MARCH 3, 2006

TEST REPORT #206039, REVISION 1.1

IP67/MECHANICAL SHOCK/
RANDOM VIBRATION TESTING

RUGGED I/O
SERIES CONNECTOR

SAMTEC, INC.

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

REVISION HISTORY

DATE	REV. NO.	DESCRIPTION	ENG.
3/3/06	1.0	Initial Issue	TP
6/12/06	1.1	Editorial changes - Pages 6,8,15,45	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.

Thomas Peel
President And
Director Of Test Program Development
Contech Research, Inc.

TP:cm/js

SCOPE

To perform IP67 and Mechanical Shock/Random Vibration testing on the Rugged I/O 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. Standards: EIA Publication 364
   CEI/IEC 60529

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

   a) Sealed Circular Cable Plug, Ethernet
   b) Panel Mount Dust Cap
   c) Ethernet Panel Mount Assembly
   d) Cable Dust Cap
   e) Sealed Circular Cable Plug, USB
   f) USB Panel Mount Assembly

2. Connectors were supplied with the appropriate conductors terminated in place by the test sponsor.

3. The samples for LLCR testing were prepared by removing the metal shell to expose the contacts as shown in Figure #1.

4. The following additional materials were submitted by the test sponsor to assist and perform the testing of items listed in #1 above.

   Description

   a) Torque Plug Adapters
   b) Test Canister (for water testing)

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

TEST SELECTION

The following test sequences were established for this program:

Sequence A	Sequence B1	Sequence B2	Sequence C1	Sequence C2
Group A-LLCR	Group A-IR	Group A-IR	Group A-LLCR	Group A-LLCR
Dust	Dust	Dust	Shock	Shock
LLCR	IR	IR	LLCR	LLCR
			Vibration	Vibration
Group B-IR	Group B-DWV	Group B-DWV	LLCR	LLCR
Dust	Dust	Dust		
IR	DWV	DWV		
Group C-DWV	Group A1-Water	Group A1-Water		
Dust	IR	IR		
DWV				
	Group B1-Water	Group B1-Water		
Group A1-LLCR	DWV	DWV		
Water				
LLCR				
Group B1-IR				
Water				
IR				
Group C1-DWV				
Water				
DWV				

TEST SELECTION continued

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(SCPU-G-2.00-D Cable(USB B)/SCRU-02 Panel Mount)

Group A - 1, 2, 3, 4, 5, 6
Group B - 7, 8, 9
Group C - 10, 11, 12
Group A1- 13, 14, 15, 16, 17, 18
Group B1- 19, 20, 21
Group C1- 22, 23, 24

Sequence B1(SCPU-G-2.00-D Cable(USB B)/DC-17-02 Dust Cover)

Group A - 25, 26, 27
Group B - 28, 29, 30
Group A1- 31, 32, 33
Group B1- 34, 35, 36

Sequence B2(SCRU-01 Panel Mount(USB B)/DC-17-01 Dust Cover)

Group A – 37, 38, 39
Group B – 40, 41, 42
Group A1- 43, 44, 45
Group B1- 46, 47, 48

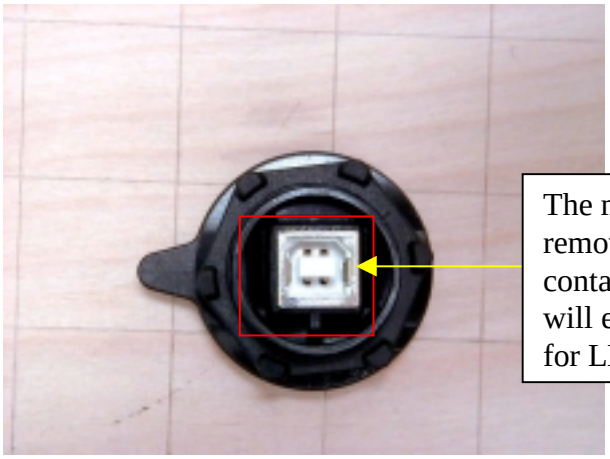
Sequence C1(SCPU-G-2.00-D Cable(USB A)/SCRU-01 Panel Mount)

Group A – 49, 50, 51, 52, 53, 54

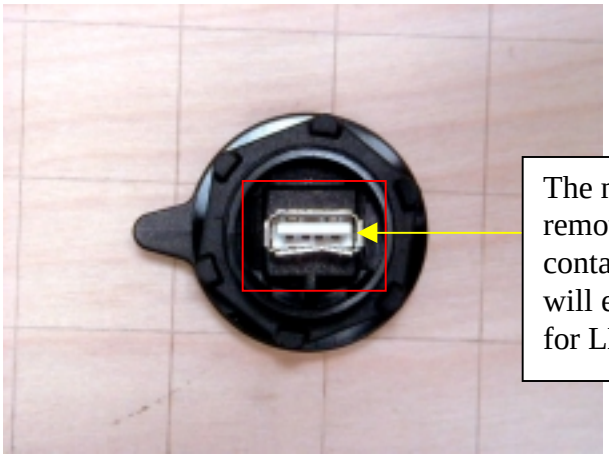
Sequence C2(SCPE-G-2.00-D Cable/SCRE-01 Panel Mount)

Group A - 55, 56, 57, 58, 59, 60

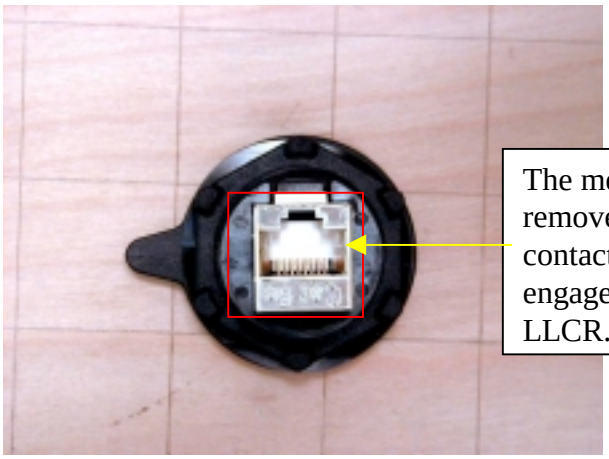
FIGURE #1



The metal shell was removed to expose the contacts. V and I probes will engage the contacts for LLCR.



The metal shell was removed to expose the contacts. V and I probes will engage the contacts for LLCR.



The metal shell was removed to expose the contacts. V and I probes will engage the contacts for LLCR.

DATA SUMMARY

TEST	REQUIREMENTS	RESULTS
SEQUENCE A		
GROUP A		
LLCR		
-CONTACT TO CONTACT	RECORD	52.6 mΩ MAX.
-CONTACT TO SHIELD	RECORD	10.4 mΩ MAX.
DUST (NUMERAL 6)	NO DAMAGE	PASSED
LLCR		
-CONTACT TO CONTACT	+10.0 mΩ MAX.CHG.	+1.6 mΩ MAX.CHG.
-CONTACT TO SHIELD	+10.0 mΩ MAX.CHG.	+1.1 mΩ MAX.CHG.
GROUP B		
IR	1000 MEGOHMS MIN.	>50000 MEGOHMS
DUST (NUMERAL 6)	NO DAMAGE	PASSED
IR	1000 MEGOHMS MIN.	>50000 MEGOHMS
GROUP C		
DWV	NO FLASHOVER, ETC.	PASSED
DUST (NUMERAL 6)	NO DAMAGE	PASSED
DWV	NO FLASHOVER, ETC.	PASSED
GROUP A1		
LLCR		
-CONTACT TO CONTACT	RECORD	52.7 mΩ MAX.
-CONTACT TO SHIELD	RECORD	18.5 mΩ MAX.
WATER (NUMERAL 7)	NO WATER INGRESS	PASSED
LLCR		
-CONTACT TO CONTACT	+10.0 mΩ MAX.CHG.	+5.6 mΩ MAX.CHG.
-CONTACT TO SHIELD	+10.0 mΩ MAX.CHG.	+3.7 mΩ MAX.CHG.
GROUP B1		
IR	1000 MEGOHMS MIN.	>50000 MEGOHMS
WATER (NUMERAL 7)	NO WATER INGRESS	PASSED
IR	1000 MEGOHMS MIN.	>50000 MEGOHMS
GROUP C1		
DWV	NO FLASHOVER, ETC.	PASSED
WATER (NUMERAL 7)	NO WATER INGERSS	PASSED
DWV	NO FLASHOVER, ETC.	PASSED

DATA SUMMARY - continued

TEST	REQUIREMENTS	RESULTS
SEQUENCE B1		
GROUP A		
IR	1000 MEGHOMS	>50000 MEGOHMS
DUST (NUMERAL 6)	NO DAMAGE	PASSED
IR	1000 MEGOHMS	>50000 MEGOHMS
GROUP B		
DWV	NO FLASHOVER, ETC.	PASSED
DUST (NUMERAL 6)	NO DAMAGE	PASSED
DWV	NO FLASHOVER, ETC.	PASSED
GROUP A1		
WATER (NUMERAL 7)	NO WATER INGRESS	PASSED
IR	1000 MEGOHMS MIN.	>50000 MEGOHMS
GROUP B1		
WATER (NUMERAL 7)	NO WATER INGRESS	PASSED
DWV	NO BREAKDOWN, ETC.	PASSED
SEQUENCE B2		
GROUP A		
IR	1000 MEGHOMS	>50000 MEGOHMS
DUST (NUMERAL 6)	NO DAMAGE	PASSED
IR	1000 MEGOHMS	>50000 MEGOHMS
GROUP B		
DWV	NO FLASHOVER, ETC.	PASSED
DUST (NUMERAL 6)	NO DAMAGE	PASSED
DWV	NO FLASHOVER, ETC.	PASSED
GROUP A1		
WATER (NUMERAL 7)	NO WATER INGRESS	PASSED
IR	1000 MEGOHMS MIN.	>50000 MEGOHMS
GROUP B1		
WATER (NUMERAL 7)	NO WATER INGRESS	PASSED
DWV	NO BREAKDOWN, ETC.	PASSED

DATA SUMMARY - continued

TEST	REQUIREMENTS	RESULTS
SEQUENCE C1		
GROUP A		
LLCR		
-CONTACT TO CONTACT	RECORD	91.1 mΩ MAX.
-CONTACT TO SHIELD	RECORD	12.6 mΩ MAX.
MECHANICAL SHOCK	NO DAMAGE	PASSED
LLCR		
-CONTACT TO CONTACT	+10.0 mΩ MAX.CHG.	+1.1 mΩ MAX.CHG.
-CONTACT TO SHIELD	+10.0 mΩ MAX.CHG.	+0.5 mΩ MAX.CHG.
RANDOM VIBRATION	NO DAMAGE	PASSED
LLCR		
-CONTACT TO CONTACT	+10.0 mΩ MAX.CHG.	+1.3 mΩ MAX.CHG.
-CONTACT TO SHIELD	+10.0 mΩ MAX.CHG.	+1.0 mΩ MAX.CHG.
SEQUENCE C2		
GROUP A		
LLCR		
-CONTACT TO CONTACT	RECORD	92.2 mΩ MAX.
-CONTACT TO SHIELD	RECORD	140.1 mΩ MAX.
MECHANICAL SHOCK	NO DAMAGE	PASSED
LLCR		
-CONTACT TO CONTACT	+10.0 mΩ MAX.CHG.	+1.5 mΩ MAX.CHG.
-CONTACT TO SHIELD	+10.0 mΩ MAX.CHG.	+13.5 mΩ MAX.CHG.
RANDOM VIBRATION	NO DAMAGE	PASSED
LLCR		
-CONTACT TO CONTACT	+10.0 mΩ MAX.CHG.	+2.3 mΩ MAX.CHG.
-CONTACT TO SHIELD	+10.0 mΩ MAX.CHG.	+11.8 mΩ MAX.CHG.

EQUIPMENT LIST

ID#	Next Cal	Last Cal	Equipment Name	Manufacturer	Model #	Serial #	Accuracy	Freq.Cal
16			High Vac Chamber	Edwards Co.	EIM8	1092	N/A	12mon
26	1/10/2007	1/10/2006	Dial-a-Gram Scale	Ohaus Co.	2610	26	See Cal Cert	12mon
281			Vibration Power Amp	Ling Dynamics	DPA 10K	156	N/A	N/A
282			Vibration Shaker Table	Ling Dynamics	V-730	163	N/A	N/A
321	2/22/2006	2/22/2005	AC-DC Hipot /Megometer	Hipotronics Co.	H300B	DS16-201	See Cal Cert	12 mon.
403			Sand Chamber	Contech Research	4000	4000 i n 3-1	N/A	Ea Test
553	12/12/2006	12/12/2005	12 channel Power Unit	PCB Co.	483A	1303	See Cal Cert	12mon
601			Computer	A.M.I.	P111-450	082714	N/A	N/A
874			Computer	M&P	Vectra	us75203327	N/A	N/A
1121	10/31/2006	10/31/2005	Accelerometer	PCB	353B04	57715	See Cal. Cert.	12mon
1145	10/21/2006	10/21/2005	Digital Timer	VWR	62379-036	99319122	±.001%	12mon
1166	7/19/2006	7/19/2005	Sine/Rndm Vib Control Digitizer	Hewlett Packard	E1432A	US39342279	See Cal Cert	12 mon
1167			Interface	Hewlett Packard	E8491B	US390100753	N/A	N/A
1168			Mainframe	Hewlett Packard	E8408A	US39000357	N/A	N/A
1271			Amplifier	Unholtz Dickie	SA15	3483	See Manual	N/A
1272			Shaker Table	Unholtz Dickie	S202PB	263	N/A	N/A
1278	7/29/2006	7/29/2005	Microohm mtr	Keithley	580	0803947	See Manual	12 mon.
1366			Main Frame	Aiglent H.P.	8408A		N/A	N/A
1367			Interface	Aiglent H.P.	E8491A		N/A	N/A
1368	2/13/2007	2/13/2006	Sine/Rnd Control digitizer	Aiglent H.P.	E1432A	US35470169	See Manual	12mont
1435	5/2/2006	5/2/2005	Air Pressure Monitor	Contech DAN	C05	001	See Cert	12mon
1442			Sand Storm Box	Contech Research	SSB-1	62705		
1465			Immersion Tube	Contech	1 Meter	N/A	N/A	N/A
1467	12/16/2006	12/16/2005	Accelerometer	PCB	353B15	106490	See Cal Cert	12mon
1468			Flow Meter	Cole Parmer	0-150	501081	N/A	N/A

TEST RESULTS

SEQUENCE A

GROUP A

PROJECT NO.: 206039 SPECIFICATION: N/A

PART NO.: See Page 6 PART DESCRIPTION: Cable Assy(USB B)/ Panel Mount Assy

SAMPLE SIZE: 6 Samples TECHNICIAN: BE

START DATE: 2/9/06 COMPLETE DATE: 2/9/06

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 24%

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 : 100 milliamps maximum
   b) Open Circuit Voltage : 20 millivolts
   c) No. Of Positions : 4 Contact to Contact/Sample
   : 1 Contact to Shield/Sample

PROCEDURE: continued

3. The samples were mated and torqued to 7.0 in-lbs prior to test. The panel mount connectors were attached to the test canister using a torque of 25 in-lbs on the nut on the inside of the canister (See Figure #2).

4. 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 Type	Avg.	Max.	Min.
SCPU-G-2.00-D Cable(USB B)/ SCRU-02 Panel Mount			
-Contact to Contact	40.8	52.6	31.2
-Contact to Shield	9.3	10.4	8.4

2. See data files 20603901 and 20603905 for individual data points.

FIGURE #2

ENCLOSURES

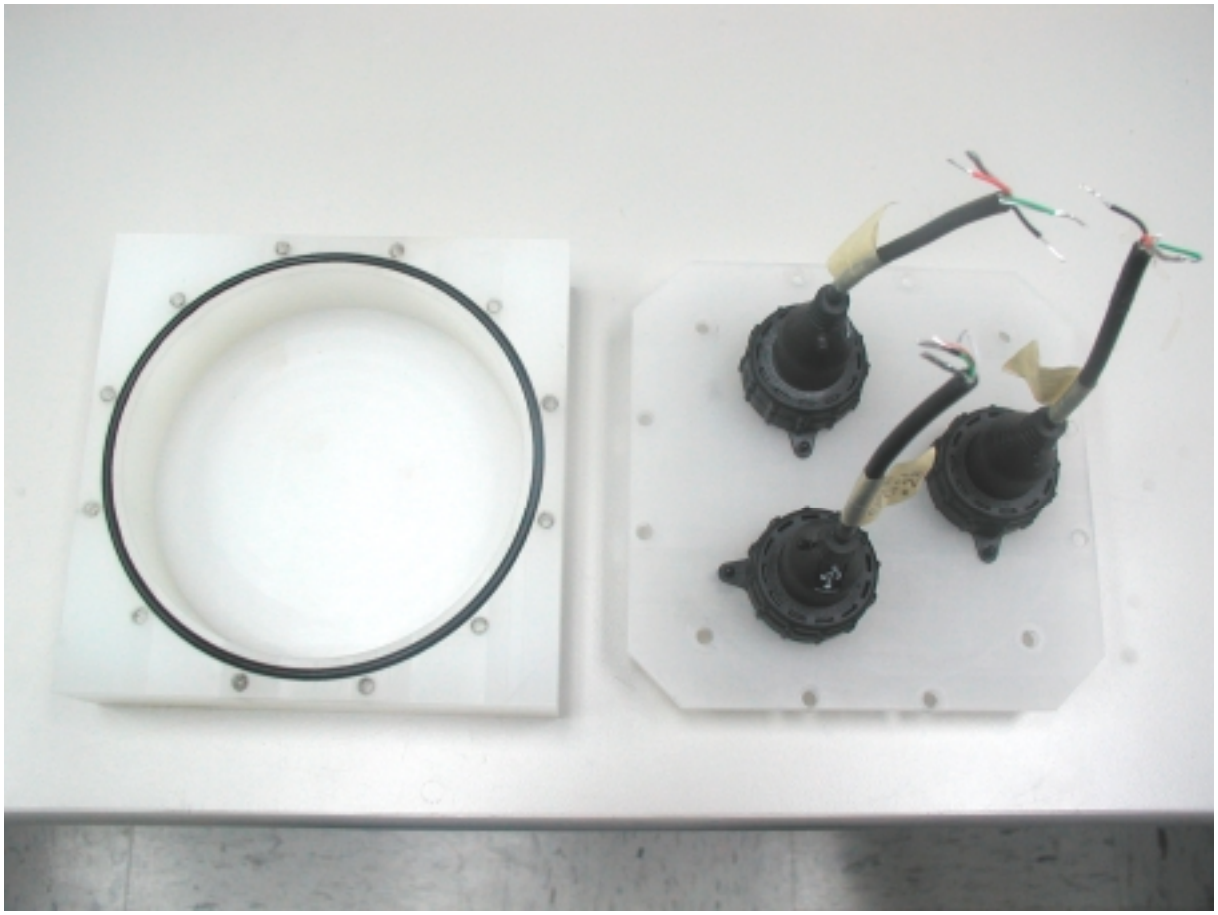
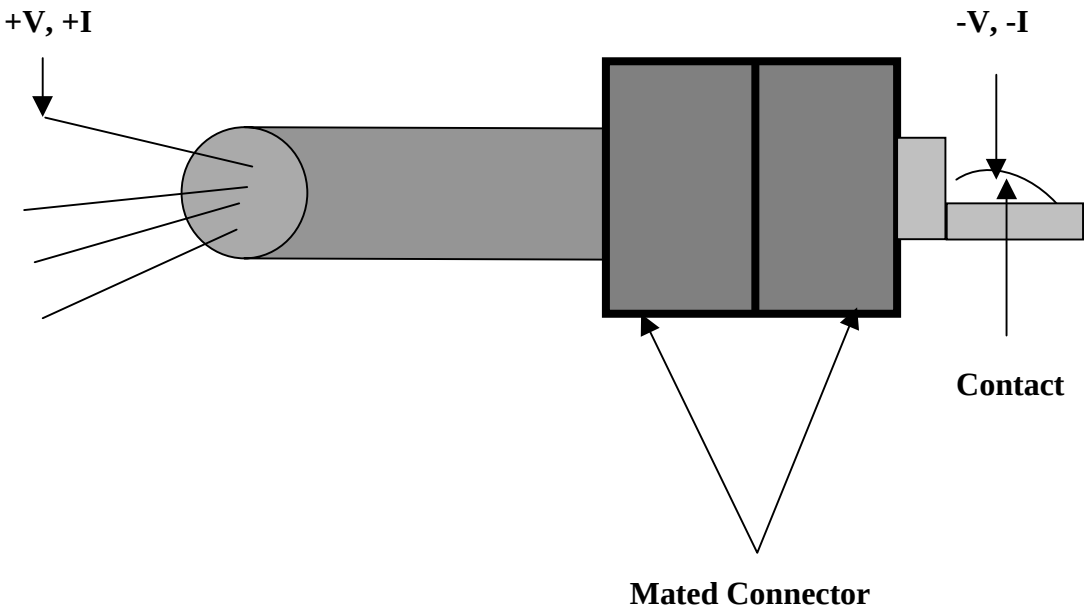


FIGURE #3

TYPICAL LLCR SET-UP



PROJECT NO.: 206039 SPECIFICATION: N/A

PART NO.: See Page 6 PART DESCRIPTION: Cable Assy(USB B)/ Panel Mount Assy

SAMPLE SIZE: 6 Samples TECHNICIAN: BE

START DATE: 2/10/06 COMPLETE DATE: 2/10/06

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 24%

EQUIPMENT ID#: 16, 26, 403, 601, 1278, 1435, 1468

DUST EXPOSURE (NUMERAL 6)

PURPOSE:

To simulate applications where components may be exposed unmated for extended periods of time and are susceptible to exposure to a dust environment. To determine the impact of residual dust on the electrical stability of the contact system.

PROCEDURE:

1. The test was performed in accordance with CEI/IEC 60529 IP67, Paragraph 13.4.

2. Test Conditions:
   a) Size of Chamber : 2.48 ft^3
   b) Amount of Dust : 22 grams
   c) Exposure Time : 2.0 hours under vacuum
   d) Dust Type : Talcum Powder

3. The connectors were exposed in a mated condition while assembled to the test canister as shown in Figure #2.

4. After exposure the test samples were cleaned by wiping the contact surfaces with a brush.

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

6. 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 exposed.

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 exposed.

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

	CHANGE IN LOW LEVEL CIRCUIT RESISTANCE (Milliohms)	
Sample Type	Avg. Change.	Max. Change.
SCPU-G-2.00-D Cable(USB B)/ SCRU-02 Panel Mount		
-Contact to Contact	-0.6	+1.6
-Contact to Shield	-0.4	+1.1

3. See data files 20603901 and 20603905 for individual data points.

LLCR DATA FILES

FILE NUMBERS

20603901
20603905

			Low Level Contact Resistance					
	Project:	206039				Spec:	EIA 364, TP 23	
	Customer:	Samtec				Subgroup:	Seq A, Group A	
	Product:	Rugged I/O connector				File #:	20603901	
	Description:	SCPU-G-2.00-D Cable (USB B) to SCRU-02 Panel mount						
	Open circuit voltage:		20mv			Current:	10ma	
				Delta values				
				units: milliohms				
	Temp ºC	23	23					
	R.H. %	24	24					
	Date:	09Feb06	10Feb06					
	Pos. ID	Initial	Dust					
	1-Red	35.7	-1.0					
	1-Black	33.9	-1.6					
	1-Green	50.0	-1.4					
	1-White	52.6	-0.3					
	2-Red	32.3	-2.3					
	2-Black	31.9	1.6					
	2-Green	47.4	-0.5					
	2-White	49.0	-1.7					
	3-Red	31.2	-0.1					
	3-Black	32.2	-0.3					
	3-Green	50.3	-2.0					
	3-White	50.2	1.5					
	4-Red	32.7	-1.4					
	4-Black	35.0	-2.4					
	4-Green	47.8	1.2					
	4-White	47.3	-0.7					
	5-Red	31.2	-1.0					
	5-Black	31.9	-0.4					
	5-Green	47.6	1.2					
	5-White	49.1	-1.9					
	6-Red	31.3	-0.7					
	6-Black	32.7	0.4					
	6-Green	47.8	-0.5					
	6-White	48.1	-0.2					
	MAX	52.6	1.6					
	MIN	31.2	-2.4					
	AVG	40.8	-0.6					
	STD	8.4	1.2					
	Open	0	0					
	Tech	BE	BE					
	Equip ID	601	601					
		1278	1278					

			Low Level Contact Resistance					
	Project:	206039				Spec:	EIA 364, TP 23	
	Customer:	Samtec				Subgroup:	Seq A, Group A	
	Product:	Rugged I/O connector				File #:	20603905	
	Description:	SCPU-G-2.00-D Cable (USB B) to SCRU-02 Panel mount (Shield)						
	Open circuit voltage:		20mv			Current:	10ma	
				Delta values				
				units: milliohms				
	Temp ºC	23	23					
	R.H. %	24	24					
	Date:	09Feb06	10Feb06					
	Pos. ID	Initial	Dust					
	Shield # 1	10.1	0.7					
	Shield # 2	10.4	-2.1					
	Shield # 3	9.2	-1.3					
	Shield # 4	8.4	-0.6					
	Shield # 5	8.9	1.1					
	Shield # 6	9.0	-0.2					
	MAX	10.4	1.1					
	MIN	8.4	-2.1					
	AVG	9.3	-0.4					
	STD	0.8	1.2					
	Open	0	0					
	Tech	BE	BE					
	Equip ID	601	601					
		1278	1278					

TEST RESULTS

SEQUENCE A

GROUP B

PROJECT NO.: 206039 SPECIFICATION: N/A

PART NO.: See Page 6 PART DESCRIPTION: Cable Assy(USB B)/ Panel Mount Assy

SAMPLE SIZE: 3 Samples TECHNICIAN: BE

START DATE: 2/9/06 COMPLETE DATE: 2/9/06

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 24%

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) Between Contacts and Shell	:	Yes
d) Mated Condition	:	Mated
e) Electrification Time	:	2.0 Minutes
f) Test Voltage	:	500 VDC

3. The samples were mated and torqued to 7.0 in-lbs prior to test. The panel mount connectors were attached to the test canister using a torque of 25 in-lbs on the nut on the inside of the canister (See Figure #2).

REQUIREMENTS:

When the specified test voltage is applied, the insulation resistance shall not be less than 1000 megohms.

RESULTS:

The insulation resistance exceeded 50000 megohms.

PROJECT NO.: 206039 SPECIFICATION: N/A

PART NO.: See Page 6 PART DESCRIPTION: Cable Assy(USB B)/ Panel Mount Assy

SAMPLE SIZE: 3 Samples TECHNICIAN: BE

START DATE: 2/9/06 COMPLETE DATE: 2/9/06

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 24%

EQUIPMENT ID#: 16, 26, 321, 403, 1435, 1468

DUST EXPOSURE (NUMERAL 6)

PURPOSE:

To simulate applications where components may be exposed unmated for extended periods of time and are susceptible to exposure to a dust environment. To determine the impact of residual dust on the electrical stability of the contact system.

PROCEDURE:

1. The test was performed in accordance with CEI/IEC 60529 IP67, Paragraph 13.4.

2. Test Conditions:

   a) Size of Chamber : 2.48 ft^3
   b) Amount of Dust : 22 grams
   c) Exposure Time : 2.0 hours under vacuum
   d) Dust Type : Talcum Powder

3. The connectors were exposed in a mated condition while assembled to the test canisters as shown in Figure #2.

4. After exposure the test samples were cleaned by wiping the contact surfaces with a brush.

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

6. 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 exposed.

2. The insulation resistance shall not be less than 1000 megohms.

RESULTS:

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

2. The insulation resistance exceeded 50000 megohms.

TEST RESULTS

SEQUENCE A

GROUP C

PROJECT NO.: 206039 SPECIFICATION: N/A

PART NO.: See Page 6 PART DESCRIPTION: Cable Assy(USB B)/ Panel Mount Assy

SAMPLE SIZE: 3 Samples TECHNICIAN: BE

START DATE: 2/9/06 COMPLETE DATE: 2/9/06

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 24%

EQUIPMENT ID#: 321

DIELECTRIC WITHSTANDING VOLTAGE (SEA LEVEL)

PURPOSE:

To determine if the samples maintain their dielectric integrity after being stressed by exposure to mechanical and environmental conditioning.

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)	Between Contacts and Shell	: Yes
f)	Mated Condition	: Mated
e)	Hold Time	: 60 Seconds
g)	Rate of Application	: 500 volts/sec.
h)	Test Voltage	: 1125 VAC

3. The samples were mated and torqued to 7.0 in-lbs prior to test. The panel mount connectors were attached to the test canister using a torque of 25 in-lbs on the nut on the inside of the canister (See Figure #2).

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.

PROJECT NO.: 206039 SPECIFICATION: N/A

PART NO.: See Page 6 PART DESCRIPTION: Cable Assy(USB B)/ Panel Mount Assy

SAMPLE SIZE: 3 Samples TECHNICIAN: BE

START DATE: 2/9/06 COMPLETE DATE: 2/9/06

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 24%

EQUIPMENT ID#: 16, 26, 321, 403, 1435, 1468

DUST EXPOSURE (NUMERAL 6)

PURPOSE:

To simulate applications where components may be exposed unmated for extended periods of time and are susceptible to exposure to a dust environment. To determine the impact of residual dust on the electrical stability of the contact system.

PROCEDURE:

1. The test was performed in accordance with CEI/IEC 60529 IP67, Paragraph 13.4.

2. Test Conditions:

   a) Size of Chamber : 2.48 ft^3
   b) Amount of Dust : 22 grams
   c) Exposure Time : 2.0 hours under vacuum
   d) Dust Type : Talcum Powder

3. The connectors were exposed in a mated condition while assembled to the test canisters as shown in Figure #2.

4. After exposure the test samples were cleaned by wiping the contact surfaces with a brush.

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

6. 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 exposed.

2. When a 1125 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 exposed.

2. There was no evidence of arcing, breakdown, etc., when a 1125 VAC voltage was applied.

TEST RESULTS

SEQUENCE A

GROUP A1

PROJECT NO.: 206039 SPECIFICATION: N/A

PART NO.: See Page 6 PART DESCRIPTION: Cable Assy(USB B)/ Panel Mount Assy

SAMPLE SIZE: 6 Samples TECHNICIAN: BE

START DATE: 2/8/06 COMPLETE DATE: 2/8/06

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 25%

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 : 100 milliamps maximum
   b) Open Circuit Voltage : 20 millivolts
   c) No. of Positions : 4 Contact to Contact/Sample
   : 1 Contact to Shield/Sample

PROCEDURE: continued

3. The samples were mated and torqued to 7.0 in-lbs prior to test. The panel mount connectors were attached to the test canister using a torque of 25 in-lbs on the nut on the inside of the test canister supplied by the test sponsor.

4. 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 Type	Avg.	Max.	Min.
SCPU-G-2.00-D Cable(USB B)/ SCRU-02 Panel Mount			
-Contact to Contact	41.2	52.7	30.3
-Contact to Shield	10.9	18.5	8.6

2. See data files 20603902 and 20603906 for individual data points.

PROJECT NO.: 206039 SPECIFICATION: N/A

PART NO.: See Page 6 PART DESCRIPTION: Cable Assy(USB B)/ Panel Mount Assy

SAMPLE SIZE: 6 Samples TECHNICIAN: BE

START DATE: 2/10/06 COMPLETE DATE: 2/10/06

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 24%

EQUIPMENT ID#: 601, 1278, 1145, 1465

WATER EXPOSURE (NUMERAL 7)

PURPOSE:

To simulate applications where components may be submerged in water for short periods of time.

PROCEDURE:

1. The test was performed in accordance with CEI/IEC 60529, Paragraph 14.2.7.

2. The connectors were exposed in a mated condition while assembled to the test canisters (supplied by the test sponsor).

3. The assembled enclosures were placed in the water column so that the bottom of the test part was not lower than 1 meter and the top of the test part was not higher that 0.15 meters below the top of the water.

4. Test Conditions:

   a) Type of Water : DI
   b) Time of Exposure : 30 minutes

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

6. 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 Type	Avg. Change	Max. Change
SCPU-G-2.00-D Cable(USB)/ SCRU-02 Panel Mount		
-Contact to Contact	-0.5	+5.6
-Contact to Shield	+1.0	+3.7

2. See data files 20603902 and 20603906 for individual data points.

3. Visual examination of the connectors revealed no water inside the USB and housing.

LLCR DATA FILES

FILE NUMBERS

20603902
20603906

			Low Level Contact Resistance					
	Project:	206039				Spec:	EIA 364, TP 23	
	Customer:	Samtec				Subgroup:	Seq A, Group A1	
	Product:	Rugged I/O connector				File #:	20603902	
	Description:	SCPU-G-2.00-D Cable (USB B) to SCRU-02 Panel mount						
	Open circuit voltage:		20mv			Current:	10ma	
				Delta values				
				units: milliohms				
	Temp ºC	23	23					
	R.H. %	25	24					
	Date:	08Feb06	10Feb06					
	Pos. ID	Initial	Water					
	13-Red	30.3	0.2					
	13-Black	32.0	0.2					
	13-Green	48.5	-0.5					
	13-White	46.5	1.6					
	14-Red	31.0	-0.3					
	14-Black	32.4	-0.7					
	14-Green	49.3	-2.2					
	14-White	49.1	-2.7					
	15-Red	35.5	-5.3					
	15-Black	33.0	5.6					
	15-Green	49.3	3.0					
	15-White	50.1	-2.7					
	16-Red	38.7	-1.1					
	16-Black	30.3	1.1					
	16-Green	52.5	-1.7					
	16-White	51.1	-1.6					
	17-Red	32.3	-2.0					
	17-Black	32.5	-0.5					
	17-Green	47.1	-2.6					
	17-White	47.3	1.1					
	18-Red	32.8	-0.2					
	18-Black	32.8	-0.1					
	18-Green	52.5	0.2					
	18-White	52.7	-1.8					
	MAX	52.7	5.6					
	MIN	30.3	-5.3					
	AVG	41.2	-0.5					
	STD	8.9	2.2					
	Open	0	0					
	Tech	BE	BE					
	Equip ID	601	601					
		1278	1278					

			Low Level Contact Resistance					
	Project:	206039				Spec:	EIA 364, TP 23	
	Customer:	Samtec				Subgroup:	Seq A, Group A1	
	Product:	Rugged I/O connector				File #:	20603906	
	Description:	SCPU-G-2.00-D Cable (USB B) to SCRU-02 Panel mount (Shield)						
	Open circuit voltage:		20mv			Current:	10ma	
				Delta values				
				units: milliohms				
	Temp ºC	23	23					
	R.H. %	25	24					
	Date:	08Feb06	10Feb06					
	Pos. ID	Initial	Water					
	Shield # 13	8.6	3.7					
	Shield # 14	9.2	1.2					
	Shield # 15	9.4	2.0					
	Shield # 16	18.5	0.0					
	Shield # 17	10.6	-1.2					
	Shield # 18	8.8	0.2					
	MAX	18.5	3.7					
	MIN	8.6	-1.2					
	AVG	10.9	1.0					
	STD	3.8	1.7					
	Open	0	0					
	Tech	BE	BE					
	Equip ID	601	601					
		1278	1278					

TEST RESULTS

SEQUENCE A

GROUP B1

PROJECT NO.: 206039 SPECIFICATION: N/A

PART NO.: See Page 6 PART DESCRIPTION: Cable Assy(USB B)/ Panel Mount Assy

SAMPLE SIZE: 3 Samples TECHNICIAN: BE

START DATE: 2/9/06 COMPLETE DATE: 2/9/06

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 24%

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) Between Contacts and Shell	:	Yes
d) Mated Condition	:	Mated
e) Electrification Time	:	2.0 Minutes
f) Test Voltage	:	500 VDC

3. The samples were mated and torqued to 7.0 in-lbs prior to test. The panel mount connectors were attached to the test canister using a torque of 25 in-lbs on the nut on the inside of the canister.

REQUIREMENTS:

When the specified test voltage is applied, the insulation resistance shall not be less than 1000 megohms.

RESULTS:

The insulation resistance exceeded 50000 megohms.

PROJECT NO.: 206039 SPECIFICATION: N/A

PART NO.: See Page 6 PART DESCRIPTION: Cable Assy(USB B)/ Panel Mount Assy

SAMPLE SIZE: 3 Samples TECHNICIAN: BE

START DATE: 2/10/06 COMPLETE DATE: 2/13/06

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 24%

EQUIPMENT ID#: 321, 1145, 1465

WATER EXPOSURE (NUMERAL 7)

PURPOSE:

To simulate applications where components may be submerged in water for short periods of time.

PROCEDURE:

1. The test was performed in accordance with CEI/IEC 60529, Paragraph 14.2.7.

2. The connectors were exposed in a mated condition while assembled to the test canisters (supplied by the test sponsor).

3. The assembled enclosures were placed in the water column so that the bottom of the test part was not lower than 1 meter and the top of the test part was not higher that 0.15 meters below the top of the water.

4. Test Conditions:

   a) Type of Water : DI
   b) Time of Exposure : 30 minutes

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

6. 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. There shall be no evidence of water within the connector body.

3. The insulation resistance shall not be less than 1000 megohms.

RESULTS:

1. Visual examination of the connectors revealed no water inside the USB and housing.

2. The insulation resistance exceeded 50000 megohms.

TEST RESULTS

SEQUENCE A

GROUP C1

PROJECT NO.: 206039 SPECIFICATION: N/A

PART NO.: See Page 6 PART DESCRIPTION: Cable Assy(USB B)/ Panel Mount Assy

SAMPLE SIZE: 3 Samples TECHNICIAN: BE

START DATE: 2/9/06 COMPLETE DATE: 2/9/06

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 24%

EQUIPMENT ID#: 321

DIELECTRIC WITHSTANDING VOLTAGE (SEA LEVEL)

PURPOSE:

To determine if the samples maintain their dielectric integrity after being stressed by exposure to mechanical and environmental conditioning.

PROCEDURE:

1. The test was performed in accordance with EIA 364, TP 20.

2. Test Conditions:

a)	Between Adjacent Contacts	: Yes
b)	Between Rows	: Yes
c)	Between Contacts and Shell	: Yes
f)	Mated Condition	: Mated
e)	Hold Time	: 60 Seconds
g)	Rate of Application	: 500 volts/sec.
h)	Test Voltage	: 1125 VAC

3. The samples were mated and torqued to 7.0 in-lbs prior to test. The panel mount connectors were attached to the test canister using a torque of 25 in-lbs on the nut on the inside of the canister as supplied by the test sponsor.

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.

PROJECT NO.: 206039 SPECIFICATION: N/A

PART NO.: See Page 6 PART DESCRIPTION: Cable Assy(USB B)/ Panel Mount Assy

SAMPLE SIZE: 3 Samples TECHNICIAN: BE

START DATE: 2/10/06 COMPLETE DATE: 2/13/06

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 24%

EQUIPMENT ID#: 321, 1145, 1465

WATER EXPOSURE (NUMERAL 7)

PURPOSE:

To simulate applications where components may be submerged in water for short periods of time.

PROCEDURE:

1. The test was performed in accordance with CEI/IEC 60529, Paragraph 14.2.7.

2. The connectors were exposed in the mated condition while assembled to the test canisters (as supplied by the test sponsor).

3. The assembled enclosures were placed in the water column so that the bottom of the test part was not lower than 1 meter and the top of the test part was not higher that 0.15 meters below the top of the water.

4. Test Conditions:

   a) Type of Water : DI
   b) Time of Exposure : 30 minutes

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

6. 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. There shall be no evidence of water within the connector board.

3. When a 1125 VAC test voltage is applied, there shall be no evidence of arcing, breakdown, etc.

RESULTS:

1. Visual examination of the connectors revealed no water inside the USB and housing.

2. There was no evidence of breakdown, arcing, etc. when a 1125 VAC voltage was applied.

TEST RESULTS

SEQUENCE B1

GROUP A

PROJECT NO.: 206039 SPECIFICATION: N/A

PART NO.: See Page 6 PART DESCRIPTION: Cable Assy(USB B)/ Dust Cover Assy

SAMPLE SIZE: 3 Samples TECHNICIAN: BE

START DATE: 2/10/06 COMPLETE DATE: 2/10/06

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 24%

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) Between Contacts and Shell	:	Yes
d) Mated Condition	:	Mated
e) Electrification Time	:	2.0 Minutes
f) Test Voltage	:	500 VDC

3. The samples were mated and torqued to 7.0 in-lbs prior to test. The panel mount connectors were attached to the test canister using a torque of 25 in-lbs on the nut on the inside of the canister (See Figure #2).

REQUIREMENTS:

When the specified test voltage is applied, the insulation resistance shall not be less than 1000 megohms.

RESULTS:

The insulation resistance exceeded 50000 megohms.

PROJECT NO.: 206039 SPECIFICATION: N/A

PART NO.: See Page 6 PART DESCRIPTION: Cable Assy(USB B)/ Dust Cover Assy

SAMPLE SIZE: 3 Samples TECHNICIAN: BE

START DATE: 2/13/06 COMPLETE DATE: 2/13/06

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 24%

EQUIPMENT ID#: 26, 321, 403, 1442

DUST EXPOSURE (NUMERAL 6)

PURPOSE:

To simulate applications where components may be exposed unmated for extended periods of time and are susceptible to exposure to a dust environment. To determine the impact of residual dust on the electrical stability of the contact system.

PROCEDURE:

1. The test was performed in accordance with CEI/IEC 60529 IP37, Paragraph 13.4.

2. Test Conditions:

   a) Size of Chamber : 2.48 ft^3
   b) Amount of Dust : 22 grams
   c) Exposure Time : 2.0 hours under vacuum
   d) Dust Type : Talcum Powder

3. The connectors were exposed in a mated condition while assembled to the test canisters as shown in Figure #2.

4. After exposure the test samples were cleaned by wiping the contact surfaces with a brush.

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

6. 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 exposed.

2. The insulation resistance shall not be less than 1000 megohms.

RESULTS:

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

2. The insulation resistance exceeded 50000 megohms.

TEST RESULTS

SEQUENCE B1

GROUP B

PROJECT NO.: 206039 SPECIFICATION: N/A

PART NO.: See Page 6 PART DESCRIPTION: Cable Assy(USB B)/ Dust Cover Assy

SAMPLE SIZE: 3 Samples TECHNICIAN: BE

START DATE: 2/10/06 COMPLETE DATE: 2/10/06

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 24%

EQUIPMENT ID#: 321

DIELECTRIC WITHSTANDING VOLTAGE (SEA LEVEL)

PURPOSE:

To determine if the samples 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)	Between Contacts and Shell	: Yes
d)	Hold Time	: 60 Seconds
e)	Rate of Application	: 500 volts/sec.
f)	Test Voltage	: 1125 VAC

3. The samples were mated and torqued to 7.0 in-lbs prior to test. The panel mount connectors were attached to the test canister using a torque of 25 in-lbs on the nut on the inside of the canister (See Figure #2).

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.

PROJECT NO.: 206039 SPECIFICATION: N/A

PART NO.: See Page 6 PART DESCRIPTION: Cable Assy(USB B)/ Dust Cover Assy

SAMPLE SIZE: 3 Samples TECHNICIAN: BE

START DATE: 2/13/06 COMPLETE DATE: 2/14/06

ROOM AMBIENT: 24°C RELATIVE HUMIDITY: 24%

EQUIPMENT ID#: 26, 321, 403, 1442

DUST EXPOSURE (NUMERAL 6)

PURPOSE:

To simulate applications where components may be exposed unmated for extended periods of time and are susceptible to exposure to a dust environment. To determine the impact of residual dust on the electrical stability of the contact system.

PROCEDURE:

1. The test was performed in accordance with CEI/IEC 60529 IP67, Paragraph 13.4.

2. Test Conditions:

   a) Size of Chamber : 2.48 ft^3
   b) Amount of Dust : 22 grams
   c) Exposure Time : 2.0 hours under vacuum
   d) Dust Type : Talcum Powder

3. The connectors were exposed in a mated condition while assembled to the test canisters as shown in Figure #2.

4. After exposure the test samples were cleaned by wiping the contact surfaces with a brush.

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

6. 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 exposed.

2. When a 1125 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 exposed.

2. There was no evidence of arcing, breakdown, etc., when a 1125 VAC voltage was applied.

TEST RESULTS

SEQUENCE B1

GROUP A1

PROJECT NO.: 206039 SPECIFICATION: N/A

PART NO.: See Page 6 PART DESCRIPTION: Cable Assy(USB B)/ Dust Cover Assy

SAMPLE SIZE: 3 Samples TECHNICIAN: BE

START DATE: 2/13/06 COMPLETE DATE: 2/13/06

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 24%

EQUIPMENT ID#: 321, 1145, 1465

WATER EXPOSURE (NUMERAL 7)

PURPOSE:

To simulate applications where components may be submerged in water for short periods of time.

PROCEDURE:

1. The test was performed in accordance with CEI/IEC 60529, Paragraph 14.2.7.

2. The connectors were exposed in a mated condition while assembled to the test canisters supplied by the test sponsor.

3. The assembled enclosures were placed in the water column so that the bottom of the test part was not lower than 1 meter and the top of the test part was not higher that 0.15 meters below the top of the water.

4. Test Conditions:

   a) Type of Water : DI
   b) Time of Exposure : 30 minutes

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

6. Final insulation resistance was measured and recorded in accordance with EIA 364, Test Procedure 21, with a test potential of 500 VDC.

PROCEDURE: Continued

7. 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. There shall be no evidence of water within the connector body.

3. The final insulation resistance shall not be less than 1000 megohms.

RESULTS:

1. The test samples as tested showed no evidence of physical deterioration or water inside the connector.

2. The final insulation resistance exceeded 50000 megohms.

TEST RESULTS

SEQUENCE B1

GROUP B1

PROJECT NO.: 206039 SPECIFICATION: N/A

PART NO.: See Page 6 PART DESCRIPTION: Cable Assy(USB B)/ Dust Cover Assy

SAMPLE SIZE: 3 Samples TECHNICIAN: BE

START DATE: 2/10/06 COMPLETE DATE: 2/10/06

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 24%

EQUIPMENT ID#: 321, 1145, 1465

WATER EXPOSURE (NUMERAL 7)

PURPOSE:

To simulate applications where components may be submerged in water for short periods of time.

PROCEDURE:

1. The test was performed in accordance with CEI/IEC 60529, Paragraph 14.2.7.

2. The connectors were exposed in a mated condition while assembled to test canisters as supplied by the test sponsor.

3. The samples were mated and torqued to 7.0 in-lbs prior to test. The panel mount connectors were attached to the test canister using a torque of 25 in-lbs on the nut on the inside of the canister.

4. The assembled enclosures were placed in the water column so that the bottom of the test part was not lower than 1 meter and the top of the test part was not higher that 0.15 meters below the top of the water.

5. Test Conditions:

   a) Type of Water : DI
   b) Time of Exposure : 30 minutes

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

PROCEDURE: continued

7. Final dielectric withstanding voltage tested was measured and recorded in accordance with EIA 364, Test Procedure 20, with a test potential of 1125 VAC.

8. 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. There shall be no evidence of water within the connector body.

3. There shall be no evidence of arcing or breakdown when a 1125 VAC test voltage is applied.

RESULTS:

1. The test samples as tested showed no evidence of physical deterioration or water within the housing.

2. There was no evidence of breakdown, arcing, etc., when a 1125 VAC test voltage was applied.

TEST RESULTS

SEQUENCE B2

GROUP A

PROJECT NO.: 206039 SPECIFICATION: N/A

PART NO.: See Page 6 PART DESCRIPTION: Panel Mount(USB B)/ Dust Cover Assy

SAMPLE SIZE: 3 Samples TECHNICIAN: BE

START DATE: 2/13/06 COMPLETE DATE: 2/13/06

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 24%

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) Between Contacts and Shell	:	Yes
d) Mated Condition	:	Mated
e) Electrification Time	:	2.0 Minutes
f) Test Voltage	:	500 VDC

3. The samples were mated and torqued to 7.0 in-lbs prior to test. The panel mount connectors were attached to the test canister using a torque of 25 in-lbs on the nut on the inside of the canister (See Figure #2).

REQUIREMENTS:

When the specified test voltage is applied, the insulation resistance shall not be less than 1000 megohms.

RESULTS:

The insulation resistance exceeded 50000 megohms.

PROJECT NO.: 206039 SPECIFICATION: N/A

PART NO.: See Page 6 PART DESCRIPTION: Panel Mount(USB B)/ Dust Cover Assy

SAMPLE SIZE: 3 Samples TECHNICIAN: BE

START DATE: 2/13/06 COMPLETE DATE: 2/14/06

ROOM AMBIENT: 24°C RELATIVE HUMIDITY: 24%

EQUIPMENT ID#: 16, 26, 321, 403, 1435, 1468

DUST EXPOSURE (NUMERAL 6)

PURPOSE:

To simulate applications where components may be exposed unmated for extended periods of time and are susceptible to exposure to a dust environment. To determine the impact of residual dust on the electrical stability of the contact system.

PROCEDURE:

1. The test was performed in accordance with CEI/IEC 60529 IP37, Paragraph 13.4.

2. Test Conditions:

   a) Size of Chamber : 2.48 ft^3
   b) Amount of Dust : 22 grams
   c) Exposure Time : 2.0 hours under vacuum
   d) Dust Type : Talcum Powder

3. The connectors were exposed in a mated condition while assembled to the test canisters as shown in Figure #2.

4. After exposure the test samples were cleaned by wiping the contact surfaces with a brush.

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

6. 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 exposed.

2. The insulation resistance shall not be less than 1000 megohms.

RESULTS:

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

2. The insulation resistance exceeded 50000 megohms.

TEST RESULTS

SEQUENCE B2

GROUP B

PROJECT NO.: 206039 SPECIFICATION: N/A

PART NO.: See Page 6 PART DESCRIPTION: Panel Mount(USB B)/ Dust Cover Assy

SAMPLE SIZE: 3 Samples TECHNICIAN: BE

START DATE: 2/13/06 COMPLETE DATE: 2/13/06

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 24%

EQUIPMENT ID#: 321

DIELECTRIC WITHSTANDING VOLTAGE (SEA LEVEL)

PURPOSE:

To determine if the samples 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) Between Contacts and Shell : Yes
   d) Hold Time : 60 Seconds
   e) Rate of Application : 500 volts/sec.
   f) Test Voltage : 1125 VAC

3. The samples were mated and torqued to 7.0 in-lbs prior to test. The panel mount connectors were attached to the test canister using a torque of 25 in-lbs on the nut on the inside of the canister (See Figure #2).

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.

PROJECT NO.: 206039 SPECIFICATION: N/A

PART NO.: See Page 6 PART DESCRIPTION: Panel Mount(USB B)/ Dust Cover Assy

SAMPLE SIZE: 3 Samples TECHNICIAN: BE

START DATE: 2/14/06 COMPLETE DATE: 2/14/06

ROOM AMBIENT: 24°C RELATIVE HUMIDITY: 24%

EQUIPMENT ID#: 16, 26, 403, 1435, 1468

DUST EXPOSURE (NUMERAL 6)

PURPOSE:

To simulate applications where components may be exposed unmated for extended periods of time and are susceptible to exposure to a dust environment. To determine the impact of residual dust on the electrical stability of the contact system.

PROCEDURE:

1. The test was performed in accordance with CEI/IEC 60529 IP67, Paragraph 13.4.

2. Test Conditions:

   a) Size of Chamber : 2.48 ft^3
   b) Amount of Dust : 22 grams
   c) Exposure Time : 2.0 hours under vacuum
   d) Dust Type : Talcum Powder

3. The connectors were exposed in a mated condition while assembled to the test canisters as shown in Figure #2.

4. After exposure the test samples were cleaned by wiping the contact surfaces with a brush.

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

6. 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 exposed.

2. When a 1125 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 exposed.

2. There was no evidence of arcing, breakdown, etc., when a 1125 VAC voltage was applied.

TEST RESULTS

SEQUENCE B2

GROUP A1

PROJECT NO.: 206039 SPECIFICATION: N/A

PART NO.: See Page 6 PART DESCRIPTION: Panel Mount(USB B)/ Dust Cover

SAMPLE SIZE: 3 Samples TECHNICIAN: BE

START DATE: 2/13/06 COMPLETE DATE: 2/13/06

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 27%

EQUIPMENT ID#: 321, 1145, 1465

WATER EXPOSURE (NUMERAL 7)

PURPOSE:

To simulate applications where components may be submerged in water for short periods of time.

PROCEDURE:

1. The test was performed in accordance with CEI/IEC 60529, Paragraph 14.2.7.

2. The connectors were exposed in a mated condition while assembled to test canisters as shown supplied by the test sponsor.

3. The samples were mated and torqued to 7.0 in-lbs prior to test. The panel mount connectors were attached to the test canister using a torque of 25 in-lbs on the nut on the inside of the canister.

4. The assembled enclosures were placed in the water column so that the bottom of the test part was not lower than 1 meter and the top of the test part was not higher that 0.15 meters below the top of the water.

5. Test Conditions:

   a) Type of Water : DI
   b) Time of Exposure : 30 minutes

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

PROCEDURE: continued

7. Final insulation resistance was measured and recorded in accordance with EIA 364, Test Procedure 21, with a test potential of 500 VDC.

8. 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. There shall be no evidence of water within the connector body.

3. The final insulation resistance shall not be less than 1000 megohms.

RESULTS:

1. The test samples as tested showed no evidence of physical deterioration or water within the housing.

2. The final insulation resistance exceeded 50000 megohms.

TEST RESULTS

SEQUENCE B2

GROUP B1

PROJECT NO.: 206039 SPECIFICATION: N/A

PART NO.: See Page 6 PART DESCRIPTION: Panel Mount(USB B)/ Dust Cover

SAMPLE SIZE: 3 Samples TECHNICIAN: BE

START DATE: 2/13/06 COMPLETE DATE: 2/13/06

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 24%

EQUIPMENT ID#: 321, 1145, 1465

WATER EXPOSURE (NUMERAL 7)

PURPOSE:

To simulate applications where components may be submerged in water for short periods of time.

PROCEDURE:

1. The test was performed in accordance with CEI/IEC 60529, Paragraph 14.2.7.

2. The samples were mated and torqued to 7.0 in-lbs prior to test. The panel mount connectors were attached to the test canister using a torque of 25 in-lbs on the nut on the inside of the canister as supplied by the test sponsor.

3. The assembled enclosures were placed in the water column so that the bottom of the test part was not lower than 1 meter and the top of the test part was not higher that 0.15 meters below the top of the water.

4. Test Conditions:
   a) Type of Water : DI
   b) Time of Exposure : 30 minutes

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

6. Final dielectric withstanding voltage testing was measured and recorded in accordance with EIA 364, Test Procedure 20, with a test potential of 1125 VAC.

7. 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. There shall be no evidence of water within the connector body.

3. There shall be no evidence of arcing or breakdown when a 1125 VAC test voltage is applied.

RESULTS:

1. The test samples as tested showed no evidence of physical deterioration or water within the housing.

2. There was no evidence of breakdown, arcing, etc., when a 1125 VAC test voltage was applied.

TEST RESULTS

SEQUENCE C1

GROUP A

PROJECT NO.: 206039 SPECIFICATION: N/A

PART NO.: See Page 6 PART DESCRIPTION: Cable Assy(USB A)/ Panel Mount Assy

SAMPLE SIZE: 6 Samples TECHNICIAN: BE

START DATE 2/14/06 COMPLETE DATE: 2/14/06

ROOM AMBIENT: 24°C RELATIVE HUMIDITY: 24%

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 : 100 milliamps maximum
   b) Open Circuit Voltage : 20 millivolts
   c) No. Of Positions : 4 Contact to Contact/Sample
   : 1 Contact to Shield/Sample

PROCEDURE: continued

3. The samples were mated and torqued to 7.0 in-lbs prior to test.

4. 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 Type	Avg.	Max.	Min.
SCPU-G-2.00-D Cable(USB A)/ SCRU-02 Panel Mount			
-Contact to Contact	70.2	91.1	48.0
-Contact to Shield	10.5	12.6	8.9

2. See data files 20603903 and 20603907 for individual data points.

PROJECT NO.: 206039 SPECIFICATION: N/A

PART NO.: See Page 6 PART DESCRIPTION: Cable Assy(USB A)/ Panel Mount Assy

SAMPLE SIZE: 6 Samples TECHNICIAN: BE

START DATE: 2/15/06 COMPLETE DATE: 2/15/06

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 26%

EQUIPMENT ID#: 553, 601, 1121, 1166, 1167, 1168, 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 : Half-sine
   d) Velocity : 9.7 feet Per Second
   e) No. of Shocks : 3 Shocks/Direction, 3 Axis (18 Total)

3. Figure #4 illustrates the test sample fixturing utilized during the test. The panel mount connectors were secured to the test fixture using a torque of 25 in-lbs on the nut on the inside of the fixture.

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 axial movement of the test samples relative to each other.

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 Type	Avg. Change	Max. Change
SCPU-G-2.00-D Cable (USB A)/ SCRU-01 Panel Mount		
-Contact to Contact	-1.7	+1.1
-Contact to Shield	-0.1	+0.5

3. See data files 20603903 and 20603907 for individual data points.

4. 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

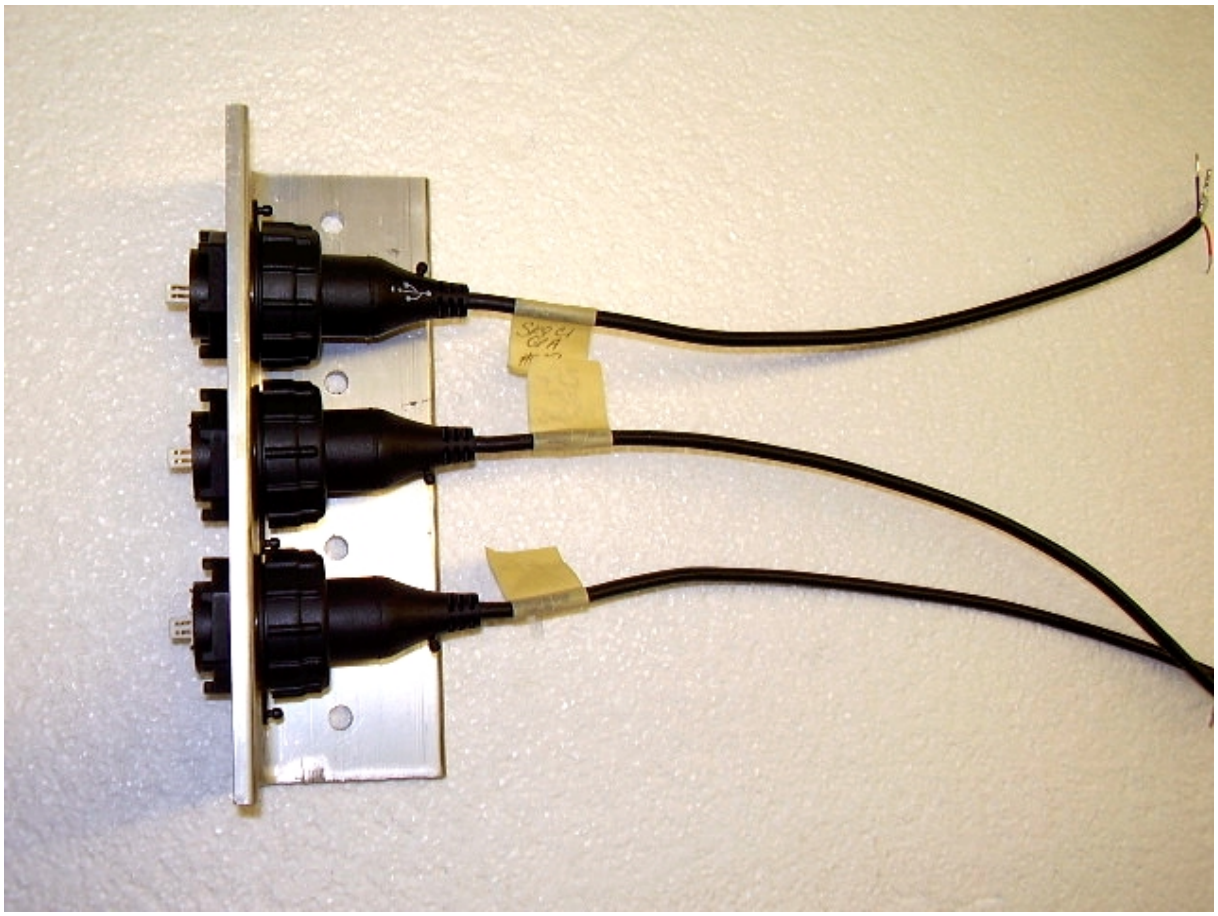
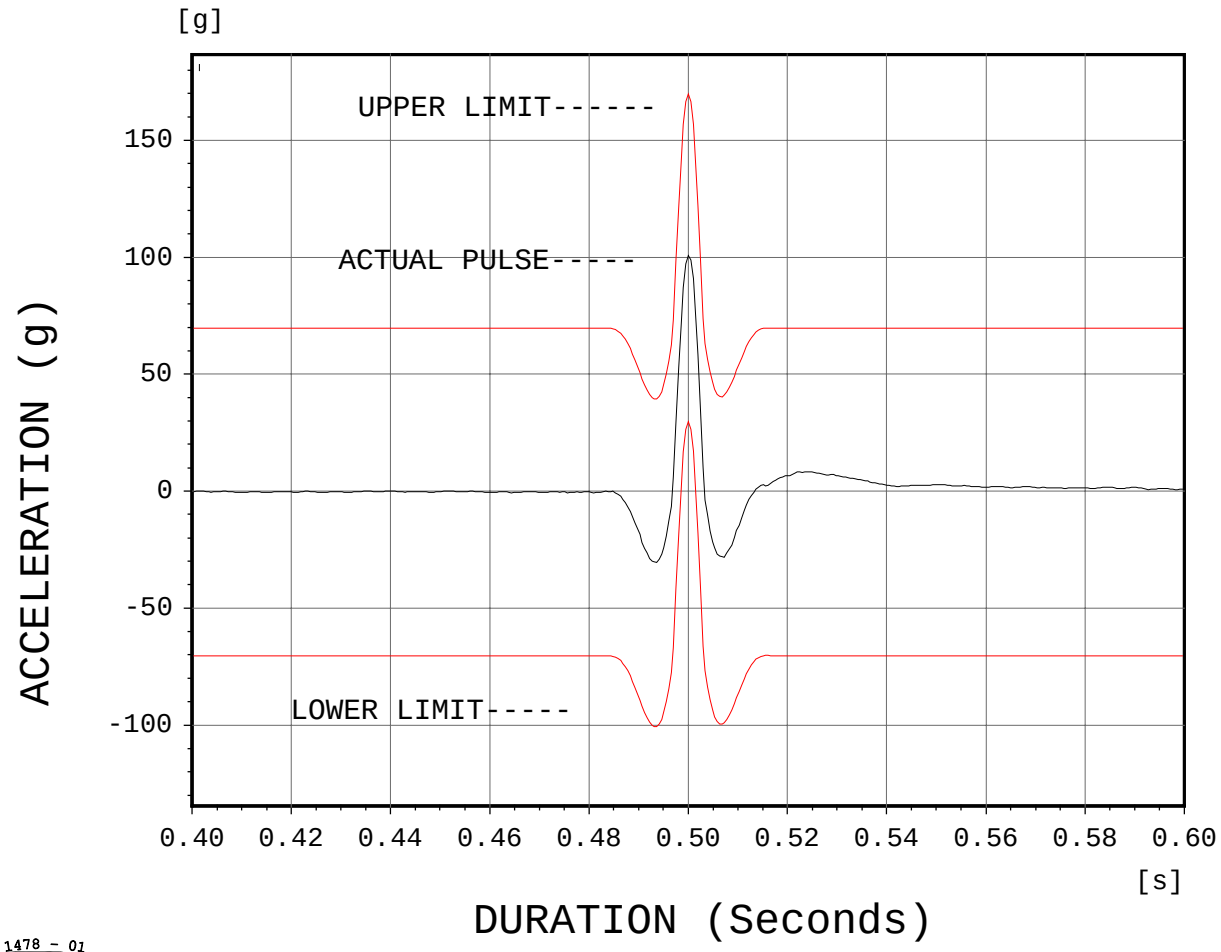


FIGURE #5

Classical Shock

Channel 1



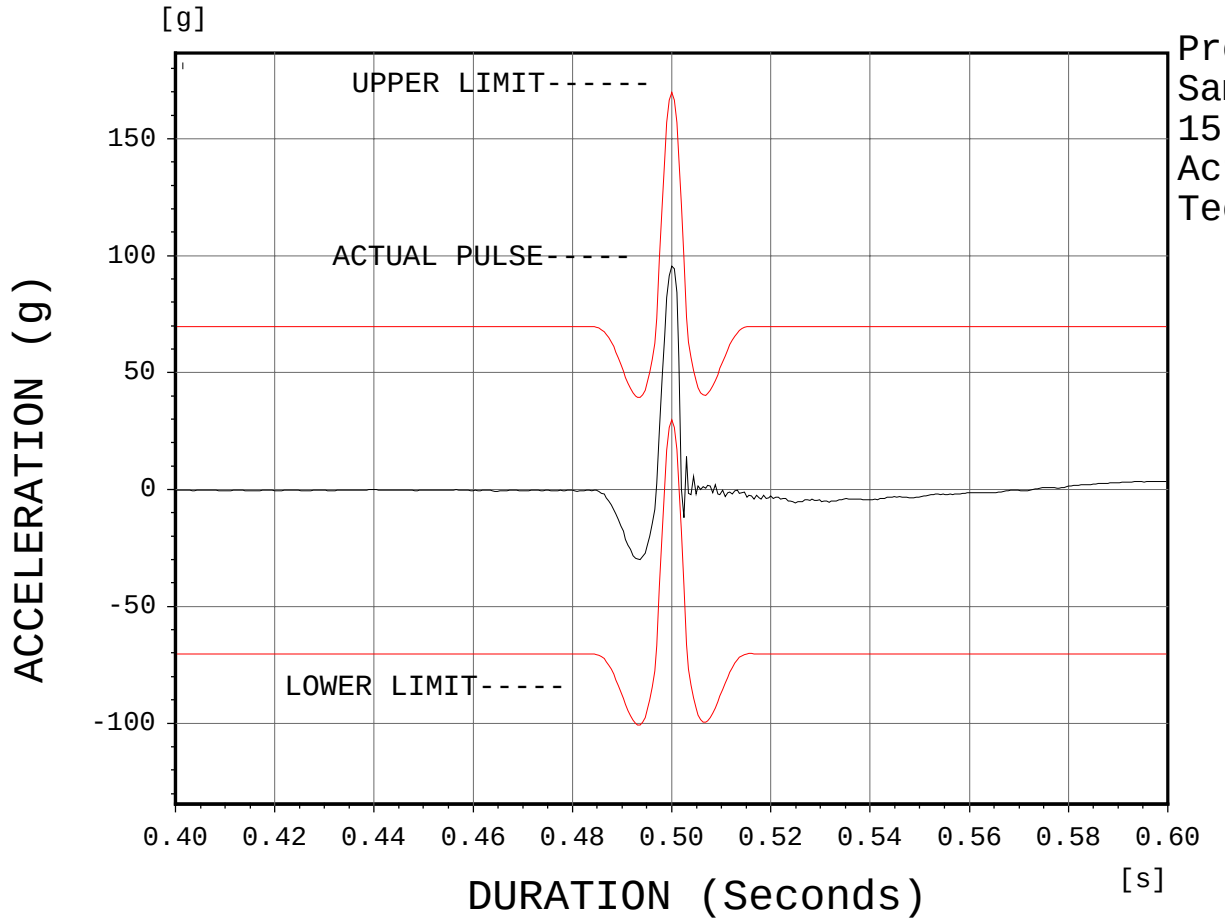
Project 206039
Samtec
15 Feb 06
Cal Wave 2
Tech: /BE

1478 - 01
ACCREDITED
1478 - 02

FIGURE #6

Classical Shock

Channel 1



Project 206039
Samtec
15 Feb 06
Actual Wave
Tech: /BE

PROJECT NO.: 206039	SPECIFICATION: N/A
PART NO.: See Page 6	PART DESCRIPTION: Cable Assy(USB A)/ Panel Mount Assy
SAMPLE SIZE: 6 Samples	TECHNICIAN: BE
START DATE: 2/16/06	COMPLETE DATE: 2/16/06
ROOM AMBIENT: 23°C	RELATIVE HUMIDITY: 28%

EQUIPMENT ID#:281, 282, 601, 874, 1278, 1366, 1367, 1368, 1467

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 EIA 364, Test Procedure 28, Test Condition V.

2. Test Conditions:

   a)Power Spectral Density : 0.04 G^2/Hz
   b)G 'RMS' : 7.56
   c)Frequency : 50 to 2000 hz
   d)Duration : 2.0 hours per axis, 3 axis total

3. Figure #4 illustrates the test sample fixturing utilized during the test. The panel mount connectors were secured to the test fixture using a torque of 25 in-lbs on the nut on the inside of the fixture.

4. Figure #5 illustrates the test sample fixturing utilized during the test.

PROCEDURE: continued

5. All subsequent variable testing was performed in accordance with 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 observed data:

	CHANGE IN LOW LEVEL CIRCUIT RESISTANCE (Milliohms)	
Sample Type	Avg. Change	Max. Change
SCPU-G-2.00-D Cable(USB A)/ SCRU-01 Panel Mount		
-Contact to Contact	-2.0	+1.3
-Contact to Shield	+0.4	+1.0

3. See data files 20603903 and 20603907 for individual data points.

LLCR DATA FILES

FILE NUMBERS

20603903
20603907

			Low Level Contact Resistance					
	Project:	206039				Spec:	EIA 364, TP 23	
	Customer:	Samtec				Subgroup:	Seq C1, Group A	
	Product:	Rugged I/O connector				File #:	20603903	
	Description:	SCPU-G-2.00-D Cable (USB A) to SCRU-01 Panel mount						
	Open circuit voltage:		20mv			Current:	10ma	
				Delta values				
				units: milliohms				
	Temp ºC	24	23	23				
	R.H. %	24	26	28				
	Date:	14Feb06	15Feb06	16Feb06				
	Pos. ID	Initial	Mech Shk	Vibration				
	49-Red	57.7	1.1	1.3				
	49-Black	50.4	-0.8	-2.5				
	49-Green	88.3	-0.7	-1.3				
	49-White	89.7	-2.1	-1.6				
	50-Red	50.5	-4.1	-4.2				
	50-Black	50.0	-1.8	-2.4				
	50-Green	90.2	-2.1	-3.7				
	50-White	89.3	-0.6	0.0				
	51-Red	49.8	-2.5	-2.8				
	51-Black	49.6	-0.1	-1.0				
	51-Green	88.8	-0.7	-0.8				
	51-White	87.0	-1.6	-2.3				
	52-Red	52.4	-5.1	-4.7				
	52-Black	49.5	-1.4	-1.1				
	52-Green	90.1	-2.4	-2.5				
	52-White	90.6	-0.8	-1.6				
	53-Red	51.7	-3.3	-3.1				
	53-Black	53.7	-5.4	-5.7				
	53-Green	90.3	-1.6	-2.3				
	53-White	91.1	-1.4	-2.1				
	54-Red	48.0	-1.7	-1.1				
	54-Black	49.3	-0.1	-0.4				
	54Green	88.4	-0.4	-0.6				
	54-White	88.2	-1.4	-1.7				
	MAX	91.1	1.1	1.3				
	MIN	48.0	-5.4	-5.7				
	AVG	70.2	-1.7	-2.0				
	STD	19.7	1.5	1.5				
	Open	0	0	0				
	Tech	BE	BE	BE				
	Equip ID	601	601	601				
		1278	1278	1278				

			Low Level Contact Resistance					
	Project:	206039				Spec:	EIA 364, TP 23	
	Customer:	Samtec				Subgroup:	Seq C1, Group A	
	Product:	Rugged I/O connector				File #:	20603907	
	Description:	SCPU-G-2.00-D Cable (USB A) to SCRU-01 Panel mount (Shield)						
	Open circuit voltage:		20mv			Current:	10ma	
				Delta values				
				units: milliohms				
	Temp ºC	24	23	23				
	R.H. %	24	26	28				
	Date:	14Feb06	15Feb06	16Feb06				
	Pos. ID	Initial	Mech Shk	Vibration				
	Shield # 49	10.4	-0.1	0.3				
	Shield # 50	10.0	-1.0	-0.2				
	Shield # 51	8.9	0.5	0.6				
	Shield # 52	10.1	0.1	1.0				
	Shield # 53	12.6	-0.6	0.3				
	Shield # 54	10.7	0.3	0.5				
	MAX	12.6	0.5	1.0				
	MIN	8.9	-1.0	-0.2				
	AVG	10.5	-0.1	0.4				
	STD	1.2	0.6	0.4				
	Open	0	0	0				
	Tech	BE	BE	BE				
	Equip ID	601	601	601				
		1278	1278	1278				

TEST RESULTS

SEQUENCE C2

GROUP A

PROJECT NO.: 206039 SPECIFICATION: N/A

PART NO.: See Page 6 PART DESCRIPTION: Cable Assy/ Panel Mount Assy

SAMPLE SIZE: 6 Samples TECHNICIAN: BE

START DATE: 2/15/06 COMPLETE DATE: 2/15/06

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 26%

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 : 100 milliamps maximum
   b) Open Circuit Voltage : 20 millivolts
   c) No. Of Positions : 4 Contact to Contact/Sample
   : 1 Contact to Shield/Sample

PROCEDURE: continued

3. The samples were mated and torqued to 7.0 in-lbs prior to test.

4. 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 Type	Avg.	Max.	Min.
SCPE-G-2.00-D Cable/ SCRE-01 Panel Mount			
-Contact to Contact	72.6	92.2	62.0
-Contact to Shield	53.6	140.1	19.2

2. See data files 20603904 and 20603908 for individual data points.

PROJECT NO.: 206039 SPECIFICATION: N/A

PART NO.: See Page 6 PART DESCRIPTION: Cable Assy/ Panel Mount Assy

SAMPLE SIZE: 6 Samples TECHNICIAN: BE

START DATE: 2/16/06 COMPLETE DATE: 2/16/06

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 28%

EQUIPMENT ID#: 553, 601, 1121, 1166, 1167, 1168, 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 : Half-sine
   d) Velocity : 9.7 feet Per Second
   e) No. of Shocks : 3 Shocks/Direction, 3 Axis (18 Total)

3. Figure #4 illustrates the test sample fixturing utilized during the test. The panel mount connectors were secured to the test fixture using a torque of 25 in-lbs on the nut on the inside of the fixture.

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 axial movement of the test samples relative to each other.

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

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

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

	CHANGE IN LOW LEVEL CIRCUIT RESISTANCE (Milliohms)	
Sample Type	Avg. Change	Max. Change
SCPE-G-2.00-D Cable/ SCRE-01 Panel Mount		
-Contact to Contact	+0.2	+1.5
-Contact to Shield	-15.6	+13.5

4. See data files 20603904 and 20603908 for individual data points.

5. The Mechanical Shock characteristics are shown in Figures #7 (Calibration Pulse) and #8(Test Pulse). Each figure displays the shock pulse contained within the upper and lower limits as defined by the appropriate test specification.

FIGURE #7

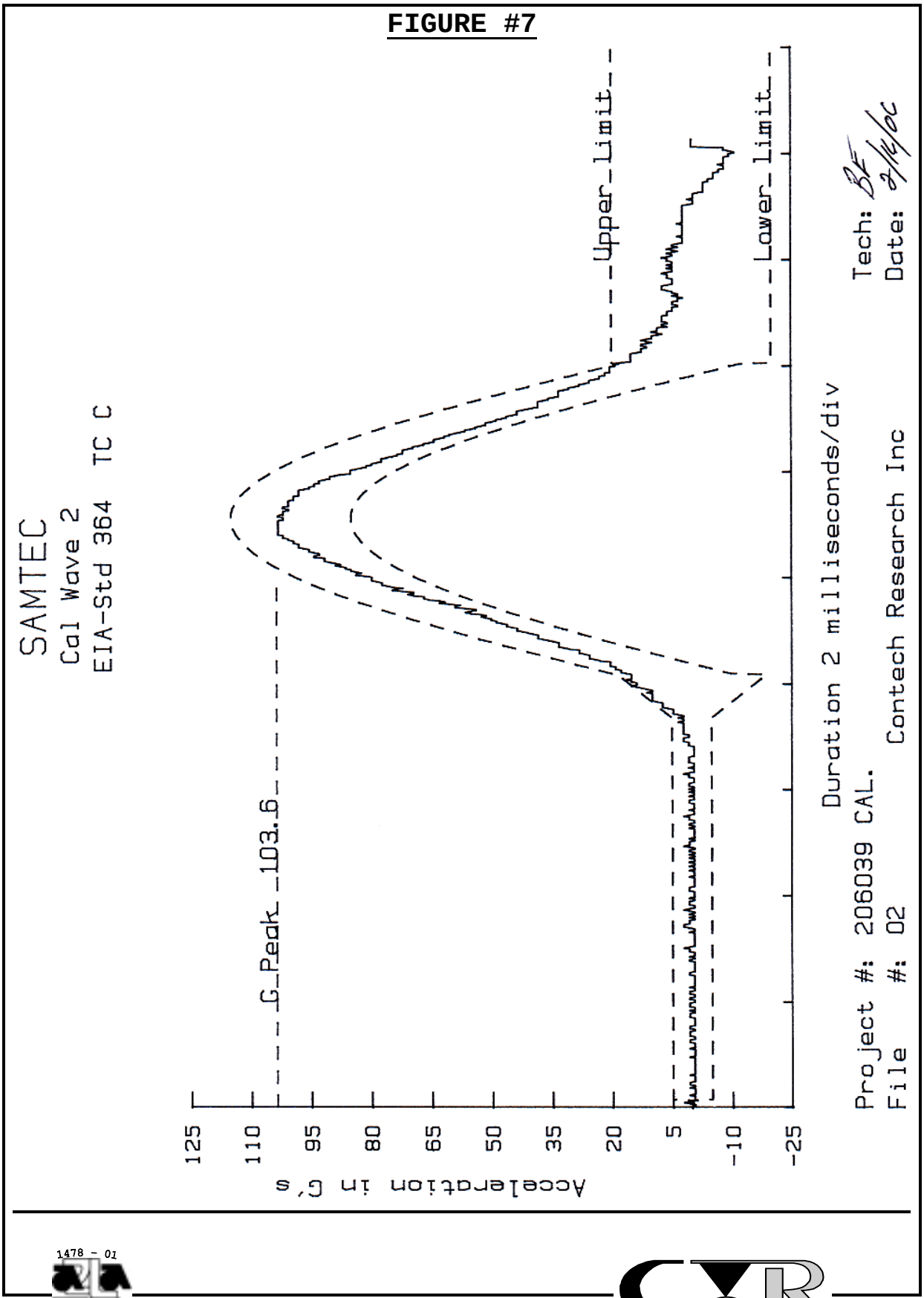
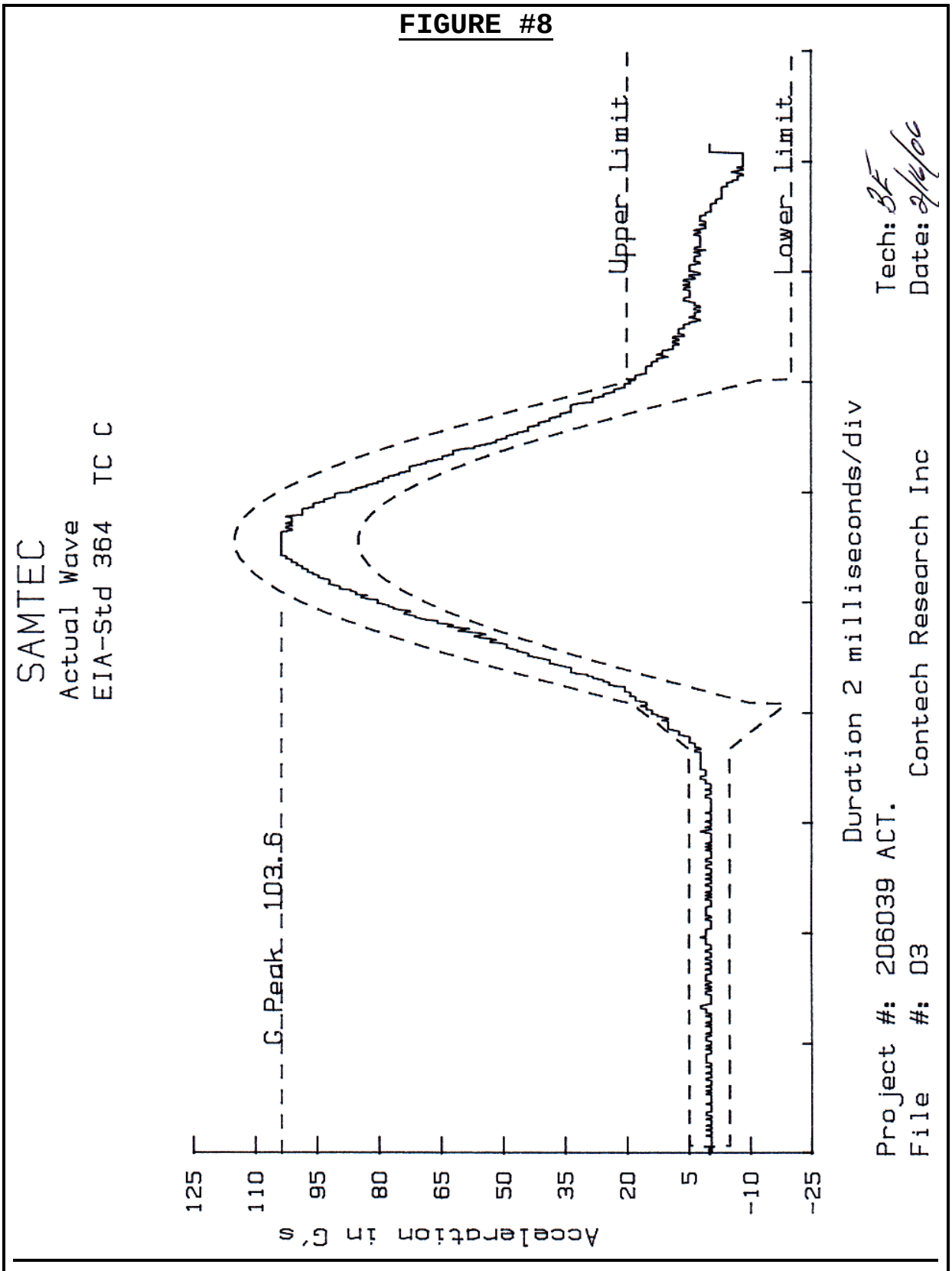

SAMTEC
Cal Wave 2
EIA-Std 364 TC C
G_Peak 103.6
Upper_Limit
Lower_Limit
Acceleration in G's
125
110
95
80
65
50
35
20
5
-10
-25
Duration 2 milliseconds/div
Project #: 206039 CAL.
File #: 02
Contech Research Inc
Tech:
Date: 2/16/06

FIGURE #8


SAMTEC
Actual Wave
EIA-Std 364 TC C
G_Peak 103.6
Upper_limit
Lower_limit
Acceleration in G's
125
110
95
80
65
50
35
20
5
-10
-25
Duration 2 milliseconds/div
Project #: 206039 ACT.
File #: 03
Contech Research Inc
Tech: BF
Date: 2/16/06

PROJECT NO.: 206039 SPECIFICATION: N/A

PART NO.: See Page 6 PART DESCRIPTION: Cable Assy/ Panel Mount Assy

SAMPLE SIZE: 6 Samples TECHNICIAN: BE

START DATE: 2/16/06 COMPLETE DATE: 2/17/06

ROOM AMBIENT: 23°C RELATIVE HUMIDITY: 35%

EQUIPMENT ID#: 281, 282, 553, 601, 874, 1278, 1366, 1367, 1368, 1467

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 EIA 364, Test Procedure 28, Test Condition V.

2. Test Conditions:

   a)Power Spectral Density : 0.04 G^2/Hz
   b)G 'RMS' : 7.56
   c)Frequency : 50 to 2000 hz
   d)Duration : 2.0 hours per axis, 3 axis total

3. Figure #4 illustrates the test sample fixturing utilized during the test. The panel mount connectors were secured to the test fixture using a torque of 25 in-lbs on the nut on the inside of the fixture.

PROCEDURE: continued

4. All subsequent variable testing was performed in accordance with 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 observed data:

	CHANGE IN LOW LEVEL CIRCUIT RESISTANCE (Milliohms)	
Sample Type	Avg. Change	Max. Change
SCPEG-2.00-D Cable/ SCRE-01 Panel Mount		
-Contact to Contact	-0.2	+2.3
-Contact to Shield	-19.7	+11.8

3. See data files 20603904 and 20603908 for individual data points.

LLCR DATA FILES

FILE NUMBERS

20603904
20603908

			Low Level Contact Resistance					
	Project:	206039				Spec:	EIA 364, TP 23	
	Customer:	Samtec				Subgroup:	Seq C2, Group A	
	Product:	Rugged I/O connector				File #:	20603904	
	Description:	SCPE-G-2.00-D Cable to SCRE-01 Panel mount						
	Open circuit voltage:		20mv			Current:	10ma	
				Delta values				
				units: milliohms				
	Temp ºC	23	23	23				
	R.H. %	26	28	35				
	Date:	15Feb06	16Feb06	17Feb06				
	Pos. ID	Initial	Mech Shk	Vibration				
	55-1	85.0	0.3	0.4				
	55-2	68.9	-0.1	-0.1				
	55-3	68.2	-0.1	0.2				
	55-4	63.6	-0.1	-0.2				
	55-5	76.7	0.4	0.8				
	55-6	62.2	0.0	2.3				
	55-7	70.7	0.0	0.6				
	55-8	68.6	0.6	0.5				
	56-1	85.3	-0.2	-0.7				
	56-2	68.4	-0.1	-0.4				
	56-3	72.5	-0.2	-0.6				
	56-4	65.1	-0.3	-0.6				
	56-5	78.9	0.2	-0.2				
	56-6	64.3	-0.3	-0.9				
	56-7	71.1	-0.3	-0.5				
	56-8	69.2	-0.2	-0.5				
	57-1	81.8	-0.4	-1.3				
	57-2	68.9	0.0	-1.7				
	57-3	73.0	-0.3	-1.7				
	57-4	64.0	0.8	-0.3				
	57-5	75.6	1.0	-0.4				
	57-6	62.0	0.8	-0.4				
	57-7	68.3	0.6	-0.2				
	57-8	65.6	0.7	0.4				
	58-1	92.2	-0.2	-1.1				
	58-2	71.0	-0.1	-0.3				
	58-3	71.7	-0.4	-0.8				
	58-4	66.0	-0.7	-1.0				
	58-5	77.4	-0.4	-0.7				
	58-6	63.2	-0.4	-0.6				
	58-7	75.4	-0.3	-0.5				
	58-8	71.4	-0.2	-0.2				
	59-1	90.5	0.9	0.2				
	59-2	71.5	0.4	-0.4				

	Customer:	Samtec				Subgroup:	Seq C2, Group A	
	Product:	Rugged I/O connector				File #:	20603904	
	Description:	SCPE-G-2.00-D Cable to SCRE-01 Panel mount						
	Open circuit voltage:		20mv			Current:	10ma	
				Delta values				
				units: milliohms				
	Temp ºC	23	23	23				
	R.H. %	26	28	35				
	Date:	15Feb06	16Feb06	17Feb06				
	Pos. ID	Initial	Mech Shk	Vibration				
	59-3	71.4	0.3	-0.5				
	59-4	66.8	0.9	-0.3				
	59-5	80.1	1.5	1.0				
	59-6	64.6	0.0	-0.8				
	59-7	76.2	0.0	-0.6				
	59-8	72.5	0.7	0.0				
	60-1	86.8	1.1	0.3				
	60-2	70.6	1.0	0.5				
	60-3	85.0	-0.6	-1.2				
	60-4	67.4	-0.3	-0.5				
	60-5	80.5	0.5	0.2				
	60-6	65.4	0.9	0.6				
	60-7	75.7	0.8	0.4				
	60-8	71.8	0.6	0.2				
	MAX	92.2	1.5	2.3				
	MIN	62.0	-0.7	-1.7				
	AVG	72.6	0.2	-0.2				
	STD	7.6	0.5	0.7				
	Open	0	0	0				
	Tech	BE	BE	BE				
	Equip ID	601	601	601				
		1278	1278	1278				

			Low Level Contact Resistance					
	Project:	206039				Spec:	EIA 364, TP 23	
	Customer:	Samtec				Subgroup:	Seq C2, Group A	
	Product:	Rugged I/O connector				File #:	20603908	
	Description:	SCPE-G-2.00-D Cable to SCRE-01 Panel mount (Shield)						
	Open circuit voltage:		20mv			Current:	10ma	
				Delta values				
				units: milliohms				
	Temp ºC	23	23	23				
	R.H. %	26	28	35				
	Date:	15Feb06	16Feb06	17Feb06				
	Pos. ID	Initial	Mech Shk	Vibration				
	Shield # 55	19.2	0.1	1.4				
	Shield # 56	140.1	-55.7	-91.0				
	Shield # 57	22.8	13.5	11.8				
	Shield # 58	44.6	-13.5	0.0				
	Shield # 59	70.3	-26.9	-33.2				
	Shield # 60	24.7	-11.2	-7.0				
	MAX	140.1	13.5	11.8				
	MIN	19.2	-55.7	-91.0				
	AVG	53.6	-15.6	-19.7				
	STD	46.5	23.9	38.1				
	Open	0	0	0				
	Tech	BE	BE	BE				
	Equip ID	601	601	601				
		1278	1278	1278				