

Project Number: Design Qualification Test Report	Tracking Code: 139088_Report_Rev_2		
Requested by: James Borgelt	Date: 8/23/2012	Product Rev: N/A	
Part #: ACP-16-01-H-00.35-T-S-P-1\ACR-16-01-H-00.35-S-S1-P-1	Lot #: N/A	Tech: Craig Ryan	Eng: Eric Mings
Part description: ACP\ACR		Qty to test: 30	
Test Start: 04/26/2011	Test Completed: 05/17/2011		



DESIGN QUALIFICATION TEST REPORT

**ACP-16-01-H-00.35-T-S-P-1
ACR-16-01-H-00.35-S-S1-P-1**

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: Design Qualification test. Please see test plan.

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) Parts not intended for testing LLCR and DWV/IR are visually inspected and cleaned if necessary.
- 7) Any additional preparation will be noted in the individual test sequences.
- 8) Samtec Test PCBs used: PCB-103219-TST-XX

FLOWCHARTS

Gas Tight

TEST STEP	GROUP A1 8 Assemblies
01	LLCR-1
02	Gas Tight
03	LLCR-2

Gas Tight = EIA-364-36A

LLCR = EIA-364-23, LLCR

20 mV Max, 100 mA Max

Use Keithley 580 or 3706 in 4 wire dry circuit mode

Thermal Aging

TEST STEP	GROUP A1 6 Assemblies Thermal Aging (Mated)
02	Forces - Mating / Unmating
03	LLCR-1
04	Thermal Aging (Mated and Undisturbed)
05	LLCR-2
06	Forces - Mating / Unmating

Thermal Aging = EIA-364-17, Test Condition 4 (105°C)

Time Condition 'B' (250 Hours)

Mating / Unmating Forces = EIA-364-13

LLCR = EIA-364-23, LLCR

20 mV Max, 100 mA Max

Use Keithley 580 or 3706 in 4 wire dry circuit mode

FLOWCHARTS Continued**IR & DWV**

TEST STEP	GROUP A1 2 Mated Sets Break Down Pin-to-Pin	GROUP A2 2 Unmated of Part # Being Tested Break Down Pin-to-Pin	GROUP A3 2 Unmated of Mating Part # Break Down Pin-to-Pin	GROUP B1 2 Mated Sets Pin-to-Pin
01	DWV/Break Down Voltage	DWV/Break Down Voltage	DWV/Break Down Voltage	IR & DWV at test voltage (on both mated sets and on each connector unmated)
02				Thermal Shock (Mated and Undisturbed)
03				IR & DWV at test voltage (on both mated sets and on each connector unmated)
04				Cyclic Humidity (Mated and Undisturbed)
05				IR & DWV at test voltage (on both mated sets and on each connector unmated)

DWV on Group B1 to be performed at Test Voltage

DWV test voltage is equal to 75% of the lowest break down voltage from Groups A1, A2 or A3

Thermal Shock = EIA-364-32, Table II, Test Condition I:

-55°C to +85°C 1/2 hour dwell, 100 cycles

Humidity = EIA-364-31, Test Condition B (240 Hours)

and Method III (+25°C to +65°C @ 90% RH to 98% RH)

ambient pre-condition and delete steps 7a and 7b

IR = EIA-364-21

DWV = EIA-364-20, Test Condition 1

FLOWCHARTS Continued**Durability/Mating/Unmating/Gaps**

TEST STEP	GROUP A1 6 Assemblies
02	LLCR-1
03	Forces - Mating / Unmating
04	25 Cycles
05	Forces - Mating / Unmating
06	25 Cycles (50 Total)
07	Forces - Mating / Unmating
08	25 Cycles (75 Total)
09	Forces - Mating / Unmating
10	25 Cycles (100 Total)
11	Forces - Mating / Unmating
12	Clean w/Compressed Air
14	LLCR-2
15	Thermal Shock (Mated and Undisturbed)
16	LLCR-3
17	Cyclic Humidity (Mated and Undisturbed)
18	LLCR-4
19	Forces - Mating / Unmating

Thermal Shock = EA-364-32, Table II, Test Condition I:

-55°C to +85°C 1/2 hour dwell, 100 cycles

Humidity = EA-364-31, Test Condition B (240 Hours)

and Method III (+25°C to +65°C @ 90% RH to 98% RH)

ambient pre-condition and delete steps 7a and 7b

Mating / Unmating Forces = EA-364-13

LLCR = EA-364-23, LLCR

20 mV Max, 100 mA Max

Use Keithley 580 or 3706 in 4 wire dry circuit mode

FLOWCHARTS ContinuedCurrent Carrying Capacity - Array

TEST STEP	GROUP A1 3 Mated Assemblies All Contacts Powered
01	CCC

(TIN PLATING) - Tabulate calculated current at RT, 65°C, 75°C and 95°C

after derating 20% and based on 105°C

(GOLD PLATING) - Tabulate calculated current at RT, 85°C, 95°C and 115°C

after derating 20% and based on 125°C

CCC, Temp rise = EIA-364-70

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

THERMAL SHOCK:

- 1) EIA-364-32, *Thermal Shock (Temperature Cycling) Test Procedure for Electrical Connectors.*
- 2) Test Condition 1: -55°C to +85°C
- 3) Test Time: ½ hour dwell at each temperature extreme
- 4) Number of Cycles: 100
- 5) All test samples are pre-conditioned at ambient.
- 6) All test samples are exposed to environmental stressing in the mated condition.

THERMAL:

- 1) EIA-364-17, *Temperature Life with or without Electrical Load Test Procedure for Electrical Connectors.*
- 2) Test Condition 4 at 105° C.
- 3) Test Time Condition B for 250 hours.
- 4) All test samples are pre-conditioned at ambient.
- 5) All test samples are exposed to environmental stressing in the mated condition.

HUMIDITY:

- 1) Reference document: EIA-364-31, *Humidity Test Procedure for Electrical Connectors.*
- 2) Test Condition B, 240 Hours.
- 3) Method III, +25° C to +65° C, 90% to 98% Relative Humidity excluding sub-cycles 7a and 7b.
- 4) All samples are pre-conditioned at ambient.
- 5) All test samples are exposed to environmental stressing in the mated condition.

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.

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. <= +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

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

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 or Signal-to-Ground
 - ii. Electrification Time 2.0 minutes
 - iii. Test Voltage (500 VDC) corresponds to calibration settings for measuring resistances.

2) MEASUREMENTS:

- a. When the specified test voltage is applied (VDC), the insulation resistance shall not be less than 1000 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 or Signal-to-Ground
 - ii. Barometric Test Condition 1
 - iii. Rate of Application 500 V/Sec
 - iv. Test Voltage (VAC) until breakdown occurs

2) MEASUREMENTS/CALCULATIONS

- a. The breakdown voltage shall be measured and recorded.
- b. The dielectric withstand 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 withstand voltage (one-fourth of the breakdown voltage).

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

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 10:1.
 - 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.

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

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. 80°C
 - c. 95°C
 - d. 115°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.

RESULTS

Temperature Rise, CCC at a 20% de-rating

- CCC for a 30°C Temperature Rise ----- 1.3A per contact with all contacts powered (ACP Cable Bundle)

Mating – Unmating Forces

Thermal Aging Group

- Initial
 - Mating
 - Min ----- 5.94 Lbs
 - Max----- 7.98 Lbs
 - Unmating
 - Min ----- 2.73 Lbs
 - Max----- 3.42 Lbs
- After Thermal
 - Mating
 - Min ----- 3.81 Lbs
 - Max----- 5.80 Lbs
 - Unmating
 - Min ----- 1.70 Lbs
 - Max----- 3.96 Lbs

RESULTS Continued

Mating\Unmating Durability Group

- Initial
 - Mating
 - Min ----- 5.95 Lbs
 - Max----- 8.31 Lbs
 - Unmating
 - Min ----- 3.17 Lbs
 - Max----- 3.65 Lbs
- After 25 Cycles
 - Mating
 - Min ----- 6.42 Lbs
 - Max----- 9.94 Lbs
 - Unmating
 - Min ----- 3.44 Lbs
 - Max----- 3.84 Lbs
- After 50 Cycles
 - Mating
 - Min ----- 6.71 Lbs
 - Max----- 10.22 Lbs
 - Unmating
 - Min ----- 3.76 Lbs
 - Max----- 4.61 Lbs
- After 75 Cycles
 - Mating
 - Min ----- 6.89 Lbs
 - Max----- 10.52 Lbs
 - Unmating
 - Min ----- 4.07 Lbs
 - Max----- 5.75 Lbs
- After 100 Cycles
 - Mating
 - Min ----- 7.01 Lbs
 - Max----- 10.63 Lbs
 - Unmating
 - Min ----- 4.32 Lbs
 - Max----- 6.74 Lbs
- After Humidity
 - Mating
 - Min ----- 5.04 Lbs
 - Max----- 6.41 Lbs
 - Unmating
 - Min ----- 2.64 Lbs
 - Max----- 2.86 Lbs

RESULTS Continued

Insulation Resistance minimums, IR

- Initial
 - Mated ----- 50000 Meg Ohms ----- Pass
 - Unmated ----- 50000 Meg Ohms ----- Pass
- Thermal
 - Mated ----- 100000 Meg Ohms ----- Pass
 - Unmated ----- 100000 Meg Ohms ----- Pass
- Humidity
 - Mated ----- 3000 Meg Ohms ----- Pass
 - Unmated ----- 3700 Meg Ohms ----- Pass

Dielectric Withstanding Voltage minimums, DWV

- Minimums
 - Breakdown Voltage ----- 1200 VAC
 - Test Voltage ----- 900 VAC
 - Working Voltage ----- 300 VAC
- Initial DWV ----- Passed
- Thermal DWV ----- Passed
- Humidity DWV ----- Passed

RESULTS Continued

LLCR:

Mating\Unmating Durability Group (96 LLCR test points)

- Initial ----- 117.7 mOhms Max
- Durability, 100 Cycles
 - <= +5.0 mOhms ----- 96 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 ----- 96 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 ----- 96 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 Aging Group (96 LLCR test points)

- Initial ----- 145.81 mOhms Max
- Thermal
 - <= +5.0 mOhms ----- 96 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

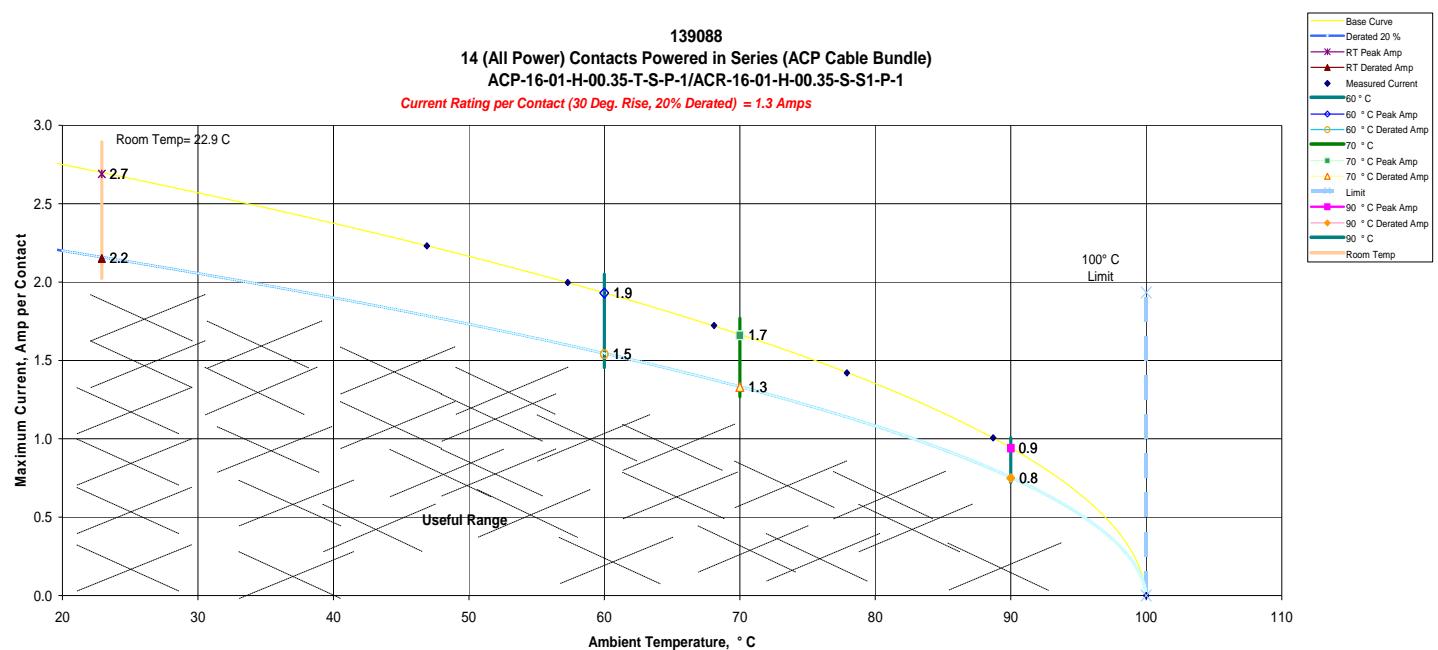
Gas Tight Group (96 LLCR test points)

- Initial ----- 116.9 mOhms Max
- Gas-Tight
 - <= +5.0 mOhms ----- 96 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 all adjacent conductors/cable bundle powered



DATA SUMMARIES Continued

MATING/UNMATING FORCE:

Thermal Aging Group

	Initial				After Thermals			
	Mating		Unmating		Mating		Unmating	
	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)
Minimum	26.42	5.94	12.14	2.73	16.96	3.81	7.55	1.70
Maximum	35.50	7.98	15.21	3.42	25.81	5.80	17.62	3.96
Average	32.07	7.21	13.81	3.10	20.72	4.66	11.73	2.64
St Dev	2.82	0.63	0.92	0.21	3.37	0.76	3.75	0.84
Count	8	8	8	8	6	6	6	6

Mating\Unmating Durability Group

	Initial				25 Cycles			
	Mating		Unmating		Mating		Unmating	
	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)
Minimum	26.47	5.95	14.10	3.17	28.56	6.42	15.30	3.44
Maximum	36.96	8.31	16.24	3.65	44.21	9.94	17.08	3.84
Average	33.17	7.46	15.16	3.41	36.87	8.29	16.06	3.61
St Dev	3.14	0.71	0.72	0.16	4.82	1.08	0.57	0.13
Count	8	8	8	8	8	8	8	8
	50 Cycles				75 Cycles			
	Mating		Unmating		Mating		Unmating	
	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)
Minimum	29.85	6.71	16.72	3.76	30.65	6.89	18.10	4.07
Maximum	45.46	10.22	20.51	4.61	46.79	10.52	25.58	5.75
Average	38.20	8.59	18.49	4.16	38.72	8.71	20.83	4.68
St Dev	5.32	1.20	1.49	0.33	5.23	1.18	2.80	0.63
Count	8	8	8	8	8	8	8	8
	100 Cycles				After Humidity			
	Mating		Unmating		Mating		Unmating	
	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)	Newton	Force (Lbs)
Minimum	31.18	7.01	19.22	4.32	22.42	5.04	11.74	2.64
Maximum	47.28	10.63	29.98	6.74	28.51	6.41	12.72	2.86
Average	38.61	8.68	23.38	5.26	25.94	5.83	12.33	2.77
St Dev	5.01	1.13	4.18	0.94	2.03	0.46	0.35	0.08
Count	8	8	8	8	8	8	8	8

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

	Pin to Pin		
	Mated	Unmated	Unmated
Minimum	ACP/ACR	ACP	ACR
Initial	50000	50000	100000
Thermal	100000	100000	100000
Humidity	3000	25000	3700

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

Voltage Rating Summary	
Minimum	ACP/ACR
Break Down Voltage	1200
Test Voltage	900
Working Voltage	300

Pin to Pin	
Initial Test Voltage	Passed
After Thermal Test Voltage	Passed
After Humidity Test Voltage	Passed

DATA SUMMARIES Continued

LLCR:

Mating\Unmating Durability Group:

- 1) A total of 96 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

	Date	2011-4-26	2011-4-26	2011-5-3	2011-5-17
Room Temp C		22	23	23	23
RH		56%	53%	40%	37%
Name		Craig Ryan	Craig Ryan	Craig Ryan	Craig Ryan
mOhm values	Actual Initial	Delta 100 Cycles	Delta Thermal	Delta Humidity	
Average	114.0	-0.2	0.1	0.0	
St. Dev.	1.7	0.2	0.4	0.5	
Min	111.1	-0.8	-2.1	-2.1	
Max	117.7	0.1	1.1	1.6	
Count	96	96	96	96	

How many samples are being tested?

4

How many contacts are on each board?

24

	Stable	Minor	Acceptable	Marginal	Unstable	Open
100 Cycles	96	0	0	0	0	0
Thermal	96	0	0	0	0	0
Humidity	96	0	0	0	0	0

DATA SUMMARIES Continued

Thermal Age Group:

- 1) A total of 96 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

		LLCR Measurement Summaries by Pin Type			
mOhm values	Date	11/16/2011	11/29/2011		
	Room Temp (Deg C)	22	22		
	Rel Humidity (%)	40	30		
	Technician	Craig Ryan	Craig Ryan		
	Actual	Delta	Delta	Delta	
	Initial	Thermal			
Pin Type 1: Signal					
Average	137.81	0.84			
St. Dev.	2.51	0.44			
Min	132.77	0.24			
Max	145.18	2.96			
Summary Count	84	84			
Total Count	84	84			

LLCR Delta Count by Category						
mOhms	Stable	Minor	Acceptable	Marginal	Unstable	Open
	≤ 5	$>5 \text{ & } \leq 10$	$>10 \text{ & } \leq 15$	$>15 \text{ & } \leq 50$	$>50 \text{ & } \leq 1000$	>1000
Thermal	84	0	0	0	0	0

DATA SUMMARIES Continued

GAS TIGHT:

- 1) A total of 96 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. <= +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

	Date	2011-4-25	2011-4-26
Room Temp C		22	23
RH		46%	50%
Name		Craig Ryan	Craig Ryan
mOhm values		Actual Initial	Delta Gas Tight
Average		113.8	-0.2
St. Dev.		1.4	0.1
Min		110.6	-0.3
Max		116.9	0.1
Count		96	96

How many samples are being tested?

4

How many contacts are on each board?

24

	Stable	Minor	Acceptable	Marginal	Unstable	Open
Gas Tight	96	0	0	0	0	0

EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: MO-04**Description:** Multimeter /Data Acquisition System**Manufacturer:** Keithley**Model:** 2700**Serial #:** 0798688**Accuracy:** See Manual

... Last Cal: 04/30/2011, Next Cal: 04/30/2012

Equipment #: PS-07**Description:** Power Supply**Manufacturer:** Agilent**Model:** AT-6031A**Serial #:** 2721A00648**Accuracy:** See Manual See Manual

... Last Cal: 08/21/2010, Next Cal: 08/21/2011

Equipment #: OV-5**Description:** Forced Air Oven, 5 Cu. Ft., 120 V**Manufacturer:** Sheldon Mfg.**Model:** CE5F**Serial #:** 02008008**Accuracy:** +/- 5 deg. C

... Last Cal: 02/16/2011, Next Cal: 02/16/2012

Equipment #: TCT-04**Description:** Dillon Quantrol TC2 Test Stand**Manufacturer:** Dillon Quantrol**Model:** TC2**Serial #:** 04-1041-04**Accuracy:** Speed Accuracy: +/- 5% of indicated speed; Displacement: +/- 5 micrometers.

... Last Cal: 05/21/2011, Next Cal: 05/21/2012

Equipment #: THC-02**Description:** Temperature/Humidity Chamber**Manufacturer:** Thermotron**Model:** SE-1000-6-6**Serial #:** 31808**Accuracy:** See Manual

... Last Cal: 02/16/2011, Next Cal: 02/16/2012

EQUIPMENT AND CALIBRATION SCHEDULES Continued

Equipment #: HPM-01

Description: Hipot Megommeter

Manufacturer: Hipotronics

Model: H306B-A

Serial #: M9905004

Accuracy: 2 % Full Scale Accuracy

... Last Cal: 11/30/2010, Next Cal: 11/30/2011

Equipment #: TSC-01

Description: Vertical Thermal Shock Chamber

Manufacturer: Cincinnatti Sub Zero

Model: VTS-3-6-6-SC/AC

Serial #: 10-VT14993

Accuracy: See Manual

... Last Cal: 05/18/2011, Next Cal: 05/18/2012