



Project Number:		Tracking Code: TC068--0945				
Requested by: Corey Rose		Date: 2/20/2006		Product Rev: 4		
Part #: SCPU-G-2.00-D-SB/SCRU-02			Lot #: 9-22-06		Tech: Troy Cook	Eng: Dave Scopelliti
Part description: SCPU-B					Qty to test: 45	
Test Start: 03/01/2006		Test Completed: 3/29/2006				



SCXU-B DVT Report

**SCPU-G-2.00-D-SB
Mated with SCRU-02**

CERTIFICATION

All instruments and measuring equipment were calibrated to National Institute for Standards and Technology (NIST) traceable standards according to ISO 10012-1 and ANSI/NCSL 2540-1, as applicable.

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SCOPE

To perform the following tests: PER SCXU-B FLOWCHART

APPLICABLE DOCUMENTS

Standards: EIA Publication 364

TEST SAMPLES AND PREPARATION

- 1) All materials were manufactured in accordance with the applicable product specification.
- 2) All test samples were identified and encoded to maintain traceability throughout the test sequences.
- 3) After soldering, the parts to be used for LLCR and DWV/IR testing were cleaned according to TLWI-0001.
- 4) Either an automated cleaning procedure or an ultrasonic cleaning procedure may be used.
- 5) The automated procedure is used with aqueous compatible soldering materials.
- 6) The ultrasonic procedure can be used with either aqueous or non-aqueous soldering components and follows:
 - a. Sample test boards are to be ultrasonically cleaned after test lead attachment, preparation and/or soldering.
 - b. Sample test boards are immersed into Branson 3510 cleaner containing Kyzen Ionox HC1 (or equivalent) with the following conditions:
 - i. Temperature: -----55° C +/- 5° C
 - ii. Frequency:-----40 KHz
 - iii. Immersion Time: ---5 to 10 Minutes
 - c. Sample test boards are removed and placed into the Branson 3510 cleaner containing deionized water with the following conditions:
 - i. Temperature: -----55° C +/- 5° C
 - ii. Frequency:-----40 KHz
 - iii. Immersion Time: ---5 to 10 Minutes
 - d. Sample test boards are removed and placed in a beaker positioned on a hot plate with a magnetic stirrer containing deionized water warmed to 55° C +/- 5° C for 1/2 to 1 minute.
 - e. Upon removal, the sample boards are rinsed for 1/2 to 1 minute at room temperature with free flowing deionized water.
 - f. After the final rinse, the sample test boards are dried in an air-circulating oven for 10 to 15 minutes at 50° C +/- 5° C.
 - g. Sample test boards are then allowed to set and recover to room ambient condition prior to testing.
- 7) Parts not intended for testing LLCR and DWV/IR are visually inspected and cleaned if necessary.
- 8) Any additional preparation will be noted in the individual test sequences.
- 9) Solder Information: None Used
- 10) Re-Flow Time/Temp: applicable to this test. Parts were not soldered.
- 11) Internal Test PCBs used: None Used

FLOWCHARTS**Current Carrying Capacity**

TEST STEP	GROUP A All Contacts
01	CCC

Normal Force

TEST STEP	GROUP A 10 Connectors	GROUP B1 Individual Contacts Ambient Setup Approve	GROUP B2 Individual Contacts Thermal (Mated) Setup Approve
01	Mating / Unmating		
02	Data Review	Normal Force	Thermal (Mated)
03	100 Cycles	Data Review	Normal Force
04	Mating / Unmating		
05	250 Cycles (+150)		
06	Mating / Unmating		
07	500 Cycles (+250)		
08	Mating / Unmating		
09	1000 Cycles (+500)		
10	Mating / Unmating		
11	Data Review		
12	Thermal Aging (Mated)		
13	Mating / Unmating		
14	Data Review		
15	Humidity (Mated)		
16	Mating / Unmating		

IR / DWV

TEST STEP	GROUP A1 Ambient	GROUP B1 Ambient	GROUP B2 Thermal	GROUP B3 Humidity
01	IR	DWV/Working Voltage	Thermal	Humidity
02	Data Review		DWV/Working Voltage	DWV/Working Voltage
03	Thermal			
04	IR			
05	Data Review			
06	Humidity			
07	IR			

FLOWCHARTS Continued**Durability/Thermal/Humidity**

TEST STEP	GROUP A1 8 connectors 1000 Cycles
01	LLCR-1
02	Data Review
03	100 Cycles
04	LLCR-2
05	Data Review
06	Thermal
07	LLCR-3
08	Data Review
09	Humidity
10	LLCR-4

Gas Tight

TEST STEP	GROUP A1 8 connectors
01	LLCR-1
02	Gas Tight
04	LLCR-2

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

THERMAL:

- 1) EIA-364-17, *Temperature Life with or without Electrical Load Test Procedure for Electrical Connectors*.
- 2) Test Condition 11 at 65° C.
- 3) Test Time Condition A for 96 hours.
- 4) Connectors are sometimes mated and all samples are pre-conditioned at ambient.

HUMIDITY:

- 1) Reference document: EIA-364-31, *Humidity Test Procedure for Electrical Connectors*.
- 2) Test Condition A, 96 Hours.
- 3) Method II, but at + 65° C, 90% to 98% Relative Humidity excluding sub-cycles 7a and 7b.
- 4) Connectors are sometimes mated and all samples are pre-conditioned at ambient.

TEMPERATURE RISE (Current Carrying Capacity, CCC):

- 1) EIA-364-70, *Temperature Rise versus Current Test Procedure for Electrical Connectors and Sockets*.
- 2) When current passes through a contact, the temperature of the contact increases as a result of I^2R (resistive) heating.
- 3) The number of contacts being investigated plays a significant part in power dissipation and therefore temperature rise.
- 4) The size of the temperature probe can affect the measured temperature.
- 5) Copper traces on PC boards will contribute to temperature rise:
 - a. Self heating (resistive)
 - b. Reduction in heat sink capacity affecting the heated contacts
- 6) A de-rating curve, usually 20%, is calculated.
- 7) Calculated de-rated currents at three temperature points are reported:
 - a. Ambient
 - b. 30° C
 - c. 40° C
 - d. 50° C
- 8) Typically, neighboring contacts (in close proximity to maximize heat build up) are energized.
- 9) The thermocouple (or temperature measuring probe) will be positioned at a location to sense the maximum temperature in the vicinity of the heat generation area.
- 10) A computer program, *TR 803.exe*, ensures accurate stability for data acquisition.
- 11) Hook-up wire cross section is larger than the cross section of any connector leads/PC board traces, jumpers, etc.
- 12) Hook-up wire length is longer than the minimum specified in the referencing standard.

MATING/UNMATING:

- 1) Reference document: EIA-364-13, *Mating and Unmating Forces Test Procedure for Electrical Connectors*.
- 2) The full insertion position was to within 0.003" to 0.004" of the plug bottoming out in the receptacle to prevent damage to the system under test.
- 3) One of the mating parts is secured to a floating X-Y table to prevent damage during cycling.

NORMAL FORCE (FOR CONTACTS TESTED IN THE HOUSING):

- 1) Reference document: EIA-364-04, *Normal Force Test Procedure for Electrical Connectors*.
- 2) The contacts shall be tested in the connector housing.
- 3) If necessary, a "window" shall be made in the connector body to allow a probe to engage and deflect the contact at the same attitude and distance (plus 0.05 mm [0.002"]) as would occur in actual use.
- 4) The connector housing shall be placed in a holding fixture that does not interfere with or otherwise influence the contact force or deflection.
- 5) Said holding fixture shall be mounted on a floating, adjustable, X-Y table on the base of the Dillon TC², computer controlled test stand with a deflection measurement system accuracy of 5.0 μm (0.0002").
- 6) The nominal deflection rate shall be 5 mm (0.2")/minute.
- 7) Unless otherwise noted a minimum of five contacts shall be tested.
- 8) The force/deflection characteristic to load and unload each contact shall be repeated five times.
- 9) The system shall utilize the TC² software in order to acquire and record the test data.
- 10) The permanent set of each contact shall be measured within the TC² software.
- 11) The acquired data shall be graphed with the deflection data on the X-axis and the force data on the Y-axis and a print out will be stored with the Tracking Code paperwork.

INSULATION RESISTANCE (IR):

To determine the resistance of insulation materials to leakage of current through or on the surface of these materials when a DC potential is applied.

- 1) PROCEDURE:
 - a. Reference document: EIA-364-21, *Insulation Resistance Test Procedure for Electrical Connectors*.
 - b. Test Conditions:
 - i. Between Adjacent Contacts
 - ii. Electrification Time 2.0 minutes
 - iii. Test Voltage (500 VDC) corresponds to calibration settings for measuring resistances.
- 2) MEASUREMENTS:
- 3) When the specified test voltage is applied (VDC), the insulation resistance shall not be less than 100 megohms.

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

To determine if the sockets can operate at its rated voltage and withstand momentary over potentials due to switching, surges, and other similar phenomenon. Separate samples are used to evaluate the effect of environmental stresses so not to influence the readings from arcing that occurs during the measurement process.

- 1) PROCEDURE:
 - a. Reference document: EIA-364-20, *Withstanding Voltage Test Procedure for Electrical Connectors*.
 - b. Test Conditions:
 - i. Between Adjacent Contacts
 - ii. Rate of Application 500 V/Sec
 - iii. Test Voltage (VAC) until breakdown occurs
- 2) MEASUREMENTS/CALCULATIONS
 - a. The breakdown voltage shall be measured and recorded.
 - b. The dielectric withstanding voltage shall be recorded as 75% of the minimum breakdown voltage.
 - c. The working voltage shall be recorded as one-third (1/3) of the dielectric withstanding voltage (one-fourth of the breakdown voltage).

LLCR:

- 1) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets*.
- 2) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
- 3) The following guidelines are used to categorize the changes in LLCR as a result from stressing
 - a. $\leq +5.0$ mOhms: ----- Stable
 - b. $+5.1$ to $+10.0$ mOhms:----- Minor
 - c. $+10.1$ to $+15.0$ mOhms: ----- Acceptable
 - d. $+15.1$ to $+50.0$ mOhms: ----- Marginal
 - e. $+50.1$ to $+2000$ mOhms: ----- Unstable
 - f. $>+2000$ mOhms:----- Open Failure

GAS TIGHT:

To provide method for evaluating the ability of the contacting surfaces in preventing penetration of harsh vapors which might lead to oxide formation that may degrade the electrical performance of the contact system.

- 1) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets*.
- 2) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
- 3) The following guidelines are used to categorize the changes in LLCR as a result from stressing
 - a. $\leq +5.0$ mOhms: ----- Stable
 - b. $+5.1$ to $+10.0$ mOhms:----- Minor
 - c. $+10.1$ to $+15.0$ mOhms: ----- Acceptable
 - d. $+15.1$ to $+50.0$ mOhms: ----- Marginal
 - e. $+50.1$ to $+2000$ mOhms: ----- Unstable
 - f. $>+2000$ mOhms:----- Open Failure
- 4) Procedure:
 - a. Reference document: EIA-364-36, *Test Procedure for Determination of Gas-Tight Characteristics for Electrical Connectors, Sockets and/or Contact Systems*.
 - b. Test Conditions:
 - i. Class II--- Mated pairs of contacts assembled to their plastic housings.
 - ii. Reagent grade Nitric Acid shall be used of sufficient volume to saturate the test chamber
 - iii. The ratio of the volume of the test chamber to the surface area of the acid shall be less than 10.
 - iv. The chamber shall be saturated with the vapor for at least 15 minutes before samples are added.
 - v. Exposure time, 55 to 65 minutes.
 - vi. The samples shall be no closer to the chamber walls than 1 inches and no closer to the surface of the acid than 3 inches.
 - vii. The samples shall be dried after exposure for a minimum of 1 hour.
 - viii. Drying temperature 50° C
 - ix. The final LLCR shall be conducted within 1 hour after drying.

RESULTS**Temperature Rise, CCC at a 20% de-rating**

- CCC for a 30°C Temperature Rise -----3.9A per contact with 4 adjacent contacts powered

Mating – Unmating Forces

- **Initial**
 - **Mating**
 - Min ----- 2.1 Lbs.
 - Max ----- 3.9 Lbs.
 - **Unmating**
 - Min ----- 2.3 Lbs.
 - Max ----- 3.3 Lbs.
- **After 100 Cycles**
 - **Mating**
 - Min ----- 3.9 Lbs.
 - Max ----- 4.8 Lbs.
 - **Unmating**
 - Min ----- 4.3 Lbs.
 - Max ----- 5.4 Lbs.
- **After 250 Cycles**
 - **Mating**
 - Min ----- 4.0 Lbs.
 - Max ----- 5.1 Lbs.
 - **Unmating**
 - Min ----- 4.2 Lbs.
 - Max ----- 5.5 Lbs.
- **After 500 Cycles**
 - **Mating**
 - Min ----- 3.9 Lbs.
 - Max ----- 5.2 Lbs.
 - **Unmating**
 - Min ----- 4.4 Lbs.
 - Max ----- 5.6 Lbs.
- **After 1000 Cycles**
 - **Mating**
 - Min ----- 3.3 Lbs.
 - Max ----- 4.7 Lbs.
 - **Unmating**
 - Min ----- 3.6 Lbs.
 - Max ----- 4.9 Lbs.
- **Thermal**
 - **Mating**
 - Min ----- 1.9 Lbs.
 - Max ----- 3.9 Lbs.
 - **Unmating**
 - Min ----- 1.7 Lbs.
 - Max ----- 3.7 Lbs.
- **Humidity**
 - **Mating**
 - Min ----- 1.8 Lbs.
 - Max ----- 3.0 Lbs.
 - **Unmating**
 - Min ----- 2.0 Lbs.
 - Max ----- 3.4 Lbs.

Normal Force at .026" deflection

- **Initial**
 - **Min**-----223.9 grams **Set ---- 0.0003"**
 - **Max**-----456.6 grams **Set ---- 0.0007"**
- **Thermal**
 - **Min**-----186.6 grams
 - **Max**-----376.4 grams

Insulation Resistance minimums, IR

- **Initial**
 - **Mated**-----100,000 Meg Ω ----- **Pass**
 - **Unmated** -----100,000 Meg Ω
- **Thermal**
 - **Mated**-----100,000 Meg Ω
 - **Unmated** -----100,000 Meg Ω
- **Humidity**
 - **Mated**-----50,000 Meg Ω
 - **Unmated** -----50,000 Meg Ω

Dielectric Withstanding Voltage minimums, DWV

- **Initial**
 - **Breakdown**
 - **Mated**-----1,900 VAC
 - **Unmated**-----2,200 VAC
 - **DWV**
 - **Mated**-----1,425 VAC
 - **Unmated**-----1,650 VAC
 - **Working voltage**
 - **Mated**-----475 VAC
 - **Unmated**-----550 VAC
- **Thermal**
 - **Breakdown**
 - **Mated**-----2,200 VAC
 - **Unmated**-----2,600 VAC
 - **DWV**
 - **Mated**-----1,650 VAC
 - **Unmated**-----1,950 VAC
 - **Working voltage**
 - **Mated**-----550 VAC
 - **Unmated**-----650 VAC
- **Humidity**
 - **Breakdown**
 - **Mated**-----1,900 VAC
 - **Unmated**-----1,900 VAC
 - **DWV**
 - **Mated**-----1,425 VAC
 - **Unmated**-----1,425 VAC
 - **Working voltage**
 - **Mated**-----475 VAC
 - **Unmated**-----475 VAC

LLCR Durability (32 LLCR test points)

- **Initial**----- 60.9 mOhms Max
- **Durability, 1000 Cycles**
 - **<= +5.0 mOhms** ----- 32 Points ----- Stable
 - **+5.1 to +10.0 mOhms** ----- 0 Points ----- Minor
 - **+10.1 to +15.0 mOhms** ----- 0 Points ----- Acceptable
 - **+15.1 to +50.0 mOhms** ----- 0 Points ----- Marginal
 - **+50.1 to +2000 mOhms**----- 0 Points ----- Unstable
 - **>+2000 mOhms**----- 0 Points ----- Open Failure
- **Thermal**
 - **<= +5.0 mOhms** ----- 32 Points ----- Stable
 - **+5.1 to +10.0 mOhms**----- 0 Points ----- Minor
 - **+10.1 to +15.0 mOhms** ----- 0 Points ----- Acceptable
 - **+15.1 to +50.0 mOhms** ----- 0 Points ----- Marginal
 - **+50.1 to +2000 mOhms**----- 0 Points ----- Unstable
 - **>+2000 mOhms**----- 0 Points ----- Open Failure
 -
- **Humidity**
 - **<= +5.0 mOhms** ----- 30 Points ----- Stable
 - **+5.1 to +10.0 mOhms**----- 2 Points ----- Minor
 - **+10.1 to +15.0 mOhms** ----- 0 Points ----- Acceptable
 - **+15.1 to +50.0 mOhms** ----- 0 Points ----- Marginal
 - **+50.1 to +2000 mOhms**----- 0 Points ----- Unstable
 - **>+2000 mOhms**----- 0 Points ----- Open Failure

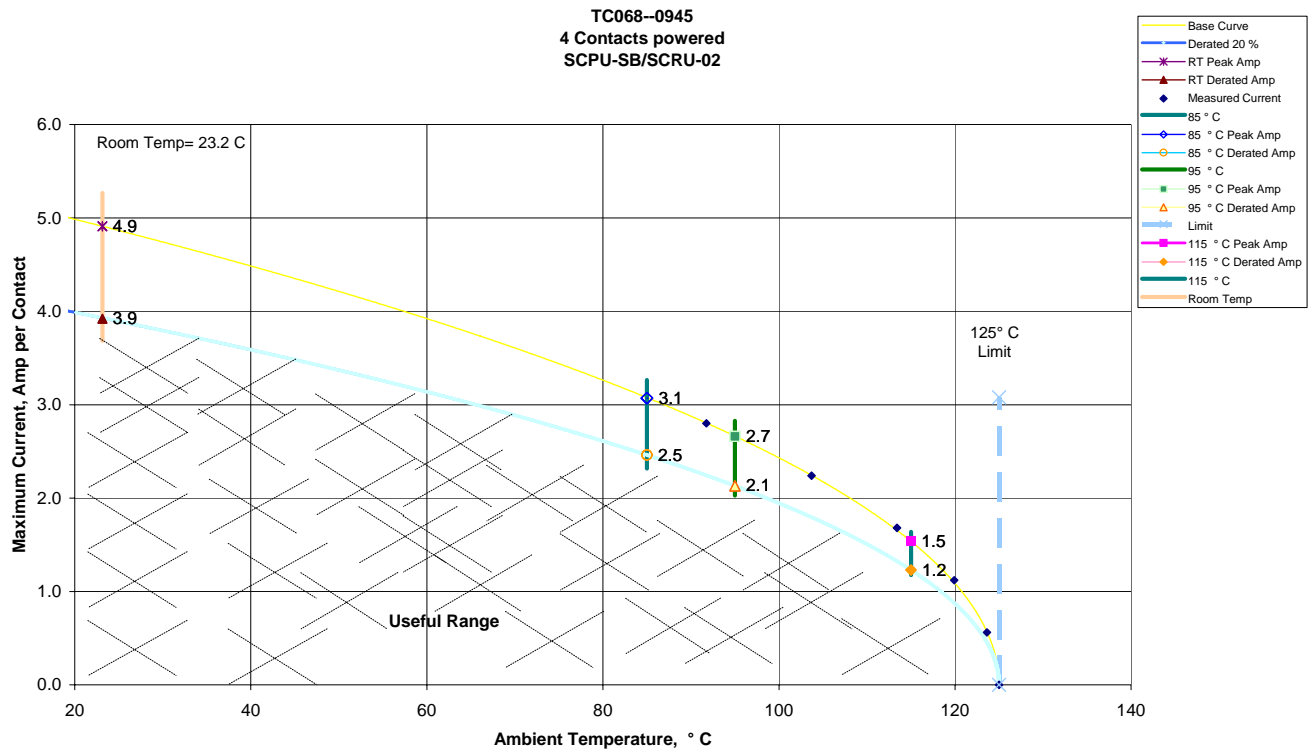
LLCR Gas Tight (32 LLCR test points)

- **Initial**----- 76.4 mOhms Max
- **Gas-Tight**
 - **<= +5.0 mOhms** ----- 32 Points ----- Stable
 - **+5.1 to +10.0 mOhms**----- 0 Points ----- Minor
 - **+10.1 to +15.0 mOhms** ----- 0 Points ----- Acceptable
 - **+15.1 to +50.0 mOhms** ----- 0 Points ----- Marginal
 - **+50.1 to +2000 mOhms**----- 0 Points ----- Unstable
 - **>+2000 mOhms**----- 0 Points ----- Open Failure

DATA SUMMARIES

TEMPERATURE RISE (Current Carrying Capacity, CCC):

- 1) High quality thermocouples whose temperature slopes track one another were used for temperature monitoring.
- 2) The thermocouples were placed at a location to sense the maximum temperature generated during testing.
- 3) Temperature readings recorded are those for which three successive readings, 15 minutes apart, differ less than 1° C (computer controlled data acquisition).
- 4) Adjacent contacts were powered:
 - a. Linear configuration with four adjacent conductors/contacts powered

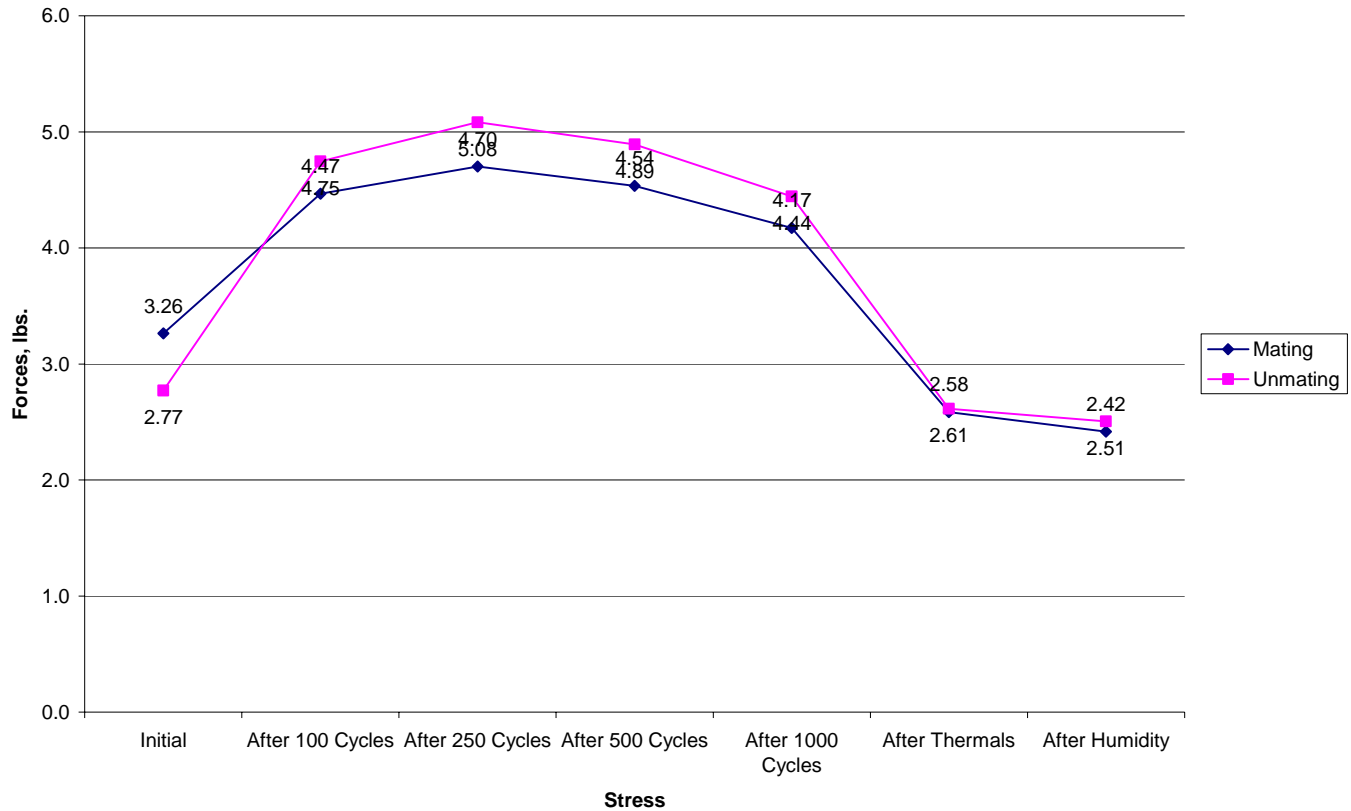


DATA SUMMARIES Continued**MATING/UNMATING:**

	Initial				After 100 Cycles			
	Mating		Unmating		Mating		Unmating	
	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)
Minimum	33.4	2.09	37.3	2.33	62.7	3.92	68.3	4.27
Maximum	62.4	3.9	53.1	3.3	76.2	4.8	85.6	5.4
Average	52.2	3.3	44.3	2.8	71.5	4.5	75.9	4.7
	After 250 Cycles				After 500 Cycles			
	Mating		Unmating		Mating		Unmating	
	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)
Minimum	64.5	4.0	67.5	4.2	62.6	3.9	69.8	4.4
Maximum	81.3	5.1	87.4	5.5	82.7	5.2	89.9	5.6
Average	75.2	4.7	81.3	5.1	72.6	4.5	78.3	4.9
	After 1000 Cycles				After Thermals			
	Mating		Unmating		Mating		Unmating	
	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)
Minimum	52.5	3.3	57.6	3.6	29.8	1.9	27.2	1.7
Maximum	74.4	4.7	78.4	4.9	63.0	3.9	59.5	3.7
Average	66.8	4.2	71.1	4.4	41.3	2.6	41.8	2.6
	After Humidity							
	Mating		Unmating					
	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)				
Minimum	29.3	1.8	32.0	2.0				
Maximum	47.8	3.0	54.1	3.4				
Average	38.7	2.4	40.1	2.5				

DATA SUMMARIES Continued

Mating/Unmating Compare

**NORMAL FORCE (FOR CONTACTS TESTED IN THE HOUSING):**

- 1) Calibrated force gauges are used along with computer controlled positioning equipment.
- 2) Typically, 8-10 readings are taken and the averages reported.

Initial	Deflections in inches Forces in Grams					
	<u>0.0030</u>	<u>0.0080</u>	<u>0.0130</u>	<u>0.0200</u>	<u>0.0260</u>	<u>SET</u>
Averages	11.69	42.29	69.86	131.71	336.49	0.0004
Min	6.90	37.10	52.70	96.10	223.90	0.0003
Max	19.00	53.40	87.40	196.20	456.60	0.0007
St. Dev	4.27	6.94	12.18	37.23	87.86	0.0001
Count	8	8	8	8	8	8

Thermal	Deflections in inches Forces in Grams					
	<u>0.0030</u>	<u>0.0080</u>	<u>0.0130</u>	<u>0.0200</u>	<u>0.0260</u>	<u>SET</u>
Averages	6.55	31.63	53.08	101.83	278.55	0.0006
Min	4.10	25.30	48.50	88.10	186.60	0.0002
Max	9.80	36.40	57.60	121.20	376.40	0.0008
St. Dev	2.90	4.69	3.74	13.93	83.94	0.0003
Count	4	4	4	4	4	4

DATA SUMMARIES Continued**INSULATION RESISTANCE (IR):**

	Initial, Meg Ohms		Thermal, Meg Ohms		Humidity, Meg Ohms	
	Mated	Unmated	Mated	Unmated	Mated	Unmated
	<u>Insulation Resistance</u>	<u>Insulation Resistance</u>	<u>Insulation Resistance</u>	<u>Insulation Resistance</u>	<u>Insulation Resistance</u>	<u>Insulation Resistance</u>
Average	100000	100000	100000	100000	66667	83333
Min	100000	100000	100000	100000	50000	50000
Max	100000	100000	100000	100000	100000	100000

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

	Initial, VAC Mated			Initial, VAC Unmated		
	<u>Breakdown Voltage</u>	<u>DWV</u>	<u>Working Voltage</u>	<u>Breakdown Voltage</u>	<u>DWV</u>	<u>Working Voltage</u>
Average	2050	1538	513	2200	1650	550
Min	1900	1425	475	2200	1650	550
Max	2200	1650	550	2200	1650	550

	Thermal, VAC Mated			Thermal, VAC Unmated		
	<u>Breakdown Voltage</u>	<u>DWV</u>	<u>Working Voltage</u>	<u>Breakdown Voltage</u>	<u>DWV</u>	<u>Working Voltage</u>
Average	2250	1688	563	2600	1950	650
Min	2200	1650	550	2600	1950	650
Max	2300	1725	575	2600	1950	650

	Humidity, VAC Mated			Humidity, VAC Unmated		
	<u>Breakdown Voltage</u>	<u>DWV</u>	<u>Working Voltage</u>	<u>Breakdown Voltage</u>	<u>DWV</u>	<u>Working Voltage</u>
Average	1950	1463	488	2650	1988	663
Min	1900	1425	475	1900	1425	475
Max	2000	1500	500	3400	2550	850

LLCR:

- 1) A total of 32 points were measured.
- 2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets*.
- 3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
- 4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
 - a. $\leq +5.0$ mOhms: ----- Stable
 - b. $+5.1$ to $+10.0$ mOhms: ----- Minor
 - c. $+10.1$ to $+15.0$ mOhms: ----- Acceptable
 - d. $+15.1$ to $+50.0$ mOhms: ----- Marginal
 - e. $+50.1$ to $+2000$ mOhms ----- Unstable
 - f. $>+2000$ mOhms: ----- Open Failure

DATA SUMMARIES Continued

Date	Feb. 24 2006	Mar. 2 2006	Mar. 8 2006	Mar. 14 2006
Room Temp C	25	26	24	25
RH	13%	24%	24%	25%
Name	Terry Spine	Terry Spine	Troy Cook	Troy Cook
mOhm values	Actual	Delta	Delta	Delta
	Initial	1000 Cycles	Thermal	Humidity
Average	47.7	0.1	0.5	1.1
St. Dev.	11.5	0.7	1.1	1.7
Min	34.9	-1.7	-1.6	-1.1
Max	60.9	1.3	3.6	7.4
Count	32	32	32	32

GAS TIGHT:

- 1) A total of 32 points were measured.
- 2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets*.
- 3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
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 - e. $+50.1$ to $+2000$ mOhms: ----- Unstable
 - f. $>+2000$ mOhms: ----- Open Failure

Date	March 2 2006	March 14 2006
Room Temp C	25	25
RH	31%	25%
Name	Terry Spine	Troy Cook
mOhm values	Actual	Delta
	Initial	Gas Tight
Average	50.4	-1.4
St. Dev.	12.6	6.6
Min	34.7	-37.4
Max	76.4	4.2
Count	32	32

DATA**MATING/UNMATING:**

Sample#	Initial				After 100 Cycles			
	Mating		Unmating		Mating		Unmating	
	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)
1	33.4	2.09	40.6	2.54	68.8	4.30	80.6	5.04
2	57.6	3.60	47.4	2.96	74.7	4.67	74.9	4.68
3	48.2	3.01	39.5	2.47	67.2	4.20	71.0	4.44
4	47.0	2.94	37.3	2.33	72.6	4.54	77.4	4.84
5	62.4	3.90	50.7	3.17	73.9	4.62	74.2	4.64
6	61.9	3.87	45.0	2.81	75.5	4.72	85.6	5.35
7	58.9	3.68	41.1	2.57	62.7	3.92	68.3	4.27
8	48.3	3.02	53.1	3.32	76.2	4.76	75.4	4.71

Sample#	After 250 Cycles				After 500 Cycles			
	Mating		Unmating		Mating		Unmating	
	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)
1	68.8	4.30	78.7	4.92	66.9	4.18	72.0	4.50
2	75.2	4.70	87.4	5.46	76.5	4.78	78.1	4.88
3	72.5	4.53	83.8	5.24	74.7	4.67	81.0	5.06
4	80.6	5.04	85.4	5.34	62.6	3.91	69.8	4.36
5	81.0	5.06	79.2	4.95	82.7	5.17	81.9	5.12
6	77.9	4.87	84.6	5.29	74.1	4.63	82.9	5.18
7	64.5	4.03	67.5	4.22	62.7	3.92	70.6	4.41
8	81.3	5.08	83.8	5.24	80.3	5.02	89.9	5.62

Sample#	After 1000 Cycles				After Thermals			
	Mating		Unmating		Mating		Unmating	
	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)
1	63.7	3.98	66.2	4.14	29.8	1.86	36.6	2.29
2	68.3	4.27	70.1	4.38	47.2	2.95	51.7	3.23
3	52.5	3.28	57.6	3.60	31.7	1.98	27.2	1.70
4	74.4	4.65	71.4	4.46	47.0	2.94	39.8	2.49
5	73.0	4.56	75.8	4.74	34.9	2.18	44.6	2.79
6	68.0	4.25	76.3	4.77	41.6	2.60	39.2	2.45
7	60.2	3.76	73.0	4.56	35.5	2.22	35.8	2.24
8	74.1	4.63	78.4	4.90	63.0	3.94	59.5	3.72

Sample#	After Humidity			
	Mating		Unmating	
	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)
1	39.2	2.45	38.1	2.38
2	45.3	2.83	46.7	2.92
3	32.6	2.04	32.0	2.00
4	47.8	2.99	54.1	3.38
5	41.1	2.57	34.1	2.13

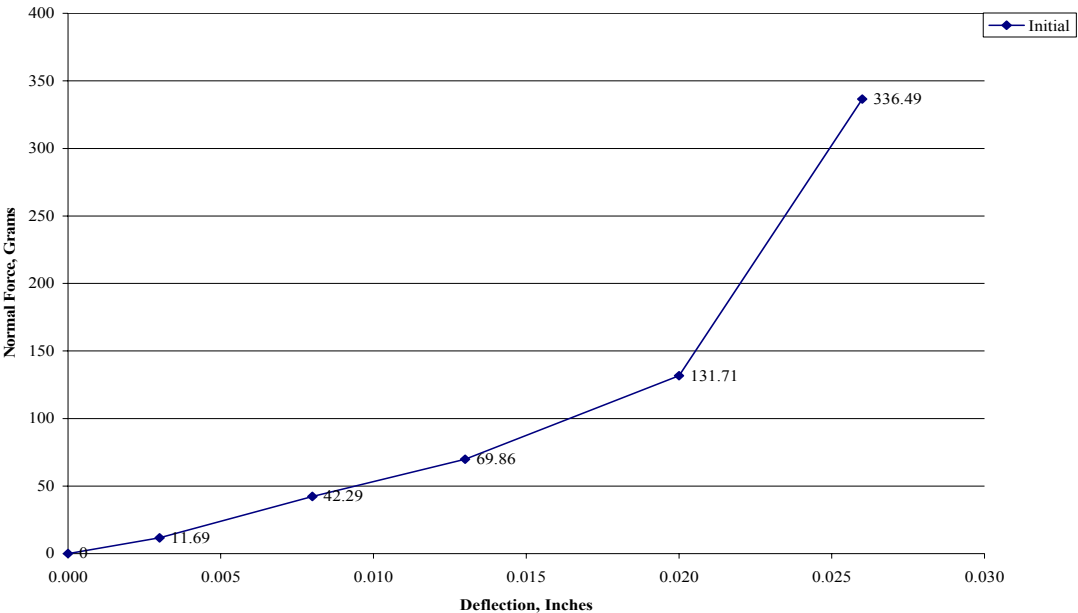
6	41.1	2.57	39.0	2.44
7	29.3	1.83	37.4	2.34
8	33.0	2.06	39.2	2.45

NORMAL FORCE (FOR CONTACTS TESTED IN THE HOUSING):

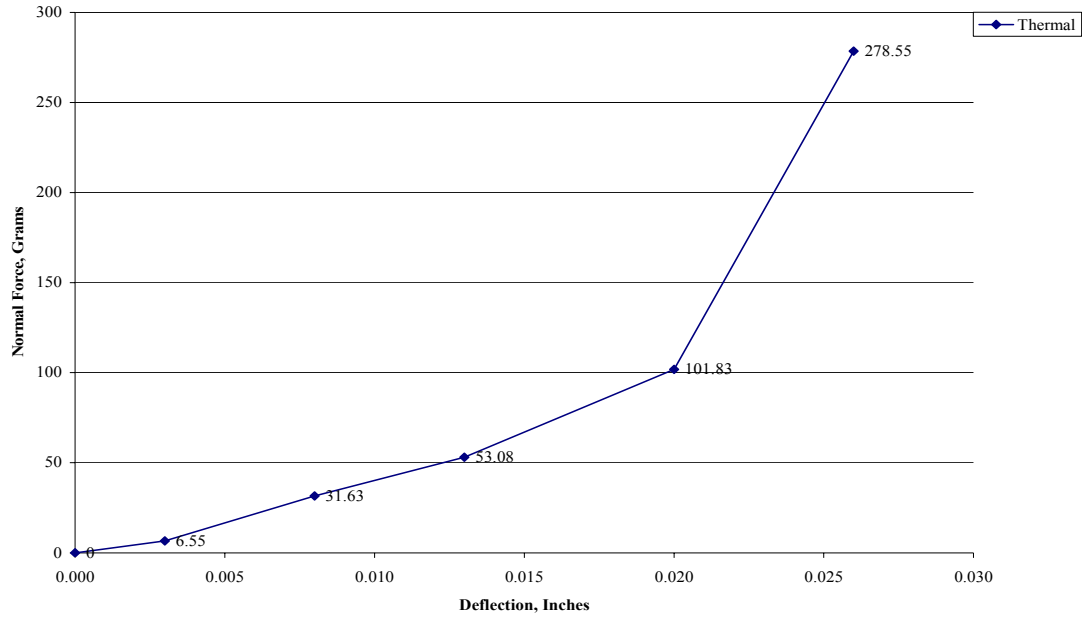
Initial	Deflections in inches Forces in Grams					
Sample #	0.0030	0.0080	0.0130	0.0200	0.0260	SET
1	13.80	53.40	87.40	172.30	437.10	0.00040
2	9.30	52.70	82.90	196.20	456.60	0.00030
3	9.30	37.10	53.90	96.10	223.90	0.00070
4	9.30	37.10	52.70	96.10	245.60	0.00040
5	19.00	43.10	72.00	151.60	398.80	0.00030
6	16.60	39.50	72.00	115.40	343.30	0.00040
7	6.90	37.10	68.40	113.00	314.40	0.00060
8	9.30	38.30	69.60	113.00	272.20	0.00030

Thermal	Deflections in inches Forces in Grams					
Sample #	0.0030	0.0080	0.0130	0.0200	0.0260	SET
1	4.10	33.40	53.60	100.00	314.90	0.00080
2	9.80	25.30	48.50	88.10	236.30	0.00020
3	4.10	36.40	57.60	121.20	376.40	0.00060
4	8.20	31.40	52.60	98.00	186.60	0.00060

Average Normal Force Initial



Average Normal Force After Thermals



INSULATION RESISTANCE (IR):

	Initial, Meg Ohms	
	Mated	Unmated
Sample #	<u>Insulation Resistance</u>	<u>Insulation Resistance</u>
1	100000	100000
2	100000	100000
3	100000	100000

	Thermal, Meg Ohms	
	Mated	Unmated
Sample #	<u>Insulation Resistance</u>	<u>Insulation Resistance</u>
1	100000	100000
2	100000	100000
3	100000	100000

	Humidity, Meg Ohms	
	Mated	Unmated
Sample #	<u>Insulation Resistance</u>	<u>Insulation Resistance</u>
1	50000	50000
2	50000	100000
3	100000	100000

DATA Continued**DIELECTRIC WITHSTANDING VOLTAGE (DWV):**

<u>Sample #</u>	<u>Initial, VAC Mated</u>			<u>Initial, VAC Unmated</u>		
	<u>Breakdown Voltage</u>	<u>DWV</u>	<u>Working Voltage</u>	<u>Breakdown Voltage</u>	<u>DWV</u>	<u>Working Voltage</u>
1	1900	1425	475	2200	1650	550
2	2200	1650	550			
3						

<u>Sample #</u>	<u>Thermal, VAC Mated</u>			<u>Thermal, VAC Unmated</u>		
	<u>Breakdown Voltage</u>	<u>DWV</u>	<u>Working Voltage</u>	<u>Breakdown Voltage</u>	<u>DWV</u>	<u>Working Voltage</u>
1	2200	1650	550	2600	1950	650
2	2300	1725	575			
3						

<u>Sample #</u>	<u>Humidity, VAC Mated</u>			<u>Humidity, VAC Unmated</u>		
	<u>Breakdown Voltage</u>	<u>DWV</u>	<u>Working Voltage</u>	<u>Breakdown Voltage</u>	<u>DWV</u>	<u>Working Voltage</u>
1	1900	1425	475	1900	1425	475
2	2000	1500	500	3400	2550	850
3						

LLCR:

Date	Feb. 24 2006	Mar. 2 2006	Mar. 8 2006	Mar. 14 2006
Room Temp C	25	26	24	25
RH	13%	24%	24%	25%
Name	Terry Spine	Terry Spine	Troy Cook	Troy Cook
mOhm values	Actual	Delta	Delta	Delta
	Initial	1000 Cycles	Thermal	Humidity
Average	47.7	0.1	0.5	1.1
St. Dev.	11.5	0.7	1.1	1.7
Min	34.9	-1.7	-1.6	-1.1
Max	60.9	1.3	3.6	7.4
Count	32	32	32	32

mOhm values		Actual	Delta	Delta	Delta
Board	Position	Initial	1000 Cycles	Thermal	Humidity
1	P1	34.9	0.1	0.1	0.4
1	P2	58.5	1.0	3.6	1.1

Tracking Code: TC068--0945

Part #: SCPU-G-2.00-D-SB/SCRU-02

Part description: SCPU-B

1	P3	36.0	0.1	0.2	0.8
1	P4	59.0	1.0	0.5	1.4
2	P1	36.0	0.1	0.3	0.9
2	P2	58.8	1.3	-0.6	1.0
2	P3	38.8	-1.0	-0.8	-0.6
2	P4	60.9	-1.2	-1.6	5.3
3	P1	36.6	0.0	0.6	0.3
3	P2	58.9	0.6	2.4	1.1
3	P3	37.1	0.1	-0.1	0.4
3	P4	59.4	0.0	-0.3	0.4
4	P1	35.3	-0.2	0.2	0.4
4	P2	56.6	-0.2	-0.2	0.1
4	P3	35.4	0.1	0.4	0.6
4	P4	58.5	0.3	0.0	0.3
5	P1	36.0	-0.1	0.4	0.5
5	P2	59.0	0.3	0.7	0.6
5	P3	36.8	0.4	0.3	3.0
5	P4	58.5	0.1	1.0	1.0
6	P1	36.3	0.2	0.6	0.2
6	P2	58.7	0.5	0.8	0.2
6	P3	36.1	0.7	1.4	0.3
6	P4	59.9	0.3	0.4	0.3
7	P1	36.1	0.8	3.0	7.4
7	P2	58.2	0.3	0.4	1.3
7	P3	39.0	-1.7	-1.5	-1.1
7	P4	60.7	-0.2	0.0	-0.5
8	P1	35.7	0.3	0.7	3.0
8	P2	57.9	1.0	1.7	2.2
8	P3	37.0	0.6	1.2	2.5
8	P4	59.5	-1.2	-0.8	-1.0

GAS TIGHT:

Date	March 2 2006	March 14 2006
Room Temp C	25	25
RH	31%	25%
Name	Terry Spine	Troy Cook
mOhm values	Actual Initial	Delta Gas Tight
Average	50.4	-1.4
St. Dev.	12.6	6.6
Min	34.7	-37.4
Max	76.4	4.2
Count	32	32

mOhm values		Actual	Delta
Board	Position	Initial	Gas Tight

Tracking Code: TC068--0945

Part #: SCPU-G-2.00-D-SB/SCRU-02

Part description: SCPU-B

1	P1	38.5	-0.5
1	P2	59.7	-0.2
1	P3	37.8	-0.5
1	P4	60.5	-0.6
2	P1	36.7	0.3
2	P2	60.2	-0.4
2	P3	40.2	-1.5
2	P4	62.1	-0.5
3	P1	37.0	-0.4
3	P2	60.6	0.4
3	P3	38.0	-0.9
3	P4	59.5	-0.3
4	P1	40.6	1.3
4	P2	64.1	-1.4
4	P3	76.4	-37.4
4	P4	60.8	-1.1
5	P1	36.8	-0.2
5	P2	60.5	-1.1
5	P3	38.0	-0.9
5	P4	58.5	-0.2
6	P1	38.6	0.9
6	P2	67.6	4.2
6	P3	37.4	0.0
6	P4	61.4	-1.1
7	P1	34.7	0.8
7	P2	57.9	-0.2
7	P3	37.3	-0.5
7	P4	59.1	0.8
8	P1	36.3	-0.5
8	P2	60.4	-0.9
8	P3	36.5	-0.5
8	P4	58.7	-0.7

EQUIPMENT AND CALIBRATION SCHEDULES**Equipment #:** THL-02**Description:** Temperature/Humidity Chart Recorder**Manufacturer:** Dickson**Model:** THDX**Serial #:** 00120351**Accuracy:** Temp: +/- 1C; Humidity: +/-2% RH (0 - 60%) +/- 3% RH (61 - 95%).

... Last Cal: 06/16/05, Next Cal: 06/16/06

Equipment #: PS-01**Description:** System Power Supply**Manufacturer:** Hewlett Packard**Model:** HP 6033A**Serial #:** (HP) 3329A-07330**Accuracy:** See Manual

... Last Cal: 05/12/05, Next Cal: 05/12/06

Equipment #: TC090601-103/105**Description:** IC Thermocouple-103/105**Manufacturer:** Samtec**Model:****Serial #:** TC090601-103/105**Accuracy:** +/- 1 degree C

... Last Cal: , Next Cal:

Equipment #: TCT-03**Description:** Dillon Quantrol TC2 Test Stand**Manufacturer:** Dillon Quantrol**Model:** TC2**Serial #:** 02-1033-03**Accuracy:** Speed Accuracy: +/- 5% of indicated speed; Displacement: +/- 5 micrometers.

... Last Cal: 5/12/05, Next Cal: 5/12/06

Equipment #: LC-250N (icell)**Description:** 250 Newton load cell for Dillon Quantrol test stand**Manufacturer:** Dillon Quantrol**Model:** icell**Serial #:** 04-0020-08**Accuracy:** .10 % of Capacity

... Last Cal: 4/19/2005, Next Cal: 4/19/2006

Equipment #: TCT-04**Description:** Dillon Quantrol TC21 25-1000 mm/min series test stand**Manufacturer:** Dillon Quantrol**Model:** TC2 I series test stand**Serial #:** 04-1041-04**Accuracy:** Speed Accuracy: +/- 5% of indicated speed; Speed Accuracy: +/- 5% of indicated speed;

... Last Cal: 4/28/2005, Next Cal: 4/28/2006

Equipment #: HPM-01**Description:** Hipot Megommeter**Manufacturer:** Hipotronics**Model:** H306B-A**Serial #:** M9905004**Accuracy:** 2 % Full Scale Accuracy 2 % Full Scale Accuracy

... Last Cal: 5/12/05, Next Cal: 05/12/06

Equipment #: OV-03**Description:** Cascade Tek Forced Air Oven**Manufacturer:** Cascade Tek**Model:** TFO-5**Serial #:** 0500100**Accuracy:** Temp. Stability: +/- .1C/C change in ambient

... Last Cal: 05/12/05, Next Cal: 05/12/06

Equipment #: THC-01**Description:** Temperature/Humidity Chamber**Manufacturer:** Thermotron**Model:** SM-8-7800**Serial #:** 30676**Accuracy:** See Manual

... Last Cal: 7/15/2005, Next Cal: 8/15/2006

Equipment #: MO-01**Description:** Micro-Ohmmeter**Manufacturer:** Keithley**Model:** 580**Serial #:** 0772740**Accuracy:** See Manual

... Last Cal: 05/12/05, Next Cal: 05/12/06

Equipment #: MO-03**Description:** Multimeter /Data Acquisition System**Manufacturer:** Keithley**Model:** 2700**Serial #:** 00120351**Accuracy:** See Manual

... Last Cal: 05/12/05, Next Cal: 05/12/06