



Project Number: Design Qualification Test Report		Tracking Code: 138203_Report_Rev_2	
Requested by: James Borgelt		Date: 6/28/2012	Product Rev: 0
Part #: ACP-16-02-H-00.35-T-S-M-1\ACR-16-02-H-00.35-S-S1-M-1		Lot #: N/A	Tech: Aaron McKim Eng: Eric Mings
Part description: ACP\ACR			Qty to test: 4
Test Start: 04/25/2011	Test Completed: 05/12/2011		



Design Qualification Test Report

**ACP-16-02-H-00.35-T-S-M-1
ACR-16-02-H-00.35-S-S1-M-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.

All contents contained herein are the property of Samtec. No portion of this report, in part or in full shall be reproduced without prior written approval of Samtec.

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) Samtec Test PCBs used: PCB-103219-TST-XX

FLOWCHARTS**Mechanical Shock / Vibration / LLCR**

TEST STEP	GROUP A1 4 Assemblies
01	LLCR-1
02	Shock
03	Vibration
04	LLCR-2

Mechanical Shock = EIA 364-27 Half Sine,

100 g's, 6 milliSeconds (Condition "C") each axis

Vibration = EIA 364-28, Random Vibration

7.56 g RMS, Condition VB -- 2 hours/axis

LLCR = EIA-364-23, LLCR

20 mV Max, 100 mA Max

Use Keithley 580 or 3706 in 4 wire dry circuit mode

Shock / Vibration / nanoSecond Event Detection

TEST STEP	GROUP A1 4 Assemblies or 60 Points
01	Event Detection, Shock
02	Event Detection, Vibration

Mechanical Shock = EIA 364-27 Half Sine,

100 g's, 6 milliSeconds (Condition "C") each axis

Vibration = EIA 364-28, Random Vibration

7.56 g RMS, Condition VB -- 2 hours/axis

Event detection requirement during Shock / Vibration is 50 nanoseconds minimum

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

MECHANICAL SHOCK (Specified Pulse):

- 1) Reference document: EIA-364-27, *Mechanical Shock Test Procedure for Electrical Connectors*
- 2) Test Condition C
- 3) Peak Value: 100 G
- 4) Duration: 6 Milliseconds
- 5) Wave Form: Half Sine
- 6) Velocity: 12.3 ft/s
- 7) Number of Shocks: 3 Shocks / Direction, 3 Axis (18 Total)

VIBRATION:

- 1) Reference document: EIA-364-28, *Vibration Test Procedure for Electrical Connectors*
- 2) Test Condition V, Letter B
- 3) Power Spectral Density: 0.04 G² / Hz
- 4) G 'RMS': 7.56
- 5) Frequency: 50 to 2000 Hz
- 6) Duration: 2.0 Hours per axis (3 axis total)

NANOSECOND-EVENT DETECTION:

- 1) Reference document: EIA-364-87, *Nanosecond-Event Detection for Electrical Connectors*
- 2) Prior to test, the samples were characterized to assure the low nanosecond event being monitored will trigger the detector.
- 3) After characterization it was determined the test samples could be monitored for 50 nanosecond events

LLCR:

- 1) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
- 2) 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

RESULTS

LLCR Mechanical Shock & Vibration (80 LLCR test points)

- **Initial**----- 48.50 mOhms Max
- **After Shock& Vibration**
 - **<= +5.0 mOhms**----- 78 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

Mechanical Shock & Random Vibration:

- **Shock**
 - **No Damage**----- Passed
 - **50 Nanoseconds**----- Passed
- **Vibration**
 - **No Damage**----- Passed
 - **50 Nanoseconds**----- Passed

DATA SUMMARIES

LLCR Shock/Vibration:

- 1) A total of 80 points were measured.
- 2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
- 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

Date	2011-4-25	2011-5-12
Room Temp C	22	23
RH	47%	53%
Name	Aaron McKim	Aaron McKim
mOhm values	Actual Initial	Delta Shock / Vibe
Average	45.1	0.1
St. Dev.	0.7	1.1
Min	43.9	-2.7
Max	48.5	6.8
Count	80	80

How many samples are being tested?	<u>4</u>
How many contacts are on each board?	<u>20</u>

	Stable	Minor	Acceptable	Marginal	Unstable	Open
Shock / Vibe	78	2	0	0	0	0

Event Detection:

Shock and Vibration Event Detection Summary	
Contacts tested	60
Test Condition	C, 100g's, 6ms, Half-Sine
Shock Events	0
Test Condition	V-B, 7.56 rms g
Vibration Events	0
Total Events	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 #: SVC-01**Description:** Shock & Vibration Table**Manufacturer:** Data Physics**Model:** LE-DSA-10-20K**Serial #:** 10037**Accuracy:** See Manual

... Last Cal: 11/31/2010, Next Cal: 11/31/2011

Equipment #: ED-03**Description:** Event Detector**Manufacturer:** Analysis Tech**Model:** 32EHD**Serial #:** 1100604**Accuracy:** See Manual

... Last Cal: 06/04/2010, Next Cal: 06/04/2011

Equipment #: ACLM-01**Description:** Accelerometer**Manufacturer:** PCB Piezotronics**Model:** 352C03**Serial #:** 115819**Accuracy:** See Manual

... Last Cal: 07/09/2010, Next Cal: 07/09/2011