MARCH 20, 2007

TEST REPORT #207036, REVISION 1.1

QUALIFICATION TESTING

PART NUMBER

HDAF-23-18.0-S-13.2
HDAM-23-17.0-S-13.2

SAMTEC, INC.

APPROVED BY: THOMAS PEEL
PRESIDENT AND
DIRECTOR OF TEST PROGRAM DEVELOPMENT
CONTECH RESEARCH, INC.

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An Independent Test and Research Laboratory

REVISION HISTORY

DATE	REV. NO.	DESCRIPTION	ENG.
3/19/2007	1.0	Initial Issue	TP
3/21/2007	1.1	Revised part number per the test sponsor.	TP
		Included FA on sample ID# C-A-5	TP

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CERTIFICATION

This is to certify that the evaluation described herein was designed and executed by personnel of Contech Research, Inc. It was performed with the concurrence of Samtec, Inc. of New Albany, IN who was the test sponsor.

All equipment and measuring instruments used during testing were calibrated and traceable to NIST according to ISO 10012-1 and ANSI/NCSL Z540-1, as applicable.

All data, raw and summarized, analysis and conclusions presented herein are the property of the test sponsor. No copy of this report, except in full, shall be forwarded to any agency, customer, etc., without the written approval of the test sponsor and Contech Research.

Thomas Peel
President and
Director of Test Program Development
Contech Research, Inc.

TP:cm

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SCOPE

To perform qualification retesting on the HDAF/HDAM Connector Series as manufactured and submitted by the test sponsor Samtec, Inc.

APPLICABLE DOCUMENTS

1. Unless otherwise specified, the following documents of issue in effect at the time of testing performed form a part of this report to the extent as specified herein. The requirements of sub-tier specifications and/or standards apply only when specifically referenced in this report.
2. Samtec Specifications:
3. Standards: EIA Publication 364

TEST SAMPLES AND PREPARATION

1. The following test samples were submitted by the test sponsor, Samtec, Inc., for the evaluation to be performed by Contech Research, Inc.

Description	Part Number
a) Receptacle Connector	HDAF-23-18.0-S-13.2
b) Plug Connector	HDAM-23-17.0-S-13.2

2. Test samples were supplied assembled and terminated to test boards by the test sponsor. Specific test boards were designed for the following tests:
    - IR/DWV
    - LLCR
3. The test samples were tested in their ‘as received’ condition.
4. Unless otherwise specified in the test procedures used, no further preparation was used.

TEST SELECTION

1. See Test Plan Flow Diagram, Figure #1, for test sequences used.
2. Test set ups and/or procedures which are standard or common are not detailed or documented herein provided they are certified as being performed in accordance with the applicable (industry or military) test methods, standards and/or drawings as specified in the detail specification.

SAMPLE CODING

1. All samples were coded. Mated test samples remained with each other throughout the test group/sequences for which they were designated. Coding was performed in a manner which remained legible for the test duration.

2. The test samples were coded in the following manner:

   Sequence A : Group A - A-A-1,A-A-2,A-A-3,A-A-4
   : Group B1 - A-B1-1,A-B1-2
   : Group B2 - A-B2-1,A-B2-2
   : Group B3 - A-B3-1,A-B3-2

   Sequence B : Group A - B-A-1,B-A-2,B-A-3,B-A-4,B-A-5,
   B-A-6,B-A-7,B-A-8

   Sequence C : Group A - C-A-1,C-A-2,C-A-3,C-A-4,C-A-5,
   C-A-6,C-A-7,C-A-8

Sample ID Key

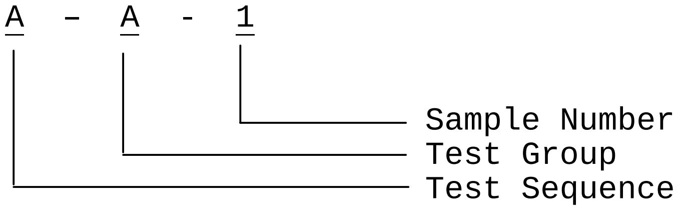
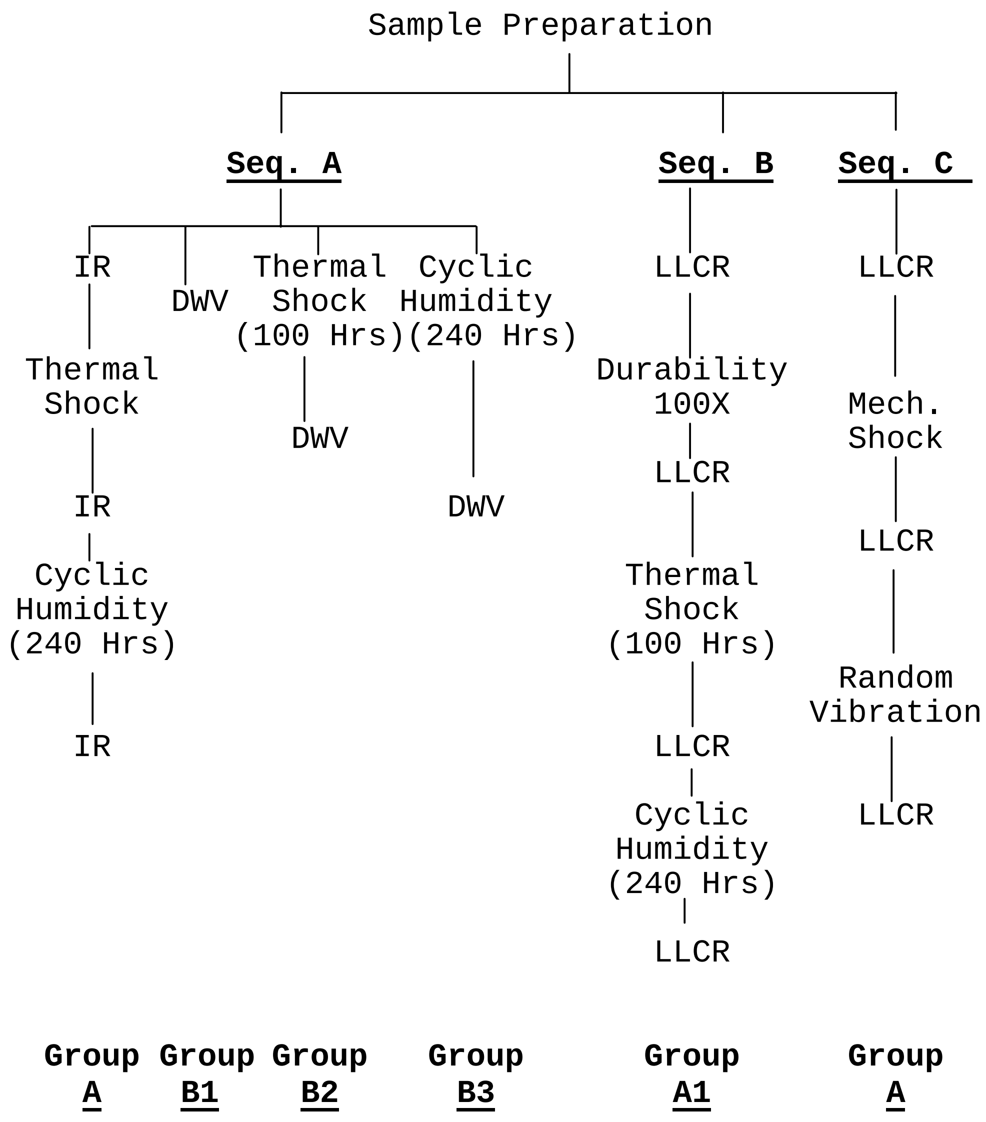


FIGURE #1

TEST PLAN FLOW DIAGRAM



IR : Insulation Resistance
DWV : Dielectric Withstanding Voltage
LLCR : Low Level Circuit Resistance

DATA SUMMARY

TEST	**REQUIREMENT**	**RESULTS**
SEQUENCE A		
Group A		
INSULATION RESISTANCE	1000 MEGOHMS MIN.	>50,000 MEGOHMS
THERMAL SHOCK	NO DAMAGE	PASSED
INSULATION RESISTANCE	1000 MEGOHMS MIN.	>50,000 MEGOHMS
HUMIDITY	NO DAMAGE	PASSED
INSULATION RESISTANCE	1000 MEGOHMS MIN.	>1850 MEGOHMS
GROUP B1		
DWV	900 VAC	PASSED
GROUP B2		
THERMAL SHOCK	NO DAMAGE	PASSED
DWV	900 VAC	PASSED
GROUP 3B		
HUMIDITY	NO DAMAGE	PASSED
DWV	900 VAC	PASSED
SEQUENCE B		
GROUP A		
LLCR	RECORD	27.1 mΩ MAX.
DURABILITY	NO DAMAGE	PASSED
LLCR	+10.0 mΩ MAX.CHG.	+4.4 mΩ MAX.CHG.
THERMAL SHOCK	NO DAMAGE	PASSED
LLCR	+10.0 mΩ MAX.CHG.	+6.0 mΩ MAX.CHG.
CYCLIC HUMIDITY	NO DAMAGE	PASSED
LLCR	+10.0 mΩ MAX.CHG.	+8.0 mΩ MAX.CHG.

DATA SUMMARY - Continued

SEQUENCE C

Group A

TEST	REQUIREMENT	RESULTS
LLCR	RECORD	26.2 mΩ MAX.
MECHANICAL SHOCK	NO DAMAGE	PASSED
LLCR	+10.0 mΩ MAX.CHG.	+6.3 mΩ MAX.CHG.
RANDOM VIBRATION	NO DAMAGE	PASSED
LLCR*	+10.0 mΩ MAX.CHG.	+5.8 mΩ MAX.CHG.

* An LLCR Open was recorded at position 24 within sample ID# C-A-5 following Random Vibration testing. Analysis by the test sponser revealed a damaged solder joint as the cause of the Open.

EQUIPMENT LIST

ID#	Next Cal	Last Cal	Equipment Name	Manufacturer	Model #	Serial #	Accuracy	Freq.Cal
27			Temp. Humid. Chamber	Blue M Co.	FR-256PC-1	F2-249	See Cal Cert	Ea Test
52			Drill Press Stand	Craftsman	25921	4001-2	N/A	N/A
192	3/6/2008	3/6/2007	Vertical Thermal Shock	Cincinnati Sub-Zero	VTS-1-5-3	88-11094	See Cal Cert	12mon
321	3/7/2008	3/7/2007	AC-DC Hipot/Megometer	Hipotronics Co.	H300B	DS16-201	See Cal Cert	12 mon.
466	7/20/2007	7/20/2006	Precision Resistor	Victoreen Co.	50,000 mego	N/A	± 1 %	12 mon.
488			X-Y Table	N.E.Affiliated Tech.	N/A	932021	N/A	N/A
553	1/8/2008	1/8/2007	12 channel Power Unit	PCB Co.	483A	1303	See Cal Cert	12mon
601			Computer	A.M.I.	P111-450	082714	N/A	N/A
684	7/10/2007	7/10/2006	Accelerometer	PCB. Co.	353B04	47648	See Cal Cert.	12mon
1166	8/10/2007	8/10/2006	Sine/Rndm Vib Control Digitizer	Hewlett Packard	E1432A	US39342279	See Cal Cert	12mon
1167			Interface	Hewlett Packard	E8491B	US390100753	N/A	N/A
1168			Mainframe	Hewlett Packard	E8408A	US39000357	N/A	N/A
1169			Computer	ARC	PC133	none	N/A	N/A
1239			Bench Oven	Blue M.	ESP400C-5	ESP-1229	See Manual	Ea Test
1271			Amplifier	Unholtz Dickie	SA15	3483	See Manual	N/A
1272			Shaker Table	Unholtz Dickie	S202PB	263	N/A	N/A
1278	8/1/2007	8/1/2006	Microohm mtr	Keithley	580	0803947	See Manual	12 mon.
1314	1/24/2008	1/24/2007	Multiplexer card	Keithley Co.	7708	0862544	See CERT	12mon
1315	1/24/2008	1/24/2007	Data Aquisition Multimeter	Keithley Co.	2700	0862680	See CERT	12mon
1361	1/24/2008	1/24/2007	Multiplexer Card	Keithley	7708	1067661	See Cal Cert	12mon
1465			Immersion Tube	Contech	1 Meter	N/A	N/A	N/A

TEST RESULTS

SEQUENCE A

Group A

PROJECT NO.: 207036 SPECIFICATION: TC076-1260

PART NO.: HDAF-23-18.0-S-13.2 PART DESCRIPTION: HDAF/HDAM
HDAM-23-17.0-S-13.2

SAMPLE SIZE: 2 Samples TECHNICIAN: BE

START DATE: 2/20/07 COMPLETE DATE: 2/20/07

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 20%

EQUIPMENT ID#: 321, 466, 1465

INSULATION RESISTANCE(IR)

PURPOSE:

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.

PROCEDURE:

1. The test was performed in accordance with EIA 364, Test Procedure 21.

2. Test Conditions:

   a) Between Adjacent Contacts : Yes
   b) Between Rows : Yes
   c) Mated Condition : Mated
   d) Mounting Condition : Mounted
   e) Electrification Time : 2.0 Minutes
   f) Test Voltage : 500 VDC

3. The test voltage was applied to designated test points on the board.

REQUIREMENTS:

When the specified test voltage is applied, the insulation resistance shall not be less than 1,000 megohms.

RESULTS:

The insulation resistance exceeded 50,000 megohms.

PROJECT NO.: 207036 SPECIFICATION: TC076-1260

PART NO.: HDAF-23-18.0-S-13.2 PART DESCRIPTION: HDAF/HDAM
HDAM-23-17.0-S-13.2

SAMPLE SIZE: 2 Samples TECHNICIAN: BE

START DATE: 2/23/07 COMPLETE DATE: 2/23/07

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 23%

EQUIPMENT ID#: 192, 321, 466, 1314, 1315, 1361, 1465

THERMAL SHOCK

PURPOSE:

To determine the resistance of a given electrical connector to exposure at extremes of high and low temperatures and the shock of alternate exposures to these extremes, simulating the worst probable conditions of storage, transportation and application.

PROCEDURE:

1. The test environment was performed in accordance with EIA 364, Test Procedure 32, with the following conditions:

2. Test Conditions:
   a) Number of Cycles : 100 Cycles
   b) Hot Extreme : +85 +3°C/-0°C
   c) Cold Extreme : -55 +0°C/-3°C
   d) Time at Temperature : 30 Minutes
   e) Mating Conditions : Mated
   f) Mounting Conditions : Mounted
   g) Transfer Time : Instantaneous

3. The total number of cycles was performed continuously.

4. Prior to performing variable measurements, the test samples were allowed to recover to room ambient conditions.

5. All subsequent variable testing was performed in accordance with the procedures previously indicated.

REQUIREMENTS: See next page.

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REQUIREMENTS:

1. There shall be no evidence of physical damage or deterioration of the test samples so exposed.
2. The insulation resistance shall exceed 1,000 megohms.

RESULTS:

1. There was no evidence of visual or physical damage to the test samples as tested.
2. The insulation resistance exceeded 50,000 megohms.

PROJECT NO.: 207036 SPECIFICATION: TC076-1260

PART NO.: HDAF-23-18.0-S-13.2 PART DESCRIPTION: HDAF/HDAM
HDAM-23-17.0-S-13.2

SAMPLE SIZE: 2 Samples TECHNICIAN: BE

START DATE: 3/1/07 COMPLETE DATE: 3/12/07

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 20%

EQUIPMENT ID#: 27, 321, 466, 1465

HUMIDITY (THERMAL CYCLING)

PURPOSE:

1. The purpose of this test is to permit evaluation of the properties of materials used in connectors as they are influenced or deteriorated by the effects of high humidity and heat conditions. Measurements made under high humidity conditions may reflect the peculiar conditions under which the readings were made, and should be compared only to initial readings when careful analysis indicates that such a comparison is valid and applicable.

2. This test obtains added effectiveness in employment of temperature cycling that provides a breathing action, inducing corrosion processes, and the introduction of moisture into partially sealed test samples. This condition imposes a vapor pressure on the samples which constitutes the major force behind the moisture migration and penetration.

PROCEDURE:

1. The test environment was performed in accordance with EIA 364, Test Procedure 31, Method III (omit Step 7a, 7b) with the following conditions:

2. Test Conditions:

   a) Preconditioning : 50°C, 24 hours
   b) Relative Humidity : 90% to 95%
   c) Temperature Conditions : 25°C to 65°C
   d) Cold Cycle : No
   e) Polarizing Voltage : No
   f) Mating Conditions : Mated
   g) Mounting Conditions : Mounted
   h) Duration : 240 hours

PROCEDURE – Continued

3. All subsequent variable testing was performed in accordance with the procedures previously indicated.

4. Prior to performing variable measurements, the test samples were allowed to recover to room ambient conditions.

REQUIREMENTS:

1. There shall be no evidence of physical deterioration of the test samples as tested.

2. The final insulation resistance shall not be less than 1,000 megohms.

RESULTS:

1. The test samples as tested showed no evidence of physical deterioration.

2. The final insulation resistance exceeded 1,850 megohms when measured at high humidity.

TEST RESULTS

SEQUENCE A

Group B1

PROJECT NO.: 207036 SPECIFICATION: TC076-1260

PART NO.: HDAF-23-18.0-S-13.2 PART DESCRIPTION: HDAF/HDAM
HDAM-23-17.0-S-13.2

SAMPLE SIZE: 2 Samples TECHNICIAN: SR

START DATE: 2/20/07 COMPLETE DATE: 2/20/07

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 20%

EQUIPMENT ID#: 321

DIELECTRIC WITHSTANDING VOLTAGE (SEA LEVEL)

PURPOSE:

To determine if the connectors can operate at its rated voltage and withstand momentary overpotentials due to switching, surges and other similar phenomenon.

PROCEDURE:

1. The test was performed in accordance with EIA 364, Test Procedure 20.
2. Test Conditions:
    a) Between Adjacent Contacts : Yes
    b) Between Rows : Yes
    c) Mated Condition : Unmated
    d) Mounting Condition : Mounted
    e) Hold Time : 60 Seconds
    f) Rate of Application : 500 volts/sec.
    g) Test Voltage : 900 VAC
3. The voltage was applied to specific test points on the board.

REQUIREMENTS:

When the specified test voltage is applied, there shall be no evidence of breakdown, arcing, etc.

RESULTS:

All test samples as tested met the requirements as specified.

TEST RESULTS

SEQUENCE A

Group B2

PROJECT NO.: 207036 SPECIFICATION: TC076-1260

PART NO.: HDAF-23-18.0-S-13.2 PART DESCRIPTION: HDAF/HDAM
HDAM-23-17.0-S-13.2

SAMPLE SIZE: 2 Samples TECHNICIAN: BE

START DATE: 2/23/07 COMPLETE DATE: 2/27/07

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 22%

EQUIPMENT ID#: 192, 321, 1314, 1315, 1361

THERMAL SHOCK

PURPOSE:

To determine the resistance of a given electrical connector to exposure at extremes of high and low temperatures and the shock of alternate exposures to these extremes, simulating the worst probable conditions of storage, transportation and application.

PROCEDURE:

1. The test environment was performed in accordance with EIA 364, Test Procedure 32, with the following conditions:

2. Test Conditions:

    a) Number of Cycles : 100 Cycles
    b) Hot Extreme : +85 +3°C/-0°C
    c) Cold Extreme : -55 +0°C/-3°C
    d) Time at Temperature : 30 Minutes
    e) Mating Conditions : Mated
    f) Mounting Conditions : Mounted
    g) Transfer Time : Instantaneous

3. The total number of cycles was performed continuously.

4. All subsequent variable testing was performed in accordance with the procedures as previously indicated.

5. Prior to performing variable measurements, the test samples were allowed to recover to room ambient conditions.

REQUIREMENTS: See next page.

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REQUIREMENTS:

1. There shall be no evidence of physical damage to the test samples as tested.

2. When a 900 VAC test voltage is applied, there shall be no evidence of arcing, breakdown, etc.

RESULTS:

1. There was evidence of physical damage to the test samples as tested.

2. There was no evidence of arcing, breakdown, etc., when a 900 VAC voltage was applied except for Sample ID# A-B2-2.

3. Following discussions with the test sponsor, the sample was unmated and the receptacle connector retested. There was no evidence of arcing, breakdown, etc., when a 900 voltage was applied.

TEST RESULTS

SEQUENCE A

Group B3

PROJECT NO.: 207036 SPECIFICATION: TC076-1260

PART NO.: HDAF-23-18.0-S-13.2 PART DESCRIPTION: HDAF/HDAM
HDAM-23-17.0-S-13.2

SAMPLE SIZE: 2 Samples TECHNICIAN: BE

START DATE: 3/1/07 COMPLETE DATE: 3/12/07

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 20%

EQUIPMENT ID#: 27, 321, 1239

HUMIDITY (THERMAL CYCLING)

PURPOSE:

1. The purpose of this test is to permit evaluation of the properties of materials used in connectors as they are influenced or deteriorated by the effects of high humidity and heat conditions. Measurements made under high humidity conditions may reflect the peculiar conditions under which the readings were made, and should be compared only to initial readings when careful analysis indicates that such a comparison is valid and applicable.

2. This test obtains added effectiveness in employment of temperature cycling that provides a breathing action, inducing corrosion processes, and the introduction of moisture into partially sealed test samples. This condition imposes a vapor pressure on the samples which constitutes the major force behind the moisture migration and penetration.

PROCEDURE:

1. The test environment was performed in accordance with EIA 364, Test Procedure 31 Method III (omit Step 7a,7b), with the following conditions:

2. Test Conditions:

a) Relative Humidity	:	90% to 95%
b) Temperature Conditions	:	25°C to 65°C
c) Cold Cycle	:	No
d) Polarizing Voltage	:	No
e) Mating Conditions	:	Mated
f) Mounting Conditions	:	Mounted
g) Duration	:	240 hours

PROCEDURE: -continued

3. The final dielectric withstanding voltage test was performed in accordance with EIA 364, Test Procedure 20 and the procedures as previously indicated. Testing was performed on the receptacle connector in the unmated condition.

4. The voltage was applied to specific test points on the board.

REQUIREMENTS:

1. There shall be no evidence of physical deterioration of the test samples as tested.

2. There shall be no evidence of arcing or breakdown when a 900 VAC test voltage is applied.

RESULTS:

1. The test samples as tested showed no evidence of physical deterioration.

2. There was evidence of breakdown, arcing, etc., when a was applied.

TEST RESULTS

SEQUENCE B

Group A

PROJECT NO.: 207036 SPECIFICATION: TC076-1260

PART NO.: HDAF-23-18.0-S-13.2 PART DESCRIPTION: HDAF/HDAM
HDAM-23-17.0-S-13.2

SAMPLE SIZE: 8 Samples TECHNICIAN: BE

START DATE: 2/20/07 COMPLETE DATE: 2/20/07

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 20%

EQUIPMENT ID#: 601, 1278

LOW LEVEL CIRCUIT RESISTANCE (LLCR)

PURPOSE:

1. To evaluate contact resistance characteristics of the contact systems under conditions where applied voltages and currents do not alter the physical contact interface and will detect oxides and films which degrade electrical stability. It is also sensitive to and may detect the presence of fretting corrosion induced by mechanical or thermal environments as well as any significant loss of contact pressure.

2. This attribute was monitored after each preconditioning and/or test exposure in order to determine said stability of the contact systems as they progress through the applicable test sequences.

3. The electrical stability of the system is determined by comparing the initial resistance value to that observed after a given test exposure. The difference is the change in resistance occurring whose magnitude establishes the stability of the interface being evaluated.

PROCEDURE:

1. The test was performed in accordance with EIA 364, Test Procedure 23, with the following conditions:

2. Test Conditions:

   a) Test Current : 10 milliamps
   b) Open Circuit Voltage : 20 millivolts

PROCEDURE -continued:

3. The points of application are shown in Figure #2.

REQUIREMENTS:

Low level circuit resistance shall be measured and recorded.

RESULTS:

1. The following is a summary of the data observed:

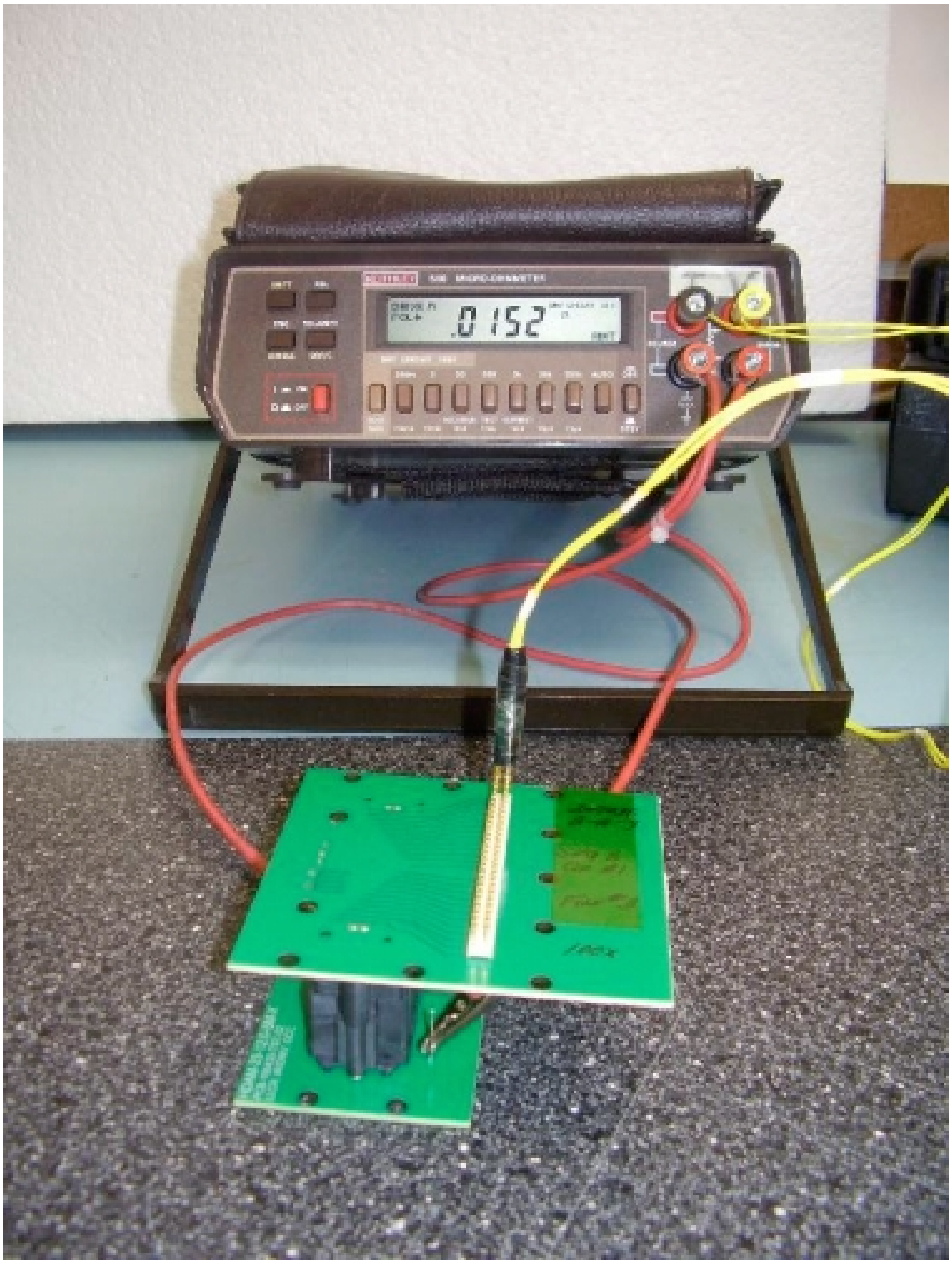
LOW LEVEL CIRCUIT RESISTANCE
(Milliohms)

Sample ID#	Avg.	Max.	Min.
B-A1-1	13.6	18.5	10.2
B-A1-2	14.1	27.1	10.0
B-A1-3	14.2	19.0	9.9
B-A1-4	13.6	17.5	9.9
B-A1-5	13.3	17.6	9.6
B-A1-6	14.7	20.9	10.5
B-A1-7	13.6	17.9	9.5
B-A1-8	13.6	16.9	10.2

2. See data files 20703601 through 20703608 for individual data points.

FIGURE #2

TYPICAL LLCR SET UP



PROJECT NO.: 207036 SPECIFICATION: TC076-1260

PART NO.: HDAF-23-18.0-S-13.2 PART DESCRIPTION: HDAF/HDAM
HDAM-23-17.0-S-13.2

SAMPLE SIZE: 8 Samples TECHNICIAN: BE

START DATE: 2/22/07 COMPLETE DATE: 2/22/07

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 22%

EQUIPMENT ID#: 52, 488, 601, 1278

DURABILITY

PURPOSE:

1. This is a preconditioning sequence which is used to induce the type of wear on the contacting surfaces which may occur under normal service conditions. The connectors are mated and unmated a predetermined number of cycles. Upon completion, the units being evaluated are exposed to the environments as specified to assess any impact on electrical stability resulting from wear or other wear dependent phenomenon.

2. This type or preconditioning sequence is also used to mechanically stress the connector system as would normally occur in actual service. This sequence in conjunction with other tests is used to determine if a significant loss of contact pressure occurs from said stresses which in turn, may result in an unstable electrical condition to exist.

PROCEDURE:

1. The test was performed in accordance with EIA 364, Test Procedure 09.

2. Test Conditions:

   a) No. of Cycles : 100
   b) Rate : 500 Cycles/Hr

3. The test samples were assembled to special holding devices and attached to the manual cycling equipment.

PROCEDURE: -continued

4. Care was taken to prevent the mating faces of the test samples from contacting each other.

5. All subsequent variable testing was performed in accordance with the procedures previously indicated.

REQUIREMENTS:

1. There shall be no evidence of physical damage to the test samples so tested.

2. The change in low level circuit resistance shall not exceed +10.0 milliohms.

RESULTS:

1. There was no evidence of physical damage to the test samples as tested.

2. The following is a summary of the data observed:

CHANGE IN
LOW LEVEL CIRCUIT RESISTANCE
(Milliohms)

Sample ID#	Avg. Change	Max. Change
B-A1-1	+0.4	+3.4
B-A1-2	-0.4	+3.4
B-A1-3	+0.2	+4.1
B-A1-4	-0.3	+2.1
B-A1-5	+0.4	+4.4
B-A1-6	-0.2	+2.7
B-A1-7	+0.1	+3.2
B-A1-8	+0.3	+3.5

3. See data files 20703601 through 20703608 for individual data points.

PROJECT NO.: 207036 SPECIFICATION: TC076-1260

PART NO.: HDAF-23-18.0-S-13.2 PART DESCRIPTION: HDAF/HDAM
HDAM-23-17.0-S-13.2

SAMPLE SIZE: 8 Samples TECHNICIAN: BE

START DATE: 2/23/07 COMPLETE DATE: 2/27/07

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 22%

EQUIPMENT ID#: 192, 601, 1278

THERMAL SHOCK

PURPOSE:

To determine the resistance of a given electrical connector to exposure at extremes of high and low temperatures and the shock of alternate exposures to these extremes, simulating the worst probable conditions of storage, transportation and application.

PROCEDURE:

1. The test environment was performed in accordance with EIA 364, Test Procedure 32, with the following conditions:

2. Test Conditions:

a) Number of Cycles	:	100 Cycles
b) Hot Extreme	:	+85 +3°C/-0°C
c) Cold Extreme	:	-55 +0°C/-3°C
d) Time at Temperature	:	30 Minutes
e) Mating Conditions	:	Mated
f) Mounting Conditions	:	Mounted
g) Transfer Time	:	Instantaneous

3. The total number of cycles were performed continuously.

4. All subsequent variable testing was performed in accordance with the procedures as previously indicated.

4. Prior to performing variable measurements, the test samples were allowed to recover to room ambient conditions.

REQUIREMENTS: See next page.

REQUIREMENTS:

1. There shall be no evidence of physical damage to the test samples as tested.
2. The change in low level circuit resistance shall not exceed +10.0 milliohms.

RESULTS:

1. The following is a summary of the observed data:

CHANGE IN
LOW LEVEL CIRCUIT RESISTANCE
(Milliohms)

Sample ID#	Avg. Change	Max. Change
B-A1-1	+0.7	+4.5
B-A1-2	+1.1	+7.3
B-A1-3	+2.2	+5.7
B-A1-4	+1.3	+4.8
B-A1-5	+2.2	+5.9
B-A1-6	+0.6	+3.9
B-A1-7	+1.7	+5.8
B-A1-8	+1.6	+6.0

2. See data files 20703601 through 20703608 for individual data points.

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PROJECT NO.: 207036 SPECIFICATION: TC076-1260

PART NO.: HDAF-23-18.0-S-13.2 PART DESCRIPTION: HDAF/HDAM
HDAM-23-17.0-S-13.2

SAMPLE SIZE: 8 Samples TECHNICIAN: BE

START DATE: 3/1/07 COMPLETE DATE: 3/12/07

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 25%

EQUIPMENT ID#: 27, 601, 1239, 1278

HUMIDITY (THERMAL CYCLING)

PURPOSE:

To evaluate the impact on electrical stability of the contact system when exposed to any environment which may generate thermal/moisture type failure mechanisms such as:

a) Fretting corrosion due to wear resulting from micromotion, induced by thermal cycling. Humidity accelerates the oxidation process.

b) Oxidation of wear debris or from particulates from the surrounding atmosphere which may have become entrapped between the contacting surfaces.

c) Failure mechanisms resulting from a wet oxidation process.

PROCEDURE:

1. The test environment was performed in accordance with EIA 364, Test Procedure 31, Procedure III with the following conditions:

2. Test Conditions:
    a) Preconditioning : 50°C, 24 Hrs
    b) Relative Humidity : 90% to 95%
    c) Temperature Conditions : 25°C to 65°C
    d) Cold Cycle : No
    e) Polarizing Voltage : No
    f) Mating Conditions : Mated
    g) Mounting Conditions : Mounted
    h) Duration : 240 hours

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PROCEDURE: -continued

3. Prior to performing variable measurements, the test samples were allowed to recover to room ambient conditions.

4. All subsequent variable testing was performed in accordance with the procedures previously indicated.

REQUIREMENTS:

1. There shall be no evidence of physical deterioration of the test samples as tested.

2. The change in low level circuit resistance shall not exceed +10.0 milliohms.

RESULTS:

1. The test samples as tested showed no evidence of physical deterioration.

2. The following is a summary of the data observed:

CHANGE IN
LOW LEVEL CIRCUIT RESISTANCE
(Milliohms)

Sample ID#	Avg. Change	Max. Change
B-A1-1	+1.4	+4.2
B-A1-2	+1.7	+6.6
B-A1-3	+1.9	+7.7
B-A1-4	-0.6	+3.1
B-A1-5	+1.8	+6.2
B-A1-6	+1.3	+6.1
B-A1-7	+1.6	+6.8
B-A1-8	+0.7	+8.0

3. See data files 20703601 through 20703608 for individual data points.

LLCR DATA FILES

DATA FILE NUMBERS

20703601
20703602
20703603
20703604
20703605
20703606
20703607
20703608

		Low Level Contact Resistance				
Project:	207036				Spec: EIA 364 TP 23	
Customer:	Samtec				Subgroup:	Seq b
Product:	Series HDAM/HDAF connector				File #:	20703601
Description:	B-A-1					
Open circuit voltage:		20mv			Current:	10ma
			Delta values			
			units: milliohms			
Temp ºC	23	23	23	23		
R.H. %	20	22	23	25		
Date:	20Feb07	22Feb07	27Feb07	12Mar07		
Pos. ID	Initial	Durability	T-Shock	Humidity		
		100X				
1	13.4	-0.7	0.3	-1.1		
2	11.8	-0.3	1.4	1.1		
3	15.4	-0.2	-0.6	0.2		
4	16.3	-2.7	-1.7	-2.7		
5	18.5	1.2	0.1	0.5		
6	13.1	0.9	2.0	0.9		
7	14.7	2.6	0.8	0.9		
8	12.3	3.2	3.3	3.9		
9	15.0	0.0	1.9	1.6		
10	13.4	-0.4	0.7	0.0		
11	14.1	-1.7	0.8	2.4		
12	10.3	1.0	1.7	3.1		
13	10.7	0.4	0.6	2.6		
14	11.6	-0.1	0.2	2.4		
15	14.4	0.4	0.0	1.1		
16	12.8	0.3	0.8	2.6		
17	13.0	0.6	0.4	2.2		
18	12.3	1.0	3.2	3.1		
19	16.3	0.3	-1.4	2.2		
20	17.2	-2.4	-2.8	-0.8		
21	14.8	1.7	-1.0	-0.6		
22	15.9	-0.8	-0.8	2.5		
23	11.4	1.7	4.5	4.2		
24	10.2	-0.2	0.7	1.3		
25	11.6	3.4	2.8	1.3		

					File #:	20703601
			Delta values			
			units: milliohms			
Temp ºC	23	23	23	23		
R.H. %	20	22	23	25		
Date:	20Feb07	22Feb07	27Feb07	12Mar07		
Pos. ID	Initial	Durability	T-Shock	Humidity		
		100X				
MAX	18.5	3.4	4.5	4.2		
MIN	10.2	-2.7	-2.8	-2.7		
AVG	13.6	0.4	0.7	1.4		
STD	2.2	1.5	1.7	1.6		
Open	0	0	0	0		
Tech	BE	BE	BE	BE		
Equip ID	601	601	601	601		
	1278	1278	1278	1278		

		Low Level Contact Resistance				
Project:	207036				Spec: EIA 364 TP 23	
Customer:	Samtec				Subgroup:	Seq b
Product:	Series HDAM/HDAF connector				File #:	20703602
Description:	B-A-2					
Open circuit voltage:		20mv			Current:	10ma
			Delta values			
			units: milliohms			
Temp ºC	23	23	23	23		
R.H. %	20	22	23	25		
Date:	20Feb07	22Feb07	27Feb07	12Mar07		
Pos. ID	Initial	Durability	T-Shock	Humidity		
		100X				
1	12.9	-0.4	-0.4	0.3		
2	12.2	-0.4	0.6	0.3		
3	13.0	0.0	0.7	1.9		
4	14.1	-0.2	2.1	2.7		
5	27.1	-12.4	-9.1	-8.3		
6	17.7	-3.4	-2.6	-1.1		
7	16.3	-2.0	2.6	2.6		
8	14.1	-1.6	0.0	0.3		
9	17.9	1.2	0.5	4.9		
10	12.9	0.1	1.3	2.2		
11	12.4	1.1	1.4	2.9		
12	11.7	0.1	1.1	2.5		
13	10.9	0.4	2.0	5.0		
14	10.6	1.2	2.4	3.2		
15	13.2	2.4	1.3	2.7		
16	12.5	1.3	1.9	2.3		
17	14.1	0.9	2.9	2.4		
18	13.6	-1.1	1.7	2.3		
19	14.6	-0.7	5.3	3.7		
20	15.3	0.4	3.2	3.5		
21	16.5	0.5	-1.5	-0.9		
22	15.4	-1.0	-0.6	0.1		
23	10.0	3.4	7.3	6.6		
24	10.6	-0.5	0.4	1.1		
25	11.9	0.8	4.1	-0.1		

					File #:	20703602
			Delta values			
			units: milliohms			
Temp ºC	23	23	23	23		
R.H. %	20	22	23	25		
Date:	20Feb07	22Feb07	27Feb07	12Mar07		
Pos. ID	Initial	Durability	T-Shock	Humidity		
		100X				
MAX	27.1	3.4	7.3	6.6		
MIN	10.0	-12.4	-9.1	-8.3		
AVG	14.1	-0.4	1.1	1.7		
STD	3.5	2.9	3.0	2.8		
Open	0	0	0	0		
Tech	BE	BE	BE	BE		
Equip ID	601	601	601	601		
	1278	1278	1278	1278		

		Low Level Contact Resistance				
Project:	207036				Spec: EIA 364 TP 23	
Customer:	Samtec				Subgroup:	Seq b
Product:	Series HDAM/HDAF connector				File #:	20703603
Description:	B-A-3					
Open circuit voltage:		20mv			Current:	10ma
			Delta values			
			units: milliohms			
Temp ºC	23	23	23	23		
R.H. %	20	22	23	25		
Date:	20Feb07	22Feb07	27Feb07	12Mar07		
Pos. ID	Initial	Durability	T-Shock	Humidity		
		100X				
1	12.9	1.3	3.8	1.2		
2	12.1	0.1	1.1	2.9		
3	15.8	0.0	2.9	1.2		
4	14.0	0.2	2.4	4.2		
5	19.0	-1.6	0.4	-3.1		
6	17.8	-1.3	4.6	0.1		
7	18.9	-1.3	1.9	3.7		
8	13.0	0.7	4.5	7.7		
9	17.6	-2.3	0.7	-0.2		
10	13.6	2.5	0.7	2.9		
11	12.8	1.1	1.8	3.4		
12	12.3	-0.2	-0.3	0.1		
13	11.9	-0.4	5.5	4.7		
14	10.1	2.2	2.6	2.3		
15	13.6	0.5	-0.2	3.0		
16	12.4	0.9	3.1	2.3		
17	15.5	2.0	4.3	1.2		
18	16.0	-2.4	1.2	0.5		
19	15.4	-0.1	1.0	2.1		
20	17.6	-1.2	0.7	-0.6		
21	15.6	-0.3	0.7	1.7		
22	14.5	0.2	1.6	0.2		
23	9.9	4.1	5.7	4.9		
24	10.4	-1.2	0.2	0.5		
25	11.6	1.3	3.0	1.2		

					File #:	20703603
			Delta values			
			units: milliohms			
Temp ºC	23	23	23	23		
R.H. %	20	22	23	25		
Date:	20Feb07	22Feb07	27Feb07	12Mar07		
Pos. ID	Initial	Durability	T-Shock	Humidity		
		100X				
MAX	19.0	4.1	5.7	7.7		
MIN	9.9	-2.4	-0.3	-3.1		
AVG	14.2	0.2	2.2	1.9		
STD	2.7	1.5	1.8	2.2		
Open	0	0	0	0		
Tech	BE	BE	BE	BE		
Equip ID	601	601	601	601		
	1278	1278	1278	1278		

		Low Level Contact Resistance				
Project:	207036				Spec: EIA 364 TP 23	
Customer:	Samtec				Subgroup:	Seq b
Product:	Series HDAM/HDAF connector				File #:	20703604
Description:	B-A-4					
Open circuit voltage:		20mv			Current:	10ma
			Delta values			
			units: milliohms			
Temp ºC	23	23	23	23		
R.H. %	20	22	23	25		
Date:	20Feb07	22Feb07	27Feb07	12Mar07		
Pos. ID	Initial	Durability	T-Shock	Humidity		
		100X				
1	13.5	0.8	1.1	-1.1		
2	11.9	0.4	1.0	2.2		
3	14.1	1.5	2.3	1.2		
4	13.6	1.4	2.4	0.7		
5	17.2	-2.6	-0.3	-0.9		
6	17.0	-0.5	1.4	-0.7		
7	16.6	-0.6	1.9	-5.3		
8	12.6	-0.6	0.0	0.2		
9	14.0	-0.6	0.3	-1.8		
10	12.3	-0.7	4.5	-1.8		
11	14.2	-1.4	0.4	-3.7		
12	9.9	2.1	2.6	3.1		
13	11.1	0.2	1.6	2.4		
14	11.0	-0.6	0.6	1.5		
15	16.4	-2.7	-0.9	-7.0		
16	13.0	-0.1	1.7	-2.9		
17	14.8	-1.2	-0.2	-3.8		
18	11.6	0.3	0.7	-0.4		
19	15.4	-0.3	0.3	-4.7		
20	13.7	-0.6	3.0	1.5		
21	17.5	-3.2	0.7	0.1		
22	13.8	0.6	0.6	0.8		
23	13.0	0.3	2.8	2.9		
24	10.3	-0.5	0.3	1.1		
25	12.5	0.7	4.8	1.0		

					Subgroup:	Seq b
			Delta values			
			units: milliohms			
Temp ºC	23	23	23	23		
R.H. %	20	22	23	25		
Date:	20Feb07	22Feb07	27Feb07	12Mar07		
Pos. ID	Initial	Durability	T-Shock	Humidity		
		100X				
MAX	17.5	2.1	4.8	3.1		
MIN	9.9	-3.2	-0.9	-7.0		
AVG	13.6	-0.3	1.3	-0.6		
STD	2.1	1.3	1.4	2.7		
Open	0	0	0	0		
Tech	BE	BE	BE	BE		
Equip ID	601	601	601	601		
	1278	1278	1278	1278		

		Low Level Contact Resistance				
Project:	207036				Spec: EIA 364 TP 23	
Customer:	Samtec				Subgroup:	Seq b
Product:	Series HDAM/HDAF connector				File #:	20703605
Description:	B-A-5					
Open circuit voltage:		20mv			Current:	10ma
			Delta values			
			units: milliohms			
Temp ºC	23	23	23	23		
R.H. %	20	22	23	25		
Date:	20Feb07	22Feb07	27Feb07	12Mar07		
Pos. ID	Initial	Durability	T-Shock	Humidity		
1	13.2	2.4	2.9	2.6		
2	12.3	-0.1	0.5	2.4		
3	15.2	-0.8	2.1	2.2		
4	13.8	0.5	3.7	3.2		
5	15.3	-0.1	2.9	2.5		
6	17.6	-2.5	-0.2	-1.3		
7	15.9	-1.3	2.8	5.2		
8	12.6	1.6	4.1	6.2		
9	14.9	1.2	4.2	1.9		
10	12.0	1.8	2.9	-1.0		
11	12.3	0.0	0.7	1.8		
12	10.4	1.4	1.7	1.5		
13	10.0	1.2	2.1	4.8		
14	9.8	2.4	2.4	5.1		
15	11.9	0.6	1.4	-0.6		
16	14.7	-0.7	-0.6	-4.7		
17	14.4	-0.4	0.4	0.4		
18	12.8	1.2	3.1	1.3		
19	14.4	-0.7	2.0	0.1		
20	14.4	0.5	1.8	1.3		
21	15.6	-0.4	5.3	1.9		
22	15.4	-1.1	0.4	-0.1		
23	14.0	-0.9	0.7	0.1		
24	10.2	-0.1	0.6	4.1		
25	9.6	4.4	5.9	3.2		

					File #:	20703605
			Delta values			
			units: milliohms			
Temp ºC	23	23	23	23		
R.H. %	20	22	23	25		
Date:	20Feb07	22Feb07	27Feb07	12Mar07		
Pos. ID	Initial	Durability	T-Shock	Humidity		
MAX	17.6	4.4	5.9	6.2		
MIN	9.6	-2.5	-0.6	-4.7		
AVG	13.3	0.4	2.2	1.8		
STD	2.2	1.5	1.7	2.4		
Open	0	0	0	0		
Tech	BE	BE	BE	BE		
Equip ID	601	601	601	601		
	1278	1278	1278	1278		

		Low Level Contact Resistance				
Project:	207036				Spec: EIA 364 TP 23	
Customer:	Samtec				Subgroup:	Seq b
Product:	Series HDAM/HDAF connector				File #:	20703606
Description:	B-A-6					
Open circuit voltage:		20mv			Current:	10ma
			Delta values			
			units: milliohms			
Temp ºC	23	23	23	23		
R.H. %	20	22	23	25		
Date:	20Feb07	22Feb07	27Feb07	12Mar07		
Pos. ID	Initial	Durability	T-Shock	Humidity		
		100X				
1	13.9	-0.2	2.0	1.3		
2	13.3	-0.8	0.2	2.5		
3	14.3	0.2	1.1	-0.2		
4	15.0	-0.6	-1.7	0.6		
5	15.9	1.0	0.9	0.8		
6	17.3	1.2	1.0	-1.9		
7	13.9	1.8	3.8	3.8		
8	20.9	-4.5	-4.5	-6.1		
9	17.0	-2.0	1.4	-1.9		
10	12.3	1.6	1.3	3.8		
11	13.4	1.4	1.6	6.1		
12	14.4	-2.3	-1.3	-1.0		
13	12.1	-0.6	0.7	3.2		
14	12.3	1.0	-0.4	1.6		
15	12.7	2.7	3.2	4.8		
16	14.5	0.1	-0.9	1.0		
17	16.7	-0.8	-0.7	-1.1		
18	13.7	0.4	0.4	6.1		
19	13.8	0.6	3.9	4.2		
20	18.3	-0.5	-0.4	1.9		
21	15.5	-0.6	-0.4	1.3		
22	15.1	0.2	0.7	0.9		
23	15.6	-2.1	0.4	0.8		
24	10.5	-0.2	0.3	0.4		
25	14.7	-1.1	1.6	-0.5		

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					File #:	20703606
			Delta values			
			units: milliohms			
Temp ºC	23	23	23	23		
R.H. %	20	22	23	25		
Date:	20Feb07	22Feb07	27Feb07	12Mar07		
Pos. ID	Initial	Durability	T-Shock	Humidity		
		100X				
MAX	20.9	2.7	3.9	6.1		
MIN	10.5	-4.5	-4.5	-6.1		
AVG	14.7	-0.2	0.6	1.3		
STD	2.2	1.5	1.8	2.7		
Open	0	0	0	0		
Tech	BE	BE	BE	BE		
Equip ID	601	601	601	601		
	1278	1278	1278	1278		

		Low Level Contact Resistance				
Project:	207036				Spec: EIA 364 TP 23	
Customer:	Samtec				Subgroup:	Seq b
Product:	Series HDAM/HDAF connector				File #:	20703607
Description:	B-A-7					
Open circuit voltage:		20mv			Current:	10ma
			Delta values			
			units: milliohms			
Temp ºC	23	23	23	23		
R.H. %	20	22	23	25		
Date:	20Feb07	22Feb07	27Feb07	12Mar07		
Pos. ID	Initial	Durability	T-Shock	Humidity		
		100X				
1	13.4	-0.1	1.5	2.7		
2	12.1	0.3	1.1	1.0		
3	16.3	-3.3	0.1	-1.4		
4	14.0	-0.6	1.8	1.8		
5	15.6	0.9	1.3	1.2		
6	17.9	-2.6	0.2	-3.3		
7	14.3	3.2	4.2	4.4		
8	12.1	0.8	5.8	6.8		
9	14.7	0.8	2.7	-2.6		
10	11.9	1.0	2.3	3.6		
11	13.0	0.1	-0.1	2.0		
12	11.6	0.2	1.1	1.1		
13	11.5	-0.5	0.6	2.5		
14	12.6	0.2	0.1	0.7		
15	14.2	0.9	0.9	0.9		
16	15.5	-1.5	0.2	0.1		
17	15.8	-1.4	-1.3	-2.1		
18	13.4	-0.4	3.5	5.5		
19	14.8	-0.5	3.0	1.9		
20	15.6	-0.3	3.7	2.3		
21	16.4	0.0	2.5	-0.3		
22	14.0	0.3	1.9	3.0		
23	10.2	2.8	4.2	4.8		
24	10.3	-0.1	0.1	0.9		
25	9.5	2.2	2.1	1.6		

					File #:	20703607
			Delta values			
			units: milliohms			
Temp ºC	23	23	23	23		
R.H. %	20	22	23	25		
Date:	20Feb07	22Feb07	27Feb07	12Mar07		
Pos. ID	Initial	Durability	T-Shock	Humidity		
		100X				
MAX	17.9	3.2	5.8	6.8		
MIN	9.5	-3.3	-1.3	-3.3		
AVG	13.6	0.1	1.7	1.6		
STD	2.1	1.4	1.7	2.4		
Open	0	0	0	0		
Tech	BE	BE	BE	BE		
Equip ID	601	601	601	601		
	1278	1278	1278	1278		

		Low Level Contact Resistance				
Project:	207036				Spec: EIA 364 TP 23	
Customer:	Samtec				Subgroup:	Seq b
Product:	Series HDAM/HDAF connector				File #:	20703608
Description:	B-A-8					
Open circuit voltage:		20mv			Current:	10ma
			Delta values			
			units: milliohms			
Temp ºC	23	23	23	23		
R.H. %	20	22	23	25		
Date:	20Feb07	22Feb07	27Feb07	12Mar07		
Pos. ID	Initial	Durability	T-Shock	Humidity		
		100X				
1	12.1	-0.1	4.3	5.6		
2	11.2	1.0	2.0	3.1		
3	14.3	0.9	2.7	3.6		
4	15.7	-0.8	-1.5	0.8		
5	15.3	2.0	0.6	5.8		
6	16.9	1.1	4.1	3.2		
7	13.7	2.5	6.0	8.0		
8	11.3	1.7	4.1	1.9		
9	14.1	-0.4	1.2	-4.8		
10	12.5	0.5	1.2	-2.1		
11	12.7	0.7	2.9	-1.3		
12	12.3	-0.8	-0.2	-0.5		
13	12.3	-1.2	-0.4	1.5		
14	12.7	-0.4	-0.3	0.4		
15	12.2	3.5	4.0	-0.1		
16	13.7	1.5	0.7	-3.8		
17	13.7	-0.9	0.0	-3.2		
18	14.1	-0.6	1.8	0.8		
19	14.7	1.2	3.8	-3.2		
20	16.8	-2.9	0.8	-1.6		
21	16.8	-2.3	-2.0	0.1		
22	14.9	-1.3	-0.8	0.1		
23	14.2	0.7	1.5	1.6		
24	10.2	0.2	0.5	0.5		
25	11.7	1.8	2.6	0.7		

					File #:	20703608
			Delta values			
			units: milliohms			
Temp ºC	23	23	23	23		
R.H. %	20	22	23	25		
Date:	20Feb07	22Feb07	27Feb07	12Mar07		
Pos. ID	Initial	Durability	T-Shock	Humidity		
		100X				
MAX	16.9	3.5	6.0	8.0		
MIN	10.2	-2.9	-2.0	-4.8		
AVG	13.6	0.3	1.6	0.7		
STD	1.8	1.5	2.0	3.1		
Open	0	0	0	0		
Tech	BE	BE	BE	BE		
Equip ID	601	601	601	601		
	1278	1278	1278	1278		

TEST RESULTS

SEQUENCE C

Group A

PROJECT NO.: 207036 SPECIFICATION: TC076-1260

PART NO.: HDAF-23-18.0-S-13.2 PART DESCRIPTION: HDAF/HDAM
HDAM-23-17.0-S-13.2

SAMPLE SIZE: 8 Samples TECHNICIAN: BE

START DATE: 2/20/07 COMPLETE DATE: 2/20/07

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 20%

EQUIPMENT ID#: 601, 1278

LOW LEVEL CIRCUIT RESISTANCE (LLCR)

PURPOSE:

1. To evaluate contact resistance characteristics of the contact systems under conditions where applied voltages and currents do not alter the physical contact interface and will detect oxides and films which degrade electrical stability. It is also sensitive to and may detect the presence of fretting corrosion induced by mechanical or thermal environments as well as any significant loss of contact pressure.

2. This attribute was monitored after each preconditioning and/or test exposure in order to determine said stability of the contact systems as they progress through the applicable test sequences.

3. The electrical stability of the system is determined by comparing the initial resistance value to that observed after a given test exposure. The difference is the change in resistance occurring whose magnitude establishes the stability of the interface being evaluated.

PROCEDURE:

1. The test was performed in accordance with EIA 364, Test Procedure 23, with the following conditions:

PROCEDURE: –continued:

2. Test Conditions:

   a) Test Current : 10 milliamps
   b) Open Circuit Voltage : 20 millivolts

3. The points of application are shown in Figure #2.

REQUIREMENTS:

Low level circuit resistance shall be measured and recorded.

RESULTS:

1. The following is a summary of the data observed:

LOW LEVEL CIRCUIT RESISTANCE
(Milliohms)

Sample ID#	Avg.	Max.	Min.
C-A-1	10.9	12.0	10.4
C-A-2	13.4	19.0	9.1
C-A-3	13.9	26.2	8.9
C-A-4	12.8	16.0	9.0
C-A-5	13.6	18.4	8.8
C-A-6	13.0	18.2	10.1
C-A-7	13.4	18.4	10.1
C-A-8	12.9	15.5	9.2

2. See data files 20703609 through 20703616 for individual data points.

PROJECT NO.: 207036 SPECIFICATION: TC076-1260

PART NO.: HDAF-23-18.0-S-13.2 PART DESCRIPTION: HDAF/HDAM
HDAM-23-17.0-S-13.2

SAMPLE SIZE: 8 Samples TECHNICIAN: BE

START DATE: 2/23/07 COMPLETE DATE: 2/23/07

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 20%

EQUIPMENT ID#: 553, 601, 684, 1166, 1167, 1168, 1169, 1271, 1272, 1278

MECHANICAL SHOCK (SPECIFIED PULSE)

PURPOSE:

To determine the mechanical and electrical integrity of connectors for use with electronic equipment subjected to shocks such as those expected from handling, transportation, etc.

PROCEDURE:

1. The test was performed in accordance with EIA 364, Test Procedure 27.
2. Test Conditions:
   a) Peak Value : 100 G
   b) Duration : 6 Milliseconds
   c) Wave Form : Sawtooth
   d) Velocity : 11.3 feet per second
   e) No. of Shocks : 3 Shocks/Direction, 3 Axis (18 Total)
3. Figure #3 illustrates the test sample fixturing utilized during the test.
4. All subsequent variable testing was performed in accordance with the procedures previously indicated.

REQUIREMENTS:

1. There shall be no evidence of physical damage to the test samples as tested.
2. The change in low level circuit resistance shall not exceed +10.0 milliohms.

RESULTS:

1. There was no evidence of physical damage to the test samples as tested.

2. The following is a summary of the data observed:

CHANGE IN
LOW LEVEL CIRCUIT RESISTANCE
(Milliohms)

Sample ID#	Avg. Change	Max. Change
C-A-1	-0.1	+2.5
C-A-2	+0.9	+6.3
C-A-3	-0.2	+1.9
C-A-4	+0.7	+4.3
C-A-5	+0.7	+5.8
C-A-6	+1.3	+5.5
C-A-7	+1.0	+2.7
C-A-8	+1.1	+5.7

3. See data files 20703609 through 20703616 for individual data points.

4. The Mechanical Shock characteristics are shown in Figures #4 (Calibration Pulse) and #5 (Test Pulse). Each figure displays the shock pulse contained within the upper and lower limits as defined by the appropriate test specification.

FIGURE #3
MECHANICAL SHOCK/VIBRATION FIXTURE

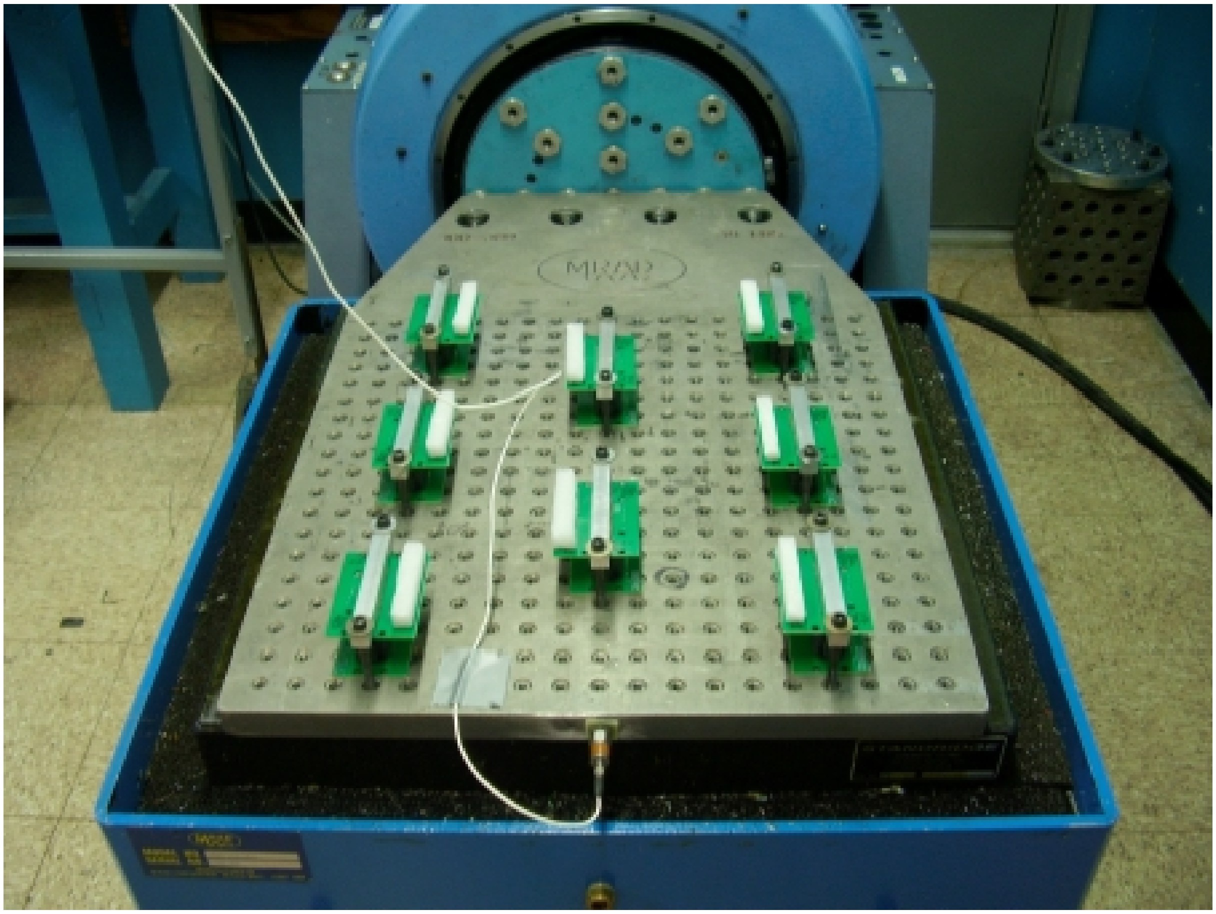
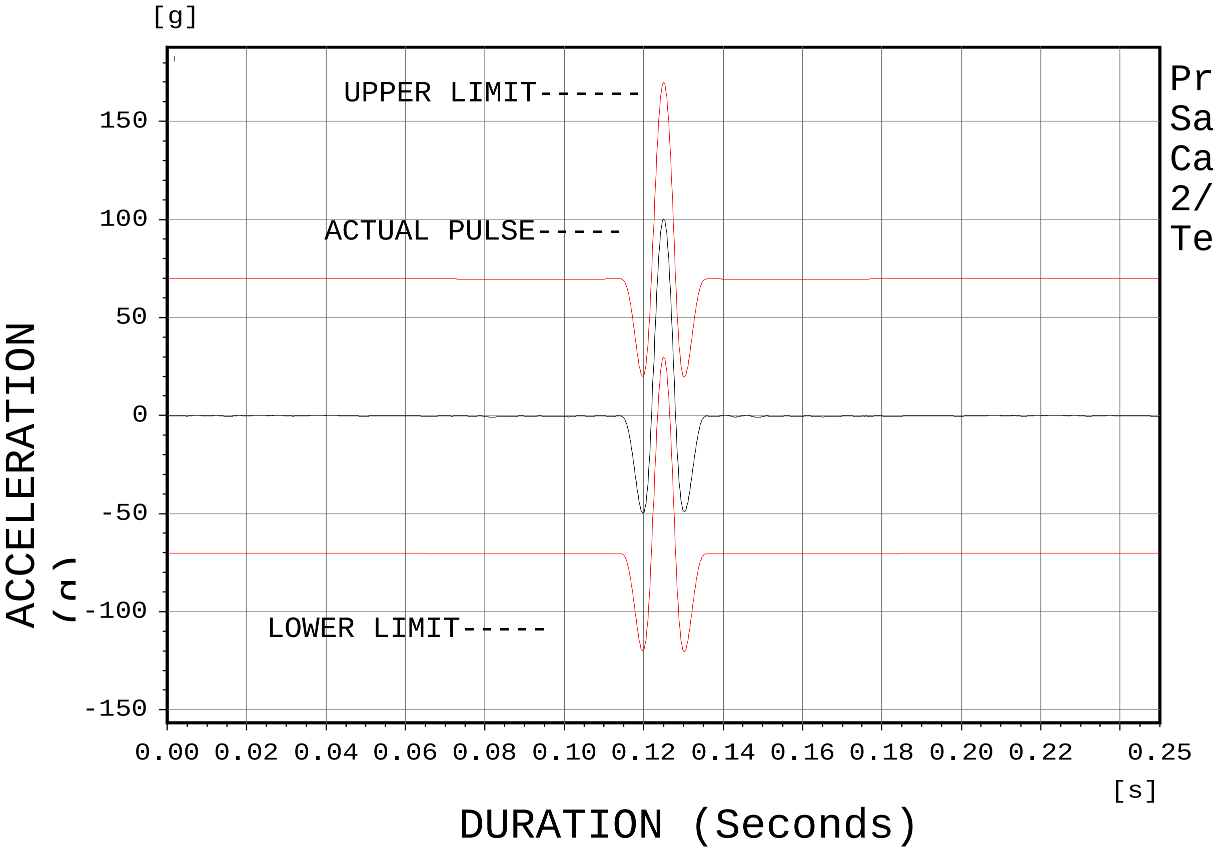


FIGURE #4

Classical Shock

Channel 1



Project 207036
Samtec
Cal Wave 1
2/23/07
Tech: /BE

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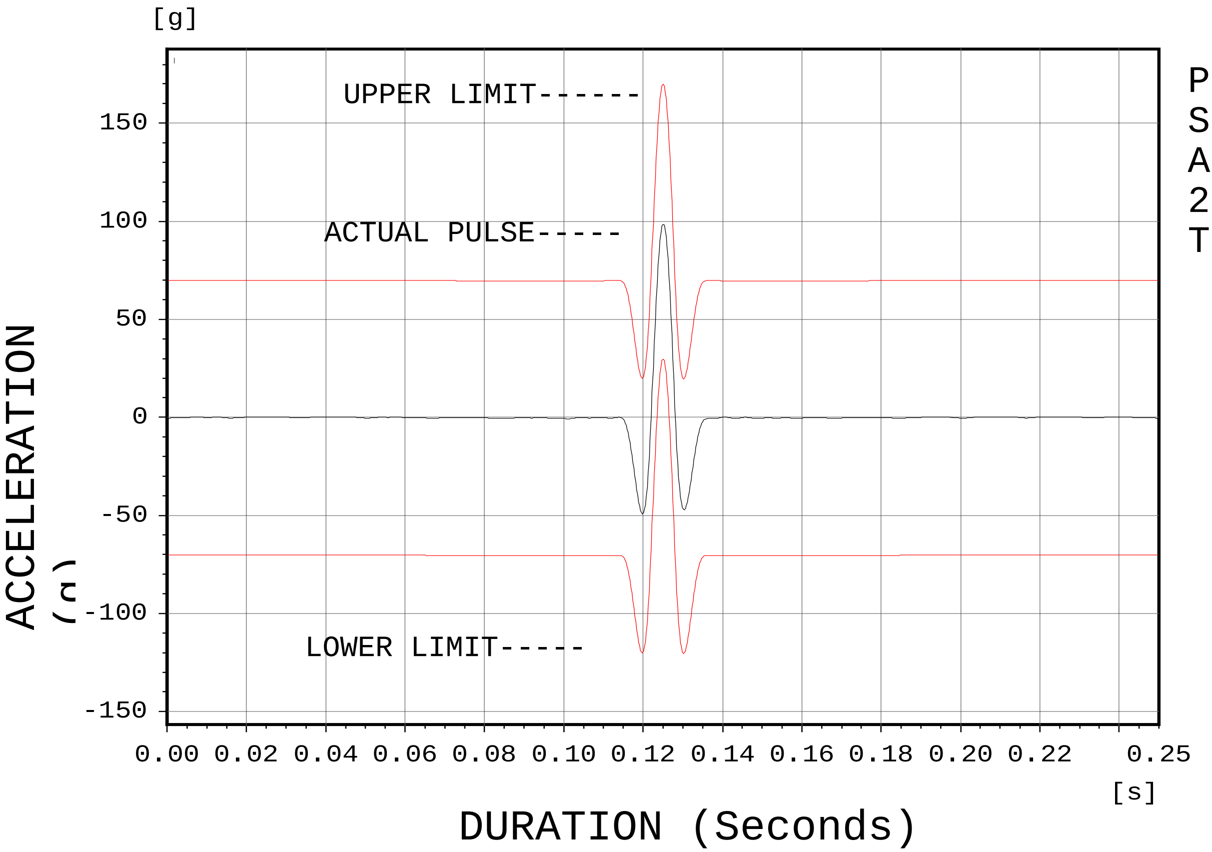
FIGURE #5

Classical Shock

Channel 1



Project 207036
Samtec
Actual Wave
2/23/07
Tech: /BE

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PROJECT NO.: 207036 SPECIFICATION: TC076-1260

PART NO.: HDAF-23-18.0-S-13.2 PART DESCRIPTION: HDAF/HDAM
HDAM-23-17.0-S-13.2

SAMPLE SIZE: 8 Samples TECHNICIAN: BE

START DATE: 3/2/07 COMPLETE DATE: 3/5/07

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 25%

EQUIPMENT ID#: 553, 601, 684, 1166, 1167, 1168, 1169, 1271, 1272, 1278

VIBRATION, RANDOM

PURPOSE:

1. To establish the mechanical integrity of the test samples exposed to external mechanical stresses.

2. To determine if the contact system is susceptible to fretting corrosion.

3. To determine if the electrical stability of the system has degraded when exposed to a vibratory environment.

PROCEDURE:

1. The test was performed in accordance with EIA 364, Test Procedure 28, Test Condition V, Letter B.

2. Test Conditions:
    a) G 'RMS' : 7.56
    b) Frequency : 50 to 2000 Hz
    c) Duration : 2.0 hours per axis, 3 axis total

3. A stabilizing medium was used such that the mated test samples did not separate during the test.

4. Figure #3 illustrates the test sample fixturing utilized during the test.

5. All subsequent variable testing was performed in accordance with procedures previously indicated.

REQUIREMENTS: See next page.

REQUIREMENTS:

1. There shall be no evidence of physical damage to the test samples as tested.

2. The change in low level circuit resistance shall not exceed +10.0 milliohms.

RESULTS:

1. There was no evidence of physical damage to the test samples as tested.

2. The following is a summary of the observed data:

CHANGE IN
LOW LEVEL CIRCUIT RESISTANCE
(Milliohms)

Sample ID#	Avg. Change	Max. Change
C-A-1	-0.1	+2.9
C-A-2	+1.4	+6.4
C-A-3	+0.9	+6.9
C-A-4	+1.5	+6.4
C-A-5*	+0.9	+5.8
C-A-6	+1.8	+7.0
C-A-7	+1.2	+4.5
C-A-8	+1.4	+5.0

3. See data files 20703609 through 20703616 for individual data points.

* Comments:

1. Following discussions with the test sponsors, sample ID#C-A-5 was unmated and visually inspected.

2. Upon visual inspection, there was no evidence of physical damage or degradation to the contacts that would result in a LLC Open.

3. The samples were mated and LLCR was measured and Open repeated.

4. An LLCR Open was recorded at position 24 within sample ID# C-A-5 following Random Vibration testing. Analysis by the test sponser revealed a damaged solder joint as the cause of the Open.

LLCR DATA FILES

DATA FILE NUMBERS

20703609
20703610
20703611
20703612
20703613
20703614
20703615
20703616

		Low Level Contact Resistance				
Project:	207036				Spec: EIA 364 TP 23	
Customer:	Samtec				Subgroup:	Seq c
Product:	Series HDAM/HDAF connector				File #:	20703609
Description:	C-A-1					
Open circuit voltage:		20mv			Current:	10ma
			Delta values			
			units: milliohms			
Temp ºC	23	23	23			
R.H. %	20	24	25			
Date:	20Feb07	23Feb07	05Mar07			
Pos. ID	Initial	M-Shock	Vibration			
1	10.7	2.5	2.9			
2	11.5	-0.1	-0.5			
3	12.0	-0.4	0.4			
4	10.5	0.7	0.7			
5	10.5	0.6	0.6			
6	10.4	-0.2	-0.3			
7	11.3	-0.8	-1.0			
8	10.9	-0.8	-0.8			
9	10.7	-0.4	-0.4			
10	10.9	-0.5	-0.8			
11	10.6	0.0	-0.3			
12	11.2	0.2	-0.6			
13	11.0	-0.4	2.9			
14	11.5	-0.9	-1.3			
15	10.9	0.0	-0.7			
16	11.4	-0.5	-1.0			
17	10.7	-0.1	-0.4			
18	10.6	-0.2	-0.4			
19	10.7	-0.1	-0.4			
20	10.9	-0.2	-0.6			
21	10.7	0.0	-0.3			
22	11.1	-0.2	-0.6			
23	11.0	-0.2	-0.3			
24	10.5	0.2	0.6			
25	11.4	0.0	0.0			

					File #:	20703609
			Delta values			
			units: milliohms			
Temp ºC	23	23	23			
R.H. %	20	24	25			
Date:	20Feb07	23Feb07	05Mar07			
Pos. ID	Initial	M-Shock	Vibration			
MAX	12.0	2.5	2.9			
MIN	10.4	-0.9	-1.3			
AVG	10.9	-0.1	-0.1			
STD	0.4	0.7	1.0			
Open	0	0	0			
Tech	BE	BE	BE			
Equip ID	601	601	601			
	1278	1278	1278			

		Low Level Contact Resistance				
Project:	207036				Spec: EIA 364 TP 23	
Customer:	Samtec				Subgroup:	Seq c
Product:	Series HDAM/HDAF connector				File #:	20703610
Description:	C-A-2					
Open circuit voltage:		20mv			Current:	10ma
			Delta values			
			units: milliohms			
Temp ºC	23	23	23			
R.H. %	20	24	25			
Date:	20Feb07	23Feb07	05Mar07			
Pos. ID	Initial	M-Shock	Vibration			
1	12.8	2.2	2.4			
2	11.9	0.3	0.2			
3	14.8	-0.5	-0.8			
4	14.7	0.4	-0.6			
5	14.2	2.3	4.3			
6	16.7	0.4	-1.8			
7	19.0	-1.4	-4.3			
8	13.5	0.6	3.1			
9	15.8	-1.2	1.4			
10	11.5	3.2	2.0			
11	12.1	0.8	3.3			
12	10.9	0.7	2.0			
13	9.9	1.2	1.7			
14	10.6	3.9	2.2			
15	12.2	0.2	1.5			
16	13.9	2.3	0.9			
17	16.3	0.4	1.3			
18	12.8	1.5	0.7			
19	13.8	0.2	1.3			
20	16.4	0.1	6.2			
21	13.8	0.6	1.1			
22	14.6	-0.6	1.9			
23	14.3	-0.9	-0.4			
24	9.5	0.3	0.3			
25	9.1	6.3	6.4			

					File #:	20703610
			Delta values			
			units: milliohms			
Temp ºC	23	23	23			
R.H. %	20	24	25			
Date:	20Feb07	23Feb07	05Mar07			
Pos. ID	Initial	M-Shock	Vibration			
MAX	19.0	6.3	6.4			
MIN	9.1	-1.4	-4.3			
AVG	13.4	0.9	1.4			
STD	2.4	1.7	2.3			
Open	0	0	0			
Tech	BE	BE	BE			
Equip ID	601	601	601			
	1278	1278	1278			

		Low Level Contact Resistance				
Project:	207036				Spec: EIA 364 TP 23	
Customer:	Samtec				Subgroup:	Seq c
Product:	Series HDAM/HDAF connector				File #:	20703611
Description:	C-A-3					
Open circuit voltage:		20mv			Current:	10ma
			Delta values			
			units: milliohms			
Temp ºC	23	23	23			
R.H. %	20	24	25			
Date:	20Feb07	23Feb07	05Mar07			
Pos. ID	Initial	M-Shock	Vibration			
1	12.1	1.1	5.2			
2	12.7	0.2	-0.2			
3	14.8	-1.2	-1.1			
4	14.9	1.2	-1.9			
5	15.3	1.4	0.4			
6	19.6	-2.6	-3.1			
7	13.7	1.2	3.6			
8	13.1	-0.1	1.7			
9	15.0	0.1	4.0			
10	13.0	0.8	1.8			
11	12.2	0.4	0.8			
12	11.8	0.0	-0.6			
13	10.3	0.5	1.0			
14	10.4	1.9	2.3			
15	12.9	-0.5	-0.4			
16	26.2	-11.3	-8.8			
17	16.4	0.2	3.5			
18	14.0	0.2	-0.5			
19	14.2	-0.4	2.6			
20	15.9	-1.1	6.9			
21	14.3	0.9	1.7			
22	13.9	0.7	-0.4			
23	11.3	0.4	0.5			
24	8.9	1.5	2.7			
25	11.9	0.2	0.0			

					File #:	20703611
			Delta values			
			units: milliohms			
Temp ºC	23	23	23			
R.H. %	20	24	25			
Date:	20Feb07	23Feb07	05Mar07			
Pos. ID	Initial	M-Shock	Vibration			
MAX	26.2	1.9	6.9			
MIN	8.9	-11.3	-8.8			
AVG	13.9	-0.2	0.9			
STD	3.4	2.5	3.0			
Open	0	0	0			
Tech	BE	BE	BE			
Equip ID	601	601	601			
	1278	1278	1278			

		Low Level Contact Resistance				
Project:	207036				Spec: EIA 364 TP 23	
Customer:	Samtec				Subgroup:	Seq c
Product:	Series HDAM/HDAF connector				File #:	20703612
Description:	C-A-4					
Open circuit voltage:		20mv			Current:	10ma
			Delta values			
			units: milliohms			
Temp ºC	23	23	23			
R.H. %	20	24	25			
Date:	20Feb07	23Feb07	05Mar07			
Pos. ID	Initial	M-Shock	Vibration			
1	13.4	0.6	1.5			
2	11.5	0.1	0.6			
3	13.6	0.3	0.0			
4	14.4	1.2	2.1			
5	14.4	0.6	2.7			
6	14.8	0.5	1.3			
7	15.0	0.2	-0.1			
8	14.5	0.4	-0.4			
9	14.6	1.0	3.4			
10	11.6	2.0	1.5			
11	11.0	0.8	1.1			
12	10.6	0.2	0.3			
13	10.5	0.2	0.3			
14	10.8	0.6	0.3			
15	11.6	0.4	0.5			
16	11.7	1.2	2.3			
17	12.4	1.8	2.1			
18	12.0	2.4	3.5			
19	16.0	-1.1	1.9			
20	15.5	1.4	6.4			
21	15.5	-1.2	0.8			
22	13.0	0.1	2.1			
23	12.5	0.1	0.9			
24	10.2	-0.6	-0.5			
25	9.0	4.3	3.3			

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Test Laboratory
1478 - 02

					File #:	20703612
			Delta values			
			units: milliohms			
Temp ºC	23	23	23			
R.H. %	20	24	25			
Date:	20Feb07	23Feb07	05Mar07			
Pos. ID	Initial	M-Shock	Vibration			
MAX	16.0	4.3	6.4			
MIN	9.0	-1.2	-0.5			
AVG	12.8	0.7	1.5			
STD	2.0	1.1	1.5			
Open	0	0	0			
Tech	BE	BE	BE			
Equip ID	601	601	601			
	1278	1278	1278			

		Low Level Contact Resistance				
Project:	207036				Spec: EIA 364 TP 23	
Customer:	Samtec				Subgroup:	Seq c
Product:	Series HDAM/HDAF connector				File #:	20703613
Description:	C-A-5					
Open circuit voltage:		20mv			Current:	10ma
			Delta values			
			units: milliohms			
Temp ºC	23	23	23			
R.H. %	20	24	25			
Date:	20Feb07	23Feb07	05Mar07			
Pos. ID	Initial	M-Shock	Vibration			
1	17.8	-4.5	-5.0			
2	11.9	0.4	-0.1			
3	14.7	0.4	-1.6			
4	14.3	-0.6	-1.2			
5	17.7	1.5	0.5			
6	13.1	3.3	4.2			
7	15.3	0.6	1.2			
8	12.3	0.8	2.3			
9	14.5	2.1	4.3			
10	11.9	3.8	2.3			
11	11.7	0.2	0.8			
12	10.5	-0.6	0.4			
13	11.4	-0.4	-0.4			
14	12.4	-0.4	-0.6			
15	13.1	3.2	0.0			
16	15.4	0.3	-0.4			
17	14.2	1.2	5.8			
18	13.4	0.8	2.1			
19	14.8	-0.3	-0.6			
20	18.4	-1.0	0.7			
21	14.3	1.1	3.9			
22	13.5	0.1	1.5			
23	14.0	-0.7	-1.1			
24	8.8	1.1	Open			
25	9.7	5.8	3.2			

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Test Laboratory

1478 - 02

					File #:	20703613
			Delta values			
			units: milliohms			
Temp ºC	23	23	23			
R.H. %	20	24	25			
Date:	20Feb07	23Feb07	05Mar07			
Pos. ID	Initial	M-Shock	Vibration			
MAX	18.4	5.8	5.8			
MIN	8.8	-4.5	-5.0			
AVG	13.6	0.7	0.9			
STD	2.4	1.9	2.3			
Open	0	0	1			
Tech	BE	BE	BE			
Equip ID	601	601	601			
	1278	1278	1278			

		Low Level Contact Resistance				
Project:	207036				Spec: EIA 364 TP 23	
Customer:	Samtec				Subgroup:	Seq c
Product:	Series HDAM/HDAF connector				File #:	20703614
Description:	C-A-6					
Open circuit voltage:		20mv			Current:	10ma
			Delta values			
			units: milliohms			
Temp ºC	23	23	23			
R.H. %	20	24	25			
Date:	20Feb07	23Feb07	05Mar07			
Pos. ID	Initial	M-Shock	Vibration			
1	11.8	2.4	3.2			
2	11.7	0.1	0.2			
3	12.8	-0.5	-0.3			
4	14.0	0.7	6.8			
5	14.5	3.2	1.1			
6	15.3	1.1	1.0			
7	13.2	2.7	3.6			
8	14.0	4.1	-0.1			
9	15.4	3.6	7.0			
10	12.3	0.9	3.7			
11	11.3	0.5	1.3			
12	11.5	0.1	1.4			
13	11.3	-0.5	1.3			
14	10.9	1.2	1.4			
15	11.8	0.3	0.6			
16	12.0	0.7	0.6			
17	13.8	-1.4	5.2			
18	11.5	4.9	1.7			
19	14.8	2.9	1.2			
20	18.2	-0.6	-1.3			
21	14.5	-0.1	0.3			
22	14.3	0.8	-0.5			
23	12.9	0.7	1.0			
24	10.7	-0.4	0.6			
25	10.1	5.5	3.5			

					File #:	20703614
			Delta values			
			units: milliohms			
Temp ºC	23	23	23			
R.H. %	20	24	25			
Date:	20Feb07	23Feb07	05Mar07			
Pos. ID	Initial	M-Shock	Vibration			
MAX	18.2	5.5	7.0			
MIN	10.1	-1.4	-1.3			
AVG	13.0	1.3	1.8			
STD	1.9	1.8	2.1			
Open	0	0	0			
Tech	BE	BE	BE			
Equip ID	601	601	601			
	1278	1278	1278			

		Low Level Contact Resistance				
Project:	207036				Spec: EIA 364 TP 23	
Customer:	Samtec				Subgroup:	Seq c
Product:	Series HDAM/HDAF connector				File #:	20703615
Description:	C-A-7					
Open circuit voltage:		20mv			Current:	10ma
			Delta values			
			units: milliohms			
Temp ºC	23	23	23			
R.H. %	20	24	25			
Date:	20Feb07	23Feb07	05Mar07			
Pos. ID	Initial	M-Shock	Vibration			
1	13.6	1.0	1.4			
2	12.3	-0.6	-0.7			
3	14.4	0.4	0.1			
4	12.9	1.2	0.8			
5	18.4	-0.4	1.2			
6	14.4	2.7	3.2			
7	14.6	-0.1	1.8			
8	13.8	1.6	0.7			
9	15.2	2.2	2.7			
10	12.1	2.7	3.3			
11	11.7	0.2	-0.3			
12	11.2	0.2	1.0			
13	10.5	0.5	0.3			
14	12.3	0.1	1.3			
15	12.4	-0.3	-0.1			
16	13.8	1.3	1.4			
17	14.5	2.6	1.6			
18	13.0	1.3	1.1			
19	14.8	0.9	0.4			
20	15.6	0.5	-1.3			
21	16.3	2.3	0.7			
22	12.9	2.2	4.0			
23	13.2	-0.2	0.2			
24	10.1	0.1	-0.4			
25	12.5	2.5	4.5			

					File #:	20703615
			Delta values			
			units: milliohms			
Temp ºC	23	23	23			
R.H. %	20	24	25			
Date:	20Feb07	23Feb07	05Mar07			
Pos. ID	Initial	M-Shock	Vibration			
MAX	18.4	2.7	4.5			
MIN	10.1	-0.6	-1.3			
AVG	13.4	1.0	1.2			
STD	1.8	1.1	1.5			
Open	0	0	0			
Tech	BE	BE	BE			
Equip ID	601	601	601			
	1278	1278	1278			

		Low Level Contact Resistance				
Project:	207036				Spec: EIA 364 TP 23	
Customer:	Samtec				Subgroup:	Seq c
Product:	Series HDAM/HDAF connector				File #:	20703616
Description:	C-A-8					
Open circuit voltage:		20mv			Current:	10ma
			Delta values			
			units: milliohms			
Temp ºC	23	23	23			
R.H. %	20	24	25			
Date:	20Feb07	23Feb07	05Mar07			
Pos. ID	Initial	M-Shock	Vibration			
1	12.4	-0.3	0.9			
2	11.7	0.0	-0.1			
3	15.3	-0.9	-2.5			
4	12.3	0.9	2.5			
5	15.2	2.8	2.0			
6	15.0	1.6	1.8			
7	15.5	3.7	-0.4			
8	11.7	1.5	2.2			
9	15.0	1.4	3.7			
10	12.3	-0.1	-0.3			
11	11.7	0.1	2.9			
12	11.4	-0.6	-0.2			
13	11.2	-0.4	-0.1			
14	11.8	-0.3	-0.3			
15	14.6	1.1	-1.6			
16	12.7	2.0	2.4			
17	13.2	1.0	1.4			
18	12.7	1.3	1.8			
19	14.3	2.2	0.2			
20	15.2	0.6	4.9			
21	13.9	1.4	4.5			
22	15.4	-0.6	1.3			
23	10.3	1.9	5.0			
24	9.2	0.5	0.5			
25	9.5	5.7	2.7			

					File #:	20703616
			Delta values			
			units: milliohms			
Temp ºC	23	23	23			
R.H. %	20	24	25			
Date:	20Feb07	23Feb07	05Mar07			
Pos. ID	Initial	M-Shock	Vibration			
MAX	15.5	5.7	5.0			
MIN	9.2	-0.9	-2.5			
AVG	12.9	1.1	1.4			
STD	1.9	1.5	1.9			
Open	0	0	0			
Tech	BE	BE	BE			
Equip ID	601	601	601			
	1278	1278	1278			