AUGUST 18, 2008

TEST REPORT #208315A

QUALIFICAITON TESTING

PART NUMBERS

ERF8-050-01-S-D-RA
ERM8-050-05.0-S-DV-L

SAMTEC, INC.

APPROVED BY: DOMINIC ARPINO
PROGRAM MANAGER
CONTECH RESEARCH, INC.

REVISION HISTORY

DATE	REV. NO.	DESCRIPTION	ENG.
8/15/2008	1.0	Initial Issue	TP

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 and MIL-STD-45662 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.

APPROVED BY: DOMINIC AR
PROGRAM MANAGER
CONTECH RESEARCH, INC.

TP:cf

SCOPE

To perform Qualificaiton testing on the ERF8/ERM8 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 test plan: ERF8-RA Flow Chart

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	ERF8-050-01-S-D-RA
b) Plug Connector	ERM8-050-05.0-S-DV-L

2. Test samples were supplied assembled and terminated to test boards by the test sponsor.

3. Test boards for mounting test samples were supplied by the test sponsor.

4. Figure #1 illustrates the connectors used for test.

5. Test leads were attached to the appropriate measurement areas of the test samples and applicable mating elements.

6. The mated test samples were secured via a stabilizing medium to maintain mechanical stability during test.

-continued on next page.

TEST SAMPLES AND PREPARATION –continued

7. Unless otherwise specified in the test procedures used, no further preparation was used.

TEST SELECTION

1. See Test Plan Flow Diagram, Figure #2, 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:

Group A: Group A – A-A-1, A-A-2
Group B1 – A-B1-B, A-B1-2
Group B2 – A-B2-1, A-B2-2
Group B3 – A-B3-1, A-B3-2

Group B: Group A1 – B-A-1, B-A-2, B-A-3, B-A-4
B-A-5, B-A-6, B-A-7, B-A-8

Group D: Group A – D-A-1, D-A-2, D-A-3

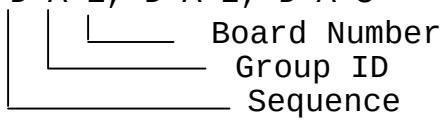


FIGURE #1

TYPICAL MATED TEST SAMPLE

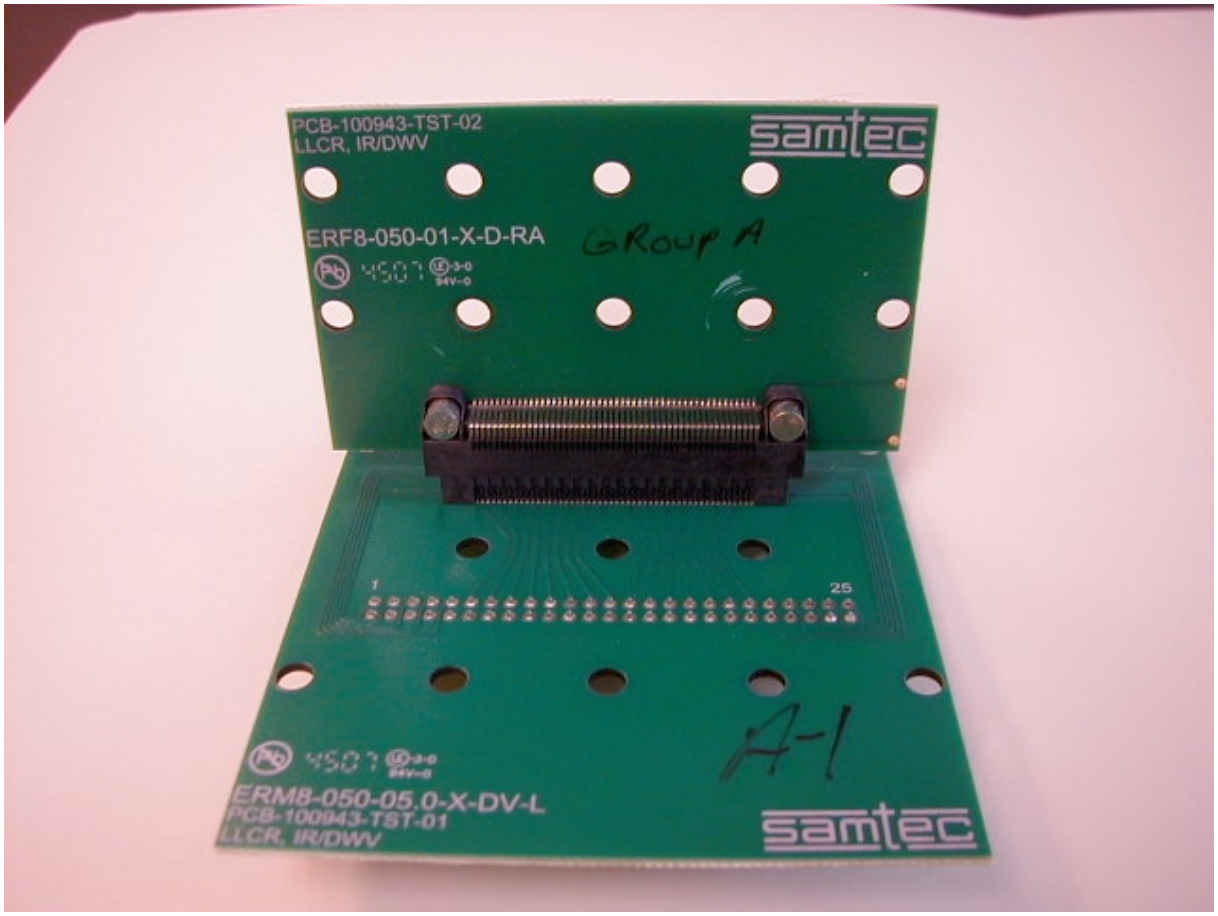
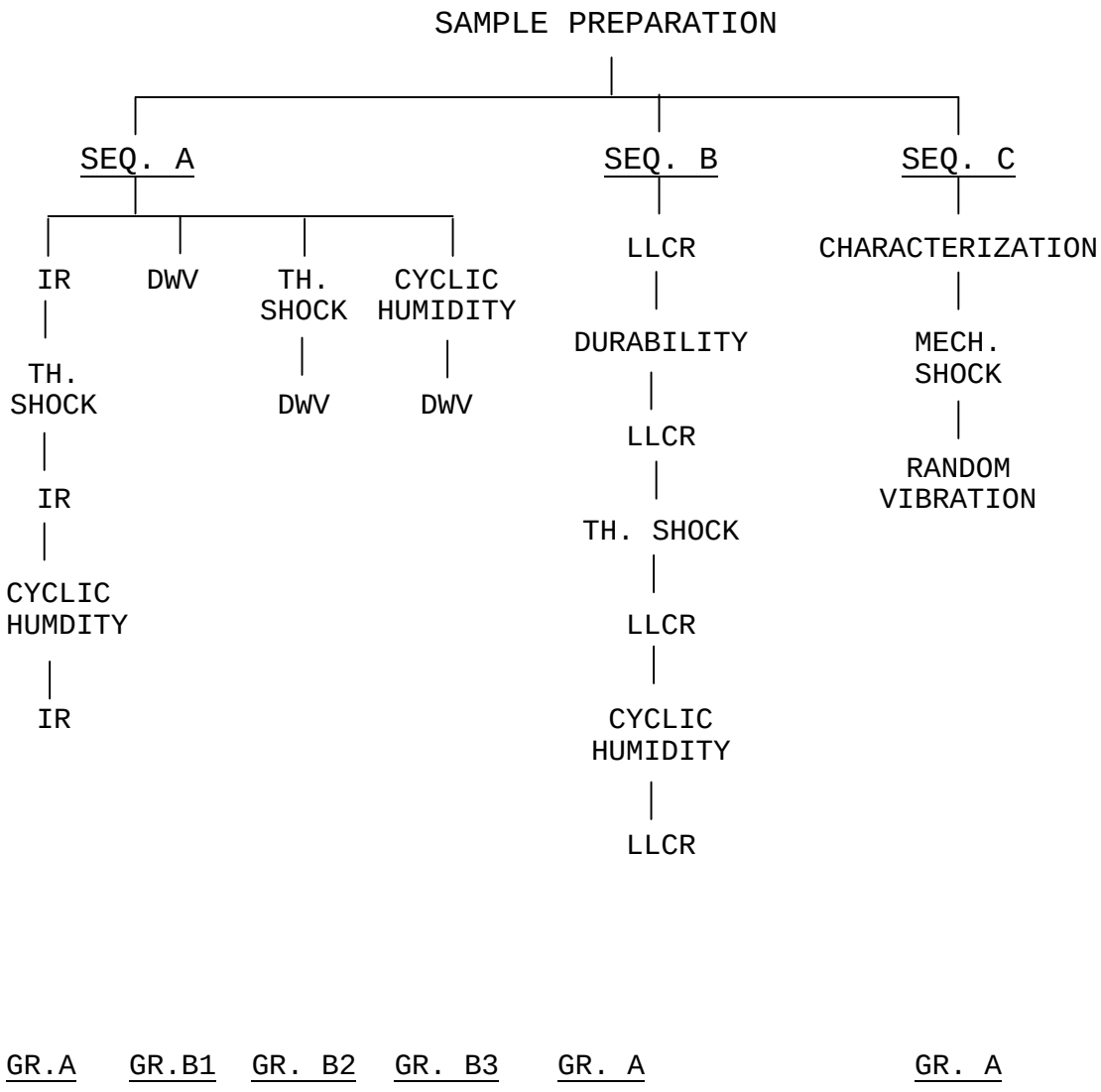


FIGURE #2

TEST PLAN FLOW DIAGRAM



DATA SUMMARY

TEST	REQUIREMENTS	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
CYCLIC HUMIDITY	NO DAMAGE	PASSED
INSULATION RESISTANCE	1000 MEGOHMS MIN.	>50,000 MEGOHMS
GROUP B1		
DWV	NO BREAKDOWN, ETC.	PASSED
GROUP B2		
THERMAL SHOCK	NO DAMAGE	PASSED
DWV	NO BREAKDOWN, ETC.	PASSED
GROUP B3		
CYCLIC HUMIDITY	NO DAMAGE	PASSED
DWV	NO BREAKDOWN, ETC.	PASSED
SEQUENCE B		
GROUP A		
LLCR	RECORD	24.1 mΩ MAX.
DURABILITY	NO DAMAGE	PASSED
LLCR	+10.0 mΩ MAX.CHG.	+2.2 mΩ MAX.CHG.
THERMAL SHOCK	NO DAMAGE	PASSED
LLCR	+10.0 mΩ MAX.CHG.	+2.0 mΩ MAX.CHG.
CYCLIC HUMIDITY	NO DAMAGE	PASSED
LLCR	+10.0 mΩ MAX.CHG.	+3.4 mΩ MAX.CHG.
SEQUENCE C		
GROUP A		
MECHANICAL SHOCK	NO DAMAGE	PASSED
	1.0 MICROSECOND	PASSED
RANDOM VIBRATION	NO DAMAGE	PASSED
	1.0 MICROSECOND	PASSED

EQUIPMENT LIST

ID#	Next Cal	Last Cal	Equipment Name	Manufacturer	Model #	Serial #	Accuracy	Freq.Cal
52			Drill Press Stand	Craftsman	25921	4001-2	N/A	N/A
192	4/29/2009	4/29/2008	Vertical Thermal Shock	Cincinnati Sub-Zero	VTS-1-5-3	88-11094	See Cal Cert	12mon
321	3/12/2009	3/12/2008	AC-DC Hipot/Megometer	Hipotronics Co.	H300B	DS16-201	See Cal Cert	12 mon.
488			X-Y Table	N.E.Affiliated Tech.	N/A	932021	N/A	N/A
547	6/12/2009	6/12/2008	Temp Humid Chamber	CSZ	ZH-8-1-H-AC	ZG9442057	See Cal Cert	12mon
553	2/11/2009	2/11/2008	12 channel Power Unit	PCB Co.	483A	1303	See Cal Cert	12mon
601			Computer	A.M.I.	P111-450	082714	N/A	N/A
673	8/12/2009	8/12/2008	Microohm Meter	Keithley Co.	580	0681911	See Cal Cert	12 mon.
677	10/5/2008	10/5/2007	Microohm Meter	Keithley Co.	580	0685122	See Cal Cert	12 mon
681			Computer	ARC Co.	P166	N/A	N/A	N/A
1166	7/17/2009	7/17/2008	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
1271			Amplifier	Unholtz Dickie	SA15	3483	N/A	N/A
1272			Shaker Table	Unholtz Dickie	S202PB	263	N/A	N/A
1315	2/7/2009	2/7/2008	Data Aquisition Multimeter	Keithley Co.	2700	0862680	See CERT	12mon
1549	12/15/2008	12/15/2007	Multiplexer Card	Keithley	7708	171629	See Cert	See Cert
1550	12/14/2008	12/14/2007	Multiplexer Card	Keithley	7708	171626	See Cert	See Cert
1556	2/5/2009	2/5/2008	Accelerometer	PCB	353B04	122769	See Cal Cert	12mon

TEST RESULTS

SEQUENCE A
GROUP A

PROJECT NO.: 208315A SPECIFICATION: ERF8-RA Flow Chart

PART NO.: ERF8-050-01-S-D-RA
ERM8-050-05.0-S-DV-L
PART DESCRIPTION: Plug/Receptacle Connector

SAMPLE SIZE: 2 Samples TECHNICIAN: BE

START DATE: 7/10/08 COMPLETE DATE: 7/10/08

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 42%

EQUIPMENT ID#: 321

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) Test Voltage	:	500 VDC

3. The test voltage was applied to specific test points on the test 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.: 208315A SPECIFICATION: ERF8-RA Flow Chart

PART NO.: ERF8-050-01-S-D-RA PART DESCRIPTION: Plug/Receptacle
ERM8-050-05.0-S-DV-L Connector

SAMPLE SIZE: 2 Samples TECHNICIAN: BE

START DATE: 7/10/08 COMPLETE DATE: 7/16/08

ROOM AMBIENT: 22 °C RELATIVE HUMIDITY: 42%

EQUIPMENT ID#: 192, 321, 1315, 1549, 1550

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.

5. 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 insulation resistance shall not be less than 1,000 megohms.

RESULTS:

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

2. The insulation resistance exceeded 50,000 megohms.

PROJECT NO.: 208315A SPECIFICATION: ERF8-RA Flow Chart

PART NO.: ERF8-050-01-S-D-RA
ERM8-050-05.0-S-DV-L
PART DESCRIPTION: Plug/Receptacle Connector

SAMPLE SIZE: 2 Samples TECHNICIAN: BE

START DATE: 7/18/08 COMPLETE DATE: 7/29/08

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 48%

EQUIPMENT ID#: 321, 547, 1315, 1549, 1550

HUMIDITY (THERMAL CYCLING)

PURPOSE:

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.

PROCEDURE:

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

2. Test Conditions:

a) Preconditioning (24 hours)	:	50°C ± 5°C
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

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: See Next Page

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 50,000 megohms after air dry of 2 hours.

TEST RESULTS

SEQUENCE A
GROUP B1

PROJECT NO.: 208315A SPECIFICATION: ERF8-RA Flow Chart

PART NO.: ERF8-050-01-S-D-RA
ERM8-050-05.0-S-DV-L
PART DESCRIPTION: Plug/Receptacle Connector

SAMPLE SIZE: 2 Samples TECHNICIAN: DH

START DATE: 7/14/08 COMPLETE DATE: 7/14/08

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 46%

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
e)	Mated Condition	: Mated
f)	Mounting Condition	: Mounted
i)	Hold Time	: 60 seconds
j)	Rate of Application	: 500 volts/sec.
k)	Test Voltage	: 900 VAC

3. The test voltage was applied to specific test points on the test 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.: 208315A SPECIFICATION: ERF8-RA Flow Chart

PART NO.: ERF8-050-01-S-D-RA PART DESCRIPTION: Plug/Receptacle
ERM8-050-05.0-S-DV-L Connector

SAMPLE SIZE: 2 Samples TECHNICIAN: BE

START DATE: 7/10/08 COMPLETE DATE: 7/16/08

ROOM AMBIENT: 22°C RELATIVE HUMIDITY: 32%

EQUIPMENT ID#: 192, 321, 1315, 1549, 1550

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.

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

RESULTS:

1. There was no 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.

TEST RESULTS

SEQUENCE A
GROUP B3

PROJECT NO.: 208315A SPECIFICATION: ERF8-RA Flow Chart

PART NO.: ERF8-050-01-S-D-RA
ERM8-050-05.0-S-DV-L
PART DESCRIPTION: Plug/Receptacle Connector

SAMPLE SIZE: 2 Samples TECHNICIAN: BE

START DATE: 7/18/08 COMPLETE DATE: 7/29/08

ROOM AMBIENT: 22°C RELATIVE HUMIDITY: 48%

EQUIPMENT ID#: 321, 547, 1315, 1549, 1550

HUMIDITY (THERMAL CYCLING)

PURPOSE:

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.

PROCEDURE:

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

2. Test Conditions:

   a) Preconditioning (24 hours) : 50°C ± 5°C
   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

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: See Next Page

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 no evidence of breakdown, arcing, etc., when a 900 VAC test voltage was applied.

TEST RESULTS

SEQUENCE B
GROUP A

PROJECT NO.: 208315A SPECIFICATION: ERF8-RA Flow Chart

PART NO.: ERF8-050-01-S-D-RA
ERM8-050-05.0-S-DV-L
PART DESCRIPTION: Plug/Receptacle Connector

SAMPLE SIZE: 8 Samples TECHNICIAN: BE, DH

START DATE: 7/10/08 COMPLETE DATE: 7/10/08

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 42%

EQUIPMENT ID#: 601, 673, 677, 681

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:

-continued on next page.

PROCEDURE: -continued

2. Test Conditions:

a) Test Current : 10 milliamps maximum
b) Open Circuit Voltage : 20 minutes
c) No. of Positions Tested : 23 per test sample

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

REQUIREMENTS:

Low level circuit resistance shall be measured and recorded.

RESULTS:

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

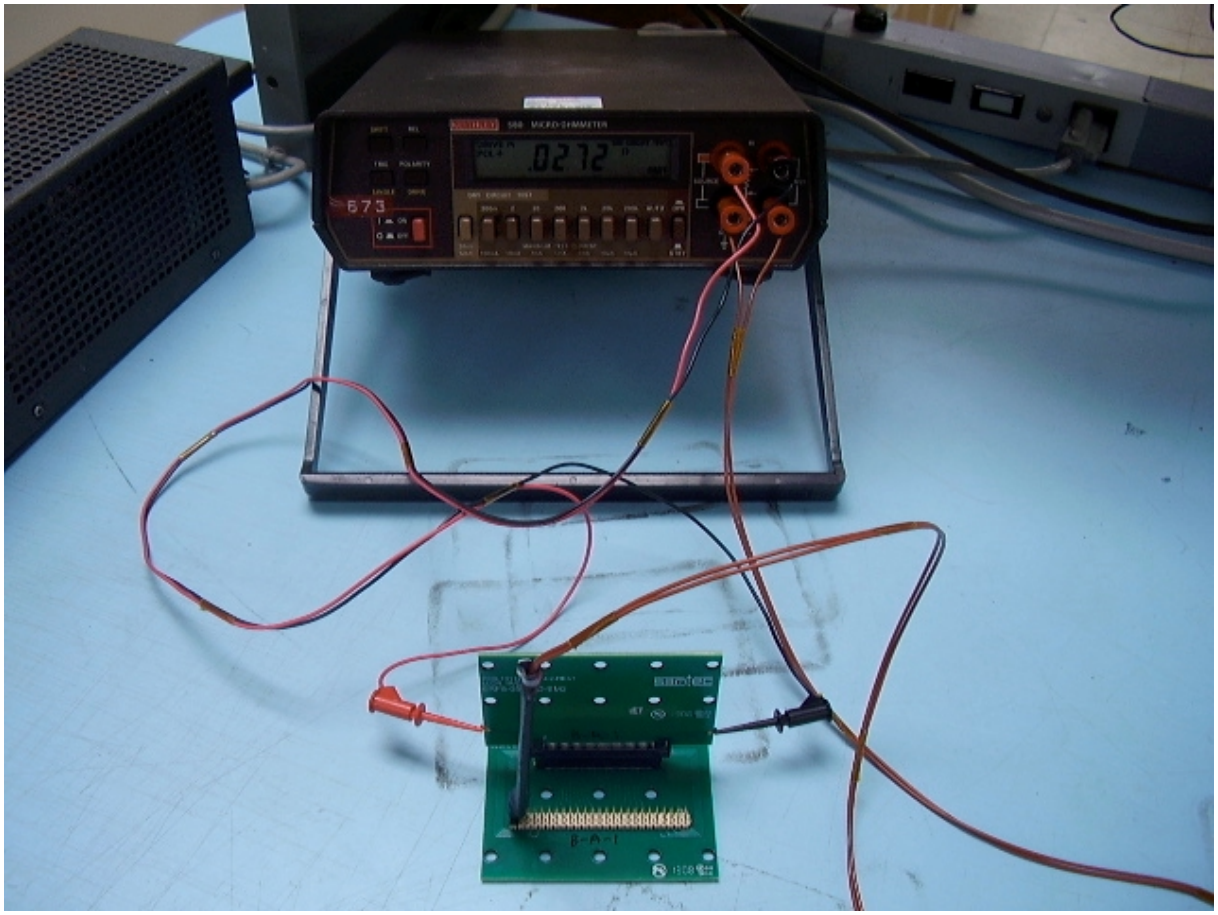
LOW LEVEL CIRCUIT RESISTANCE
(Milliohms)

Sample ID#	Avg.	Max.	Min.
B-A-1	19.7	20.8	17.1
B-A-2	19.7	23.2	16.9
B-A-3	20.3	24.1	17.2
B-A-4	19.6	22.3	16.3
B-A-5	20.0	22.2	17.1
B-A-6	19.5	21.0	17.3
B-A-7	20.0	24.0	17.0
B-A-8	19.6	22.8	17.2

2. See data files 20831501 through 20831508 for individual data points.

FIGURE #3

TYPICAL LLCR SET-UP



PROJECT NO.: 208315A SPECIFICATION: ERF8-RA Flow Chart

PART NO.: ERF8-050-01-S-D-RA
ERM8-050-05.0-S-DV-L
PART DESCRIPTION: Plug/Receptacle Connector

SAMPLE SIZE: 8 Samples TECHNICIAN: BE, DH

START DATE: 7/10/08 COMPLETE DATE: 7/10/08

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 42%

EQUIPMENT ID#: 52, 488, 601, 673, 677, 681

DURABILITY

PURPOSE:

1. This is a conditioning 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 of conditioning 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 : 1.0 inch per minute

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

-continued on next page.

PROCEDURE: -continued

4. The test samples were axially aligned to accomplish the mating and unmating function allowing for self-centering movement.

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

6. 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:

LOW LEVEL CIRCUIT RESISTANCE
(Milliohms)

Sample ID#	Avg. Change	Max. Change
B-A-1	+0.1	+1.7
B-A-2	+0.0	+2.2
B-A-3	-0.7	+1.2
B-A-4	+0.0	+0.6
B-A-5	-0.3	+0.7
B-A-6	+0.0	+0.8
B-A-7	-0.4	+0.9
B-A-8	+0.1	+1.4

2. See data files 20831501 through 20831508 for individual data points.

PROJECT NO.: 208315A SPECIFICATION: ERF8-RA Flow Chart

PART NO.: ERF8-050-01-S-D-RA PART DESCRIPTION: Plug/Receptacle
ERM8-050-05.0-S-DV-L Connector

SAMPLE SIZE: 8 Samples TECHNICIAN: BE

START DATE: 7/10/08 COMPLETE DATE: 7/16/08

ROOM AMBIENT: 22°C RELATIVE HUMIDITY: 32%

EQUIPMENT ID#: 192, 601, 673, 677, 681, 1315, 1549, 1550

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
   h) 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.

5. 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. 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
B-A-1	+0.2	+2.0
B-A-2	-0.2	+1.0
B-A-3	-1.0	+0.8
B-A-4	-0.5	+0.4
B-A-5	-0.4	+0.5
B-A-6	+0.1	+1.3
B-A-7	-0.2	+1.1
B-A-8	+0.1	+1.3

3. See data files 20831501 through 20831508 for individual data points.

PROJECT NO.: 208315A SPECIFICATION: ERF8-RA Flow Chart

PART NO.: ERF8-050-01-S-D-RA
ERM8-050-05.0-S-DV-L
PART DESCRIPTION: Plug/Receptacle Connector

SAMPLE SIZE: 8 Samples TECHNICIAN: BE, DH

START DATE: 7/18/08 COMPLETE DATE: 7/29/08

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 43%

EQUIPMENT ID#: 547, 601, 673, 677, 681, 1315, 1549, 1550

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, with the following conditions:

2. Test Conditions:

a) Preconditioning (24 hours) : 50°C ± 5°C
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-A-1	+0.2	+3.4
B-A-2	-0.2	+2.2
B-A-3	-1.1	+0.8
B-A-4	-0.9	+0.6
B-A-5	-0.8	+0.8
B-A-6	-0.3	+0.7
B-A-7	-0.9	+0.2
B-A-8	-0.3	+1.0

3. See data files 20831501 through 20831508 for individual data points.

LLCR DATA FILES

FILE NUMBERS

20831501
20831502
20831503
20831504
20831505
20831506
20831507
20831508

		Low Level Contact Resistance		
Project:	208315A		Spec:	EIA 364, TP 23
Customer:	Samtec		Subgroup:	B-A-1
Product:	Series ERF8-RA Conn.		File No:	20831501
Description:	B-A-1 - B-A-8			
Open circuit voltage:		20mV	Current:	10mA
			Delta Values	
			Units: Milliohms	
Temp ºC	23	23	23	23
R.H. %	42	42	42	48
Date:	10Jul08	10Jul08	16Jul08	29Jul08
Pos. ID	Initial	Durability	Thermal	Cyclic
		100X	Shock	Humidity
2	18.5	0.2	0.0	-0.7
3	18.1	-0.7	-1.1	-1.2
4	18.4	-0.5	-0.3	-0.7
5	17.1	0.0	-0.1	-0.5
6	20.3	1.7	0.7	1.6
7	20.3	0.2	1.0	0.9
8	20.2	1.0	0.9	0.4
9	20.1	0.0	-0.1	1.0
10	20.6	-0.1	0.2	3.4
11	19.9	0.5	0.4	0.5
12	20.8	-0.2	0.4	1.4
13	20.0	0.5	0.3	1.1
14	20.1	1.1	2.0	1.0
15	20.1	0.2	0.9	0.4
16	20.6	0.2	1.0	1.3
17	20.2	0.0	0.3	0.0
18	20.2	0.3	0.6	0.6
19	19.8	0.1	1.6	0.1
20	20.1	0.3	0.6	0.1
21	19.6	-0.6	-1.1	-1.5
22	19.4	-2.2	-2.3	-2.4
23	20.7	-1.3	-2.5	-2.7
24	17.2	0.7	0.1	-0.3
MAX	20.8	1.7	2.0	3.4
MIN	17.1	-2.2	-2.5	-2.7
AVG	19.7	0.1	0.2	0.2
STD	1.1	0.8	1.1	1.4
Open	0	0	0	0
Tech	BE	BE	BE	DH
Equip ID	601	601	601	236
	677	677	677	681

		Low Level Contact Resistance		
Project:	208315A		Spec:	EIA 364, TP 23
Customer:	Samtec		Subgroup:	B-A-2
Product:	Series ERF8-RA Conn.		File No:	20831502
Description:	B-A-1 - B-A-8			
Open circuit voltage:		20mV	Current:	10mA
			Delta Values	
			Units: Milliohms	
Temp ºC	23	23	23	23
R.H. %	42	42	42	48
Date:	10Jul08	10Jul08	16Jul08	29Jul08
Pos. ID	Initial	Durability	Thermal	Cyclic
		100X	Shock	Humidity
2	17.7	1.2	0.4	-0.1
3	17.2	-0.5	-0.6	0.3
4	18.6	0.1	-0.8	-1.0
5	16.9	0.6	-0.1	-0.4
6	20.4	-0.4	-0.1	-0.2
7	19.5	0.3	0.4	0.6
8	20.9	-0.2	-0.2	-0.2
9	19.9	-0.1	0.4	0.0
10	20.2	-0.4	-0.3	-0.3
11	19.9	0.1	0.4	2.2
12	20.4	0.7	1.0	1.4
13	23.2	-3.4	-2.5	-1.1
14	21.1	-0.3	-0.1	-0.2
15	20.5	0.0	0.9	-0.4
16	20.8	0.8	-0.2	-0.2
17	20.0	-0.1	0.0	-0.4
18	20.1	0.3	1.0	0.0
19	20.2	-0.3	-0.3	-0.6
20	20.5	-0.4	-0.2	-0.4
21	18.7	0.7	-0.7	-0.9
22	17.7	-0.2	-0.6	-1.0
23	21.3	-0.5	-2.3	-2.6
24	17.3	2.2	0.3	0.2
MAX	23.2	2.2	1.0	2.2
MIN	16.9	-3.4	-2.5	-2.6
AVG	19.7	0.0	-0.2	-0.2
STD	1.6	1.0	0.9	0.9
Open	0	0	0	0
Tech	BE	BE	BE	DH
Equip ID	601	601	601	236
	677	677	677	681

		Low Level Contact Resistance		
Project:	208315A		Spec:	EIA 364, TP 23
Customer:	Samtec		Subgroup:	B-A-3
Product:	Series ERF8-RA Conn.		File No:	20831503
Description:	B-A-1 - B-A-8			
Open circuit voltage:		20mV	Current:	10mA
			Delta Values	
			Units: Milliohms	
Temp ºC	23	23	23	23
R.H. %	42	42	42	48
Date:	10Jul08	10Jul08	16Jul08	29Jul08
Pos. ID	Initial	Durability	Thermal	Cyclic
		100X	Shock	Humidity
2	18.8	-0.2	-0.9	-1.4
3	18.7	-1.4	-1.6	-1.9
4	19.5	-1.0	-1.9	-2.3
5	17.2	0.0	-0.4	-0.5
6	20.9	-0.7	-0.7	-0.8
7	19.9	-0.3	-0.4	-0.4
8	20.5	1.0	0.4	0.8
9	19.8	0.1	0.2	0.0
10	21.4	0.1	-0.1	-0.3
11	21.9	-1.3	-0.8	-0.8
12	23.3	-2.0	-2.4	-2.2
13	19.9	1.2	0.8	0.1
14	21.3	-0.3	-0.7	-0.9
15	20.5	0.2	-0.5	-0.6
16	23.1	-2.4	-2.9	-2.1
17	24.1	-4.4	-4.1	-4.4
18	22.1	-1.5	-1.6	-1.6
19	20.6	-0.7	-1.0	-0.6
20	22.0	-0.8	-0.8	-0.9
21	17.8	0.0	-0.7	-0.7
22	17.7	-0.5	-1.2	-1.2
23	18.5	-0.4	-1.0	-1.2
24	17.7	-0.6	-1.2	-1.3
MAX	24.1	1.2	0.8	0.8
MIN	17.2	-4.4	-4.1	-4.4
AVG	20.3	-0.7	-1.0	-1.1
STD	1.9	1.2	1.1	1.1
Open	0	0	0	0
Tech	BE	BE	BE	DH
Equip ID	601	601	601	236
	677	677	677	681

		Low Level Contact Resistance		
Project:	208315A		Spec:	EIA 364, TP 23
Customer:	Samtec		Subgroup:	B-A-4
Product:	Series ERF8-RA Conn.		File No:	20831504
Description:	B-A-1 - B-A-8			
Open circuit voltage:		20mV	Current:	10mA
			Delta Values	
			Units: Milliohms	
Temp ºC	23	23	23	23
R.H. %	42	42	42	48
Date:	10Jul08	10Jul08	16Jul08	29Jul08
Pos. ID	Initial	Durability	Thermal	Cyclic
		100X	Shock	Humidity
2	18.0	0.6	0.4	0.2
3	16.6	0.3	-0.2	-0.3
4	17.9	0.2	-0.7	-0.7
5	16.8	0.1	-0.8	-0.6
6	20.6	0.2	0.3	-0.9
7	20.0	0.5	-0.4	-0.3
8	20.4	-0.3	-0.5	-0.8
9	20.4	0.1	-0.5	-1.3
10	20.8	-0.1	-1.0	-1.5
11	19.5	0.5	0.4	-0.3
12	20.8	-0.6	-0.8	-1.2
13	20.0	0.4	0.0	-0.9
14	21.3	0.3	-0.9	-1.4
15	21.1	-0.2	-1.4	-1.8
16	20.9	-0.3	0.0	-1.2
17	20.5	0.2	-0.9	-1.4
18	21.5	-0.4	-0.6	-1.5
19	22.2	-1.2	-1.6	-2.4
20	22.3	-1.3	-1.5	-1.9
21	18.4	-0.4	-1.5	-0.7
22	17.3	0.1	-0.6	-0.5
23	17.4	0.3	0.1	0.3
24	16.3	0.2	0.4	0.6
MAX	22.3	0.6	0.4	0.6
MIN	16.3	-1.3	-1.6	-2.4
AVG	19.6	0.0	-0.5	-0.9
STD	1.9	0.5	0.6	0.7
Open	0	0	0	0
Tech	BE	BE	BE	DH
Equip ID	601	601	601	236
	677	677	677	681

		Low Level Contact Resistance		
Project:	208315A		Spec:	EIA 364, TP 23
Customer:	Samtec		Subgroup:	B-A-5
Product:	Series ERF8-RA Conn.		File No:	20831505
Description:	B-A-1 - B-A-8			
Open circuit voltage:		20mV	Current:	10mA
			Delta Values	
			Units: Milliohms	
Temp ºC	23	23	23	23
R.H. %	42	42	42	48
Date:	10Jul08	10Jul08	16Jul08	29Jul08
Pos. ID	Initial	Durability	Thermal	Cyclic
		100X	Shock	Humidity
2	17.87	0.2	0.0	-0.4
3	17.07	-0.1	-0.5	-0.4
4	17.72	0.3	0.1	0.8
5	17.06	0.1	-0.4	-0.6
6	21.01	0.2	0.5	-0.5
7	20.24	0.2	0.4	0.2
8	20.67	0.0	-0.1	-0.1
9	20.23	-0.2	-0.2	-0.5
10	20.83	0.0	-0.1	-0.6
11	20.48	-0.1	-0.6	-0.6
12	21.57	0.7	-0.6	-0.8
13	20.78	-0.2	0.2	-0.8
14	21.38	-0.1	-0.2	-1.1
15	21.49	-1.3	-1.3	-1.8
16	22.17	-1.4	-0.2	-1.5
17	21.99	-1.2	-1.2	-2.1
18	21.45	-0.3	-0.5	-1.4
19	21.13	-0.8	0.2	-0.1
20	21.40	-1.4	-1.1	-1.1
21	19.04	0.0	-1.4	-1.5
22	18.11	-0.3	-1.0	-1.5
23	18.49	0.1	-0.7	-0.6
24	17.88	-0.4	-1.0	-1.3
MAX	22.2	0.7	0.5	0.8
MIN	17.1	-1.4	-1.4	-2.1
AVG	20.0	-0.3	-0.4	-0.8
STD	1.7	0.6	0.5	0.7
Open	0	0	0	0
Tech	DH	DH	BE	DH
Equip ID	673	673	601	673
	681	681	677	681

		Low Level Contact Resistance		
Project:	208315A		Spec:	EIA 364, TP 23
Customer:	Samtec		Subgroup:	B-A-6
Product:	Series ERF8-RA Conn.		File No:	20831506
Description:	B-A-1 - B-A-8			
Open circuit voltage:		20mV	Current:	10mA
			Delta Values	
			Units: Milliohms	
Temp ºC	23	23	23	23
R.H. %	42	42	42	48
Date:	10Jul08	10Jul08	16Jul08	29Jul08
Pos. ID	Initial	Durability	Thermal	Cyclic
		100X	Shock	Humidity
2	17.3	0.8	0.5	0.2
3	17.8	-1.0	-1.2	-1.0
4	18.9	-0.4	-1.3	-1.2
5	17.4	-0.1	-0.4	-0.6
6	20.7	0.4	0.1	-0.1
7	20.2	0.6	0.6	0.3
8	21.0	-0.2	-0.2	-0.4
9	21.0	0.4	0.3	-0.5
10	20.5	0.8	0.2	-0.2
11	20.2	0.4	0.1	-0.3
12	20.3	0.1	0.5	0.0
13	19.8	-0.1	0.9	0.0
14	20.4	0.0	1.3	0.6
15	20.0	0.3	1.2	-0.1
16	20.5	-0.3	0.8	-0.2
17	19.7	0.5	1.2	0.7
18	20.0	0.0	0.3	-0.2
19	20.1	-0.2	0.7	-0.4
20	19.9	0.1	0.2	0.1
21	17.7	0.4	-0.4	-0.8
22	18.0	-0.1	-0.9	-1.1
23	18.5	-0.5	-0.8	-1.1
24	18.7	-1.6	-1.9	-1.7
MAX	21.0	0.8	1.3	0.7
MIN	17.3	-1.6	-1.9	-1.7
AVG	19.5	0.0	0.1	-0.3
STD	1.2	0.6	0.9	0.6
Open	0	0	0	0
Tech	DH	DH	BE	DH
Equip ID	673	673	601	673
	681	681	677	681

		Low Level Contact Resistance		
Project:	208315A		Spec:	EIA 364, TP 23
Customer:	Samtec		Subgroup:	B-A-7
Product:	Series ERF8-RA Conn.		File No:	20831507
Description:	B-A-1 - B-A-8			
Open circuit voltage:		20mV	Current:	10mA
			Delta Values	
			Units: Milliohms	
Temp ºC	23	23	23	23
R.H. %	42	42	42	48
Date:	10Jul08	10Jul08	16Jul08	29Jul08
Pos. ID	Initial	Durability	Thermal	Cyclic
		100X	Shock	Humidity
2	18.1	0.8	0.2	-0.3
3	17.5	0.2	-0.4	-0.6
4	17.9	0.0	1.1	-0.4
5	17.0	0.3	-0.4	-0.6
6	21.5	-0.8	0.0	-1.2
7	20.3	0.4	0.8	0.2
8	21.2	0.5	0.7	-0.3
9	20.9	-0.8	-0.8	-1.4
10	20.7	0.4	0.2	-0.3
11	20.2	0.0	-0.2	-0.7
12	21.5	-1.0	-0.1	-1.9
13	21.4	-1.5	-0.9	-2.1
14	21.8	-0.4	-0.7	-1.2
15	24.0	-3.1	-3.1	-4.1
16	22.0	-0.5	0.3	-1.4
17	20.8	-0.5	-0.1	-1.2
18	21.3	0.9	-0.1	-0.4
19	20.6	-0.7	0.1	-0.4
20	21.5	-1.5	-0.8	-0.7
21	18.0	-0.1	-0.3	-0.6
22	17.7	-0.8	-0.6	-1.1
23	17.6	-0.1	0.5	-0.2
24	17.2	-0.4	-0.5	-0.8
MAX	24.0	0.9	1.1	0.2
MIN	17.0	-3.1	-3.1	-4.1
AVG	20.0	-0.4	-0.2	-0.9
STD	2.0	0.9	0.8	0.9
Open	0	0	0	0
Tech	DH	DH	BE	DH
Equip ID	673	673	601	673
	681	681	677	681

		Low Level Contact Resistance		
Project:	208315A		Spec:	EIA 364, TP 23
Customer:	Samtec		Subgroup:	B-A-8
Product:	Series ERF8-RA Conn.		File No:	20831508
Description:	B-A-1 - B-A-8			
Open circuit voltage:		20mV	Current:	10mA
			Delta Values	
			Units: Milliohms	
Temp ºC	23	23	23	23
R.H. %	42	42	42	48
Date:	10Jul08	10Jul08	16Jul08	29Jul08
Pos. ID	Initial	Durability	Thermal	Cyclic
		100X	Shock	Humidity
2	17.8	0.8	1.0	0.2
3	17.8	-1.0	-1.2	-1.6
4	18.0	-0.2	-0.5	-1.0
5	17.2	0.6	-0.4	-0.6
6	20.3	0.1	0.2	0.1
7	19.8	-0.2	0.4	-0.2
8	20.5	1.0	0.4	0.1
9	19.9	0.0	0.8	0.0
10	21.7	0.1	0.1	-0.8
11	20.1	0.5	0.7	-0.1
12	21.1	-0.6	-0.2	0.1
13	20.2	0.3	0.7	0.0
14	22.8	-1.7	-1.7	-2.3
15	20.3	1.4	1.3	0.2
16	20.8	-0.1	1.0	-0.3
17	19.9	0.7	1.0	-0.1
18	20.1	0.5	0.5	0.4
19	20.6	-0.6	-0.3	-0.8
20	21.1	-0.2	0.0	-0.7
21	17.8	0.7	-0.4	-0.2
22	17.4	-0.2	-1.1	-1.0
23	17.5	1.3	0.1	0.0
24	17.3	-0.4	-0.9	1.0
MAX	22.8	1.4	1.3	1.0
MIN	17.2	-1.7	-1.7	-2.3
AVG	19.6	0.1	0.1	-0.3
STD	1.6	0.7	0.8	0.7
Open	0	0	0	0
Tech	DH	DH	BE	DH
Equip ID	673	673	601	673
	681	681	677	681

TEST RESULTS

SEQUENCE C
GROUP A

PROJECT NO.: 208315A	SPECIFICATION: ERF8-RA Flow Chart
PART NO.: ERF8-050-01-S-D-RA ERM8-050-05.0-S-DV-L	PART DESCRIPTION: Plug/Receptacle Connector
SAMPLE SIZE: 8 Samples	TECHNICIAN: BE, DH, MO
START DATE: 7/24/08	COMPLETE DATE: 7/25/08
ROOM AMBIENT: 22°C	RELATIVE HUMIDITY: 48%
EQUIPMENT ID#: 553, 1166, 1167, 1168, 1169, 1271, 1272, 1556	

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 EIA 364, Test Procedure 27.

2. Test Conditions:

   a) Peak Value : 100 G
   b) Duration : 6 Milliseconds
   c) Wave Form : Half-Sine
   d) Velocity : 9.7 feet Per Second
   e) No. of Shocks : 3 Shocks/Direction, 3 Axis (18 Total)

3. A stabilizing medium was used to maintain mechanical stability throughout testing.

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

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

REQUIREMENTS: See Next Page

REQUIREMENTS:

1. There shall be no evidence of axial movement of the test samples relative to each other.

2. There shall be no contact interruption greater than 1.0 microsecond.

RESULTS:

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

2. There was no contact interruption greater than 1.0 microsecond.

3. The Mechanical Shock characteristics are shown in Figures #5 (Calibration Pulse) and #6 (Test Pulse). Each figure displays the shock pulse contained within the upper and lower limits as defined by the appropriate test specification.

FIGURE #4

TYPICAL MECHANICAL SHOCK /RANDOM VIBRATION FIXTURE

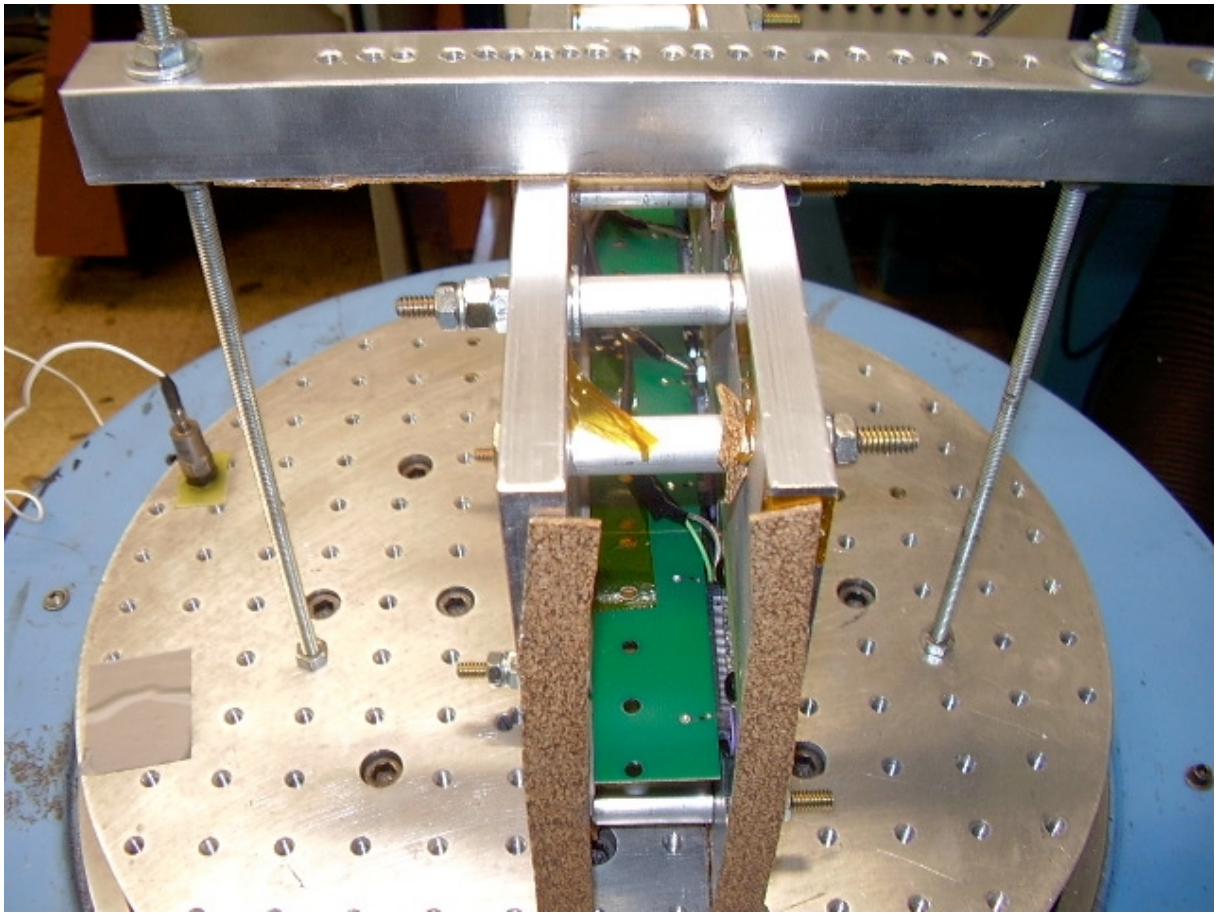
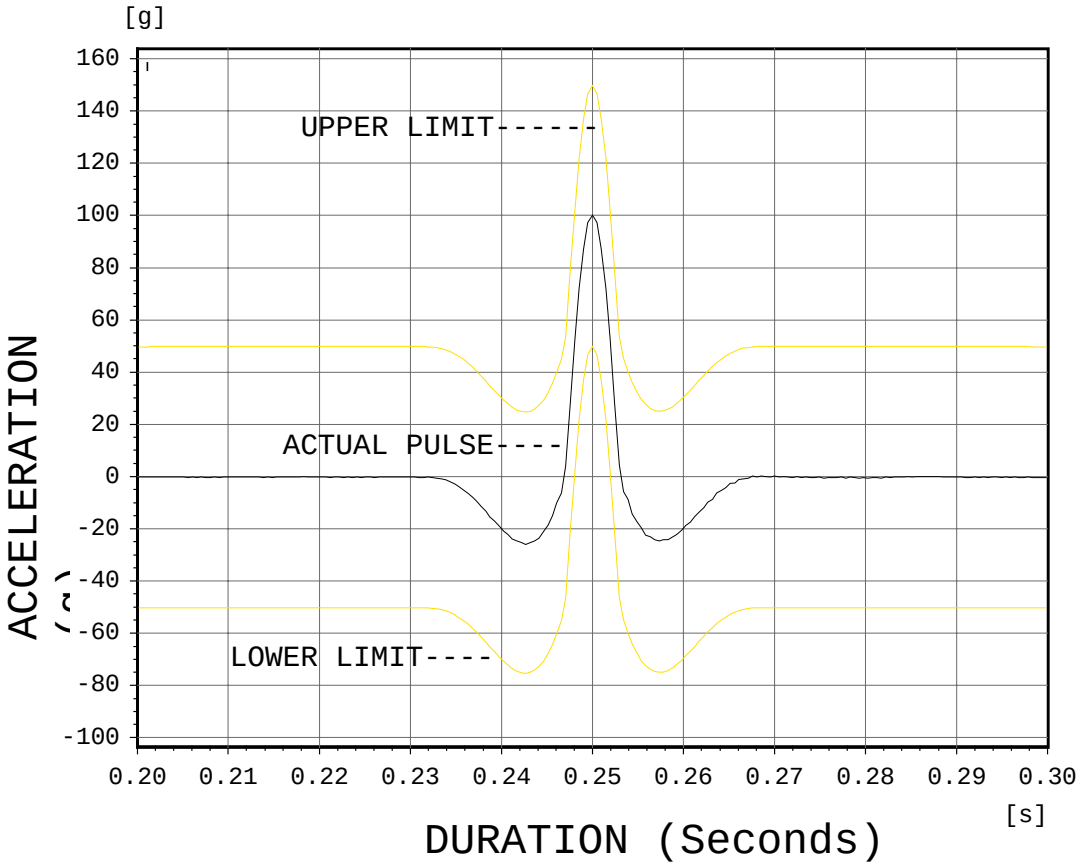


FIGURE #5

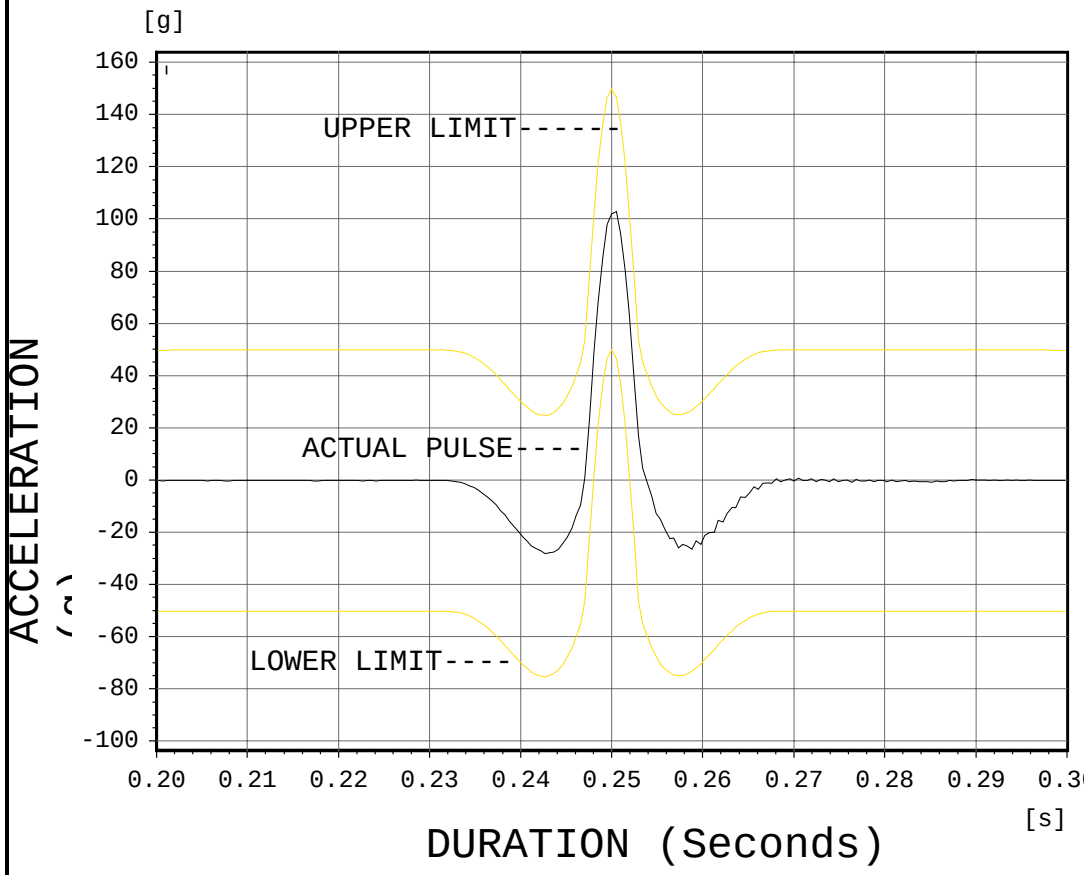
Classical Shock **_Channel 1_**



Project: 208315
7-24-08
Cal.Wave 1
Samtec/ERFA8-RA Series
100G's, 6mS, 12.3 ft/sec., Half Sine
Tech: DH

FIGURE #6

Classical Shock **_Channel 1_**



Project: 208315
7-25-08
Actual Wave
Samtec/ERFA8-RA Series
100G's, 6mS, 12.3 ft/sec., Half Sine
Tech: DH

PROJECT NO.: 208315A SPECIFICATION: ERF8-RA Flow Chart

PART NO.: ERF8-050-01-S-D-RA PART DESCRIPTION: Plug/Receptacle
ERM8-050-05.0-S-DV-L Connector

SAMPLE SIZE: 8 Samples TECHNICIAN: DH

START DATE: 7/25/08 COMPLETE DATE: 7/28/08

ROOM AMBIENT: 22°C RELATIVE HUMIDITY: 45%

EQUIPMENT ID#: 553, 1166, 1167, 1168, 1169, 1271, 1272, 1556

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.

2. Test Conditions:

   a) Power Spectral Density : 0.01 G^2/Hz
   b) G 'RMS' : 7.56
   c) Frequency : 50 to 2000 Hz
   d) Duration : 2.0 hour per axis (3 axis total)

3. A stabilizing medium was used to maintain mechanical stability throughout testing.

4. Figure #4 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. There shall be no contact interruption greater than 1.0 microsecond.

RESULTS:

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

2. There was no contact interruption greater than 1.0 microsecond.