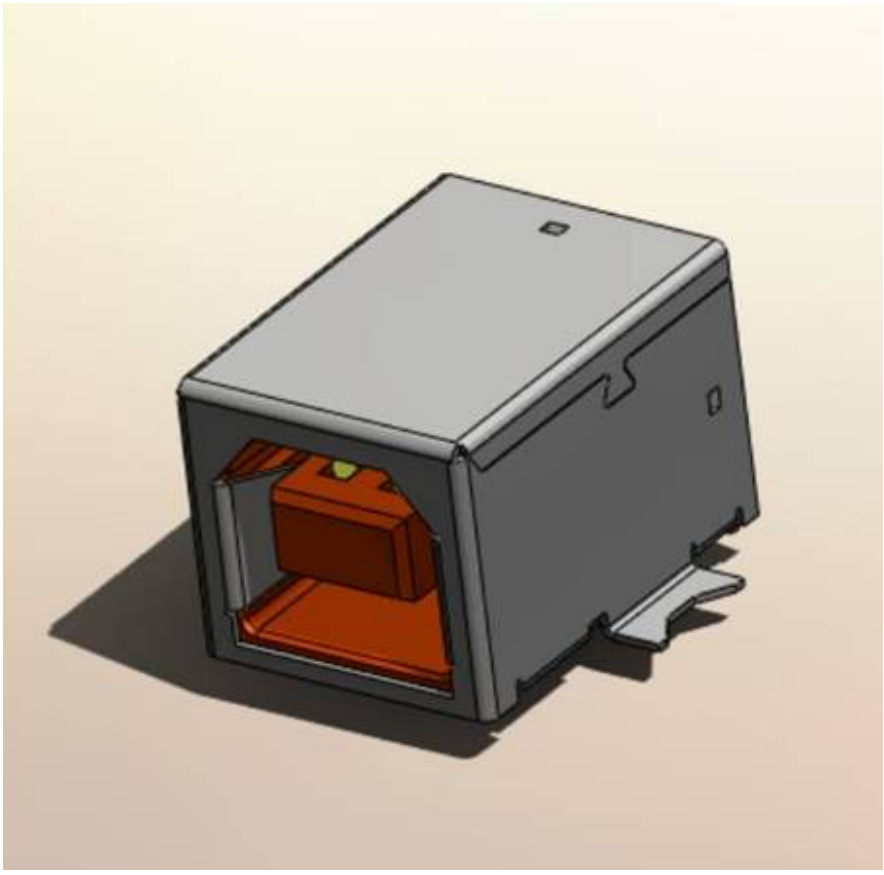
Project Number: N/A	Tracking Code: TC0945--2878--CH		
Requested by: Steven Xu	Date: 2/4/2010	Product Rev: 0	
Part #: USBR-B-S-F-O-SM/USBC-AM-BM-B-B-S-1	Lot #: 1	Tech: Kason He	Eng: Vico Zhao
Part description: USBR		Qty to test: 70	
Test Start: 12-15-2009	Test Completed: 12-31-2009		



Design Verification Test Report

USBR

USBR-B-S-F-O-SM

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.

SCOPE

To perform the following tests: DVT , mating/unmating and LLCR

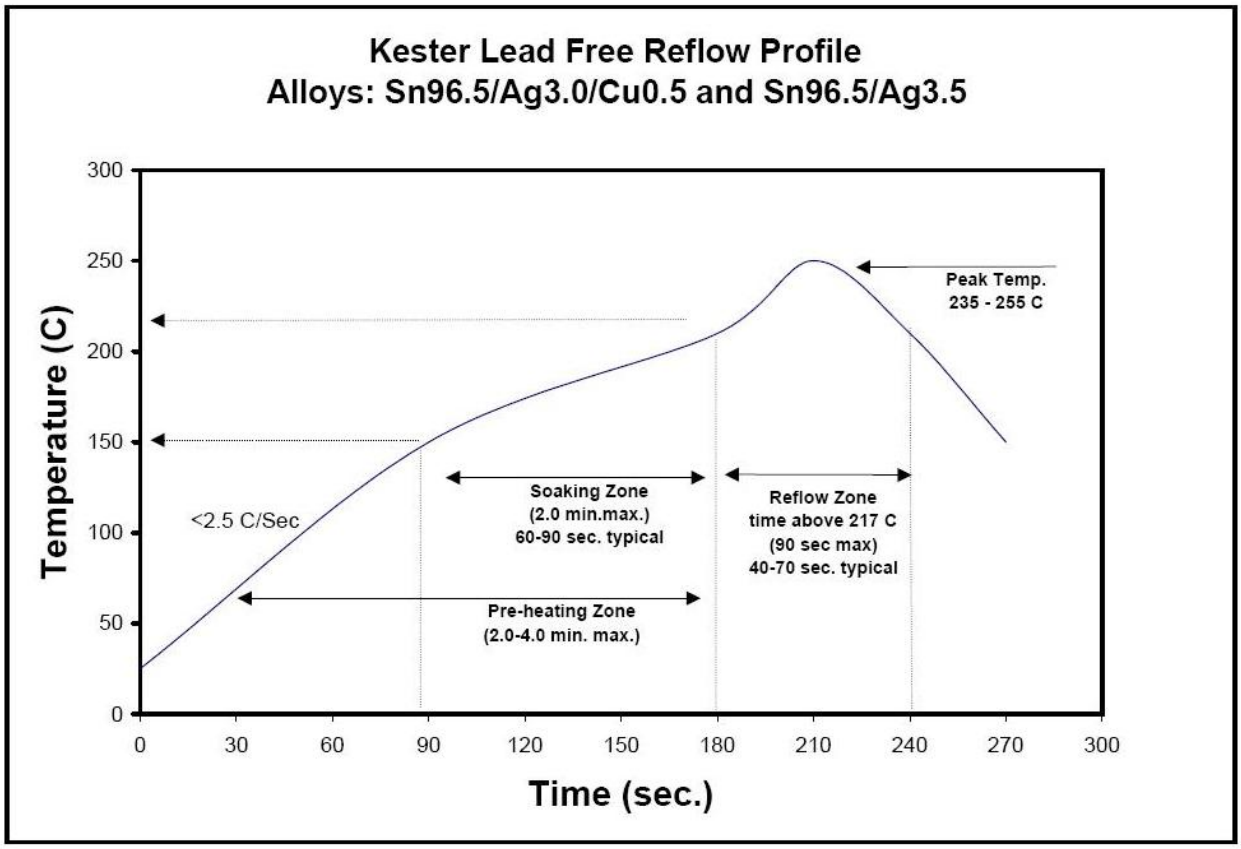
APPLICABLE DOCUMENTS

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) Solder Information: Lead free
9) Re-Flow Time/Temp: See accompanying profile.
10) Samtec Test PCBs used: PCB-101828-TST

TYPICAL OVEN PROFILE (Soldering Parts to Test Boards)



FLOWCHARTS

Extended Life Test Plan (11-03-09)

USBR-B-S-F-O-SM

Plating Thickness

TEST STEP	GROUP A (FEMALE) 20 Points Mininum - 5 Sample
01	Measure & Verify Plating Thickness
02	Document Plating Thickness

TEST STEP	GROUP B (MALE) 20 Points Mininum - 5 Sample
01	Measure & Verify Plating Thickness
02	Document Plating Thickness

Durability

TEST STEP	GROUP A 40 Points - 10 Samples 250 Cycles
01	mating/unmating force measured
02	LLCR-1
03	cycle 250
04	LLCR-2
05	mating/unmating force measured

Mating/Un-Mating Forces = EIA-364-13
LLCR = EIA-364-23, LLCR
use Keithley 580 in the dry circuit mode, 10 mA Max

Durability

TEST STEP	GROUP A 40 Points - 10 Samples 500 Cycles
01	mating/unmating force measured
02	LLCR-1
03	cycle 500
04	LLCR-2
05	mating/unmating force measured

Mating/Un-Mating Forces = EIA-364-13
LLCR = EIA-364-23, LLCR
use Keithley 580 in the dry circuit mode, 10 mA Max

FLOWCHARTS

Extended Life Test Plan (11-03-09)

USBR-B-S-F-O-SM

Durability

TEST STEP	GROUP A 40 Points - 10 Samples 750 Cycles
01	mating/unmating force measured
02	LLCR-1
03	cycle 750
04	LLCR-2
05	mating/unmating force measured

Mating/Un-Mating Forces = EIA-364-13
LLCR = EIA-364-23, LLCR
use Keithley 580 in the dry circuit mode, 10 mA Max

Durability

TEST STEP	GROUP A 40 Points - 10 Samples 1000 Cycles
01	mating/unmating force measured
02	LLCR-1
03	cycle 1000
04	LLCR-2
05	mating/unmating force measured

Mating/Un-Mating Forces = EIA-364-13
LLCR = EIA-364-23, LLCR
use Keithley 580 in the dry circuit mode, 10 mA Max

Durability

TEST STEP	GROUP A 40 Points - 10 Samples 1250 Cycles
01	mating/unmating force measured
02	LLCR-1
03	cycle 1250
04	LLCR-2
05	mating/unmating force measured

Mating/Un-Mating Forces = EIA-364-13
LLCR = EIA-364-23, LLCR
use Keithley 580 in the dry circuit mode, 10 mA Max

FLOWCHARTS

Extended Life Test Plan (11-03-09)

USBR-B-S-F-O-SM

Durability

TEST STEP	GROUP A 40 Points - 10 Samples 1500 Cycles
01	mating/unmating force measured
02	LLCR-1
03	cycle 1500
04	LLCR-2
05	mating/unmating force measured

Mating/Un-Mating Forces = EIA-364-13
LLCR = EIA-364-23, LLCR
use Keithley 580 in the dry circuit mode, 10 mA Max

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

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

Tracking Code: TC0945--2878--CH	Part #: USBR-B-S-F-O-SM
Part description: USBR	

RESULTS

Plating Thickness

Au

- **Min ---------- 3.28µ"**
- **Max---------- 4.44µ"**

Ni

- **Min ---------- 106.37µ"**
- **Max---------- 123.59µ"**

Mating – Unmating Forces

Seq1 250 cycles

- **Initial**
  - **Mating**
    - **Min ---------- 4.01 Lbs**
    - **Max---------- 5.10 Lbs**
  - **Unmating**
    - **Min ---------- 7.96 Lbs**
    - **Max---------- 9.20 Lbs**
- **After 250 Cycles**
  - **Mating**
    - **Min ---------- 3.99 Lbs**
    - **Max---------- 5.50 Lbs**
  - **Unmating**
    - **Min ---------- 4.28 Lbs**
    - **Max---------- 8.10 Lbs**

Seq2 500 cycles

- **Initial**
  - **Mating**
    - **Min ---------- 4.17 Lbs**
    - **Max---------- 5.10 Lbs**
  - **Unmating**
    - **Min ---------- 7.70 Lbs**
    - **Max---------- 9.00 Lbs**
- **After 500 Cycles**
  - **Mating**
    - **Min ---------- 4.26 Lbs**
    - **Max---------- 4.70 Lbs**
  - **Unmating**
    - **Min ---------- 6.31 Lbs**
    - **Max---------- 7.80 Lbs**

Tracking Code: TC0945--2878--CH	Part #: USBR-B-S-F-O-SM
Part description: USBR	

RESULTS

Seq3 750 cycles

- **Initial**
  - **Mating**
    - **Min ---------- 4.12 Lbs**
    - **Max---------- 5.40 Lbs**
  - **Unmating**
    - **Min ---------- 8.03 Lbs**
    - **Max---------- 8.80 Lbs**
- **After 750 Cycles**
  - **Mating**
    - **Min ---------- 4.01 Lbs**
    - **Max---------- 4.80 Lbs**
  - **Unmating**
    - **Min ---------- 5.27 Lbs**
    - **Max---------- 6.40 Lbs**

Seq4 1000 cycles

- **Initial**
  - **Mating**
    - **Min ---------- 4.43 Lbs**
    - **Max---------- 5.00 Lbs**
  - **Unmating**
    - **Min ---------- 8.03 Lbs**
    - **Max---------- 8.80 Lbs**
- **After 1000 Cycles**
  - **Mating**
    - **Min ---------- 3.88 Lbs**
    - **Max---------- 4.20 Lbs**
  - **Unmating**
    - **Min ---------- 4.59 Lbs**
    - **Max---------- 5.50 Lbs**

Seq5 1250 cycles

- **Initial**
  - **Mating**
    - **Min ---------- 4.37 Lbs**
    - **Max---------- 5.00 Lbs**
  - **Unmating**
    - **Min ---------- 6.50 Lbs**
    - **Max---------- 9.00 Lbs**
- **After 1250 Cycles**
  - **Mating**
    - **Min ---------- 3.66 Lbs**
    - **Max---------- 4.10 Lbs**
  - **Unmating**
    - **Min ---------- 3.95 Lbs**
    - **Max---------- 4.30 Lbs**

RESULTS

Seq6 1500 cycles

- **Initial**
  - **Mating**
    - **Min ---------- 4.37 Lbs**
    - **Max---------- 4.80 Lbs**
  - **Unmating**
    - **Min ---------- 8.36 Lbs**
    - **Max---------- 8.90 Lbs**

- **After 1500 Cycles**
  - **Mating**
    - **Min ---------- 3.22 Lbs**
    - **Max---------- 3.60 Lbs**
  - **Unmating**
    - **Min ---------- 3.48 Lbs**
    - **Max---------- 3.80 Lbs**

LLCR (60 LLCR test points)

Seq1 250 cycles

Contact

- **Initial ---------- 25.2mOhms Max**
- **Durability, 250 Cycles**
  - **<= +5.0 mOhms ---------- 40 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**

Shell

- **Initial----------7.3mOhms Max**
- **Durability, 250 Cycles**
  - **<= +5.0 mOhms ---------- 20 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**

Seq2 500 cycles

Contact

- **Initial ---------- 25.1mOhms Max**
- **Durability, 500 Cycles**
  - **<= +5.0 mOhms ---------- 40 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**

Shell

- **Initial----------6.4mOhms Max**
- **Durability, 500 Cycles**
  - **<= +5.0 mOhms ---------- 20 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**

RESULTS

Seq3 750 cycles

Contact

- **Initial ---------- 25.2mOhms Max**
- **Durability, 750 Cycles**
  - **<= +5.0 mOhms ---------- 40 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**

Shell

- **Initial ---------- 6.3mOhms Max**
- **Durability,750 Cycles**
  - **<= +5.0 mOhms ---------- 20 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**

Seq4 1000 cycles

Contact

- **Initial ---------- 25.3mOhms Max**
- **Durability, 1000 Cycles**
  - **<= +5.0 mOhms ---------- 40 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**

Shell

- **Initial ---------- 6.1mOhms Max**
- **Durability, 1000 Cycles**
  - **<= +5.0 mOhms ---------- 20 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**

RESULTS

Seq5 1250 cycles

Contact

- **Initial ---------- 25.2mOhms Max**
- **Durability, 1250 Cycles**
  - **<= +5.0 mOhms ---------- 40 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**

Shell

- **Initial ---------- 5.5mOhms Max**
- **Durability, 1250 Cycles**
  - **<= +5.0 mOhms ---------- 20 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**

Seq6 1500 cycles

Contact

- **Initial ---------- 25.1mOhms Max**
- **Durability, 1500 Cycles**
  - **<= +5.0 mOhms ---------- 40 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**

Shell

- **Initial ---------- 5.4mOhms Max**
- **Durability, 1500 Cycles**
  - **<= +5.0 mOhms ---------- 20 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

PLATING THICKNESS

Min	3.28	106.37
Max	4.44	123.59
Average	3.89	113.86

MATING/UNMATING:

Seq1 250 cycles

	Initial				After 250 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)
Minimum	64.2	4.01	127.4	7.96	63.9	3.99	68.4	4.28
Maximum	81.5	5.1	147.5	9.2	87.5	5.5	129.5	8.1
Average	72.6	**4.5**	137.6	**8.6**	73.4	**4.6**	102.8	**6.4**

Seq2 500 cycles

	Initial				After 500 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)
Minimum	66.7	4.17	123.1	7.70	68.1	4.26	100.9	6.31
Maximum	81.8	5.1	143.9	9.0	74.8	4.7	125.6	7.8
Average	73.8	**4.6**	134.3	**8.4**	71.4	**4.5**	110.5	**6.9**

Seq3 750 cycles

	Initial				After 750 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)
Minimum	66.0	4.12	128.4	8.03	64.2	4.01	84.3	5.27
Maximum	86.8	5.4	140.1	8.8	77.3	4.8	102.7	6.4
Average	75.6	**4.7**	134.0	**8.4**	69.5	**4.3**	94.7	**5.9**

Seq4 1000 cycles

	Initial				After 1000 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)
Minimum	70.9	4.43	128.4	8.03	62.1	3.88	73.4	4.59
Maximum	79.4	5.0	140.1	8.8	67.7	4.2	88.6	5.5
Average	74.6	**4.7**	133.5	**8.3**	64.7	**4.0**	79.2	**4.9**

Seq5 1250 cycles

	Initial				After 1250 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)
Minimum	69.9	4.37	104.1	6.50	58.6	3.66	63.2	3.95
Maximum	79.4	5.0	143.9	9.0	66.3	4.1	68.4	4.3
Average	74.2	**4.6**	132.5	**8.3**	62.6	**3.9**	66.2	**4.1**

Tracking Code: TC0945--2878--CH	Part #: USBR-B-S-F-O-SM
Part description: USBR	

DATA SUMMARIES
Seq6 1500 cycles

	Initial				After 1500 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)	Force (Oz)	Force (Lbs)
Minimum	69.9	4.37	133.7	8.36	51.5	3.22	55.7	3.48
Maximum	77.3	4.8	142.9	8.9	56.8	3.6	61.4	3.8
Average	74.2	**4.6**	137.0	**8.6**	53.9	**3.4**	58.4	**3.6**

DATA SUMMARIES

LLCR:

1) A total of **60** 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

Seq1 250 cycles
Contact

Date	Dec. 22 2009	Dec. 28 2009
Room Temp C	22	16
RH	37%	51%
Name	Kason He	Kason
mOhm values	**Actual Initial**	**Delta 250 Cycles**
Average	22.2	-0.2
St. Dev.	2.5	0.2
Min	19.2	-0.8
Max	25.2	0.4
Count	40	40

	Stable	Minor	Acceptable	Marginal	Unstable	Open
250 Cycles	40	0	0	0	0	0

Shell

Date	Dec. 22 2009	Dec. 28 2009
Room Temp C	22	16
RH	37%	51%
Name	Kason He	Kason He
mOhm values	**Actual Initial**	**Delta 250 Cycles**
Average	6.1	2.5
St. Dev.	0.7	1.3
Min	5.3	0.0
Max	7.3	4.7
Count	20	20

	Stable	Minor	Acceptable	Marginal	Unstable	Open
250 Cycles	20	0	0	0	0	0

DATA SUMMARIES
Seq2 500 cycles
Contact

	Date	Dec. 22 2009	Dec. 23 2009
	Room Temp C	22	19
	RH	37%	54%
	Name	Kason He	Kason He
mOhm values		**Actual Initial**	**Delta 500 Cycles**
	Average	22.1	0.3
	St. Dev.	2.5	0.6
	Min	19.1	-0.4
	Max	25.1	2.8
	Count	40	40

	Stable	Minor	Acceptable	Marginal	Unstable	Open
500 Cycles	40	0	0	0	0	0

Shell

	Date	Dec. 22 2009	Dec. 23 2009
	Room Temp C	22	19
	RH	37%	54%
	Name	Kason He	Kason He
mOhm values		**Actual Initial**	**Delta 500 Cycles**
	Average	5.6	1.2
	St. Dev.	0.4	0.8
	Min	5.0	-0.8
	Max	6.4	2.4
	Count	20	20

	Stable	Minor	Acceptable	Marginal	Unstable	Open
500 Cycles	20	0	0	0	0	0

Tracking Code: TC0945--2878--CH	Part #: USBR-B-S-F-O-SM
Part description: USBR	

DATA SUMMARIES

Seq3 750 cycles

Contact

Date	Dec. 22 2009	Dec. 25 2009
Room Temp C	22	18
RH	37%	59%
Name	Kason He	Peter Chen
mOhm values	**Actual Initial**	**Delta 750 Cycles**
Average	22.1	0.5
St. Dev.	2.5	0.6
Min	19.0	-0.4
Max	25.2	1.8
Count	40	40

	Stable	Minor	Acceptable	Marginal	Unstable	Open
750 Cycles	40	0	0	0	0	0

Shell

Date	Dec. 22 2009	Dec. 25 2009
Room Temp C	22	18
RH	37%	59%
Name	Kason He	Peter Chen
mOhm values	**Actual Initial**	**Delta 750 Cycles**
Average	5.3	2.2
St. Dev.	0.5	1.9
Min	4.8	-1.3
Max	6.3	4.7
Count	20	20

	Stable	Minor	Acceptable	Marginal	Unstable	Open
750 Cycles	20	0	0	0	0	0

DATA SUMMARIES

Seq4

Contact

Date	Dec. 22 2009	Dec. 28 2009
Room Temp C	22	19
RH	37%	51%
Name	Kason He	Peter Chen
mOhm values	**Actual Initial**	**Delta 1000 Cycles**
Average	22.2	0.7
St. Dev.	2.5	0.7
Min	19.0	-1.1
Max	25.3	2.5
Count	40	40

	Stable	Minor	Acceptable	Marginal	Unstable	Open
1000 Cycles	40	0	0	0	0	0

Shell

Date	Dec. 22 2009	Dec. 31 2009
Room Temp C	22	19
RH	37%	51%
Name	Kason He	Peter Chen
mOhm values	**Actual Initial**	**Delta 1000 Cycles**
Average	5.3	1.8
St. Dev.	0.4	1.7
Min	4.9	-1.0
Max	6.1	3.6
Count	20	20

	Stable	Minor	Acceptable	Marginal	Unstable	Open
1000 Cycles	20	0	0	0	0	0

DATA SUMMARIES

Seq5

Contact

Date	Dec. 22 2009	Dec. 29 2009
Room Temp C	22	21
RH	37%	55%
Name	Kason He	Peter Chen
mOhm values	**Actual Initial**	**Delta 1250 Cycles**
Average	22.2	0.2
St. Dev.	2.5	0.4
Min	19.0	-0.6
Max	25.2	1.2
Count	40	40

	Stable	Minor	Acceptable	Marginal	Unstable	Open
1250 Cycles	40	0	0	0	0	0

Shell

Date	Dec. 22 2009	Dec. 29 2009
Room Temp C	22	22
RH	37%	55%
Name	Kason He	Peter Chen
mOhm values	**Actual Initial**	**Delta 1250 Cycles**
Average	5.1	0.4
St. Dev.	0.2	1.9
Min	4.8	-1.2
Max	5.5	3.9
Count	20	20

	Stable	Minor	Acceptable	Marginal	Unstable	Open
1250 Cycles	20	0	0	0	0	0

DATA SUMMARIES

Seq6

Contact

Date	Dec. 22 2009	Dec. 31 2009
Room Temp C	22	19
RH	37%	60%
Name	Kason He	Kason He
mOhm values	**Actual Initial**	**Delta 1500 Cycles**
Average	22.2	0.3
St. Dev.	2.4	0.6
Min	19.2	-0.4
Max	25.1	2.3
Count	40	40

	Stable	Minor	Acceptable	Marginal	Unstable	Open
1500 Cycles	40	0	0	0	0	0

Shell

Date	Dec. 22 2009	Dec. 31 2009
Room Temp C	22	19
RH	37%	60%
Name	Kason He	Peter Chen
mOhm values	**Actual Initial**	**Delta 1500 Cycles**
Average	5.1	0.6
St. Dev.	0.1	1.6
Min	4.9	-1.0
Max	5.4	3.1
Count	20	20

	Stable	Minor	Acceptable	Marginal	Unstable	Open
1500 Cycles	20	0	0	0	0	0

DATA

PLATING THICKNESS:

UNIT:μ"

Pin#	Au	Ni
1	4.29	113.61
2	3.55	120.85
3	4.12	111.62
4	3.62	117.61
5	3.91	118.49
6	4.44	123.59
7	3.28	109.86
8	3.69	114.77
9	4.18	108.31
10	4.19	110.87
11	3.69	106.37
12	4.27	111.58
13	3.87	112.97
14	4.09	110.55
15	3.88	117.67
16	3.92	121.34
17	3.52	115.91
18	3.81	107.38
19	3.70	111.24
20	3.69	112.69
Min	3.28	106.37
Max	4.44	123.59
Average	3.89	113.86

MATING/UNMATING:

Seq 1	Initial		After 250 Cycles	
Sample#	Mating	Unmating	Mating	Unmating
1	4.56	8.33	4.67	6.20
2	4.41	9.22	5.47	6.44
3	4.21	8.45	4.26	6.66
4	4.50	8.93	4.30	6.64
5	4.59	8.60	4.01	5.07
6	4.15	8.53	3.99	4.28
7	4.81	8.97	4.67	7.17
8	4.01	7.96	4.54	6.46
9	5.09	8.60	4.78	7.23
10	5.07	8.40	5.16	8.09

Seq2	Initial		After 500 Cycles	
Sample#	Mating	Unmating	Mating	Unmating
1	4.74	8.14	4.54	6.31
2	4.54	8.42	4.26	6.88
3	4.37	7.70	4.30	6.46
4	4.72	8.67	4.39	7.21
5	5.12	9.00	4.65	7.85
6	4.70	8.11	4.50	6.66
7	4.61	8.36	4.67	6.53
8	4.26	8.42	4.32	6.90
9	4.17	8.71	4.34	7.10
10	4.94	8.45	4.63	7.17

Seq3	Initial		After 750 Cycles	
Sample#	Mating	Unmating	Mating	Unmating
1	4.61	8.14	4.01	5.40
2	4.70	8.11	4.37	5.27
3	4.34	8.22	4.17	6.42
4	4.54	8.58	4.21	6.24
5	4.12	8.03	4.01	5.38
6	5.27	8.45	4.65	5.89
7	4.37	8.64	4.12	5.93
8	5.42	8.29	4.83	6.22
9	4.78	8.75	4.48	6.15
10	5.09	8.51	4.61	6.26

Seq4	Initial		After 1000 Cycles	
Sample#	Mating	Unmating	Mating	Unmating
1	4.72	8.36	4.06	4.81
2	4.61	8.71	4.01	5.16
3	4.43	8.09	3.95	4.72
4	4.52	8.45	4.04	5.05
5	4.78	8.75	4.15	5.53
6	4.96	8.49	4.23	5.16
7	4.70	8.03	4.01	4.59
8	4.67	8.36	3.88	4.70
9	4.54	8.05	4.04	5.01
10	4.70	8.18	4.08	4.76

Seq5	Initial		After 1250 Cycles	
Sample#	Mating	Unmating	Mating	Unmating
1	4.74	8.05	3.92	4.17
2	4.50	8.64	4.12	4.28
3	4.65	8.53	3.77	4.10
4	4.61	6.50	3.86	4.26
5	4.37	8.09	3.88	4.17
6	4.52	8.47	4.04	4.08
7	4.76	8.73	3.86	4.26
8	4.48	9.00	3.66	3.95
9	4.96	8.45	3.86	4.01
10	4.81	8.36	4.15	4.10

Seq6	Initial		After 1500 Cycles	
Sample#	Mating	Unmating	Mating	Unmating
1	4.61	8.73	3.48	3.73
2	4.83	8.42	3.24	3.77
3	4.65	8.36	3.55	3.84
4	4.48	8.58	3.37	3.64
5	4.61	8.45	3.35	3.73
6	4.81	8.93	3.42	3.48
7	4.37	8.69	3.46	3.62
8	4.76	8.58	3.29	3.55
9	4.59	8.36	3.33	3.64
10	4.70	8.51	3.22	3.51

LLCR:

Seq1 Contact

	mOhm values	Actual	Delta
Board	Position	Initial	250 Cycles
1	P1	20.3	-0.3
1	P2	19.4	-0.6
1	P3	25.1	-0.4
1	P4	24.2	-0.4
2	P1	20.1	0.0
2	P2	19.3	-0.5
2	P3	25.0	-0.5
2	P4	24.1	-0.3
3	P1	20.0	-0.4
3	P2	19.3	-0.4
3	P3	24.8	-0.5

3	P4	24.1	-0.2
4	P1	20.4	-0.2
4	P2	19.5	-0.1
4	P3	25.2	-0.4
4	P4	24.3	0.0
5	P1	20.2	0.4
5	P2	19.7	0.0
5	P3	25.0	0.2
5	P4	24.5	0.2
6	P1	20.1	0.1
6	P2	19.4	-0.3
6	P3	25.0	-0.2
6	P4	24.3	-0.3
7	P1	20.2	-0.5
7	P2	19.3	-0.4
7	P3	25.0	-0.8
7	P4	24.0	-0.3
8	P1	20.0	0.2
8	P2	19.4	-0.2
8	P3	24.9	-0.1
8	P4	24.3	-0.5
9	P1	20.6	-0.3
9	P2	19.4	-0.4
9	P3	25.1	-0.3
9	P4	24.3	-0.3
10	P1	20.0	0.0
10	P2	19.2	-0.3
10	P3	24.6	-0.4
10	P4	24.2	-0.4

Shell

	mOhm values	**Actual**	**Delta**
Board	**Position**	**Initial**	**250 Cycles**
1	P1	6.3	1.8
1	P2	7.3	1.0
2	P1	6.6	2.0
2	P2	6.5	2.3
3	P1	6.8	1.2
3	P2	6.9	0.0
4	P1	5.7	4.7
4	P2	5.9	4.4
5	P1	5.6	3.0
5	P2	5.6	3.2
6	P1	5.4	3.0
6	P2	5.3	3.9
7	P1	5.4	1.1
7	P2	5.5	0.8
8	P1	5.5	2.8

8	P2	5.6	2.3
9	P1	7.2	2.7
9	P2	7.3	2.7
10	P1	5.5	4.4
10	P2	5.6	3.0

Seq2 Contact

	mOhm values	Actual	Delta
Board	Position	Initial	500 Cycles
1	P1	20.0	0.1
1	P2	19.2	0.0
1	P3	24.9	0.3
1	P4	24.1	0.1
2	P1	19.9	0.5
2	P2	19.2	0.4
2	P3	24.8	0.9
2	P4	24.1	0.0
3	P1	19.7	-0.1
3	P2	19.2	-0.2
3	P3	24.5	0.3
3	P4	24.2	0.0
4	P1	20.3	0.4
4	P2	19.6	0.2
4	P3	24.9	1.8
4	P4	24.4	0.4
5	P1	19.2	1.4
5	P2	19.3	0.7
5	P3	25.1	0.6
5	P4	24.3	2.8
6	P1	20.1	0.4
6	P2	19.5	0.2
6	P3	24.9	0.0
6	P4	24.3	0.4
7	P1	20.3	-0.4
7	P2	19.3	-0.2
7	P3	25.1	-0.4
7	P4	24.2	-0.2
8	P1	20.0	0.8
8	P2	19.1	0.5
8	P3	25.1	0.0
8	P4	23.9	0.4
9	P1	20.5	-0.1
9	P2	19.3	-0.2
9	P3	25.1	0.3
9	P4	24.4	-0.3
10	P1	20.0	0.0
10	P2	19.1	0.2
10	P3	24.8	0.4

10	P4	24.0	0.3

Shell

	mOhm values	Actual	Delta
Board	Position	Initial	500 Cycles
1	P1	5.7	1.0
1	P2	6.0	2.0
2	P1	5.9	1.0
2	P2	6.1	1.6
3	P1	5.3	2.3
3	P2	5.4	1.9
4	P1	5.5	1.0
4	P2	5.7	0.9
5	P1	6.4	0.4
5	P2	6.2	-0.8
6	P1	5.2	1.5
6	P2	5.2	1.7
7	P1	5.5	0.7
7	P2	5.6	0.9
8	P1	5.0	2.4
8	P2	5.1	2.3
9	P1	5.5	0.8
9	P2	5.4	0.9
10	P1	5.4	0.3
10	P2	5.5	0.2

Seq3 Contact

	mOhm values	Actual	Delta
Board	Position	Initial	750 Cycles
1	P1	20.1	-0.1
1	P2	19.3	0.0
1	P3	24.9	0.2
1	P4	24.0	0.3
2	P1	20.1	1.1
2	P2	19.3	1.1
2	P3	24.9	1.8
2	P4	24.1	0.2
3	P1	19.7	0.0
3	P2	19.3	-0.2
3	P3	24.8	0.2
3	P4	24.0	0.5
4	P1	20.1	0.7
4	P2	19.4	0.1
4	P3	25.1	1.4
4	P4	24.4	0.3
5	P1	20.0	1.1
5	P2	19.4	0.9
5	P3	24.9	0.5
5	P4	24.3	-0.3

6	P1	20.4	1.2
6	P2	19.0	0.8
6	P3	25.1	0.4
6	P4	24.1	1.0
7	P1	19.9	-0.2
7	P2	19.1	0.0
7	P3	25.0	-0.4
7	P4	23.9	0.5
8	P1	20.3	0.5
8	P2	19.3	0.3
8	P3	25.2	0.0
8	P4	24.3	1.0
9	P1	20.0	1.7
9	P2	19.0	1.0
9	P3	24.9	1.0
9	P4	24.0	0.7
10	P1	19.7	0.4
10	P2	19.3	-0.1
10	P3	24.9	0.0
10	P4	24.3	-0.4

Shell

	mOhm values	Actual	Delta
Board	**Position**	**Initial**	**750 Cycles**
1	P1	4.8	1.3
1	P2	5.0	1.3
2	P1	5.8	-0.3
2	P2	6.0	-1.3
3	P1	5.8	2.4
3	P2	5.9	2.2
4	P1	5.4	3.6
4	P2	5.3	3.5
5	P1	5.7	0.5
5	P2	6.3	-1.1
6	P1	4.9	4.7
6	P2	4.9	4.6
7	P1	4.9	4.2
7	P2	4.8	4.0
8	P1	4.8	4.1
8	P2	4.8	3.9
9	P1	5.8	1.0
9	P2	5.7	1.3
10	P1	5.0	1.5
10	P2	4.9	1.5

Seq4 Contact

	mOhm values	Actual	Delta
Board	Position	Initial	1000 Cycles
1	P1	19.9	0.9
1	P2	20.5	-1.1
1	P3	23.7	1.8
1	P4	24.5	-0.3
2	P1	20.1	0.3
2	P2	19.5	0.3
2	P3	24.9	1.1
2	P4	24.3	0.5
3	P1	20.0	1.0
3	P2	19.4	1.3
3	P3	25.0	1.8
3	P4	24.2	0.8
4	P1	20.1	0.5
4	P2	19.0	0.4
4	P3	24.8	0.1
4	P4	23.9	1.9
5	P1	20.3	1.0
5	P2	19.4	0.8
5	P3	25.2	0.8
5	P4	24.4	0.5
6	P1	20.1	1.2
6	P2	19.1	0.2
6	P3	25.0	0.9
6	P4	24.0	2.5
7	P1	20.1	0.9
7	P2	19.2	0.0
7	P3	25.1	1.5
7	P4	24.2	0.2
8	P1	20.5	0.2
8	P2	19.2	0.5
8	P3	25.3	1.5
8	P4	24.3	-0.2
9	P1	19.9	1.0
9	P2	19.2	0.3
9	P3	24.8	1.7
9	P4	24.1	0.0
10	P1	20.3	-0.2
10	P2	19.3	1.3
10	P3	25.1	-0.2
10	P4	24.4	0.4

Shell

	mOhm values	Actual	Delta
Board	Position	Initial	1000 Cycles
1	P1	5.2	3.0
1	P2	6.1	0.6
2	P1	5.4	3.1
2	P2	5.1	3.2
3	P1	5.4	2.9
3	P2	5.1	3.4
4	P1	5.0	2.1
4	P2	4.9	2.1
5	P1	6.1	3.6
5	P2	6.0	3.3
6	P1	5.2	2.8
6	P2	5.1	2.9
7	P1	5.0	2.5
7	P2	4.9	2.7
8	P1	5.3	-0.7
8	P2	5.0	-0.6
9	P1	5.0	-0.5
9	P2	5.2	0.8
10	P1	5.2	-1.0
10	P2	5.1	-0.8

Seq5 Contact

	mOhm values	Actual	Delta
Board	Position	Initial	1250 Cycles
1	P1	20.3	-0.3
1	P2	19.3	1.2
1	P3	25.1	-0.6
1	P4	24.3	0.3
2	P1	19.9	0.9
2	P2	19.0	0.8
2	P3	24.8	0.4
2	P4	24.2	0.5
3	P1	20.1	-0.3
3	P2	19.3	-0.2
3	P3	25.0	-0.5
3	P4	24.4	-0.4
4	P1	20.3	-0.2
4	P2	19.0	0.3
4	P3	25.1	-0.2
4	P4	24.2	-0.3
5	P1	20.3	0.0
5	P2	19.0	0.5

5	P3	25.1	0.7
5	P4	24.0	0.3
6	P1	20.5	0.0
6	P2	19.2	0.1
6	P3	25.1	0.8
6	P4	24.2	0.1
7	P1	20.2	-0.4
7	P2	19.2	0.6
7	P3	24.9	0.5
7	P4	24.0	0.0
8	P1	20.2	-0.1
8	P2	19.3	0.4
8	P3	25.2	-0.3
8	P4	24.3	0.2
9	P1	20.0	0.7
9	P2	19.3	0.5
9	P3	24.7	0.5
9	P4	24.5	0.3
10	P1	20.2	1.0
10	P2	19.6	0.4
10	P3	25.1	0.3
10	P4	24.3	0.1

Shell

	mOhm values	Actual	Delta
Board	**Position**	**Initial**	**1250 Cycles**
1	P1	5.2	-1.0
1	P2	5.2	-1.1
2	P1	4.8	-0.2
2	P2	4.8	-0.3
3	P1	5.0	0.2
3	P2	4.8	-0.4
4	P1	5.3	2.0
4	P2	5.1	2.1
5	P1	5.1	-0.7
5	P2	5.1	-0.7
6	P1	5.5	-1.2
6	P2	5.3	-1.0
7	P1	5.0	3.9
7	P2	5.1	3.4
8	P1	5.2	-0.9
8	P2	5.2	-1.0
9	P1	5.3	3.7
9	P2	5.2	3.4
10	P1	5.2	-1.0
10	P2	5.2	-0.9

Seq6
Contact

	mOhm values	Actual	Delta
Board	Position	Initial	1500 Cycles
1	P1	20.4	0.5
1	P2	19.3	0.7
1	P3	25.0	0.3
1	P4	24.4	0.2
2	P1	20.2	-0.1
2	P2	19.6	-0.3
2	P3	25.1	-0.3
2	P4	24.2	0.0
3	P1	20.3	-0.1
3	P2	19.4	-0.1
3	P3	25.1	-0.1
3	P4	24.5	-0.4
4	P1	20.4	-0.3
4	P2	19.3	0.1
4	P3	25.1	-0.3
4	P4	24.1	-0.1
5	P1	20.2	-0.2
5	P2	19.4	0.3
5	P3	25.0	-0.1
5	P4	24.2	-0.1
6	P1	20.3	0.1
6	P2	19.5	0.5
6	P3	24.9	1.7
6	P4	24.1	0.9
7	P1	20.3	0.3
7	P2	19.3	0.3
7	P3	24.9	0.9
7	P4	24.4	0.1
8	P1	20.4	0.9
8	P2	19.2	0.1
8	P3	25.0	1.3
8	P4	24.3	0.5
9	P1	20.2	0.6
9	P2	19.5	-0.3
9	P3	24.9	1.4
9	P4	24.4	0.0
10	P1	20.4	0.4
10	P2	19.6	-0.2
10	P3	25.1	2.3
10	P4	24.2	0.1

Shell

	mOhm values	Actual	Delta
Board	Position	Initial	1500 Cycles
1	P1	5.4	-1.0
1	P2	5.3	-1.0
2	P1	5.1	-0.8
2	P2	5.2	-1.0
3	P1	5.2	2.7
3	P2	5.0	2.8
4	P1	5.0	-0.7
4	P2	5.2	-1.0
5	P1	5.2	-0.8
5	P2	5.0	-0.6
6	P1	5.0	2.6
6	P2	5.2	2.4
7	P1	5.1	-0.9
7	P2	5.0	-0.8
8	P1	5.3	2.0
8	P2	5.3	1.6
9	P1	5.1	3.1
9	P2	5.2	1.6
10	P1	5.0	0.9
10	P2	4.9	2.1

EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: HZ-MO-03
Description: Micro-ohmmeter
Manufacturer: Keithley
Model: 580
Serial #: 297288
Accuracy: Last Cal: 2009-7-22, Next Cal: 2010-7-21

Equipment #: HZ-TCT-02
Description: Mating-Un\mating analyzer
Manufacturer: SA PRECISION INSTRUMENTS
Model: 1220S
Serial #: 200620
Accuracy: Last Cal: 2009-12-14, Next Cal: 2010-12-13