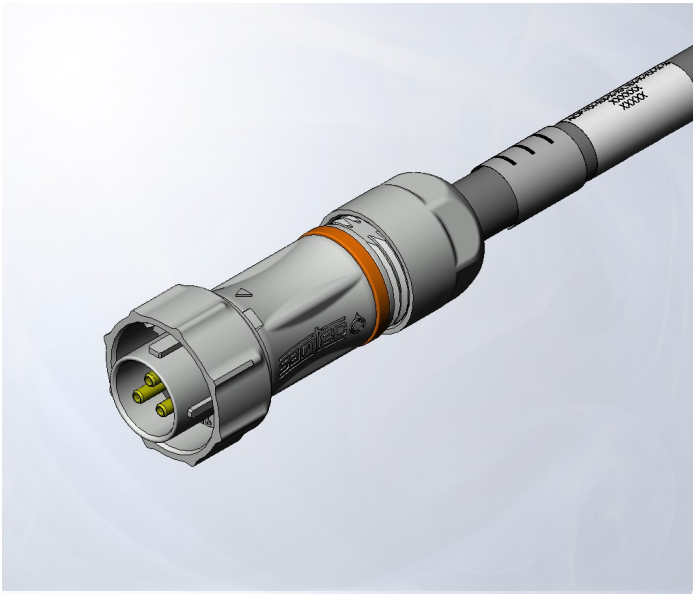
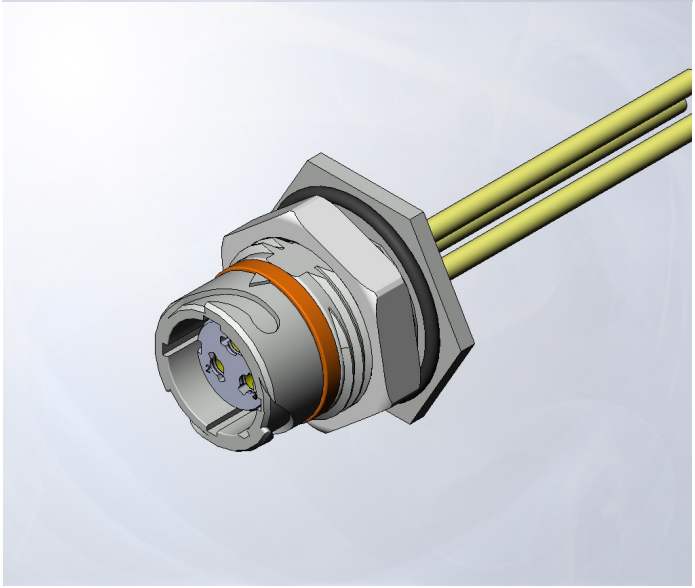
Project Number: Design Qualification Test Report	Tracking Code: 197438_Report_Rev_1		
Requested by: James Borgelt	Date: 5/7/2012	Product Rev: B	
Part #: ACP-16-04-H-00.35-T-S-M-3/ACR-16-04-H-00.35-S-S1-M-3	Lot #: N/A	Tech: Tony Wagoner	Eng: Eric Mings
Part description: ACP/ACR		Qty to test: 8	
Test Start: 5/11/2012	Test Completed: 6/01/2012		





Design Qualification Test Report

ACP-16-04-H-00.35-T-S-M-3

ACR-16-04-H-00.35-S-S1-M-3

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: 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 8 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 G^2 / 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) <= +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 – 24 AWG (16 LLCR test points)

- **Initial ---------- 50.08 mOhms Max**
- **After Shock& Vibration**
  - **<= +5.0 mOhms---------- 16 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**

LLCR Mechanical Shock & Vibration – RF Signal (16 LLCR test points)

- **Initial ---------- 159.78 mOhms Max**
- **After Shock& Vibration**
  - **<= +5.0 mOhms---------- 16 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**

LLCR Mechanical Shock & Vibration - Ground (16 LLCR test points)

- **Initial ---------- 18.31 mOhms Max**
- **After Shock& Vibration**
  - **<= +5.0 mOhms---------- 16 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**

Mechanical Shock & Random Vibration:

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

DATA SUMMARIES

LLCR Shock/Vibration - Power:

1) A total of 48 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) <= +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	5/25/2012	5/29/2012		
Room Temp (Deg C)	21	22		
Rel Humidity (%)	43	46		
Technician	Tony Wagoner	Tony Wagoner		
mOhm values	**Actual Initial**	**Delta Shock-Vib**	**Delta**	**Delta**
	Pin Type 1: 24 AWG			
Average	48.63	0.17		
St. Dev.	0.83	0.07		
Min	47.48	0.05		
Max	50.08	0.31		
Summary Count	16	16		
Total Count	16	16		
	Pin Type 2: RF Signal			
Average	154.92	0.19		
St. Dev.	2.21	0.20		
Min	151.63	0.00		
Max	159.78	0.88		
Summary Count	16	16		
Total Count	16	16		
	Pin Type 3: Ground			
Average	17.99	0.12		
St. Dev.	0.20	0.09		
Min	17.66	0.00		
Max	18.31	0.29		
Summary Count	16	16		
Total Count	16	16		

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
Shock-Vib	**48**	**0**	**0**	**0**	**0**	**0**

DATA SUMMARIES

Mechanical Shock & Random Vibration/Event Detection

Shock and Vibration Event Detection Summary	
Contacts tested	24
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: 03/27/2012, Next Cal: 03/27/2013

Equipment #: SVC-01
Description: Shock & Vibration Table
Manufacturer: Data Physics
Model: LE-DSA-10-20K
Serial #: 10037
Accuracy: See Manual
… Last Cal: 06/23/2012, Next Cal: 12/20/2012

Equipment #: ED-03
Description: Event Detector
Manufacturer: Analysis Tech
Model: 32EHD
Serial #: 1100604
Accuracy: See Manual
… Last Cal: 07/14/2011, Next Cal: 07/14/2012

Equipment #: ACLM-01
Description: Accelerometer
Manufacturer: PCB Piezotronics
Model: 352C03
Serial #: 115819
Accuracy: See Manual
… Last Cal: 07/27/2011, Next Cal: 07/27/2012