

1.0 Purpose

The objective of this testing is to confirm the performance of the Lynx mezzanine connector system. The test matrix consisted of modified test sequences to the requirements of Telcordia GR-1217-CORE (12/08).

2.0 Definitions

2.1 N/A

3.0 Change Control Rules

3.1 Ref. ICS100 Engineering\Document Change Request Procedure

4.0 Identification Rules

4.1 Ref. ICS100 Engineering\Document Change Request Procedure

5.0 Requirements

5.1 Performance and Test Description

The product is designed to meet the electrical, mechanical, and environmental performance requirements listed in Table 1.0. All tests are conducted at ambient temperature and pressure unless otherwise noted.

TABLE 1

Item	Test Method	Condition	Requirement
Visual Examination	EIA-364-18B	10X	No damage
Low Level Contact Resistance (LLCR)	EIA-364-23C	Opt. 1, 20 mV max, 100 mA max.	Initial – record max. Increase - ≤ 10 mΩ
Insulation Resistance (IR)	EIA-364-21E	500Vdc, 60 seconds 5 adjacent and 5 opposing contact pairs	≥1000 MΩ
Dielectric Withstanding Voltage (DWV)	EIA-364-20E	500Vac rms, 60 seconds 5 adjacent and 5 opposing contact pairs	No breakdown, arc-over Leakage current ≤ 0.5 mA
Thermal Shock	EIA-364-32F	-65C to +105C, 25 cycles, 30 min. dwell	No damage
Humidity w/Temperature Cycling	EIA-364-31D	50, 10-hour cycles, 2 hour ramp, 25 to 65° C, 80 to 98% RH	No damage
Dust	EIA-364-91A	Benign dust composition #1, 1 hour	No damage
Vibration	EIA-364-28F	random, 9.25g, 50-2000 Hz, 2 hours/axis, 3 axes	No damage No discontinuity > 1 ms
Mechanical Shock	EIA-364-27C	½ sine, 30g, 11 ms, 3 shocks/direction/axis, 3 axes	No damage No discontinuity > 1 ms
Unmate/Mate Force	EIA-364-13E	Method A, 12.7 mm/minute max.	Mate force ≤ 31.2 N Unmate force ≤ 15.6 N
Durability	EIA-364-09C	127 mm/minute max.	No damage
High Temperature Life	EIA-364-17C	Method A, 500 hours @ 105C	No damage
MFG	EIA-364-65B	4 gas, class IIa, 10 days unmated (both hdrs & recs), 10 days mated	No damage
Disturbance	GR-1217-CORE 12/08	Unmate approx. 0.10 mm, then re-seat	No damage
Plating thickness	ASTM B568 2014	X-ray fluorescence, 10 contacts Each header and receptacle	Au ≥ 0.76 μm Ni ≥ 1.27 μm
Au plating porosity	EIA-364-53B	30 minute exposure, 10 contacts minimum Each header and receptacle	≤ 2 pore indicators

5.2 PRODUCT QUALIFICATION

5.2.1 Equipment Calibration

Any test equipment and inspection facilities used in the performance of any test shall be maintained in a calibration system in accordance with MIL-C-45662.

5.2.2 Qualification Testing

A. Sample Selection

Sockets shall be prepared in accordance with the applicable product and process documentation. The samples shall be selected from current production.

B. Test Sequence

Samples shall be subjected to the inspection sequences specified in Table 2.0.

5.2.3 Acceptance

Acceptance is based upon the verification that the product meets the requirements of Table 1.0. Failures attributed to equipment, test set-up, or operator deficiencies shall not disqualify the product.

TABLE 2.0

Test Description	1	2a	2b	3	4	5
Visual examination	1,15	1,10	1,13	1,7	1,20	1
Low Level Contact Resistance (LLCR)	2,5,7,9, 11,14		2,5,7, 9,11	3, 5	2,4,7,9,11, 13,15,17,19	
Mate/Unmate Force (3X)	3,12		3,12	2, 6	5,18	
Durability – 100X	4,13				6	
Durability – 250X			4			
MFG – 5 days unmated headers & receptacles					8,10	
MFG – 5 days mated					12,14	
Disturbance					16	
High temperature life				4		
Pre-condition temp life					3	
Insulation Resistance (IR)		2,5,8				
Dielectric Withstanding Voltage (DWV)		3,6,9				
Thermal Shock		4	8			
Humidity w/ temp. cycling		7	10			
Dust – unmated headers & receptacles	6		6			
Vibration	10					
Mechanical shock	8					
Plating thickness (Au & Ni)						2
Au plating porosity (nitric acid)						3

Sample sizes:

Group 1 – 3 mated pair connectors on LLCR PCB's

Group 2a – 3 mated pair connectors, 5 adjacent and 5 opposing contact pairs

Group 2b – 4 mated pair connectors on LLCR PCB's

Group 3 – 3 mated pair connectors on LLCR PCB's, 1 mated pair connectors on continuity PCB's

Group 4 – 4 mated pair connectors on LLCR PCB's

Group 5 – 2 loose piece headers & 2 loose piece receptacles

SAMPLE DESCRIPTION

Item	Description	AICS Part #	Lot #	Base Material	Plating	Lubricant*	Housing Material
1	Lynx 4x30 Header	11826-BCA	Not provided	Cu alloy	Au	ZC015	S475
2	Lynx 4x30 Receptacle	11828-1CA	Not provided	Cu alloy	Au	ZC015	S475
3	Lynx 4x30 LLCR PCB	3594-203 Rev C	Not provided	Cu	Imm. Sn	N/A	FR4

*= applied to mixed flowing gas (MFG) samples only per requestor.

6.0 Results

MECHANICAL SHOCK & VIBRATION TEST GROUP 1 RESULTS

Step #	Test	Requirement	Step Description	Result
1	Visual examination	No damage	Initial	No damage
2	LLCR #1	Record max.	Initial	13.26 mΩ max
3	Mate/unmate force	Mate force ≤ 31.2N Unmate force ≤ 15.6 N	Initial	24.8 N max. mate 11.1 N max. unmate
4	Durability – 100X	No damage	Before dust	No damage
5	LLCR #2	10 mΩ max. incr.	After 100X	5.16 mΩ max incr.
6	Dust	No damage	Before mech. shock	No damage
7	LLCR #3	10 mΩ max. incr.	After dust	3.26 mΩ max incr.
8	Mechanical shock	No damage	½ sine, 30G, 11 ms	No damage No discontinuity > 1 ms
9	LLCR #4	10 mΩ max. incr.	After mech. shock	1.67 mΩ max incr.
10	Vibration	No damage No discontinuity > 1 μs	9.25g, 50-2000 hz, 2 hours/axis	No damage No discontinuity > 1 ms
11	LLCR #5	10 mΩ max. incr.	After vibration	1.37 mΩ max incr.
12	Mate/unmate force	Mate force ≤ 31.2 N Unmate force ≤ 15.6 N	Final	31.82 N max. mate 18.37 N max. unmate
13	Durability – 100X	No damage	After shock & vib	No damage
14	LLCR #6	10 mΩ max. incr.	After 200X total	1.50 mΩ max incr.
15	Visual examination	No damage	Final	No damage
16*	Mechanical shock	No damage	½ sine, 50G, 11 ms	No damage No discontinuity > 1 ms
17*	LLCR #6	10 mΩ max. incr.	After 50G shock	2.49 mΩ max incr.

*=additional steps required by requestor for information purposes only

IR/DWV TEST GROUP 2A RESULTS

Step #	Test	Requirement	Step Description	Result
1	Visual examination	No damage	Initial	No damage
2	IR #1	≥1000 MΩ	Initial	109 GΩ min.
3	DWV #1	No breakdown, arc-over Leakage current ≤ 0.5 mA	Initial	No breakdown, arc-over, 0.57 μA max leakage current
4	Thermal Shock	No damage	-65C to +105C, 25 cycles	No damage
5	IR #2	≥1000 MΩ	After thermal shock	162 GΩ min.
6	DWV #2	No breakdown, arc-over Leakage current ≤ 0.5 mA	After thermal shock	No breakdown, arc-over, 0.57 μA max leakage current
7	Humidity	No damage	50, 10-hour cycles	No damage
8	IR #3	≥1000 MΩ	After humidity	291 GΩ min.
9	DWV #3	No breakdown, arc-over Leakage current ≤ 0.5 mA	After humidity	No breakdown, arc-over, 0.43 μA max leakage current
10	Visual examination	No damage	Final	No damage

THERMAL SHOCK/HUMIDITY TEST GROUP 2B RESULTS

Step #	Test	Requirement	Step Description	Result
1	Visual examination	No damage	Initial	No damage
2	LLCR #1	Record max.	Initial	10.7 mΩ max
3	Mate/unmate force	Mate force ≤ 31.2N Unmate force ≤ 15.6 N	1 st 3 cycles durability	27.7 N max. mate 15.2 N max. unmate
4	Durability – 250X	No damage	Initial	No damage
5	LLCR #2	10 mΩ max. incr.	After 250X	2.6 mΩ max incr.
6	Dust	No damage	Before thermal shock	No damage
7	LLCR #3	10 mΩ max. incr.	After dust	3.5 mΩ max incr.
8	Thermal Shock	No damage	-65C to +105C, 25 cycles	No damage
9	LLCR #4	10 mΩ max. incr.	After thermal shock	3.7 mΩ max incr.
10	Humidity	No damage	50, 10-hour cycles	No damage
11	LLCR #5	10 mΩ max. incr.	After humidity	8301 mΩ max incr. (2 contacts)
12	Mate/unmate force	Mate force ≤ 31.2N Unmate force ≤ 15.6 N	3 cycles	21.8 N max. mate 12.6 N max. unmate
13	Visual examination	No damage	Final	No damage

HIGH TEMP LIFE TEST GROUP 3 RESULTS

Step #	Test	Requirement	Step Description	Result
1	Visual examination	No damage	Initial	No damage
2	Mate/unmate force	Mate force ≤ 31.2N Unmate force ≤ 15.6 N	Initial	25.9 N max. mate 10.2 N max. unmate
3	LLCR #1	Record max.	Initial	13.2 mΩ max
4	High temp. life	No damage	105C, 500 hours	No damage
5	LLCR #2	10 mΩ max. incr.	After high temp life	8.88 mΩ max incr.
6	Mate/unmate force	Mate force ≤ 31.2N Unmate force ≤ 15.6 N	After high temp life	15.8 N max. mate 9.4 N max. unmate
7	Visual examination	No damage	Final	No damage

MFG TEST GROUP 4 RESULTS

Step #	Test	Requirement	Step Description	Result
1	Visual examination	No damage	Initial	No damage
2	LLCR #1	Record max.	Initial	11.9 mΩ max
3	Pre-cond temp life	No damage	105C, 300 hours	No damage
4	LLCR #2	10 mΩ max. incr.	After pre-cond temp life	2.9 mΩ max incr.
5	Mate/unmate force	Mate force ≤ 31.2N Unmate force ≤ 15.6 N	Initial	16.0 N max. mate 6.8 N max. unmate
6	Durability – 100X	No damage	Before MFG	No damage
7	LLCR #3	10 mΩ max. incr.	After durability	4.0 mΩ max incr.
8	MFG	No damage	5d unmated hrs & recs	No damage
9	LLCR #4	10 mΩ max. incr.	After 5d MFG	2.9 mΩ max incr.
10	MFG	No damage	5d unmated hrs & recs	No damage
11	LLCR #5	10 mΩ max. incr.	After 10d MFG	1.9 mΩ max incr.
12	MFG	No damage	5d mated	No damage
13	LLCR #6	10 mΩ max. incr.	After 15d MFG	1.8 mΩ max incr.
14	MFG	No damage	5d mated	No damage
15	LLCR #7	10 mΩ max. incr.	After 20d MFG	1.6 mΩ max incr.
16	Disturbance	No damage	After MFG	No damage
17	LLCR #8	10 mΩ max. incr.	After disturb.	1.7 mΩ max incr.
18	Durability – 100X	No damage	After MFG	No damage
19	LLCR #9	10 mΩ max. incr.	After 200X total	2.2 mΩ max incr.
20	Visual examination	No damage	Final	No damage

PLATING THICKNESS/POROSITY TEST GROUP 5 RESULTS

Step #	Test	Requirement	Step Description	Result
1	Visual examination	No damage	Initial	No damage
2	Plating thickness	Au ≥ 0.76 μm Ni ≥ 1.27 μm	Initial	Au – 1.46 μm min. Ni – 2.61 μm min.
3	Au plating porosity	≤ 2 pore indicators	Initial	Headers – 0 pore indicators Receptacle – 0 pore indicators

7.0 Conclusion

Samples successfully completed all the testing specified herein with the exception of the following:

1. Test Group 1: 2 of 3 samples exceeded the specification max mating and unmating forces following mechanical shock and vibration due to wear on the contacts.
2. Test Group 2B: 2 contacts exceeded the maximum LLCR increase after humidity exposure due to dust debris. No evidence of corrosion, wear through or mechanical failure were found.

8.0 References

- 8.1 ISO9001 Handbook of Quality Standards and Compliance
- 8.2 InterCon Systems Quality Manual applicable specifications
- 8.3 Applicable documents

The following documents shall form a part of this specification to the extent specified herein. In the event of conflict between the requirements of this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between the requirements of this specification and the referenced documents, this specification shall take precedence.

Military

- EIA-364 ELECTRICAL CONNECTOR/SOCKET TEST PROCEDURES INCLUDING ENVIRONMENTAL CLASSIFICATIONS
- MIL-G-45204 Gold Plating, Electrodeposited
- MIL-C-45662 Calibration System Requirements
- MIL-F-55110 Printed Wiring Boards
- MIL-STD-275 Printed Wiring for Electronic Equipment

Industry Specifications/Standards

- J-STD-004 Requirements for Soldering Fluxes
- J-STD-005 Requirements for Soldering Pastes
- J-STD-006 Requirements for Electronic Grade Solder Alloys and Fluxed and Non-Fluxed Solid Solders for Electronic Soldering Applications
- UL-94 Tests for Flammability of Plastic Materials

8.0 Other

9.0 Revision Record

<u>Rev.</u>	<u>Page(s)</u>	<u>Description of Change</u>	<u>EC#</u>	<u>Date</u>
A	All	New Release		1/9/19