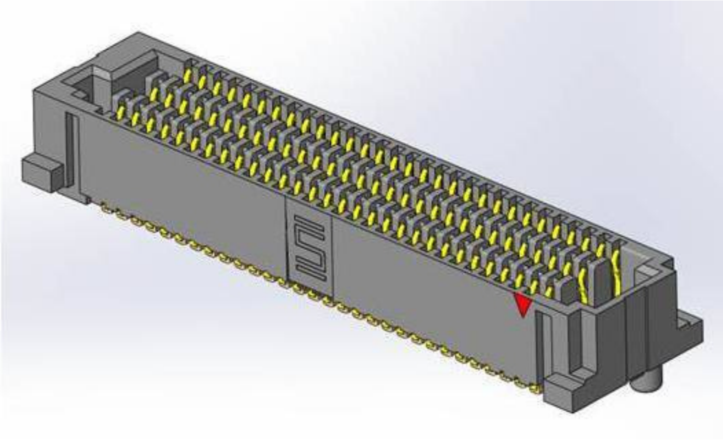
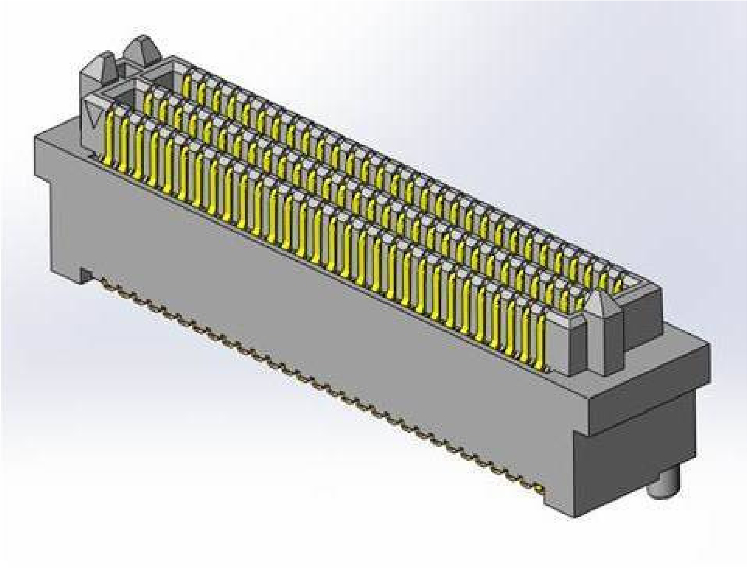
Project Number: Design Qualification Test Report	Tracking Code: 251496_Report_Rev_1
Requested by: Catie Eichhorn	Date: 8/15/2013
Part #: SEAF8-30-05.0-S-06-2/SEAM8-30-S05.0-S-06-2-K-TR	
Part description: SEAF8/SEAM8	Tech: Kason He
Test Start: 05/28/2013	Test Completed: 06/25/2013





DESIGN QUALIFICATION TEST REPORT

SEAF8/SEAM8
SEAF8-30-05.0-S-06-2/SEAM8-30-S05.0-S-06-2-K-TR

CERTIFICATION

All instruments and measuring equipment were calibrated to National Institute for Standards and Technology (NIST) traceable standards according to IS0 10012-l and ANSI/NCSL 2540-1, as applicable.

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SCOPE

To perform the following tests: Design Qualification test. Please see test plan.

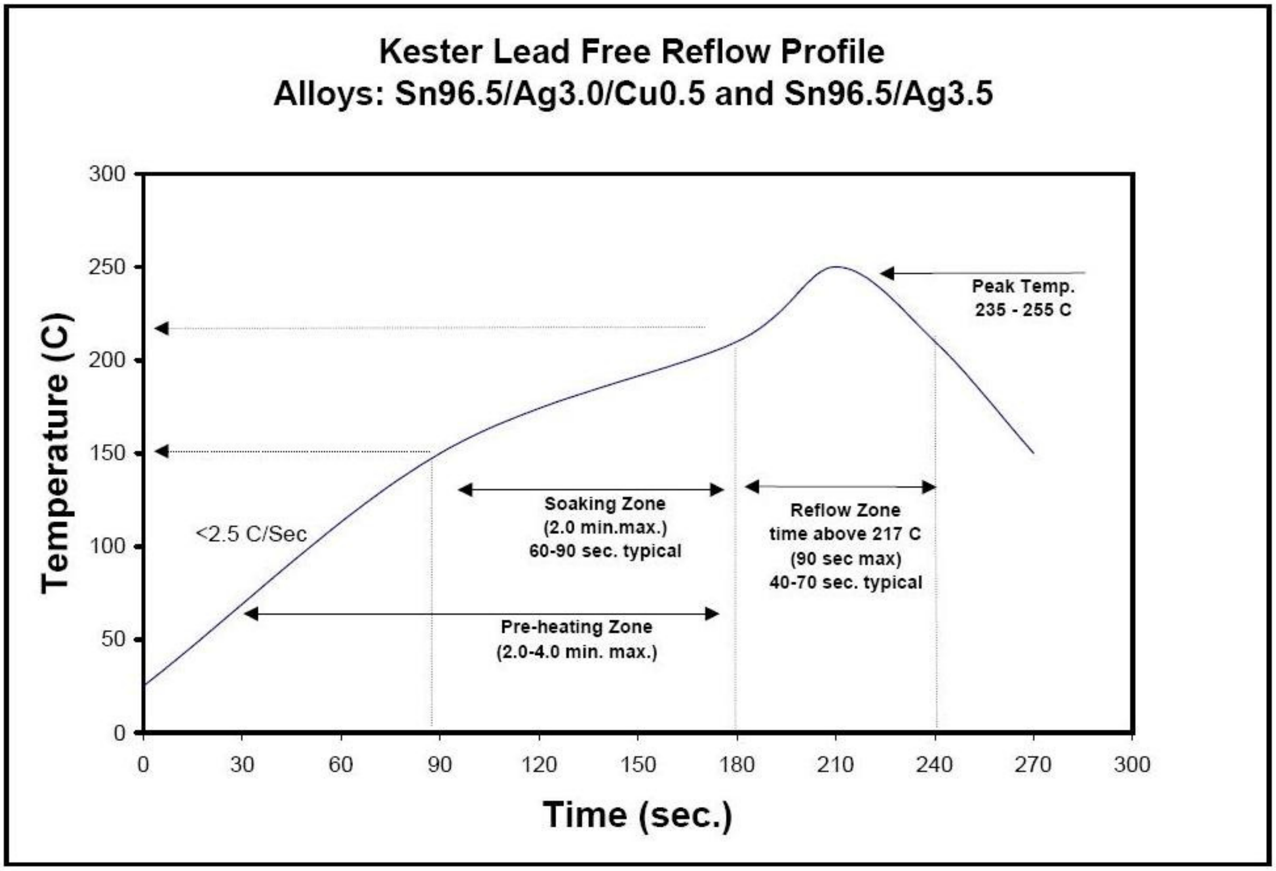
APPLICABLE DOCUMENTS

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 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 are visually inspected and cleaned if necessary.
7) Any additional preparation will be noted in the individual test sequences.
8) Solder Information: Lead Free
9) Re-Flow Time/Temp: See accompanying profile.
10) Samtec Test PCBs used: PCB-104011-TST

TYPICAL OVEN PROFILE (Soldering Parts to Test Boards)



FLOWCHARTS

Extended Life

TEST STEP	GROUP 1 8 Assemblies 100 Cycles	GROUP 2 8 Assemblies 250 Cycles	GROUP 3 8 Assemblies 500 Cycles	GROUP 4 8 Assemblies 1,000 Cycles
01	* Plating Thickness Verification	* Plating Thickness Verification	* Plating Thickness Verification	* Plating Thickness Verification
02	LLCR-1	LLCR-1	LLCR-1	LLCR-1
03	100 Cycles	250 Cycles	500 Cycles	1,000 Cycles
04	Clean Mating Interface	Clean Mating Interface	Clean Mating Interface	Clean Mating Interface
05	LLCR-2	LLCR-2	LLCR-2	LLCR-2
06	Thermal Shock (Mated and undisturbed)	Thermal Shock (Mated and undisturbed)	Thermal Shock (Mated and undisturbed)	Thermal Shock (Mated and undisturbed)
07	LLCR-3	LLCR-3	LLCR-3	LLCR-3
08	Cyclic Humidity (Mated and undisturbed)	Cyclic Humidity (Mated and undisturbed)	Cyclic Humidity (Mated and undisturbed)	Cyclic Humidity (Mated and undisturbed)
09	LLCR-4	LLCR-4	LLCR-4	LLCR-4
10	*** Photos of Contact Area	*** Photos of Contact Area	*** Photos of Contact Area	*** Photos of Contact Area

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
LLCR = EIA-364-23, LLCR
20 mV Max, 100 mA Max
Use Keithley 580 or 3706 in 4 wire dry circuit mode
*** Measure, verify, and document plating thickness on both male and female (one group only)**
**** Plating thickness to be measured on loose pins used during assembly. Pins to be provided by requestor.**
***** Save 2-3 photos of contact area in project folder for each group**

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

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

RESULTS

LLCR Durability 100 cycles: (192 points)

- **Initial --- 21.00mOhms Max**
- **Durability, 100 Cycles**
  - **<= +5.0 mOhms ---------------------------------- 192 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 ---------------------------------- 192 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 ---------------------------------- 184 Points ------------------------ Stable**
  - **+5.1 to +10.0 mOhms ---------------------------------8 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 Durability 250 cycles: (192 points)

- **Initial --- 20.48mOhms Max**
- **Durability, 250 Cycles**
  - **<= +5.0 mOhms ---------------------------------- 192 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 ---------------------------------- 192 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 ---------------------------------- 178 Points ------------------------ Stable**
  - **+5.1 to +10.0 mOhms ------------------------------- 14 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**

RESULTS Continued

LLCR Durability 500 cycles: (192 points)

- **Initial -- 18.91mOhms Max**
- **Durability, 500 Cycles**
  - **<= +5.0 mOhms ---------------------------------- 192 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 ---------------------------------- 192 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 ---------------------------------- 186 Points ------------------------ Stable**
  - **+5.1 to +10.0 mOhms ---------------------------------6 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 Durability 1000 cycles: (192 points)

- **Initial -- 20.24mOhms Max**
- **Durability, 1000 Cycles**
  - **<= +5.0 mOhms ---------------------------------- 192 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 ---------------------------------- 192 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 ---------------------------------- 190 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**

DATA SUMMARIES

LLCR Durability 100 cycles:

1) A total of 192 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

	LLCR Measurement Summaries by Pin Type			
Date	2013-5-28	2013-5-28	2013-6-5	2013-6-25
Room Temp (Deg C)	23	23	22	24
Rel Humidity (%)	60	58	58	55
Technician	Kason He	Kason He	Kason He	Kason He
mOhm values	**Actual Initial**	**Delta 100 Cycles**	**Delta Therm Shck**	**Delta Humidity**
	Pin Type 1: Signal			
Average	16.97	0.70	0.76	1.25
St. Dev.	1.01	0.74	0.77	1.52
Min	15.45	0.00	0.01	0.00
Max	21.00	4.73	4.48	8.15
Summary Count	192	192	192	192
Total Count	192	192	192	192

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
100 Cycles	**192**	**0**	**0**	**0**	**0**	**0**
Therm Shck	**192**	**0**	**0**	**0**	**0**	**0**
Humidity	**184**	**8**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

LLCR Durability 250 cycles:

1) A total of 192 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

	LLCR Measurement Summaries by Pin Type			
Date	2013-5-28	2013-5-29	2013-6-5	2013-6-25
Room Temp (Deg C)	23	25	22	24
Rel Humidity (%)	60	60	58	55
Technician	kason he	kason he	Kason He	Kason He
mOhm values	**Actual Initial**	**Delta 250 Cycles**	**Delta Therm Shck**	**Delta Humidity**
	Pin Type 1: Signal			
Average	17.01	0.64	0.70	1.26
St. Dev.	0.69	0.55	0.73	1.61
Min	15.69	0.00	0.00	0.00
Max	20.48	3.30	4.43	7.11
Summary Count	192	192	192	192
Total Count	192	192	192	192

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
250 Cycles	**192**	**0**	**0**	**0**	**0**	**0**
Therm Shck	**192**	**0**	**0**	**0**	**0**	**0**
Humidity	**178**	**14**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

LLCR Durability 500 cycles:

1) A total of 192 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

	LLCR Measurement Summaries by Pin Type			
Date	2013-5-29	2013-5-30	2013-6-5	2013-6-25
Room Temp (Deg C)	25	23	22	24
Rel Humidity (%)	60	60	58	55
Technician	kason he	kason he	Kason He	Kason He
mOhm values	**Actual Initial**	**Delta 500 Cycles**	**Delta Therm Shck**	**Delta Humidity**
	Pin Type 1: Signal			
Average	16.64	0.57	0.68	1.26
St. Dev.	0.58	0.43	0.65	1.46
Min	15.58	0.00	0.01	0.01
Max	18.91	2.12	3.35	8.84
Summary Count	192	192	192	192
Total Count	192	192	192	192

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
500 Cycles	**192**	**0**	**0**	**0**	**0**	**0**
Therm Shck	**192**	**0**	**0**	**0**	**0**	**0**
Humidity	**186**	**6**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

LLCR Durability 1000 cycles:

1) A total of 192 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

	LLCR Measurement Summaries by Pin Type			
Date	2013-5-30	2013-6-1	2013-6-7	2013-6-25
Room Temp (Deg C)	23	23	22	24
Rel Humidity (%)	60	60	59	56
Technician	kason he	kason he	Kason He	Kason He
mOhm values	**Actual Initial**	**Delta 1000 Cycles**	**Delta Therm Shck**	**Delta Humidity**
	Pin Type 1: Signal			
Average	16.80	0.70	0.77	1.24
St. Dev.	0.86	0.67	0.69	1.08
Min	15.45	0.01	0.01	0.01
Max	20.24	3.83	3.44	5.86
Summary Count	192	192	192	192
Total Count	192	192	192	192

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
1000 Cycles	**192**	**0**	**0**	**0**	**0**	**0**
Therm Shck	**192**	**0**	**0**	**0**	**0**	**0**
Humidity	**190**	**2**	**0**	**0**	**0**	**0**

EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: HZ-TCT-01
Description: Normal force analyzer
Manufacturer: Mecmesin Multitester
Model: Mecmesin Multitester 2.5-i
Serial #: 08-1049-04
Accuracy: Last Cal: 4/26/2013, Next Cal: 4/25/2014

Equipment #: HZ-MO-05
Description: Micro-ohmmeter
Manufacturer: Keithley
Model: 3706
Serial #: 1285188
Accuracy: Last Cal: 11/15/2012, Next Cal: 11/14/2013