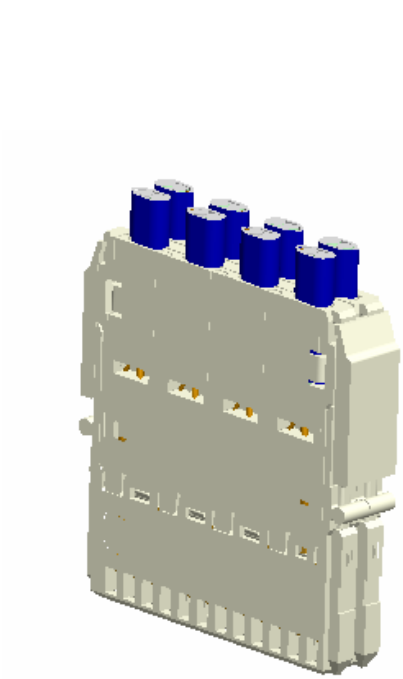
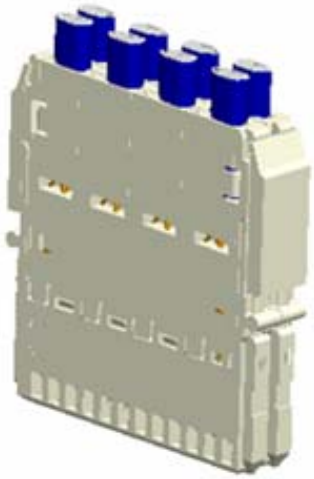
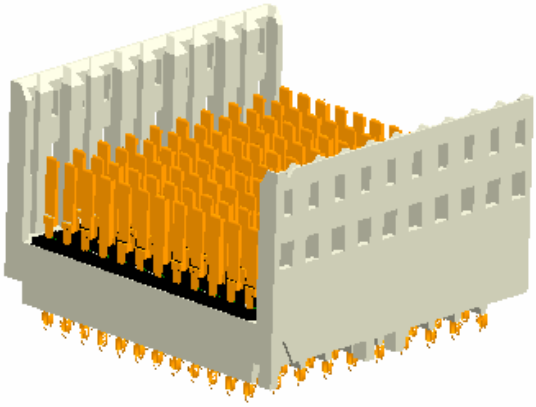
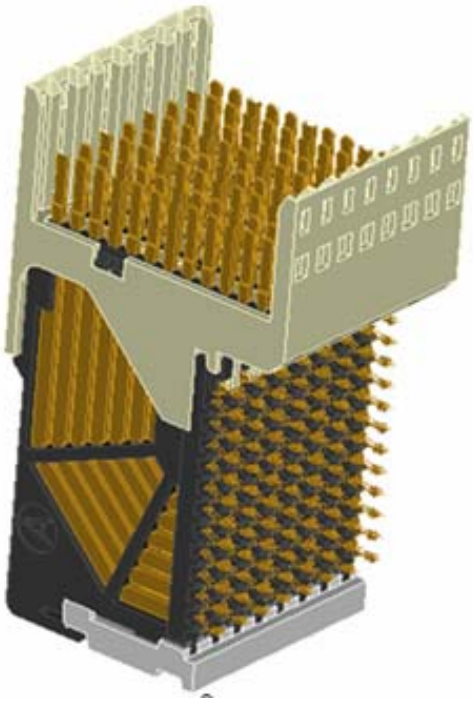
AirMax VS® Cable I/O Receptacle









Cable I/O Receptacle to Vertical I/O Header

Cable I/O Receptacle to Right Angle I/O Header

TABLE OF CONTENTS:

1.0 OBJECTIVE

This specification defines the performance, test, quality and reliability requirements of the Cable I/O Receptacles for the AirMax VS® Connector System. This specification applies to all Cable I/O Receptacle configurations on 2 and 3 mm pitch and the mating products. The test sequences defined in this specification meet the intent of Telcordia GR-1217-CORE requirements.

2.0 SCOPE

This specification is applicable to the termination characteristics of the AirMax VS® Cable I/O Receptacle with mating products which provides a high speed interconnect for differential pairs and single-ended lines.

3.0 APPLICABLE DOCUMENTS

3.1 FCI Specifications

- Applicable FCI product customer drawings
- I/O VH and I/O RAH requirements not covered in this product specification
- FCI AirMax VS Connector System, press-fit products GS-12-239

3.2 Other Standards and Specifications

- UL94V-O: Test for Flammability of Plastic Materials in Devices and Appliances
- EIA 364: Electrical Connector/Socket Test Procedures Including Environmental Classifications
- GR-1217-CORE: Telcordia Specification “Generic Requirements for Separable Electrical Connectors”
- IEC 60512-9: Electromechanical Components for Electronic Equipment; Basic Testing Procedures and Measuring Methods

3.3 FCI Lab Reports - Supporting Data

- MB2-2734-CR (Product qualification test report, AirMax VS® Cable Connector)

4.0 REQUIREMENTS

4.1 Materials

The material for each component shall be as specified herein or equivalent.

- Contacts: copper alloy
- Plating: performance-based plating, qualified to meet the requirements of this specification, including the Telcordia GR-1217-CORE (November 1995) Central Office test sequence.
- Housings: high temperature thermoplastic; UL 94V-0 compliant

4.2 Visual Examination of Product

- Visual examinations shall be performed using 10X magnifications. Parts should be free from blistering, cracks, discoloration, etc.

5.0 ELECTRICAL CHARACTERISTICS

5.1 Low Level Contact Resistance

Measurements shall be performed using a four-wire method per EIA 364-23B. The maximum initial signal contact resistance is 50 mΩ. The increase in resistance for any position shall not exceed 10 mΩ. The following details apply:

a) Test voltage: 20 mV maximum open circuit
b) Test current: 100 mA maximum
c) Number of readings: 500 minimum

5.2 Insulation Resistance

The insulation resistance of mated connectors shall not be less than 1000 MΩ after environmental exposure when measured in accordance with EIA 364-21C. The following details shall apply:

a) Test voltage: 250 VDC
b) Electrification time: 60 seconds
c) Points of measurement: between closest adjacent contacts
d) Number of readings: 30 (10 readings per loose-piece connector set)

5.3 Dielectric Withstanding Voltage

There shall be no evidence of arc-over, insulation breakdown, or excessive leakage current (>0.5 mA) when the mated connectors are tested in accordance with EIA 364-20C. The following details shall apply:

a) Test voltage: 250 VAC, 60Hz
b) Test duration: 60 seconds
c) Voltage application rate: 500 V per second
d) Points of Measurement: between closest adjacent contacts
e) Number of readings: 30 (10 readings per loose-piece connector set)

5.4 Current Rating

Perform in accordance with EIA 364-70A. Measure temperature vs. applied current for all contacts powered. The following details shall apply:

a) Ambient conditions: still air at 25°C
b) Thermocouple location: mechanically attached to the base of the header mating contacts
c) Copper trace weight: 1 oz
d) Quantity and location of thermocouples: 10 (5 on an interior column at positions A, C, E, G, and I; 5 on an outside column at positions A, C, E, F, G, and I)

The temperature rise above ambient shall not exceed 30 degrees C when all contacts are powered at 0.5A.

6.0 MECHANICAL CHARACTERISTICS

6.1 Mating / Unmating Force

Perform in accordance with EIA 364-13B. The force to mate a receptacle connector and compatible header shall not exceed 0.6 N per contact. The un-mating force shall not be less than 0.15 N per contact. The following details shall apply:

a) Cross head speed: 1 inch per minute
b) Lubrication: None
c) Utilize free-floating fixtures
d) Number of mate/un-mate cycles: 3
e) Number of mated connector pairs to be tested: 5 x 2 columns + 5 x 10 columns

7.0 ENVIRONMENTAL CONDITIONS

After exposure to the following environmental conditions as specified in "Table 1 - Test Sequences" in accordance with the specified test procedure and/or details, the product shall show no physical damage and shall meet the electrical and mechanical requirements in sections 6 and 7. Unless specified otherwise the products shall be mated during exposure.

7.1 Thermal Shock:

Perform in accordance with EIA 364-32C. The following details shall apply:

a) Number of cycles: 5
b) Temperature range: -55 to + 85ºC
c) Time at each temperature: 30 minutes minimum
d) Transfer time: 30 seconds maximum

7.2 Cyclical Humidity and Temperature:

Mated samples are to be exposed to cyclical humidity and temperature in accordance with EIA 364-31B. Samples are to be subjected to 50 cycles of 10-hour duration for a total of 500 hours.

A cycle consists of the following steps.

a) 2 hour ramp from 25°C at 80%-98% RH to 65°C at 90%-98% RH
b) 4 hour dwell at 65°C at 90%-98% RH
c) 2 hour ramp down to 25°C at 80%-98% RH
d) 2 hour dwell at 25°C at 80%-98% RH

7.3 Temperature Life:

Perform in accordance with EIA 364-17B. Headers and receptacles shall remain mated without any electrical load. The following details shall apply:

a) Temperature: 85°C
b) Duration: 500 hours

7.4 Industrial Mixed Flowing Gas (Class IIA, 4-gas):

Samples are to be exposed to an industrial gas mixture in accordance with Telcordia GR-1217-CORE, November 1995, Section 9.1.3. The headers are to be exposed UNMATED for 10 days to the gas mixture detailed below. The samples are then mated with the cable receptacle and exposed to an additional 10 days. The following details shall apply:

a) Temperature: 30°C
b) Relative humidity: 70%
c) Mandatory readings after the 10^{th} and 20^{th} days
d) Gas compositions, per **Central Office** requirements:

Gas Type	Gas Concentration
NO_2	200 ppb
Cl_2	10 ppb
H_2S	10 ppb
SO_2	100 ppb

7.5 Vibration

Perform in accordance with Telcordia GR-1217-CORE, November 1995, Sections 6.3.5 and 9.1.2.1. The following details shall apply:

a) Vibration amplitude: 1.5 mm (0.06 inch) double amplitude or 10G acceleration
b) Frequency range: 10 to 500 to 10 Hz
c) Sweep time: 15 minutes per cycle
d) Duration: 8 hours along each of three orthogonal axes (24 hours total)
e) Mounting: rigidly mounted assemblies
f) No discontinuities greater than 1 micro-second

7.6 Mechanical Shock

Perform in accordance with Telcordia GR-1217-CORE, November 1995, Sections 6.3.5 and 9.1.2.1. The following details shall apply:

a) Amplitude: half sine 30G
b) Duration: 11 milliseconds
c) Number of shocks: 3 shocks along each of three orthogonal axis (18 total)
d) Mounting: rigidly mounted assemblies
e) Take resistance measurements after shock in each axis
f) No discontinuities greater than 1 micro-second

7.7 Durability

Perform in accordance with EIA 364-09C. Use standard laboratory procedure as applicable to the specific product. The following details shall apply:

a) Number of cycles: See Table 1 (200 total mating cycles)
b) Cycling rate: 12.5 cm (5 inches) per minute

7.8 Dust Contamination

Perform in accordance with Telcordia GR-1217-CORE, November 1995, Section 9.1.1.1 & Table 9-1. Unmated headers shall be subjected to a one-hour dust exposure using a benign dust composition as specified in Table 9-1 of Telcordia GR-1217-CORE, November 1995.

7.9 Disturb

Perform in accordance with Telcordia GR-1217-CORE, November 1995, Section 9.1.3.3 paragraph 7. The mated connectors shall be subjected to an interface disturbance that consists of slightly unmating the sample approximately 0.10 mm (0.004 inch). The sample is then reseated and measurements are made.

8.0 QUALITY ASSURANCE PROVISIONS

8.1 Equipment Calibration

All test equipment and inspection facilities used in the performance of any test shall be maintained in a calibration system in accordance with ISO 9000.

8.2 Inspection Conditions

Unless otherwise specified herein, all inspections shall be performed under the following ambient conditions:

a) Temperature: 25 ± 5°C
b) Relative humidity: 20% to 80%
c) Barometric pressure: Local ambient

8.3 Sample Quantity and Description

The test sequences for qualification test and connector sample sizes for each are shown in Table 1. The number of readings is specified in the description for each test.

8.4 Acceptance

Electrical and mechanical requirements placed on test samples as indicated in the sections of this specification shall be established from test data using appropriate statistical techniques or shall otherwise be customer specified, and all samples tested in accordance with the product specification shall meet the stated requirements.

Failures attributed to equipment, test set-up or operator error shall not disqualify the product. If product failure occurs, corrective action shall be taken and samples resubmitted for qualification.

8.5 Qualification Testing

Qualification testing shall be performed on sample units build with equipment and procedures normally used in production. The test sequence is shown in Table 1.

8.6 Re-Qualification Testing

If any of the following conditions occur, the responsible product engineer shall initiate re-qualification testing consisting of all applicable parts of the qualification test matrices as discussed in section 9.5.

a) A significant design change is made to the existing product, which impacts the product form, fit or function. Examples of significant changes shall include, but not be limited to, changes in the plating, material composition or thickness, contact force, pin/contact surface geometry, insulator or housing design, pin/contact base material or pin/contact lubrication.
b) A significant change is made to the manufacturing process, which impacts the product form, fit or function.
c) A significant event occurs during production or end use requiring corrective action to be taken relative to the product design or manufacturing process.

Table 1: Qualification Test Matrix

TEST GROUP ID:		P	1	2	3a	3b	4	5	6
QTY OF 120 POSITION CABLE RECEPTACLE ASSY'S		4	4	4	3	4	5*	5	1
QTY OF 120 POSITION HEADERS		4	4	4	3	4	5*	5	1
QTY OF LLCR TEST BOARD SETS		4	4	4		4	4		
QTY OF CONTINUITY BOARDS (BACKPLANE)							1*		1
TEST DESCRIPTION	**SECTION**	Design verification for product extension	Mixed Flowing Gas	Temp Life	Thermal Shock & Humidity	Thermal Shock & Humidity	Vibration & Mech. Shock	(Un)-mating Force	Current Rating
VISUAL EXAMINATION OF PRODUCT	4.3	1,6	1,16	1,5	1,11	1,16	1,14	1	1,3
MATE HEADER AND RECEPTACLE			2,8		2	2,10	2,8		
UNMATE HEADER AND RECEPTACLE			6			8	6		
ELECTRICAL:									
LOW LEVEL CONTACT RESISTANCE	5.1	3,5	3,5,9,11, 13,15	2,4		3,5,7,11, 13,15	3,5,9,11,1 3		
INSULATION RESISTANCE	5.2				3,6,9				
DIELECTRIC WITHSTANDING VOLTAGE	5.3				4,7,10				
CURRENT RATING	5.4								2
MECHANICAL:									
MATING/UN-MATING FORCE	6.1	2						2	
ROBUSTNESS	6.2.1								
ROTATION	6.2.2								
PULL	6.2.3								
TORSION	6.2.4								
ENVIRONMENTAL:									
THERMAL SHOCK	7.1				5	4			
CYCLICAL HUMIDITY & TEMPERATURE	7.2				8	12			
TEMPERATURE LIFE	7.3			3					
MFG, UNMATED CONNECTOR, 10-DAYS	7.4		7						
MFG, MATED, 10-DAYS	7.4		10						
VIBRATION	7.5						10		
MECHANICAL SHOCK	7.6						12		
DURABILITY, 99 CYCLES	7.7	4	4, 14			6,14	4		
DUST COMTAMINATION	7.8					9	7		
DISTURB	7.9		12						

NOTES:
*(Test Group 4) Discontinuity is to be measured only on the set of connectors that are not being monitored for LLCR

9.0 REVISION RECORD

REV	PAGE	DESCRIPTION	EC #	DATE
A	all	- Page-4 Section 5.1, Change contact resistance from 30 mΩ to 50 mΩ. - Released to REV-A.	---	15May08