



# SOUTHWEST RESEARCH INSTITUTE®

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Calibration Laboratory  
Certificate #0972-01

## Certificate of Calibration

**Submitted By:** DIV20

**Address:** B51

**Contact:** DON BANNON

**Manufacturer / Model:** HEWLETT-PACKARD / 34970A

**Description:** DATA ACQUISITION/SWITCH UNIT

**Serial No:** US37018965

**Asset No:** 012733

**Procedure:** AGILENT 34970A - 21 MAR 06

**Work Order:** 303079293

**Date Issued:** Feb 28, 2008

**Calibration Date:** Feb 28, 2008

**\*Calibration Due:** Feb 28, 2009

**Calibration Location:** Bldg. 64

**Environment:** Temp. 73.0°F Hum. 40 %RH

**\*\*Data Type:** FOUND-LEFT

**DivID/Location:** N/A

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, 2005, ANSI/NC SL Z540-1-1994 and relevant requirements of the ISO 9000-2000 standard. This certificate shall not be reproduced, except in full, without the written approval of the Southwest Research Institute Calibration Laboratory. This certificate shall not be used to claim product endorsement by Southwest Research Institute, American Association for Laboratory Accreditation (A2LA) or any agency of the U. S. Government. Results of this calibration relate only to the instrument described above at the time of calibration and does not imply any long term stability of the instrument.

\*Determined by the customer, does not imply the instrument will remain within tolerance as any number of factors may cause an out-of-tolerance condition before this date. \*\*Found/Left = adjustment and/or repair was not required, As Left = adjusted and/or repaired was required. The client has sole responsibility for determination of in-/out-of-tolerance or compliance/noncompliance. See Remarks or attached Measurement Report with the same Work Order number for data.

Reported uncertainty calculated in accordance with the ISO "Guide to the Expression of Uncertainty in Measurement" (GUM) and represents an expanded uncertainty with a coverage factor of k=2 to approximate a 95% confidence level.

**Remarks:** None

### Standards Used

Asset No.	Serial No.	Manufacturer	Model	Description	Cal Due
000201	5195014	FLUKE	5725A	AMPLIFIER	May 21, 08
000182	5200003	FLUKE	5700A/EP	CALIBRATOR	May 21, 08

Reviewed by: ( ) srk ( ) mar ( ) wgh

Measurements by: Bob Trollinger  
Metrology Technician

Southwest Research Institute  
Calibration Laboratory  
Measurement Report

Work Order:	303079293	Mfr:	HP	Technician:	blt
Asset No:	012733	Model:	34970A	Cal Date:	28-Feb-08
Serial No:	US37018965	Type:	Data Acquisition Switch		
Remarks:					

Function/Range	Test Point	TI Reading	Difference	+/-Limit	+/-Uncertainty	Found/Left
DC CURRENT	mAmp	mAmp	mAmp	mAmp	mAmp	Result
10 mAmp	0.00000	0.00022	0.00022	0.002	0.0012	Pass
100 mAmp	0.0000	0.0000	0.0000	0.005	0.0012	Pass
1 A	Amp	Amp	Amp	Amp	Amp	
	0.000000	0.000000	0.000000	0.0001	0.0012	Pass
DC Volts	mVolts	mVolts	mVolts	mVolts	mVolts	
100 mVolt	0.0000	0.0012	0.0012	0.004	0.0012	Pass
	Volts	Volts	Volts	Volts	Volts	
1 Volt	0.000000	0.000001	0.000001	0.000007	0.0000012	Pass
10 Volt	0.00000	0.00000	0.00000	0.00005	0.000012	Pass
100 Volt	0.0000	0.0000	0.0000	0.0006	0.00012	Pass
300 Volt	0.000	0.000	0.000	0.009	0.0012	Pass
Ohms 4 Wire	Ohm	Ohm	Ohm	Ohm	Ohm	
100 Ohm	0.0000	0.0002	0.0002	0.004	0.00012	Pass
1 kOhm	0.00	0.000000	0.000000	0.00001	0.0012	Pass
10 kOhm	0.0	0.00000	0.00000	0.0001	0.012	Pass
100 kOhm	0	0.0000	0.0000	0.001	0.12	Pass
1 MOhm	0	0.000000	0.000000	0.00001	1.2	Pass
10 MOhm	0	0.00000	0.00000	0.0001	12	Pass
100 MOhm	0	0.0000	0.0000	0.0100	120	Pass
Gain Verification DCV	mVolts	mVolts	mVolts	mVolts	mVolts	
100 mVolt	100.0000	99.9980	-0.0020	0.009	0.00016	Pass
	Volts	Volts	Volts	Volts	Volts	
1 Volt	1.000000	1.000003	0.000003	0.000047	0.0000042	Pass
10 Volt	10.00000	10.00005	0.00005	0.0004	0.000030	Pass
100 Volt	100.0000	100.0005	0.0005	0.0051	0.00040	Pass
300 Volt	300.000	300.001	0.001	0.0225	0.0018	Pass
Ohms 4 Wire	Ohm	Ohm	Ohm	Ohm	Ohm	
100 Ohm	100.00133	99.9990	-0.0023	0.014	0.0049	Pass
	kOhm	kOhm	kOhm	kOhm	kOhm	
1 kOhm	0.9999319	0.999920	-0.000012	0.00011	0.000036	Pass
10 kOhm	9.999280	9.99920	-0.00008	0.0011	0.00036	Pass
100 kOhm	99.99393	99.9934	-0.0005	0.011	0.0036	Pass
	MOhm	MOhm	MOhm	MOhm	MOhm	
1 MOhm	0.9998827	0.999881	-0.000002	0.00011	0.00004	Pass
10 MOhm	9.998906	9.99880	-0.00011	0.0014	0.00032	Pass
100 Mohm	99.98559	99.9856	0.0000	0.81	0.0036	Pass

Southwest Research Institute  
Calibration Laboratory  
Measurement Report

Work Order:	303079293	Mfr:	HP	Technician:	blt
Asset No:	012733	Model:	34970A	Cal Date:	28-Feb-08
Serial No:	US37018965	Type:	Data Acquisition Switch		

Function/Range	Test Point	TI Reading	Difference	+/-Limit	+/-Uncertainty	Found/Left
DC CURRENT	mAmp	mAmp	mAmp	mAmp	mAmp	Result
10 mA	10.0000	10.00023	0.00023	0.007	0.0014	Pass
100 mA	100.0000	100.0040	0.0040	0.055	0.015	Pass
	Amp	Amp	Amp	Amp	Amp	
1 A	1.0000	1.000060	0.0001	0.0011	0.00030	Pass
AC Volts	mVolts	mVolts	mVolts	mVolts	mVolts	
100 mV @ 1 kHz	100.0000	100.0001	0.0001	0.1	0.015	Pass
100 mV @ 50 kHz	100.0000	100.0094	0.0094	0.17	0.026	Pass
AC Volts	Volts	Volts	Volts	Volts	Volts	
1 V @ 1 kHz	1.000000	0.999990	-0.000010	0.001	0.000050	Pass
1 V @ 50 kHz	1.000000	1.000256	0.000256	0.0017	0.00010	Pass
10 V @ 1 kHz	10.00000	10.00001	0.00001	0.014	0.00042	Pass
10 V @ 50 kHz	10.00000	10.00258	0.00258	0.017	0.00082	Pass
10 V @ 10 Hz	10.00000	10.00014	0.00014	0.014	0.0026	Pass
	mVolts	mVolts	mVolts	mVolts	mVolts	
10 mV @ 1 kHz	10.0000	9.9995	-0.0005	0.046	0.0051	Pass
	Volts	Volts	Volts	Volts	Volts	
100 V @ 1 kHz	100.0000	100.0008	0.0008	0.1	0.0053	Pass
100 V @ 50 kHz	100.0000	99.9991	-0.0009	0.17	0.0085	Pass
300 V @ 1 kHz	300.000	300.027	0.027	0.42	0.044	Pass
300 V @ 50 kHz	200.000	200.091	0.091	0.6	0.12	Pass
AC Amp	mAmps	mAmps	mAmps	mAmps	mAmps	
10 mA @ 1 kHz	10.00000	9.99800	-0.00200	0.014	0.0014	Pass
100 mA @ 1 kHz	100.0000	100.0300	0.0300	0.6	0.070	Pass
	Amps	Amps	Amps	Amps	Amps	
1A @ 1 kHz	0.010000	0.010031	0.000031	0.00051	0.000010	Pass
AC Amp	Amps	Amps	Amps	Amps	Amps	
1A @ 1 kHz	1.000000	1.000220	0.000220	0.0014	0.0010	Pass
Frequency	Hz	Hz	Hz	Hz	Hz	
100 mV @ 100 Hz	100.0000	99.99750	-0.00250	0.1	0.012	Pass
	kHz	kHz	kHz	kHz	kHz	
1 V @ 100 kHz	100.0000	99.99702	-0.00298	0.01	0.012	Pass

END OF REPORT