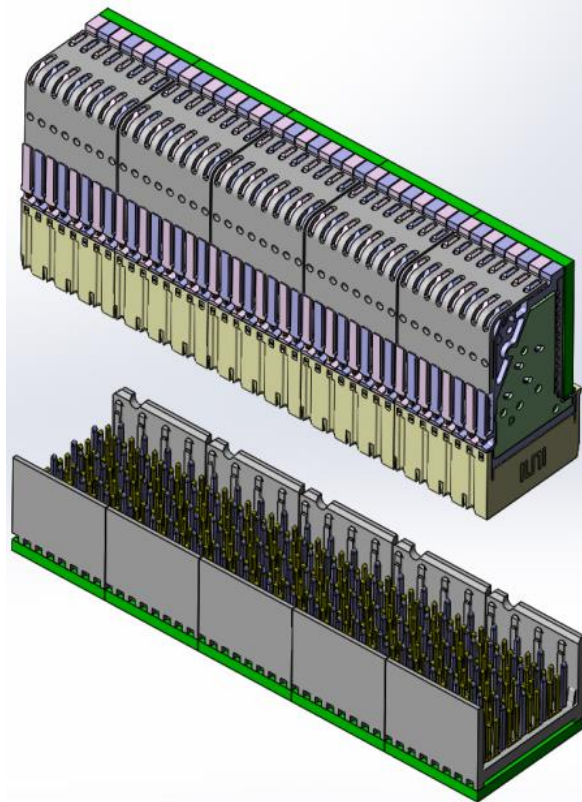




Project Number: Design Qualification Test Report	Tracking Code: 1282712_Report_Rev_1
Requested by: Corey Rose	Date: 11/10/2017
Part #: HDTF-4-08-S-RA-HS-100/HDTM-4-08-1-S-VT-0-1	Tech: Aaron McKim
Part description: HDTF/HDTM (5 connectors per test board)	Qty to test: 65
Test Start: 09/15/2017	Test Completed: 11/08/2017



(FIVE CONNECTORS MOUNTED PER TEST BOARD)

DESIGN QUALIFICATION TEST REPORT

HDTF/HDTM
HDTF-4-08-S-RA-HS-100/HDTM-4-08-1-S-VT-0-1

Tracking Code:1282712_Report_Rev_1	Part #: HDTF-4-08-S-RA-HS-100/HDTM-4-08-1-S-VT-0-1
Part description: HDTF/HDTM (5 connectors per test board)	

REVISION HISTORY

DATA	REV.NUM.	DESCRIPTION	ENG
11/10/2017	1	Initial Issue	PC

CERTIFICATION

All instruments and measuring equipment were calibrated to National Institute for Standards and Technology (NIST) traceable standards according to ISO 10012-1 and ANSI/NCSL 2540-1, as applicable.

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SCOPE

To perform the following tests: Design Qualification test. Please see test plan.

APPLICABLE DOCUMENTS

Standards: EIA Publication 364

TEST SAMPLES AND PREPARATION

- 1) All materials were manufactured in accordance with the applicable product specification.
- 2) All test samples were identified and encoded to maintain traceability throughout the test sequences.
- 3) After soldering, the parts to be used for LLCR and DWV/IR testing were cleaned according to TLWI-0001.
- 4) Either an automated cleaning procedure or an ultrasonic cleaning procedure may be used.
- 5) The automated procedure is used with aqueous compatible soldering materials.
- 6) Parts not intended for testing LLCR and DWV/IR are visually inspected and cleaned if necessary.
- 7) Any additional preparation will be noted in the individual test sequences.
- 8) Solder Information: Lead free
- 9) Samtec Test PCBs used: PCB-108308-TST.

FLOWCHARTS

Thermal Shock/Humidity/Dust/Durability

Note: Use Amphenol LLCR PCB with 5 parts per PCB

Group 1		Group 2		Group 3		Group 4	
HDTF-4-08-S-RA-HS-100 HDTM-4-08-1-S-VT-0-1 10 Assemblies Samtec -RA Mated To Samtec -VT		922-421A-D3D HDTM-4-08-1-S-VT-0-1 10 Assemblies Amphenol -RA Mated To Samtec -VT		HDTF-4-08-S-RA-HS-100 923-400E-40D 10 Assemblies Samtec -RA Mated To Amphenol -VT		922-421A-D3D 923-400E-40D 10 Assemblies Amphenol -RA Mated To Amphenol -VT	
Step	Description	Step	Description	Step	Description	Step	Description
1.	Visual Inspection <i>Note: Check for lifted beams.</i>	1.	Visual Inspection <i>Note: Check for lifted beams.</i>	1.	Visual Inspection <i>Note: Check for lifted beams.</i>	1.	Visual Inspection <i>Note: Check for lifted beams.</i>
2.	Mating/Unmating Force (3) - Non Standard	2.	Mating/Unmating Force (3) - Non Standard	2.	Mating/Unmating Force (3) - Non Standard	2.	Mating/Unmating Force (3) - Non Standard
3.	LLCR (2)	3.	LLCR (2)	3.	LLCR (2)	3.	LLCR (2)
4.	Cycles Quantity = 250 Cycles	4.	Cycles Quantity = 250 Cycles	4.	Cycles Quantity = 250 Cycles	4.	Cycles Quantity = 250 Cycles
5.	LLCR (2) Max Delta = 10 mOhm	5.	LLCR (2) Max Delta = 10 mOhm	5.	LLCR (2) Max Delta = 10 mOhm	5.	LLCR (2) Max Delta = 10 mOhm
6.	Dust <i>Note: EIA-364-91 Composition 1 Benign, per section 9 GR-1217-CORE Telcordia</i>	6.	Dust <i>Note: EIA-364-91 Composition 1 Benign, per section 9 GR-1217-CORE Telcordia</i>	6.	Dust <i>Note: EIA-364-91 Composition 1 Benign, per section 9 GR-1217-CORE Telcordia</i>	6.	Dust <i>Note: EIA-364-91 Composition 1 Benign, per section 9 GR-1217-CORE Telcordia</i>
7.	LLCR (2) Max Delta = 10 mOhm	7.	LLCR (2) Max Delta = 10 mOhm	7.	LLCR (2) Max Delta = 10 mOhm	7.	LLCR (2) Max Delta = 10 mOhm
8.	Thermal Shock (4) - Non Standard	8.	Thermal Shock (4) - Non Standard	8.	Thermal Shock (4) - Non Standard	8.	Thermal Shock (4) - Non Standard
9.	LLCR (2) Max Delta = 10 mOhm	9.	LLCR (2) Max Delta = 10 mOhm	9.	LLCR (2) Max Delta = 10 mOhm	9.	LLCR (2) Max Delta = 10 mOhm
10.	Humidity (1) - Non Standard	10.	Humidity (1) - Non Standard	10.	Humidity (1) - Non Standard	10.	Humidity (1) - Non Standard
11.	LLCR (2) Max Delta = 10 mOhm	11.	LLCR (2) Max Delta = 10 mOhm	11.	LLCR (2) Max Delta = 10 mOhm	11.	LLCR (2) Max Delta = 10 mOhm
12.	Mating/Unmating Force (3) - Non Standard	12.	Mating/Unmating Force (3) - Non Standard	12.	Mating/Unmating Force (3) - Non Standard	12.	Mating/Unmating Force (3) - Non Standard

(1) Humidity = Other

Test Condition = C (500 Hours)

Test Method = III (+25°C to +65°C @ 80% RH to 98% RH)

EIA-364-31C minimum 50 cycles and minimum 500 hours.

(2) LLCR = EIA-364-23

Open Circuit Voltage = 20 mV Max

Test Current = 100 mA Max

(3) Mating/Unmating Force = Other

EIA-364-13 rate of 0.5" per minute

(4) Thermal Shock = Other

Exposure Time at Temperature Extremes = 1/2 Hour

Method A, Test Condition = II (-65°C to +105°C)

Test Duration = (5 Cycles)

EIA-364-TP32B

FLOWCHARTS Continued

Temperature Life

Note: Use Amphenol LLCR PCB with 5 parts per PCB

<u>Group 1</u>		<u>Group 2</u>		<u>Group 3</u>		<u>Group 4</u>	
HDTF-4-08-S-RA-HS-100		922-421A-D3D		HDTF-4-08-S-RA-HS-100		922-421A-D3D	
HDTM-4-08-1-S-VT-0-1		HDTM-4-08-1-S-VT-0-1		923-400E-40D		923-400E-40D	
10 Assemblies		10 Assemblies		10 Assemblies		10 Assemblies	
Samtec -RA Mated To Samtec -VT		Amphenol -RA Mated To Samtec -VT		Samtec -RA Mated To Amphenol -VT		Amphenol -RA Mated To Amphenol -VT	
Step	Description	Step	Description	Step	Description	Step	Description
1.	Visual Inspection <i>Note: Check for lifted beams.</i>	1.	Visual Inspection <i>Note: Check for lifted beams.</i>	1.	Visual Inspection <i>Note: Check for lifted beams.</i>	1.	Visual Inspection <i>Note: Check for lifted beams.</i>
2.	Mating/Unmating Force (2) - Non Standard	2.	Mating/Unmating Force (2) - Non Standard	2.	Mating/Unmating Force (2) - Non Standard	2.	Mating/Unmating Force (2) - Non Standard
3.	LLCR ₍₁₎	3.	LLCR ₍₁₎	3.	LLCR ₍₁₎	3.	LLCR ₍₁₎
4.	Temperature Life <i>Note: EIA-364-17 Test Method= A, Time Condition 5 = 1000 Hours at 105°C</i>	4.	Temperature Life <i>Note: EIA-364-17 Test Method= A, Time Condition 5 = 1000 Hours at 105°C</i>	4.	Temperature Life <i>Note: EIA-364-17 Test Method= A, Time Condition 5 = 1000 Hours at 105°C</i>	4.	Temperature Life <i>Note: EIA-364-17 Test Method= A, Time Condition 5 = 1000 Hours at 105°C</i>
5.	LLCR ₍₁₎ Max Delta = 10 mOhm	5.	LLCR ₍₁₎ Max Delta = 10 mOhm	5.	LLCR ₍₁₎ Max Delta = 10 mOhm	5.	LLCR ₍₁₎ Max Delta = 10 mOhm
6.	Mating/Unmating Force (2) - Non Standard	6.	Mating/Unmating Force (2) - Non Standard	6.	Mating/Unmating Force (2) - Non Standard	6.	Mating/Unmating Force (2) - Non Standard
7.	LLCR ₍₁₎ Max Delta = 10 mOhm	7.	LLCR ₍₁₎ Max Delta = 10 mOhm	7.	LLCR ₍₁₎ Max Delta = 10 mOhm	7.	LLCR ₍₁₎ Max Delta = 10 mOhm

(1) LLCR = EIA-364-23

Open Circuit Voltage = 20 mV Max

Test Current = 100 mA Max

(2) Mating/Unmating Force = Other

EIA-364-13 rate of 0.5" per minute.

(3) Thermal Age = Other

Test Condition = 4 (105°C)

Time Condition = A (1000 Hours)

EIA-364-17

FLOWCHARTS Continued

Vibration And Mechanical Shock With Durability

Group 1 HDTF-4-08-S-RA-HS-100 HDTM-4-08-1-S-VT-0-1 200 Points Samtec -RA Mated To Samtec -VT		Group 2 922-421A-3D3 HDTM-4-08-1-S-VT-0-1 200 Points Amphenol -RA Mated To Samtec -VT		Group 3 HDTF-4-08-S-RA-HS-100 923-400E-40D 200 Points Samtec -RA Mated To Amphenol -VT		Group 4 922-421A-D3D 923-400E-40D 200 Points Amphenol -RA Mated To Amphenol -VT	
Step	Description	Step	Description	Step	Description	Step	Description
1.	Visual Inspection <i>Note: Check for lifted beams.</i>	1.	Visual Inspection <i>Note: Check for lifted beams.</i>	1.	Visual Inspection <i>Note: Check for lifted beams.</i>	1.	Visual Inspection <i>Note: Check for lifted beams.</i>
2.	Mating/Unmating Force (2) - Non Standard	2.	Mating/Unmating Force (2) - Non Standard	2.	Mating/Unmating Force (2) - Non Standard	2.	Mating/Unmating Force (2) - Non Standard
3.	LLCR (1)	3.	LLCR (1)	3.	LLCR (1)	3.	LLCR (1)
4.	Cycles Quantity = 100 Cycles	4.	Cycles Quantity = 100 Cycles	4.	Cycles Quantity = 100 Cycles	4.	Cycles Quantity = 100 Cycles
5.	LLCR (1) Max Delta = 10 mOhm	5.	LLCR (1) Max Delta = 10 mOhm	5.	LLCR (1) Max Delta = 10 mOhm	5.	LLCR (1) Max Delta = 10 mOhm
6.	Dust <i>Note: EIA-364-91 Coposition 1 Benign, per section 9 GR-1217-CORE Telcordia</i>	6.	Dust <i>Note: EIA-364-91 Coposition 1 Benign, per section 9 GR-1217-CORE Telcordia</i>	6.	Dust <i>Note: EIA-364-91 Coposition 1 Benign, per section 9 GR-1217-CORE Telcordia</i>	6.	Dust <i>Note: EIA-364-91 Coposition 1 Benign, per section 9 GR-1217-CORE Telcordia</i>
7.	LLCR (1) Max Delta = 10 mOhm	7.	LLCR (1) Max Delta = 10 mOhm	7.	LLCR (1) Max Delta = 10 mOhm	7.	LLCR (1) Max Delta = 10 mOhm
8.	Nanosecond Event Detection (Mechanical Shock) (3) - Non Standard <i>Note: On X axis.</i>	8.	Nanosecond Event Detection (Mechanical Shock) (3) - Non Standard <i>Note: On X axis.</i>	8.	Nanosecond Event Detection (Mechanical Shock) (4) - Non Standard <i>Note: On X axis.</i>	8.	Nanosecond Event Detection (Mechanical Shock) (3) - Non Standard <i>Note: On X axis.</i>
9.	LLCR (1) Max Delta = 10 mOhm	9.	LLCR (1) Max Delta = 10 mOhm	9.	LLCR (1) Max Delta = 10 mOhm	9.	LLCR (1) Max Delta = 10 mOhm
10.	Nanosecond Event Detection (Mechanical Shock) (3) - Non Standard <i>Note: On Y axis.</i>	10.	Nanosecond Event Detection (Mechanical Shock) (3) - Non Standard <i>Note: On Y axis.</i>	10.	Nanosecond Event Detection (Mechanical Shock) (4) - Non Standard <i>Note: On Y axis.</i>	10.	Nanosecond Event Detection (Mechanical Shock) (3) - Non Standard <i>Note: On Y axis.</i>
11.	LLCR (1) Max Delta = 10 mOhm	11.	LLCR (1) Max Delta = 10 mOhm	11.	LLCR (1) Max Delta = 10 mOhm	11.	LLCR (1) Max Delta = 10 mOhm
12.	Nanosecond Event Detection (Mechanical Shock) (3) - Non Standard <i>Note: On Z axis.</i>	12.	Nanosecond Event Detection (Mechanical Shock) (3) - Non Standard <i>Note: On Z axis.</i>	12.	Nanosecond Event Detection (Mechanical Shock) (4) - Non Standard <i>Note: On Z axis.</i>	12.	Nanosecond Event Detection (Mechanical Shock) (3) - Non Standard <i>Note: On Z axis.</i>
13.	LLCR (1) Max Delta = 10 mOhm	13.	LLCR (1) Max Delta = 10 mOhm	13.	LLCR (1) Max Delta = 10 mOhm	13.	LLCR (1) Max Delta = 10 mOhm
14.	Nanosecond Event Detection (Random Vibration) (5) - Non Standard <i>Note: On X axis.</i>	14.	Nanosecond Event Detection (Random Vibration) (5) - Non Standard <i>Note: On X axis.</i>	14.	Nanosecond Event Detection (Random Vibration) (5) - Non Standard <i>Note: On X axis.</i>	14.	Nanosecond Event Detection (Random Vibration) (5) - Non Standard <i>Note: On X axis.</i>
15.	LLCR (1) Max Delta = 10 mOhm	15.	LLCR (1) Max Delta = 10 mOhm	15.	LLCR (1) Max Delta = 10 mOhm	15.	LLCR (1) Max Delta = 10 mOhm
16.	Nanosecond Event Detection (Random Vibration) (5) - Non Standard <i>Note: On Y axis.</i>	16.	Nanosecond Event Detection (Random Vibration) (5) - Non Standard <i>Note: On Y axis.</i>	16.	Nanosecond Event Detection (Random Vibration) (5) - Non Standard <i>Note: On Y axis.</i>	16.	Nanosecond Event Detection (Random Vibration) (5) - Non Standard <i>Note: On Y axis.</i>
17.	LLCR (1) Max Delta = 10 mOhm	17.	LLCR (1) Max Delta = 10 mOhm	17.	LLCR (1) Max Delta = 10 mOhm	17.	LLCR (1) Max Delta = 10 mOhm
18.	Nanosecond Event Detection (Random Vibration) (5) - Non Standard <i>Note: On Z axis.</i>	18.	Nanosecond Event Detection (Random Vibration) (5) - Non Standard <i>Note: On Z axis.</i>	18.	Nanosecond Event Detection (Random Vibration) (5) - Non Standard <i>Note: On Z axis.</i>	18.	Nanosecond Event Detection (Random Vibration) (5) - Non Standard <i>Note: On Z axis.</i>
19.	LLCR (1) Max Delta = 10 mOhm	19.	LLCR (1) Max Delta = 10 mOhm	19.	LLCR (1) Max Delta = 10 mOhm	19.	LLCR (1) Max Delta = 10 mOhm
20.	Cycles Quantity = 100 Cycles	20.	Cycles Quantity = 100 Cycles	20.	Cycles Quantity = 100 Cycles	20.	Cycles Quantity = 100 Cycles
21.	Mating/Unmating Force (2) - Non Standard	21.	Mating/Unmating Force (2) - Non Standard	21.	Mating/Unmating Force (2) - Non Standard	21.	Mating/Unmating Force (2) - Non Standard
22.	LLCR (1) Max Delta = 10 mOhm	22.	LLCR (1) Max Delta = 10 mOhm	22.	LLCR (1) Max Delta = 10 mOhm	22.	LLCR (1) Max Delta = 10 mOhm

(1) LLCR = EIA-364-23

Open Circuit Voltage = 20 mV Max

Test Current = 100 mA Max

(2) Mating/Unmating Force = Other

EIA-364-13 Rate of 0.5" per minute

FLOWCHARTS Continued**(3) Nanosecond Event Detection (Mechanical Shock) = Other**

Use EIA-364-87 for Nanosecond Event Detection:

Test Condition = F (50 nanoseconds at 10 ohms)

Use EIA-364-27 for Mechanical Shock:

Test Condition = H (30 G Peak, 11 milliseconds, Half Sine)

Number of Shocks = 3 Per Direction, Per Axis, 18 Total

(4) Nanosecond Event Detection (Mechanical Shock) = Other

Use EIA-364-87 for Nanosecond Event Detection:

Test Condition = H (30 nanoseconds at 10 ohms)

Use EIA-364-27 for Mechanical Shock:

Test Condition = A (50 G Peak, 11 milliseconds, Half Sine)

Number of Shocks = 3 Per Direction, Per Axis, 18 Total

(5) Nanosecond Event Detection (Random Vibration) = Other

Use EIA-364-87 for Nanosecond Event Detection:

Test Condition = F (50 nanoseconds at 10 ohms)

Use EIA-364-TB28E for Random Vibration:

Condition = VA (5.35g RMS Average, 2 Hours/Axis)

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

THERMAL SHOCK:

- 1) EIA-364-TP32B, *Thermal Shock (Temperature Cycling) Test Procedure for Electrical Connectors*.
- 2) Test Condition II: -65°C to +105°C
- 3) Test Time: ½ hour dwell at each temperature extreme
- 4) Number of Cycles: 5
- 5) All test samples are pre-conditioned at ambient.
- 6) All test samples are exposed to environmental stressing in the mated condition.

THERMAL:

- 1) EIA-364-17, *Temperature Life without Electrical Load Test Procedure for Electrical Connectors*.
- 2) Test Condition 4 at 105° C
- 3) Test Time Condition B for 1000 hours.
- 4) All test samples are pre-conditioned at ambient.
- 5) All test samples are exposed to environmental stressing in the mated condition.

HUMIDITY:

- 1) Reference document: EIA-364-31C, *Humidity Test Procedure for Electrical Connectors*.
- 2) Test Condition C, 500 Hours.
- 3) Method III, +25° C to + 65° C, 80% to 98% Relative Humidity excluding sub-cycles 7a and 7b.
- 4) All samples are pre-conditioned at ambient.
- 5) All test samples are exposed to environmental stressing in the mated condition.

MECHANICAL SHOCK (Specified Pulse):

- 1) Reference document: EIA-364-27, *Mechanical Shock Test Procedure for Electrical Connectors*
- 2) Test Condition H
- 3) Peak Value: 30 G
- 4) Duration: 11 Milliseconds
- 5) Wave Form: Half Sine
- 6) Number of Shocks: 3 Shocks / Direction, 3 Axis (18 Total)

VIBRATION:

- 1) Reference document: EIA-364-28, *Vibration Test Procedure for Electrical Connectors*
- 2) Test Condition V, Letter A
- 3) Power Spectral Density: 0.02 G² / Hz
- 4) G 'RMS': 5.35
- 5) Frequency: 50 to 2000 Hz
- 6) Duration: 2.0 Hours per axis (3 axis total)

NANOSECOND-EVENT DETECTION:

- 1) Reference document: EIA-364-87, *Nanosecond-Event Detection for Electrical Connectors*
- 2) Prior to test, the samples were characterized to assure the low nanosecond event being monitored will trigger the detector.
- 3) After characterization it was determined the test samples could be monitored for 50 nanosecond events at 10 ohms.

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes

MATING/UNMATING:

- 1) Reference document: EIA-364-13, *Mating and Unmating Forces Test Procedure for Electrical Connectors*.
- 2) The full insertion position was to within 0.003" to 0.004" of the plug bottoming out in the receptacle to prevent damage to the system under test.
- 3) One of the mating parts is secured to a floating X-Y table to prevent damage during cycling.
- 4) Rate of 0.5" per minute.

LLCR:

- 1) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets*.
- 2) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
- 3) The following guidelines are used to categorize the changes in LLCR as a result from stressing
 - a. $\leq +5.0$ mOhms: -----Stable
 - b. $+5.1$ to $+10.0$ mOhms: -----Minor
 - c. $+10.1$ to $+15.0$ mOhms: -----Acceptable
 - d. $+15.1$ to $+50.0$ mOhms: -----Marginal
 - e. $+50.1$ to $+2000$ mOhms: -----Unstable
 - f. $>+2000$ mOhms: -----Open Failure

RESULTS

Mating – Unmating Forces

Thermal Shock/Humidity/Dust/Durability

Group 1 HDTF-4-08-S-RA-HS-100(Samtec-RA) / HDTM-4-08-1-S-VT-0-1(Samtec-VT)

- Initial
 - Mating
 - Min -----30.82 Lbs
 - Max-----31.57 Lbs
 - Unmating
 - Min -----21.75 Lbs
 - Max-----22.49 Lbs
- Humidity
 - Mating
 - Min -----26.14 Lbs
 - Max-----26.37 Lbs
 - Unmating
 - Min -----21.58 Lbs
 - Max-----22.96 Lbs

Group 2 922-421A-D3D(Amphenol-RA) / HDTM-4-08-1-S-VT-0-1(Samtec-VT)

- Initial
 - Mating
 - Min -----44.55 Lbs
 - Max-----47.19 Lbs
 - Unmating
 - Min -----26.38 Lbs
 - Max-----26.63 Lbs
- Humidity
 - Mating
 - Min -----39.74 Lbs
 - Max-----42.00 Lbs
 - Unmating
 - Min -----31.31 Lbs
 - Max-----31.96 Lbs

Group 3 HDTF-4-08-S-RA-HS-100(Samtec-RA) / 923-400E-40D(Amphenol-VT)

- Initial
 - Mating
 - Min -----28.78 Lbs
 - Max-----29.25 Lbs
 - Unmating
 - Min -----21.67 Lbs
 - Max-----25.10 Lbs
- Humidity
 - Mating
 - Min -----24.90 Lbs
 - Max-----26.69 Lbs
 - Unmating
 - Min -----19.02 Lbs
 - Max-----19.04 Lbs

RESULTS Continued**Group 4 922-421A-D3D(Amphenol-RA) / 923-400E-40D(Amphenol-VT)**

- **Initial**
 - **Mating**
 - **Min** -----38.05 Lbs
 - **Max** -----45.28 Lbs
 - **Unmating**
 - **Min** -----24.23 Lbs
 - **Max** -----25.63 Lbs
- **Humidity**
 - **Mating**
 - **Min** -----32.88 Lbs
 - **Max** -----34.91 Lbs
 - **Unmating**
 - **Min** -----24.72 Lbs
 - **Max** -----26.74 Lbs

Temperature Life**Group 1 HDTF-4-08-S-RA-HS-100(Samtec-RA) / HDTM-4-08-1-S-VT-0-1(Samtec-VT)**

- **Initial**
 - **Mating**
 - **Min** -----32.40 Lbs
 - **Max** -----32.59 Lbs
 - **Unmating**
 - **Min** -----17.15 Lbs
 - **Max** -----24.23 Lbs
- **Thermal Aging**
 - **Mating**
 - **Min** -----19.88 Lbs
 - **Max** -----21.43 Lbs
 - **Unmating**
 - **Min** -----16.83 Lbs
 - **Max** -----17.97 Lbs

Group 2 922-421A-D3D(Amphenol -RA) / HDTM-4-08-1-S-VT-0-1(Samtec-VT)

- **Initial**
 - **Mating**
 - **Min** -----44.93 Lbs
 - **Max** -----47.13 Lbs
 - **Unmating**
 - **Min** -----26.76 Lbs
 - **Max** -----28.64 Lbs
- **Thermal Aging**
 - **Mating**
 - **Min** -----28.47 Lbs
 - **Max** -----28.63 Lbs
 - **Unmating**
 - **Min** -----22.16 Lbs
 - **Max** -----23.74 Lbs

RESULTS Continued**Group 3 HDTF-4-08-S-RA-HS-100(Samtec-RA) / 923-400E-40D(Amphenol-VT)**

- **Initial**
 - **Mating**
 - **Min** -----26.02 Lbs
 - **Max** -----26.78 Lbs
 - **Unmating**
 - **Min** -----20.25 Lbs
 - **Max** -----21.48 Lbs
- **Thermal Aging**
 - **Mating**
 - **Min** -----17.54 Lbs
 - **Max** -----18.14 Lbs
 - **Unmating**
 - **Min** -----13.25 Lbs
 - **Max** -----14.13 Lbs

Group 4 922-421A-D3D(Amphenol -RA) / 923-400E-40D(Amphenol-VT)

- **Initial**
 - **Mating**
 - **Min** -----40.89 Lbs
 - **Max** -----44.87 Lbs
 - **Unmating**
 - **Min** -----25.35 Lbs
 - **Max** -----25.93 Lbs
- **Thermal Aging**
 - **Mating**
 - **Min** -----21.74 Lbs
 - **Max** -----25.59 Lbs
 - **Unmating**
 - **Min** -----18.75 Lbs
 - **Max** -----20.18 Lbs

Vibration and Mechanical Shock with Durability**Group 1 HDTF-4-08-S-RA-HS-100(Samtec-RA) / HDTM-4-08-1-S-VT-0-1(Samtec-VT)**

- **Initial**
 - **Mating**
 - **Min** ----- 5.82 Lbs
 - **Max** ----- 6.03 Lbs
 - **Unmating**
 - **Min** ----- 4.28 Lbs
 - **Max** ----- 4.84 Lbs
- **S&V**
 - **Mating**
 - **Min** ----- 8.85 Lbs
 - **Max** -----11.16 Lbs
 - **Unmating**
 - **Min** ----- 5.82 Lbs
 - **Max** ----- 7.08 Lbs

RESULTS Continued**Group 2 922-421A-D3D(Amphenol -RA) / HDTM-4-08-1-S-VT-0-1(Samtec-VT)**

- **Initial**
 - **Mating**
 - **Min** ----- 7.98 Lbs
 - **Max** ----- 9.66 Lbs
 - **Unmating**
 - **Min** ----- 4.88 Lbs
 - **Max** ----- 5.36 Lbs
- **S&V**
 - **Mating**
 - **Min** ----- 14.78 Lbs
 - **Max** ----- 16.33 Lbs
 - **Unmating**
 - **Min** ----- 6.43 Lbs
 - **Max** ----- 8.54 Lbs

Group 3 HDTF-4-08-S-RA-HS-100(Samtec-RA) / 923-400E-40D(Amphenol-VT)

- **Initial**
 - **Mating**
 - **Min** ----- 5.02 Lbs
 - **Max** ----- 5.88 Lbs
 - **Unmating**
 - **Min** ----- 2.24 Lbs
 - **Max** ----- 4.59 Lbs
- **S&V**
 - **Mating**
 - **Min** ----- 9.14 Lbs
 - **Max** ----- 10.57 Lbs
 - **Unmating**
 - **Min** ----- 7.08 Lbs
 - **Max** ----- 7.47 Lbs

Group 4 922-421A-D3D(Amphenol -RA) / 923-400E-40D(Amphenol-VT)

- **Initial**
 - **Mating**
 - **Min** ----- 8.22 Lbs
 - **Max** ----- 9.76 Lbs
 - **Unmating**
 - **Min** ----- 5.08 Lbs
 - **Max** ----- 5.53 Lbs
- **S&V**
 - **Mating**
 - **Min** ----- 11.00 Lbs
 - **Max** ----- 12.83 Lbs
 - **Unmating**
 - **Min** ----- 7.39 Lbs
 - **Max** ----- 8.66 Lbs

RESULTS Continued**LLCR Thermal Shock/Humidity/Dust/Durability (200 LLCR test points)****Group 1 HDTF-4-08-S-RA-HS-100(Samtec-RA) / HDTM-4-08-1-S-VT-0-1(Samtec-VT)****Signal pin**

Initial -----23.25 mOhms Max

Ground pin

Initial -----15.11 mOhms Max

• **Durability, 250 Cycles**

- <= +5.0 mOhms ----- 200 Points ----- Stable
- +5.1 to +10.0 mOhms -----0 Points ----- Minor
- +10.1 to +15.0 mOhms -----0 Points ----- Acceptable
- +15.1 to +50.0 mOhms -----0 Points ----- Marginal
- +50.1 to +2000 mOhms -----0 Points ----- Unstable
- >+2000 mOhms -----0 Points ----- Open Failure

• **Dust**

- <= +5.0 mOhms ----- 200 Points ----- Stable
- +5.1 to +10.0 mOhms -----0 Points ----- Minor
- +10.1 to +15.0 mOhms -----0 Points ----- Acceptable
- +15.1 to +50.0 mOhms -----0 Points ----- Marginal
- +50.1 to +2000 mOhms -----0 Points ----- Unstable
- >+2000 mOhms -----0 Points ----- Open Failure

• **Thermal Shock**

- <= +5.0 mOhms ----- 200 Points ----- Stable
- +5.1 to +10.0 mOhms -----0 Points ----- Minor
- +10.1 to +15.0 mOhms -----0 Points ----- Acceptable
- +15.1 to +50.0 mOhms -----0 Points ----- Marginal
- +50.1 to +2000 mOhms -----0 Points ----- Unstable
- >+2000 mOhms -----0 Points ----- Open Failure

• **Humidity**

- <= +5.0 mOhms ----- 196 Points ----- Stable
- +5.1 to +10.0 mOhms -----3 Points ----- Minor
- +10.1 to +15.0 mOhms -----1 Points ----- Acceptable
- +15.1 to +50.0 mOhms -----0 Points ----- Marginal
- +50.1 to +2000 mOhms -----0 Points ----- Unstable
- >+2000 mOhms -----0 Points ----- Open Failure

RESULTS Continued**Group 2 922-421A-D3D(Amphenol -RA) / HDTM-4-08-1-S-VT-0-1(Samtec-VT)****Signal pin****Initial -----20.85 mOhms Max****Ground pin****Initial -----14.44 mOhms Max**• **Durability, 250 Cycles**

- <= +5.0 mOhms ----- 200 Points ----- Stable
- +5.1 to +10.0 mOhms -----0 Points ----- Minor
- +10.1 to +15.0 mOhms -----0 Points ----- Acceptable
- +15.1 to +50.0 mOhms -----0 Points ----- Marginal
- +50.1 to +2000 mOhms -----0 Points ----- Unstable
- >+2000 mOhms -----0 Points ----- Open Failure

• **Dust**

- <= +5.0 mOhms ----- 200 Points ----- Stable
- +5.1 to +10.0 mOhms -----0 Points ----- Minor
- +10.1 to +15.0 mOhms -----0 Points ----- Acceptable
- +15.1 to +50.0 mOhms -----0 Points ----- Marginal
- +50.1 to +2000 mOhms -----0 Points ----- Unstable
- >+2000 mOhms -----0 Points ----- Open Failure

• **Thermal Shock**

- <= +5.0 mOhms ----- 200 Points ----- Stable
- +5.1 to +10.0 mOhms -----0 Points ----- Minor
- +10.1 to +15.0 mOhms -----0 Points ----- Acceptable
- +15.1 to +50.0 mOhms -----0 Points ----- Marginal
- +50.1 to +2000 mOhms -----0 Points ----- Unstable
- >+2000 mOhms -----0 Points ----- Open Failure

• **Humidity**

- <= +5.0 mOhms ----- 198 Points ----- Stable
- +5.1 to +10.0 mOhms -----2 Points ----- Minor
- +10.1 to +15.0 mOhms -----0 Points ----- Acceptable
- +15.1 to +50.0 mOhms -----0 Points ----- Marginal
- +50.1 to +2000 mOhms -----0 Points ----- Unstable
- >+2000 mOhms -----0 Points ----- Open Failure

RESULTS Continued**Group 3 HDTF-4-08-S-RA-HS-100(Samtec-RA) / 923-400E-40D(Amphenol-VT)****Signal pin****Initial -----22.43 mOhms Max****Ground pin****Initial -----15.52 mOhms Max**

- **Durability, 250 Cycles**
 - <= +5.0 mOhms ----- 200 Points ----- Stable
 - +5.1 to +10.0 mOhms -----0 Points ----- Minor
 - +10.1 to +15.0 mOhms -----0 Points ----- Acceptable
 - +15.1 to +50.0 mOhms -----0 Points ----- Marginal
 - +50.1 to +2000 mOhms -----0 Points ----- Unstable
 - >+2000 mOhms -----0 Points ----- Open Failure
- **Dust**
 - <= +5.0 mOhms ----- 200 Points ----- Stable
 - +5.1 to +10.0 mOhms -----0 Points ----- Minor
 - +10.1 to +15.0 mOhms -----0 Points ----- Acceptable
 - +15.1 to +50.0 mOhms -----0 Points ----- Marginal
 - +50.1 to +2000 mOhms -----0 Points ----- Unstable
 - >+2000 mOhms -----0 Points ----- Open Failure
- **Thermal Shock**
 - <= +5.0 mOhms ----- 200 Points ----- Stable
 - +5.1 to +10.0 mOhms -----0 Points ----- Minor
 - +10.1 to +15.0 mOhms -----0 Points ----- Acceptable
 - +15.1 to +50.0 mOhms -----0 Points ----- Marginal
 - +50.1 to +2000 mOhms -----0 Points ----- Unstable
 - >+2000 mOhms -----0 Points ----- Open Failure
- **Humidity**
 - <= +5.0 mOhms ----- 197 Points ----- Stable
 - +5.1 to +10.0 mOhms -----3 Points ----- Minor
 - +10.1 to +15.0 mOhms -----0 Points ----- Acceptable
 - +15.1 to +50.0 mOhms -----0 Points ----- Marginal
 - +50.1 to +2000 mOhms -----0 Points ----- Unstable
 - >+2000 mOhms -----0 Points ----- Open Failure

RESULTS Continued**Group 4 922-421A-D3D(Amphenol -RA) / 923-400E-40D(Amphenol-VT)****Signal pin****Initial -----20.86 mOhms Max****Ground pin****Initial -----14.39 mOhms Max**

- **Durability, 250 Cycles**
 - <= +5.0 mOhms ----- 200 Points ----- Stable
 - +5.1 to +10.0 mOhms -----0 Points ----- Minor
 - +10.1 to +15.0 mOhms -----0 Points ----- Acceptable
 - +15.1 to +50.0 mOhms -----0 Points ----- Marginal
 - +50.1 to +2000 mOhms -----0 Points ----- Unstable
 - >+2000 mOhms -----0 Points ----- Open Failure
- **Dust**
 - <= +5.0 mOhms ----- 200 Points ----- Stable
 - +5.1 to +10.0 mOhms -----0 Points ----- Minor
 - +10.1 to +15.0 mOhms -----0 Points ----- Acceptable
 - +15.1 to +50.0 mOhms -----0 Points ----- Marginal
 - +50.1 to +2000 mOhms -----0 Points ----- Unstable
 - >+2000 mOhms -----0 Points ----- Open Failure
- **Thermal Shock**
 - <= +5.0 mOhms ----- 200 Points ----- Stable
 - +5.1 to +10.0 mOhms -----0 Points ----- Minor
 - +10.1 to +15.0 mOhms -----0 Points ----- Acceptable
 - +15.1 to +50.0 mOhms -----0 Points ----- Marginal
 - +50.1 to +2000 mOhms -----0 Points ----- Unstable
 - >+2000 mOhms -----0 Points ----- Open Failure
- **Humidity**
 - <= +5.0 mOhms ----- 200 Points ----- Stable
 - +5.1 to +10.0 mOhms -----0 Points ----- Minor
 - +10.1 to +15.0 mOhms -----0 Points ----- Acceptable
 - +15.1 to +50.0 mOhms -----0 Points ----- Marginal
 - +50.1 to +2000 mOhms -----0 Points ----- Unstable
 - >+2000 mOhms -----0 Points ----- Open Failure

RESULTS Continued**LLCR Temperature Life (200 LLCR test points)****Group 1 HDTF-4-08-S-RA-HS-100(Samtec-RA) / HDTM-4-08-1-S-VT-0-1(Samtec-VT)****Signal Pin**

- Initial ----- 22.31 mOhms Max

Ground Pin

- Initial ----- 14.30 mOhms Max
- Thermal Aging
 - <= +5.0 mOhms ----- 200 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 0 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 0 Points ----- Acceptable
 - +15.1 to +50.0 mOhms ----- 0 Points ----- Marginal
 - +50.1 to +2000 mOhms ----- 0 Points ----- Unstable
 - >+2000 mOhms ----- 0 Points ----- Open Failure

Group 2 922-421A-D3D(Amphenol -RA) / HDTM-4-08-1-S-VT-0-1(Samtec-VT)**Signal Pin**

- Initial ----- 22.64 mOhms Max

Ground Pin

- Initial ----- 14.26 mOhms Max
- Thermal Aging
 - <= +5.0 mOhms ----- 200 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 0 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 0 Points ----- Acceptable
 - +15.1 to +50.0 mOhms ----- 0 Points ----- Marginal
 - +50.1 to +2000 mOhms ----- 0 Points ----- Unstable
 - >+2000 mOhms ----- 0 Points ----- Open Failure

Group 3 HDTF-4-08-S-RA-HS-100(Samtec-RA) / 923-400E-40D(Amphenol-VT)**Signal Pin**

- Initial ----- 22.19 mOhms Max

Ground Pin

- Initial ----- 15.04 mOhms Max
- Thermal Aging
 - <= +5.0 mOhms ----- 198 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 2 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 0 Points ----- Acceptable
 - +15.1 to +50.0 mOhms ----- 0 Points ----- Marginal
 - +50.1 to +2000 mOhms ----- 0 Points ----- Unstable
 - >+2000 mOhms ----- 0 Points ----- Open Failure

Group 4 922-421A-D3D(Amphenol -RA) / 923-400E-40D(Amphenol-VT)**Signal Pin**

- Initial ----- 21.45 mOhms Max

Ground Pin

- Initial ----- 14.30 mOhms Max
- Thermal Aging
 - <= +5.0 mOhms ----- 200 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 0 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 0 Points ----- Acceptable
 - +15.1 to +50.0 mOhms ----- 0 Points ----- Marginal
 - +50.1 to +2000 mOhms ----- 0 Points ----- Unstable
 - >+2000 mOhms ----- 0 Points ----- Open Failure

RESULTS Continued**LLCR Vibration and Mechanical Shock with Durability (200 LLCR test points)****Group 1 HDTF-4-08-S-RA-HS-100(Samtec-RA) / HDTM-4-08-1-S-VT-0-1(Samtec-VT)****Signal Pin**

- Initial ----- 29.60 mOhms Max

Ground Pin

- Initial ----- 16.33 mOhms Max
- Durability, 100 Cycles
 - <= +5.0 mOhms ----- 196 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 4 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 0 Points ----- Acceptable
 - +15.1 to +50.0 mOhms ----- 0 Points ----- Marginal
 - +50.1 to +2000 mOhms ----- 0 Points ----- Unstable
 - >+2000 mOhms ----- 0 Points ----- Open Failure
- Dust
 - <= +5.0 mOhms ----- 194 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 5 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 1 Points ----- Acceptable
 - +15.1 to +50.0 mOhms ----- 0 Points ----- Marginal
 - +50.1 to +2000 mOhms ----- 0 Points ----- Unstable
 - >+2000 mOhms ----- 0 Points ----- Open Failure
- shock-X axis
 - <= +5.0 mOhms ----- 193 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 6 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 1 Points ----- Acceptable
 - +15.1 to +50.0 mOhms ----- 0 Points ----- Marginal
 - +50.1 to +2000 mOhms ----- 0 Points ----- Unstable
 - >+2000 mOhms ----- 0 Points ----- Open Failure
- shock -Y axis
 - <= +5.0 mOhms ----- 193 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 6 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 1 Points ----- Acceptable
 - +15.1 to +50.0 mOhms ----- 0 Points ----- Marginal
 - +50.1 to +2000 mOhms ----- 0 Points ----- Unstable
 - >+2000 mOhms ----- 1 Points ----- Open Failure
- shock -Z axis
 - <= +5.0 mOhms ----- 192 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 6 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 2 Points ----- Acceptable
 - +15.1 to +50.0 mOhms ----- 0 Points ----- Marginal
 - +50.1 to +2000 mOhms ----- 0 Points ----- Unstable
 - >+2000 mOhms ----- 0 Points ----- Open Failure
- Vibe-X axis
 - <= +5.0 mOhms ----- 193 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 6 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 1 Points ----- Acceptable
 - +15.1 to +50.0 mOhms ----- 0 Points ----- Marginal
 - +50.1 to +2000 mOhms ----- 0 Points ----- Unstable
 - >+2000 mOhms ----- 0 Points ----- Open Failure
- Vibe -Y axis
 - <= +5.0 mOhms ----- 194 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 4 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 2 Points ----- Acceptable
 - +15.1 to +50.0 mOhms ----- 0 Points ----- Marginal
 - +50.1 to +2000 mOhms ----- 0 Points ----- Unstable
 - >+2000 mOhms ----- 0 Points ----- Open Failure

- **RESULTS Continued**

- **Vibe -Z axis**

- **<= +5.0 mOhms ----- 193 Points ----- Stable**
- **+5.1 to +10.0 mOhms -----5 Points ----- Minor**
- **+10.1 to +15.0 mOhms -----2 Points ----- Acceptable**
- **+15.1 to +50.0 mOhms -----0 Points ----- Marginal**
- **+50.1 to +2000 mOhms -----0 Points ----- Unstable**
- **>+2000 mOhms -----0 Points ----- Open Failure**

- **Durability, 100 Cycles**

- **<= +5.0 mOhms ----- 193 Points ----- Stable**
- **+5.1 to +10.0 mOhms -----6 Points ----- Minor**
- **+10.1 to +15.0 mOhms -----1 Points ----- Acceptable**
- **+15.1 to +50.0 mOhms -----0 Points ----- Marginal**
- **+50.1 to +2000 mOhms -----0 Points ----- Unstable**
- **>+2000 mOhms -----0 Points ----- Open Failure**

RESULTS Continued**Group 2 922-421A-D3D(Amphentol -RA) / HDTM-4-08-1-S-VT-0-1(Samtec-VT)****Signal Pin**

- Initial ----- 20.66 mOhms Max

Ground Pin

- Initial ----- 13.53 mOhms Max
- Durability, 100 Cycles
 - <= +5.0 mOhms ----- 200 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 0 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 0 Points ----- Acceptable
 - +15.1 to +50.0 mOhms ----- 0 Points ----- Marginal
 - +50.1 to +2000 mOhms ----- 0 Points ----- Unstable
 - >+2000 mOhms ----- 0 Points ----- Open Failure
- Dust
 - <= +5.0 mOhms ----- 200 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 0 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 0 Points ----- Acceptable
 - +15.1 to +50.0 mOhms ----- 0 Points ----- Marginal
 - +50.1 to +2000 mOhms ----- 0 Points ----- Unstable
 - >+2000 mOhms ----- 0 Points ----- Open Failure
- shock-X axis
 - <= +5.0 mOhms ----- 200 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 0 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 0 Points ----- Acceptable
 - +15.1 to +50.0 mOhms ----- 0 Points ----- Marginal
 - +50.1 to +2000 mOhms ----- 0 Points ----- Unstable
 - >+2000 mOhms ----- 0 Points ----- Open Failure
- shock -Y axis
 - <= +5.0 mOhms ----- 200 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 0 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 0 Points ----- Acceptable
 - +15.1 to +50.0 mOhms ----- 0 Points ----- Marginal
 - +50.1 to +2000 mOhms ----- 0 Points ----- Unstable
 - >+2000 mOhms ----- 0 Points ----- Open Failure
- shock -Z axis
 - <= +5.0 mOhms ----- 200 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 0 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 0 Points ----- Acceptable
 - +15.1 to +50.0 mOhms ----- 0 Points ----- Marginal
 - +50.1 to +2000 mOhms ----- 0 Points ----- Unstable
 - >+2000 mOhms ----- 0 Points ----- Open Failure
- Vibe-X axis
 - <= +5.0 mOhms ----- 200 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 0 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 0 Points ----- Acceptable
 - +15.1 to +50.0 mOhms ----- 0 Points ----- Marginal
 - +50.1 to +2000 mOhms ----- 0 Points ----- Unstable
 - >+2000 mOhms ----- 0 Points ----- Open Failure
- Vibe -Y axis
 - <= +5.0 mOhms ----- 200 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 0 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 0 Points ----- Acceptable
 - +15.1 to +50.0 mOhms ----- 0 Points ----- Marginal
 - +50.1 to +2000 mOhms ----- 0 Points ----- Unstable
 - >+2000 mOhms ----- 0 Points ----- Open Failure

RESULTS Continued**• Vibe -Z axis**

- **<= +5.0 mOhms ----- 200 Points ----- Stable**
- **+5.1 to +10.0 mOhms -----0 Points ----- Minor**
- **+10.1 to +15.0 mOhms -----0 Points ----- Acceptable**
- **+15.1 to +50.0 mOhms -----0 Points ----- Marginal**
- **+50.1 to +2000 mOhms -----0 Points ----- Unstable**
- **>+2000 mOhms -----0 Points ----- Open Failure**

• Durability, 100 Cycles

- **<= +5.0 mOhms ----- 200 Points ----- Stable**
- **+5.1 to +10.0 mOhms -----0 Points ----- Minor**
- **+10.1 to +15.0 mOhms -----0 Points ----- Acceptable**
- **+15.1 to +50.0 mOhms -----0 Points ----- Marginal**
- **+50.1 to +2000 mOhms -----0 Points ----- Unstable**
- **>+2000 mOhms -----0 Points ----- Open Failure**

RESULTS Continued**Group 3 HDTF-4-08-S-RA-HS-100(Samtec-RA) / 923-400E-40D(Amphenol-VT)****Signal Pin**

- Initial ----- 24.23 mOhms Max

Ground Pin

- Initial ----- 14.21 mOhms Max
- Durability, 100 Cycles
 - <= +5.0 mOhms ----- 200 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 0 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 0 Points ----- Acceptable
 - +15.1 to +50.0 mOhms ----- 0 Points ----- Marginal
 - +50.1 to +2000 mOhms ----- 0 Points ----- Unstable
 - >+2000 mOhms ----- 0 Points ----- Open Failure
- Dust
 - <= +5.0 mOhms ----- 199 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 1 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 0 Points ----- Acceptable
 - +15.1 to +50.0 mOhms ----- 1 Points ----- Marginal
 - +50.1 to +2000 mOhms ----- 0 Points ----- Unstable
 - >+2000 mOhms ----- 0 Points ----- Open Failure
- shock-X axis
 - <= +5.0 mOhms ----- 200 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 0 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 0 Points ----- Acceptable
 - +15.1 to +50.0 mOhms ----- 0 Points ----- Marginal
 - +50.1 to +2000 mOhms ----- 0 Points ----- Unstable
 - >+2000 mOhms ----- 0 Points ----- Open Failure
- shock -Y axis
 - <= +5.0 mOhms ----- 199 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 1 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 0 Points ----- Acceptable
 - +15.1 to +50.0 mOhms ----- 0 Points ----- Marginal
 - +50.1 to +2000 mOhms ----- 0 Points ----- Unstable
 - >+2000 mOhms ----- 1 Points ----- Open Failure
- shock -Z axis
 - <= +5.0 mOhms ----- 200 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 0 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 0 Points ----- Acceptable
 - +15.1 to +50.0 mOhms ----- 0 Points ----- Marginal
 - +50.1 to +2000 mOhms ----- 0 Points ----- Unstable
 - >+2000 mOhms ----- 0 Points ----- Open Failure
- Vibe-X axis
 - <= +5.0 mOhms ----- 200 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 0 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 0 Points ----- Acceptable
 - +15.1 to +50.0 mOhms ----- 0 Points ----- Marginal
 - +50.1 to +2000 mOhms ----- 0 Points ----- Unstable
 - >+2000 mOhms ----- 0 Points ----- Open Failure
- Vibe -Y axis
 - <= +5.0 mOhms ----- 200 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 0 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 0 Points ----- Acceptable
 - +15.1 to +50.0 mOhms ----- 0 Points ----- Marginal
 - +50.1 to +2000 mOhms ----- 0 Points ----- Unstable
 - >+2000 mOhms ----- 0 Points ----- Open Failure

RESULTS Continued

- **Vibe -Z axis**
 - **<= +5.0 mOhms ----- 200 Points ----- Stable**
 - **+5.1 to +10.0 mOhms -----0 Points ----- Minor**
 - **+10.1 to +15.0 mOhms -----0 Points ----- Acceptable**
 - **+15.1 to +50.0 mOhms -----0 Points ----- Marginal**
 - **+50.1 to +2000 mOhms -----0 Points ----- Unstable**
 - **>+2000 mOhms -----0 Points ----- Open Failure**
- **Durability, 100 Cycles**
 - **<= +5.0 mOhms ----- 200 Points ----- Stable**
 - **+5.1 to +10.0 mOhms -----0 Points ----- Minor**
 - **+10.1 to +15.0 mOhms -----0 Points ----- Acceptable**
 - **+15.1 to +50.0 mOhms -----0 Points ----- Marginal**
 - **+50.1 to +2000 mOhms -----0 Points ----- Unstable**
 - **>+2000 mOhms -----0 Points ----- Open Failure**

RESULTS Continued**Group 4 922-421A-D3D(Amphenol -RA) / 923-400E-40D(Amphenol-VT)****Signal Pin**

- Initial ----- 20.80 mOhms Max

Ground Pin

- Initial ----- 16.99 mOhms Max
- Durability, 100 Cycles
 - <= +5.0 mOhms ----- 200 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 0 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 0 Points ----- Acceptable
 - +15.1 to +50.0 mOhms ----- 0 Points ----- Marginal
 - +50.1 to +2000 mOhms ----- 0 Points ----- Unstable
 - >+2000 mOhms ----- 0 Points ----- Open Failure
- Dust
 - <= +5.0 mOhms ----- 199 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 1 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 0 Points ----- Acceptable
 - +15.1 to +50.0 mOhms ----- 0 Points ----- Marginal
 - +50.1 to +2000 mOhms ----- 0 Points ----- Unstable
 - >+2000 mOhms ----- 0 Points ----- Open Failure
- shock-X axis
 - <= +5.0 mOhms ----- 200 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 0 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 0 Points ----- Acceptable
 - +15.1 to +50.0 mOhms ----- 0 Points ----- Marginal
 - +50.1 to +2000 mOhms ----- 0 Points ----- Unstable
 - >+2000 mOhms ----- 0 Points ----- Open Failure
- shock -Y axis
 - <= +5.0 mOhms ----- 200 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 0 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 0 Points ----- Acceptable
 - +15.1 to +50.0 mOhms ----- 0 Points ----- Marginal
 - +50.1 to +2000 mOhms ----- 0 Points ----- Unstable
 - >+2000 mOhms ----- 0 Points ----- Open Failure
- shock -Z axis
 - <= +5.0 mOhms ----- 200 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 0 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 0 Points ----- Acceptable
 - +15.1 to +50.0 mOhms ----- 0 Points ----- Marginal
 - +50.1 to +2000 mOhms ----- 0 Points ----- Unstable
 - >+2000 mOhms ----- 0 Points ----- Open Failure
- Vibe-X axis
 - <= +5.0 mOhms ----- 199 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 1 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 0 Points ----- Acceptable
 - +15.1 to +50.0 mOhms ----- 0 Points ----- Marginal
 - +50.1 to +2000 mOhms ----- 0 Points ----- Unstable
 - >+2000 mOhms ----- 0 Points ----- Open Failure
- Vibe -Y axis
 - <= +5.0 mOhms ----- 199 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 0 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 1 Points ----- Acceptable
 - +15.1 to +50.0 mOhms ----- 0 Points ----- Marginal
 - +50.1 to +2000 mOhms ----- 0 Points ----- Unstable
 - >+2000 mOhms ----- 0 Points ----- Open Failure

RESULTS Continued

- **Vibe -Z axis**
 - **<= +5.0 mOhms ----- 199 Points ----- Stable**
 - **+5.1 to +10.0 mOhms -----0 Points ----- Minor**
 - **+10.1 to +15.0 mOhms -----1 Points ----- Acceptable**
 - **+15.1 to +50.0 mOhms -----0 Points ----- Marginal**
 - **+50.1 to +2000 mOhms-----0 Points ----- Unstable**
 - **>+2000 mOhms-----4 Points ----- Open Failure**
- **Durability, 100 Cycles**
 - **<= +5.0 mOhms -----87 Points ----- Stable**
 - **+5.1 to +10.0 mOhms -----8 Points ----- Minor**
 - **+10.1 to +15.0 mOhms -----0 Points ----- Acceptable**
 - **+15.1 to +50.0 mOhms -----1 Points ----- Marginal**
 - **+50.1 to +2000 mOhms-----0 Points ----- Unstable**
 - **>+2000 mOhms-----0 Points ----- Open Failure**

DATA SUMMARIES

Mating – Unmating Forces

Thermal Shock/Humidity/Dust/Durability

Group 1 HDTF-4-08-S-RA-HS-100(Samtec-RA) / HDTM-4-08-1-S-VT-0-1(Samtec-VT)

	Initial				After Humidity			
	Mating		Unmating		Mating		Unmating	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	137.11	30.82	96.75	21.75	116.25	26.14	96.00	21.58
Maximum	140.42	31.57	100.01	22.49	117.31	26.37	102.13	22.96
Average	138.76	31.20	98.38	22.12	116.78	26.25	99.07	22.27
St Dev	2.35	0.53	2.31	0.52	0.75	0.17	4.34	0.98
Count	2	2	2	2	2	2	2	2

Group 2 922-421A-D3D(Amphenol -RA) / HDTM-4-08-1-S-VT-0-1(Samtec-VT)

	Initial				After Humidity			
	Mating		Unmating		Mating		Unmating	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	197.71	44.45	117.32	26.38	176.61	39.71	139.27	31.31
Maximum	209.90	47.19	118.46	26.63	186.82	42.00	142.16	31.96
Average	203.80	45.82	117.89	26.50	181.71	40.85	140.71	31.64
St Dev	8.62	1.94	0.80	0.18	7.22	1.62	2.04	0.46
Count	2	2	2	2	2	2	2	2

Group 3 HDTF-4-08-S-RA-HS-100(Samtec-RA) / 923-400E-40D(Amphenol-VT)

	Initial				After Humidity			
	Mating		Unmating		Mating		Unmating	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	127.99	28.78	96.37	21.67	110.73	24.90	84.60	19.02
Maximum	130.11	29.25	111.63	25.10	118.73	26.69	84.69	19.04
Average	129.05	29.01	104.00	23.38	114.73	25.79	84.65	19.03
St Dev	1.50	0.34	10.79	2.43	5.65	1.27	0.07	0.02
Count	2	2	2	2	2	2	2	2

Group 4 922-421A-D3D(Amphenol -RA) / 923-400E-40D(Amphenol-VT)

	Initial				After Humidity			
	Mating		Unmating		Mating		Unmating	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	169.26	38.05	107.77	24.23	146.23	32.88	109.95	24.72
Maximum	201.41	45.28	114.01	25.63	155.26	34.91	118.96	26.74
Average	185.33	41.67	110.89	24.93	150.74	33.89	114.45	25.73
St Dev	22.73	5.11	4.42	0.99	6.39	1.44	6.37	1.43
Count	2	2	2	2	2	2	2	2

DATA SUMMARIES Continued**Temperature Life****Group 1 HDTF-4-08-S-RA-HS-100(Samtec-RA) / HDTM-4-08-1-S-VT-0-1(Samtec-VT)**

	Initial				After Thermals			
	Mating		Unmating		Mating		Unmating	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	144.10	32.40	76.30	17.15	88.43	19.88	74.88	16.83
Maximum	144.97	32.59	107.78	24.23	95.34	21.43	79.93	17.97
Average	144.54	32.49	92.04	20.69	91.88	20.66	77.40	17.40
St Dev	0.61	0.14	22.26	5.00	4.89	1.10	3.57	0.80
Count	2	2	2	2	2	2	2	2

Group 2 922-421A-D3D(Amphenol -RA) / HDTM-4-08-1-S-VT-0-1(Samtec-VT)

	Initial				After Thermals			
	Mating		Unmating		Mating		Unmating	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	199.83	44.93	119.01	26.76	126.65	28.47	98.59	22.16
Maximum	209.63	47.13	127.38	28.64	127.32	28.63	105.59	23.74
Average	204.73	46.03	123.19	27.70	126.99	28.55	102.09	22.95
St Dev	6.93	1.56	5.92	1.33	0.47	0.11	4.95	1.11
Count	2	2	2	2	2	2	2	2

Group 3 HDTF-4-08-S-RA-HS-100(Samtec-RA) / 923-400E-40D(Amphenol-VT)

	Initial				After Thermals			
	Mating		Unmating		Mating		Unmating	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	115.74	26.02	90.09	20.25	78.02	17.54	58.95	13.25
Maximum	119.12	26.78	95.56	21.48	80.70	18.14	62.83	14.13
Average	117.43	26.40	92.82	20.87	79.36	17.84	60.89	13.69
St Dev	2.39	0.54	3.87	0.87	1.90	0.43	2.75	0.62
Count	2	2	2	2	2	2	2	2

Group 4 922-421A-D3D(Amphenol -RA) / 923-400E-40D(Amphenol-VT)

	Initial				After Thermals			
	Mating		Unmating		Mating		Unmating	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	181.87	40.89	112.76	25.35	96.71	21.74	83.42	18.75
Maximum	199.59	44.87	115.35	25.93	113.82	25.59	89.77	20.18
Average	190.73	42.88	114.06	25.64	105.27	23.67	86.59	19.47
St Dev	12.53	2.82	1.83	0.41	12.10	2.72	4.49	1.01
Count	2	2	2	2	2	2	2	2

DATA SUMMARIES Continued**Vibration and Mechanical Shock with Durability****Group 1 HDTF-4-08-S-RA-HS-100(Samtec-RA) / HDTM-4-08-1-S-VT-0-1(Samtec-VT)**

	Initial				After Shock/Vibe			
	Mating		Unmating		Mating		Unmating	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	25.88	5.82	19.05	4.28	39.36	8.85	25.87	5.82
Maximum	26.84	6.03	21.52	4.84	49.21	11.06	31.47	7.08
Average	26.46	5.95	20.10	4.52	45.12	10.14	27.88	6.27
St Dev	0.46	0.10	1.07	0.24	4.27	0.96	2.54	0.57
Count	4	4	4	4	4	4	4	4

Group 2 922-421A-D3D(Amphentol -RA) / HDTM-4-08-1-S-VT-0-1(Samtec-VT)

	Initial				After Shock/Vibe			
	Mating		Unmating		Mating		Unmating	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	35.50	7.98	21.71	4.88	65.75	14.78	28.61	6.43
Maximum	42.97	9.66	23.84	5.36	72.63	16.33	38.00	8.54
Average	39.03	8.77	22.75	5.11	68.72	15.45	34.19	7.69
St Dev	2.74	0.62	0.90	0.20	3.08	0.69	3.95	0.89
Count	5	5	5	5	5	5	5	5

Group 3 HDTF-4-08-S-RA-HS-100(Samtec-RA) / 923-400E-40D(Amphentol-VT)

	Initial				After Shock/Vibe			
	Mating		Unmating		Mating		Unmating	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	22.32	5.02	9.96	2.24	40.65	9.14	31.48	7.08
Maximum	26.14	5.88	20.39	4.59	47.02	10.57	33.24	7.47
Average	23.27	5.23	17.45	3.92	44.23	9.94	32.13	7.22
St Dev	1.63	0.37	4.27	0.96	2.44	0.55	0.71	0.16
Count	5	5	5	5	5	5	5	5

Group 4 922-421A-D3D(Amphentol -RA) / 923-400E-40D(Amphentol-VT)

	Initial				After Shock/Vibe			
	Mating		Unmating		Mating		Unmating	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	36.54	8.22	22.60	5.08	48.95	11.00	32.88	7.39
Maximum	43.43	9.76	24.61	5.53	57.09	12.83	38.53	8.66
Average	39.55	8.89	23.64	5.32	52.66	11.84	34.62	7.78
St Dev	2.48	0.56	0.94	0.21	3.19	0.72	2.26	0.51
Count	5	5	5	5	5	5	5	5

DATA SUMMARIES Continued**LLCR Thermal Shock/Humidity/Dust/Durability (200 LLCR test points)**

- 1). A total of 200 points were measured.
- 2). EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets*.
- 3). A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
- 4). The following guidelines are used to categorize the changes in LLCR as a result from stressing.
 - a. $\leq +5.0$ mOhms:-----Stable
 - b. $+5.1$ to $+10.0$ mOhms:-----Minor
 - c. $+10.1$ to $+15.0$ mOhms:-----Acceptable
 - d. $+15.1$ to $+50.0$ mOhms:-----Marginal
 - e. $+50.1$ to $+2000$ mOhms-----Unstable
 - f. $> +2000$ mOhms:-----Open Failure

Group 1 HDTF-4-08-S-RA-HS-100(Samtec-RA) / HDTM-4-08-1-S-VT-0-1(Samtec-VT)

LLCR Measurement Summaries by Pin Type					
Date	2017/9/19	2017/9/22	2017/9/26	2017/9/28	2017/10/19
Room Temp (Deg C)	23	23	23	23	23
Rel Humidity (%)	45	46	46	46	38
Technician	Aaron McKim	Aaron McKim	Aaron McKim	Aaron McKim	Aaron McKim
mOhm values	Actual Initial	Delta After 250 Cycles	Delta After Dust	Delta Thermal Shock	Delta Humidity
Pin Type 1: Signal					
Average	16.70	0.60	0.87	0.92	1.02
St. Dev.	3.17	0.45	0.44	0.58	1.11
Min	11.68	0.03	0.07	0.00	0.07
Max	23.15	2.30	2.23	3.02	7.00
Summary Count	100	100	100	100	100
Total Count	100	100	100	100	100
Pin Type 2: Ground					
Average	12.59	0.43	0.51	0.55	0.76
St. Dev.	1.26	0.26	0.35	0.31	1.19
Min	10.24	0.00	0.02	0.00	0.04
Max	15.11	1.14	1.65	1.43	7.96
Summary Count	100	100	100	100	100
Total Count	100	100	100	100	100

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	≤ 5	$>5 \text{ \& } \leq 7.5$	$>7.5 \text{ \& } \leq 10$	$>10 \text{ \& } \leq 50$	$>50 \text{ \& } \leq 1000$	>1000
After 250 Cycles	200	0	0	0	0	0
After Dust	200	0	0	0	0	0
Thermal Shock	200	0	0	0	0	0
Humidity	196	3	1	0	0	0

DATA SUMMARIES Continued**Group 2 922-421A-D3D(Amphentol -RA) / HDTM-4-08-1-S-VT-0-1(Samtec-VT)**

LLCR Measurement Summaries by Pin Type					
Date	2017/9/19	2017/9/22	2017/9/27	2017/9/28	2017/10/20
Room Temp (Deg C)	23	23	23	23	23
Rel Humidity (%)	45	45	46	46	38
Technician	Aaron McKim	Aaron McKim	Aaron McKim	Aaron McKim	Aaron McKim
mOhm values	Actual Initial	Delta After 250 Cycles	Delta After Dust	Delta Thermal Shock	Delta Humidity
Pin Type 1: Signal					
Average	15.11	0.31	0.62	0.70	0.80
St. Dev.	2.80	0.22	0.42	0.46	0.97
Min	10.23	0.00	0.03	0.01	0.00
Max	20.85	0.96	2.09	2.34	6.55
Summary Count	100	100	100	100	100
Total Count	100	100	100	100	100
Pin Type 2: Ground					
Average	11.60	0.36	0.47	0.56	0.66
St. Dev.	1.28	0.29	0.36	0.36	0.62
Min	9.31	0.01	0.00	0.02	0.02
Max	14.44	1.83	1.69	1.57	3.45
Summary Count	100	100	100	100	100
Total Count	100	100	100	100	100

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	<=5	>5 & <=7.5	>7.5 & <=10	>10 & <=50	>50 & <=1000	>1000
After 250 Cycles	200	0	0	0	0	0
After Dust	200	0	0	0	0	0
Thermal Shock	200	0	0	0	0	0
Humidity	198	2	0	0	0	0

DATA SUMMARIES Continued**Group 3 HDTF-4-08-S-RA-HS-100(Samtec-RA) / 923-400E-40D(Amphenol-VT)**

LLCR Measurement Summaries by Pin Type					
Date	2017/9/19	2017/9/25	2017/9/27	2017/9/28	2017/10/20
Room Temp (Deg C)	23	23	23	23	23
Rel Humidity (%)	45	45	46	46	38
Technician	Aaron McKim	Aaron McKim	Aaron McKim	Aaron McKim	Aaron McKim
mOhm values	Actual Initial	Delta After 250 Cycles	Delta Dust	Delta Thermal Shock	Delta Humidity
Pin Type 1: Signal					
Average	16.60	0.35	0.35	0.56	0.79
St. Dev.	3.14	0.23	0.28	0.39	0.83
Min	11.20	0.00	0.01	0.01	0.01
Max	22.43	1.44	1.43	2.49	6.41
Summary Count	100	100	100	100	100
Total Count	100	100	100	100	100
Pin Type 2: Ground					
Average	12.65	0.55	0.57	0.78	1.01
St. Dev.	1.42	0.39	0.41	0.52	0.86
Min	9.59	0.01	0.01	0.01	0.00
Max	15.52	1.86	1.96	2.58	5.82
Summary Count	100	100	100	100	100
Total Count	100	100	100	100	100

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	<=5	>5 & <=7.5	>7.5 & <=10	>10 & <=50	>50 & <=1000	>1000
After 250 Cycles	200	0	0	0	0	0
Dust	200	0	0	0	0	0
Thermal Shock	200	0	0	0	0	0
Humidity	197	3	0	0	0	0

DATA SUMMARIES Continued**Group 4 922-421A-D3D(Amphentol -RA) / 923-400E-40D(Amphentol-VT)**

LLCR Measurement Summaries by Pin Type					
Date	2017/9/19	2017/9/25	2017/9/26	2017/9/28	2017/10/20
Room Temp (Deg C)	23	23	23	23	23
Rel Humidity (%)	45	45	45	45	38
Technician	Aaron McKim	Aaron McKim	Aaron McKim	Aaron McKim	Aaron McKim
mOhm values	Actual Initial	Delta After 250 Cycles	Delta Dust	Delta Thermal Shock	Delta Humidity
Pin Type 1: Signal					
Average	15.38	0.34	0.51	0.52	0.62
St. Dev.	2.79	0.30	0.33	0.42	0.42
Min	10.51	0.00	0.00	0.01	0.00
Max	20.86	1.51	1.48	2.16	1.83
Summary Count	100	100	100	100	100
Total Count	100	100	100	100	100
Pin Type 2: Ground					
Average	11.82	0.46	0.53	0.66	0.77
St. Dev.	1.31	0.37	0.38	0.35	0.36
Min	9.22	0.00	0.04	0.04	0.03
Max	14.39	1.62	2.00	1.77	2.49
Summary Count	100	100	100	100	100
Total Count	100	100	100	100	100

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	<=5	>5 & <=7.5	>7.5 & <=10	>10 & <=50	>50 & <=1000	>1000
After 250 Cycles	200	0	0	0	0	0
Dust	200	0	0	0	0	0
Thermal Shock	200	0	0	0	0	0
Humidity	200	0	0	0	0	0

DATA SUMMARIES Continued**LLCR Temperature Life (200 LLCR test points)**

- 1) A total of 200 points were measured.
- 2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets*.
- 3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
- 4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
 - a. $\leq +5.0$ mOhms:-----Stable
 - b. $+5.1$ to $+10.0$ mOhms:-----Minor
 - c. $+10.1$ to $+15.0$ mOhms:-----Acceptable
 - d. $+15.1$ to $+50.0$ mOhms:-----Marginal
 - e. $+50.1$ to $+2000$ mOhms:-----Unstable
 - f. $>+2000$ mOhms:-----Open Failure

Group 1 HDTF-4-08-S-RA-HS-100(Samtec-RA) / HDTM-4-08-1-S-VT-0-1(Samtec-VT)

LLCR Measurement Summaries by Pin Type		
Date	2017/9/15	2017/10/27
Room Temp (Deg C)	23	23
Rel Humidity (%)	45	36
Technician	Aaron McKim	Aaron McKim
mOhm values	Actual Initial	Delta 1000hr Thermal Age
Pin Type 1: Signal		
Average	15.94	0.66
St. Dev.	3.15	0.64
Min	10.79	0.02
Max	22.31	4.10
Summary Count	100	100
Total Count	100	100
Pin Type 2: Ground		
Average	11.84	0.81
St. Dev.	1.27	0.46
Min	9.43	0.12
Max	14.30	2.32
Summary Count	100	100
Total Count	100	100

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	≤ 5	>5 & ≤ 7.5	>7.5 & ≤ 10	>10 & ≤ 50	>50 & ≤ 1000	>1000
1000hr Thermal Age	200	0	0	0	0	0

DATA SUMMARIES Continued**Group 2 922-421A-D3D(Amphentol -RA) / HDTM-4-08-1-S-VT-0-1(Samtec-VT)**

LLCR Measurement Summaries by Pin Type		
Date	2017/9/15	2017/10/30
Room Temp (Deg C)	23	22
Rel Humidity (%)	45	33
Technician	Aaron McKim	Aaron McKim
mOhm values	Actual Initial	Delta 1000hr Thermal Age
Pin Type 1: Signal		
Average	15.46	0.51
St. Dev.	2.88	0.44
Min	10.58	0.00
Max	22.64	2.27
Summary Count	100	100
Total Count	100	100
Pin Type 2: Ground		
Average	11.54	0.37
St. Dev.	1.24	0.35
Min	9.20	0.00
Max	14.26	2.17
Summary Count	100	100
Total Count	100	100

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	<=5	>5 & <=7.5	>7.5 & <=10	>10 & <=50	>50 & <=1000	>1000
1000hr Thermal Age	200	0	0	0	0	0

DATA SUMMARIES Continued**Group 3 HDTF-4-08-S-RA-HS-100(Samtec-RA) / 923-400E-40D(Amphenol-VT)**

LLCR Measurement Summaries by Pin Type		
Date	2017/9/15	2017/10/30
Room Temp (Deg C)	23	23
Rel Humidity (%)	45	33
Technician	Aaron McKim	Aaron McKim
mOhm values	Actual Initial	Delta 1000hr Thermal Age
Pin Type 1: Signal		
Average	16.43	1.58
St. Dev.	3.12	1.06
Min	11.09	0.04
Max	22.19	7.31
Summary Count	100	100
Total Count	100	100
Pin Type 2: Ground		
Average	12.56	0.99
St. Dev.	1.33	0.70
Min	9.76	0.02
Max	15.05	3.35
Summary Count	100	100
Total Count	100	100

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	<=5	>5 & <=7.5	>7.5 & <=10	>10 & <=50	>50 & <=1000	>1000
1000hr Thermal Age	198	2	0	0	0	0

DATA SUMMARIES Continued**Group 4 922-421A-D3D(Amphenol -RA) / 923-400E-40D(Amphenol-VT)**

LLCR Measurement Summaries by Pin Type		
Date	2017/9/15	2017/10/30
Room Temp (Deg C)	23	23
Rel Humidity (%)	45	33
Technician	Aaron McKim	Aaron McKim
mOhm values	Actual	Delta
	Initial	1000hr Thermal Age
Pin Type 1: Signal		
Average	15.38	0.61
St. Dev.	2.76	0.55
Min	10.70	0.01
Max	21.45	3.34
Summary Count	100	100
Total Count	100	100
Pin Type 2: Ground		
Average	11.85	0.44
St. Dev.	1.24	0.35
Min	9.53	0.00
Max	14.43	1.50
Summary Count	100	100
Total Count	100	100

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	<=5	>5 & <=7.5	>7.5 & <=10	>10 & <=50	>50 & <=1000	>1000
1000hr Thermal Age	200	0	0	0	0	0

DATA SUMMARIES Continued**LLCR Vibration and Mechanical Shock with Durability (200 LLCR test points)**

- 1) A total of 200 points were measured.
- 2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets*.
- 3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
- 4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
 - a. $\leq +5.0$ mOhms:-----Stable
 - b. $+5.1$ to $+10.0$ mOhms:-----Minor
 - c. $+10.1$ to $+15.0$ mOhms:-----Acceptable
 - d. $+15.1$ to $+50.0$ mOhms:-----Marginal
 - e. $+50.1$ to $+2000$ mOhms-----Unstable
 - f. $>+2000$ mOhms:-----Open Failure

Group 1 HDTF-4-08-S-RA-HS-100(Samtec-RA) / HDTM-4-08-1-S-VT-0-1(Samtec-VT)

LLCR Measurement Summaries by Pin Type										
Date	2017/7/28	2017/7/28	2017/7/29	2017/7/29	2017/7/29	2017/7/29	2017/7/31	2017/7/31	2017/8/1	2017/8/1
Temp (Deg C)	23	23	23	23	23	23	23	23	23	23
Humidity (%)	51	50	43	44	44	44	44	44	46	46
Technician	Aaron McKim	Aaron McKim	Aaron McKim	Aaron McKim	Aaron McKim	Aaron McKim	Aaron McKim	Aaron McKim	Aaron McKim	Aaron McKim
Pin values	Actual	Delta	Delta	Delta	Delta	Delta	Delta	Delta	Delta	Delta
	Initial	100 Cycles	Dust	Shock X	Shock Y	Shock Z	Vibe X	Vibe Y	Vibe Z	100 Cycles
Pin Type 1: Signal										
Average	18.68	1.61	2.23	2.30	2.29	2.30	2.31	2.34	2.32	2.26
St. Dev.	3.36	1.42	1.50	1.51	1.49	1.54	1.45	1.47	1.51	1.49
Min	10.88	0.01	0.23	0.25	0.23	0.05	0.42	0.52	0.61	0.61
Max	29.60	6.83	7.56	7.60	7.53	7.59	7.67	7.69	7.66	7.53
Vary Count	100	100	100	100	100	100	100	100	100	100
Total Count	100	100	100	100	100	100	100	100	100	100
Pin Type 2: Ground										
Average	11.79	0.74	0.65	0.77	0.73	0.77	0.84	0.89	0.83	0.98
St. Dev.	1.53	0.43	0.49	0.50	0.49	0.52	0.49	0.56	0.49	0.56
Min	8.81	0.00	0.00	0.00	0.01	0.00	0.03	0.02	0.01	0.10
Max	16.33	1.82	2.71	2.65	2.56	2.83	2.58	2.69	2.71	2.64
Vary Count	100	100	100	100	100	100	100	100	100	100
Total Count	100	100	100	100	100	100	100	100	100	100

LLCR Delta Count by Category						
mOhms	Stable	Minor	Acceptable	Marginal	Unstable	Open
	≤ 5	$>5 \text{ \& } \leq 7.5$	$>7.5 \text{ \& } \leq 10$	$>10 \text{ \& } \leq 50$	$>50 \text{ \& } \leq 1000$	>1000
100 Cycles	196	4	0	0	0	0
Dust	194	5	1	0	0	0
Shock X	193	6	1	0	0	0
Shock Y	193	6	1	0	0	0
Shock Z	192	6	2	0	0	0
Vibe X	193	6	1	0	0	0
Vibe Y	194	4	2	0	0	0
Vibe Z	193	5	2	0	0	0
100 Cycles	193	6	1	0	0	0

Nanosecond Event Detection:

Shock and Vibration Event Detection Summary	
Contacts tested	40
Test Condition	C, 30g's, 11ms, Half-Sine
Shock Events	0
Test Condition	50-2000Hz, V-B, 5.35 rms g
Vibration Events	0
Total Events	0

DATA SUMMARIES Continued**Group 2 922-421A-D3D(Amphentol -RA) / HDTM-4-08-1-S-VT-0-1(Samtec-VT)**

LLCR Measurement Summaries by Pin Type										
Date	2017/8/31	2017/8/31	2017/8/31	2017/9/8	2017/9/11	2017/9/11	2017/9/12	2017/9/12	2017/9/12	2017/9/12
Temp (Deg C)	23	23	23	23	23	23	23	23	23	23
Humidity (%)	43	43	43	39	45	45	45	45	45	45
Technician	Aaron McKim	Aaron McKim	Aaron McKim	Aaron McKim	Aaron McKim	Aaron McKim	Aaron McKim	Aaron McKim	Aaron McKim	Aaron McKim
Pin values	Actual	Delta	Delta	Delta	Delta	Delta	Delta	Delta	Delta	Delta
	Initial	100 Cycles	Dust	Shock X	Shock Y	Shock Z	Vibe X	Vibe Y	Vibe Z	100 Cycles
Pin Type 1: Signal										
Average	15.52	0.72	1.17	1.21	1.28	1.36	1.29	1.34	1.33	1.34
St. Dev.	3.00	0.67	0.87	0.83	0.88	0.88	0.90	0.92	0.88	0.86
Min	9.51	0.01	0.08	0.10	0.10	0.03	0.08	0.16	0.07	0.18
Max	20.66	3.23	3.58	3.78	3.95	3.88	4.26	3.94	4.24	3.80
Pass Count	100	100	100	100	100	100	100	100	100	100
Total Count	100	100	100	100	100	100	100	100	100	100
Pin Type 2: Ground										
Average	9.95	0.52	0.60	0.66	0.66	0.70	0.69	0.77	0.78	0.83
St. Dev.	1.33	0.43	0.58	0.55	0.56	0.59	0.55	0.60	0.60	0.53
Min	7.31	0.00	0.01	0.00	0.01	0.00	0.01	0.00	0.02	0.06
Max	13.53	2.73	3.77	2.97	3.08	3.21	3.20	3.21	3.16	3.16
Pass Count	100	100	100	100	100	100	100	100	100	100
Total Count	100	100	100	100	100	100	100	100	100	100

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	<=5	>5 & <=7.5	>7.5 & <=10	>10 & <=50	>50 & <=1000	>1000
100 Cycles	200	0	0	0	0	0
Dust	200	0	0	0	0	0
Shock X	200	0	0	0	0	0
Shock Y	200	0	0	0	0	0
Shock Z	200	0	0	0	0	0
Vibe X	200	0	0	0	0	0
Vibe Y	200	0	0	0	0	0
Vibe Z	200	0	0	0	0	0
100 Cycles	200	0	0	0	0	0

Nanosecond Event Detection:

Shock and Vibration Event Detection Summary	
Contacts tested	40
Test Condition	C, 30g's, 11ms, Half-Sine
Shock Events	0
Test Condition	50-2000Hz, V-B, 5.35 rms g
Vibration Events	0
Total Events	0

DATA SUMMARIES Continued**Group 3 HDTF-4-08-S-RA-HS-100(Samtec-RA) / 923-400E-40D(Amphenol-VT)**

LLCR Measurement Summaries by Pin Type										
Date	2017/6/28	2017/7/3	2017/7/27	2017/8/4	2017/8/4	2017/8/4	2017/8/4	2017/8/4	2017/8/4	2017/8/11
Temp (Deg C)	22	22	23	23	23	23	23	23	23	23
Humidity (%)	44	41	50	45	45	45	45	45	45	44
Technician	Aaron McKim	Aaron McKim	Aaron McKim	Aaron McKim	Aaron McKim	Aaron McKim	Aaron McKim	Aaron McKim	Aaron McKim	Aaron McKim
Pin values	Actual	Delta	Delta	Delta	Delta	Delta	Delta	Delta	Delta	Delta
	Initial	100 Cycles	Dust	Shock X	Shock Y	Shock Z	Vibe X	Vibe Y	Vibe Z	100 Cycles
Pin Type 1: Signal										
Average	16.65	0.66	0.53	0.56	0.57	0.60	0.67	0.67	0.72	0.77
St. Dev.	3.57	0.74	0.70	0.63	0.65	0.65	0.67	0.65	0.66	0.71
Min	10.61	0.02	0.02	0.00	0.00	0.00	0.01	0.01	0.00	0.02
Max	24.23	4.10	5.25	4.96	5.11	4.92	4.98	4.85	4.77	4.74
Pass Count	100	100	100	100	100	100	100	100	100	100
Total Count	100	100	100	100	100	100	100	100	100	100
Pin Type 2: Ground										
Average	10.89	0.55	0.47	0.57	0.57	0.57	0.60	0.60	0.63	0.77
St. Dev.	1.47	0.42	0.39	0.43	0.48	0.40	0.43	0.42	0.41	0.47
Min	8.40	0.00	0.01	0.01	0.00	0.00	0.01	0.00	0.01	0.00
Max	14.21	2.15	2.50	1.91	2.94	1.94	1.96	2.03	2.08	2.05
Pass Count	100	100	100	100	100	100	100	100	100	100
Total Count	100	100	100	100	100	100	100	100	100	100

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	<=5	>5 & <=7.5	>7.5 & <=10	>10 & <=50	>50 & <=1000	>1000
100 Cycles	200	0	0	0	0	0
Dust	199	1	0	0	0	0
Shock X	200	0	0	0	0	0
Shock Y	199	1	0	0	0	0
Shock Z	200	0	0	0	0	0
Vibe X	200	0	0	0	0	0
Vibe Y	200	0	0	0	0	0
Vibe Z	200	0	0	0	0	0
100 Cycles	200	0	0	0	0	0

Nanosecond Event Detection:

Shock and Vibration Event Detection Summary	
Contacts tested	40
Test Condition	C, 30g's, 11ms, Half-Sine
Shock Events	0
Test Condition	50-2000Hz, V-B, 5.35 rms g
Vibration Events	0
Total Events	0

DATA SUMMARIES Continued**Group 4 922-421A-D3D(Amphenol -RA) / 923-400E-40D(Amphenol-VT)**

LLCR Measurement Summaries by Pin Type										
Date	2017/6/28	2017/7/3	2017/7/27	2017/8/11	2017/8/11	2017/8/11	2017/8/12	2017/8/14	2017/8/14	2017/8/14
Temp (Deg C)	22	22	23	23	23	23	23	23	23	23
Humidity (%)	45	42	51	46	46	46	46	46	46	46
Technician	Aaron McKim	Aaron McKim	Aaron McKim	Aaron McKim	Aaron McKim	Aaron McKim	Aaron McKim	Aaron McKim	Aaron McKim	Aaron McKim
Pin values	Actual	Delta	Delta	Delta	Delta	Delta	Delta	Delta	Delta	Delta
	Initial	100 Cycles	Dust	Shock X	Shock Y	Shock Z	Vibe X	Vibe Y	Vibe Z	100 Cycles
Pin Type 1: Signal										
Average	15.70	0.40	0.42	0.58	0.58	0.58	0.70	0.73	0.68	0.70
St. Dev.	3.04	0.40	0.37	0.40	0.44	0.37	0.36	0.38	0.40	0.42
Min	9.98	0.00	0.00	0.01	0.01	0.01	0.04	0.06	0.01	0.01
Max	20.80	2.86	2.86	3.23	3.13	2.85	2.37	2.55	2.57	2.37
Pass Count	100	100	100	100	100	100	100	100	100	100
Total Count	100	100	100	100	100	100	100	100	100	100
Pin Type 2: Ground										
Average	10.75	0.49	0.79	0.66	0.62	0.68	0.82	0.94	0.85	1.00
St. Dev.	1.52	0.51	1.01	0.52	0.54	0.56	0.78	0.95	1.00	0.97
Min	8.70	0.00	0.01	0.02	0.01	0.02	0.01	0.03	0.03	0.07
Max	16.99	4.23	5.42	4.10	4.04	4.29	6.13	8.16	9.13	8.62
Pass Count	100	100	100	100	100	100	100	100	100	100
Total Count	100	100	100	100	100	100	100	100	100	100

LLCR Delta Count by Category						
mOhms	Stable	Minor	Acceptable	Marginal	Unstable	Open
	<=5	>5 & <=7.5	>7.5 & <=10	>10 & <=50	>50 & <=1000	>1000
100 Cycles	200	0	0	0	0	0
Dust	199	1	0	0	0	0
Shock X	200	0	0	0	0	0
Shock Y	200	0	0	0	0	0
Shock Z	200	0	0	0	0	0
Vibe X	199	1	0	0	0	0
Vibe Y	199	0	1	0	0	0
Vibe Z	199	0	1	0	0	0
100 Cycles	199	0	1	0	0	0

Nanosecond Event Detection:

Shock and Vibration Event Detection Summary	
Contacts tested	40
Test Condition	C, 30g's, 11ms, Half-Sine
Shock Events	0
Test Condition	50-2000Hz, V-B, 5.35 rms g
Vibration Events	0
Total Events	0

EQUIPMENT AND CALIBRATION SCHEDULES**Equipment #:** THC-02**Description:** Temperature/Humidity Chamber**Manufacturer:** Thermotron**Model:** SE-1000-6-6**Serial #:** 31808**Accuracy:** See Manual

... Last Cal: 02/16/2017, Next Cal: 02/16/2018

Equipment #: TSC-01**Description:** Vertical Thermal Shock Chamber**Manufacturer:** Cincinnatti Sub Zero**Model:** VTS-3-6-6-SC/AC**Serial #:** 10-VT14993**Accuracy:** See Manual

... Last Cal: 05/18/2017, Next Cal: 05/18/2018

Equipment #: OV-03**Description:** Cascade Tek Forced Air Oven (Chamber Room)**Manufacturer:** Cascade Tek**Model:** TFO-5**Serial #:** 0500100**Accuracy:** Temp. Stability: +/- .1C/C change in ambient Temp. Stability: +/- .1C/C change in ambient

... Last Cal: 05/03/2017, Next Cal: 05/03/2018

Equipment #: MO-04**Description:** Multimeter /Data Acquisition System**Manufacturer:** Keithley**Model:** 2700**Serial #:** 0798688**Accuracy:** See Manual

... Last Cal: 04/30/2017, Next Cal: 04/30/2018

Equipment #: TCT-01**Description:** Test Stand**Manufacturer:** Chatillon**Model:** TCD-1000**Serial #:** 05 23 00 02**Accuracy:** Speed Accuracy: +/-5% of max speed; Displacement: +/- .5% or +/- .005, whichever is greater.

... Last Cal: 08/24/2017, Next Cal: 08/24/2018

Equipment #: SVC-01**Description:** Shock & Vibration Table**Manufacturer:** Data Physics**Model:** LE-DSA-10-20K**Serial #:** 10037**Accuracy:** See Manual

... Last Cal: 06/23/2017, Next Cal: 12/20/2018

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

... Last Cal: 07/27/2017, Next Cal: 07/27/2018

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

... Last Cal: 07/14/2017, Next Cal: 07/14/2018