST		PASS TEST
CAPACITANCE		100.00pF	99.98		99.90 - 100.10
		1.0000nF	.9999	.9990 - 1.0010	
		1.0000uF	.9999	.9990 - 1.0010	
		10.000uF	10.000	9.990 - 10.010	
		100.00uF	99.98	99.90 - 100.10	
DISSIPATION		CHECK	PASS TEST	PASS TEST	
RESISTANCE		100.00Ω	100.01	99.80 - 100.20	
		10.000KΩ	9.998	9.980 - 10.020	
		1.0000MΩ	.9999	.9980 - 1.0020	
H.I.S. REFERENCE STANDARDS				CAL DATE	CYCLE
GR	STANDARD CAPACITORS	1409 SERIES	----	6-05	12 MO
GR	STANDARD INDUCTORS	1482 SERIES	----	5-05	6 MO
ESI	STANDARD RESISTOR	SR1 SERIES	----	2-05	6 MO
HP	DIGITAL MULTIMETER	3458A	2823A14064	4-05	6 MO
GR	STANDARD CAPACITORS	1403 SERIES	----	10-04	12 MO
					