Connector Block, 110XC Cross Connect

1. INTRODUCTION

1.1. Purpose

Testing was performed on the AMP* Connector Block, 110XC, Cross Connect, to determine its conformance to the requirements of AMP Product Specification 108-1589 Rev. A.

1.2 Scope

This report covers the electrical, mechanical, and environmental performance of the Connector Block, 110XC, Cross Connect. Testing was performed at the GAD Americas North Product Reliability Center and the Americas Regional Laboratory between Jun97 and Apr98.

1.3. Conclusion

The Connector Block, 110XC, Cross Connect listed in paragraph 1.5., conformed to the electrical, mechanical, and environmental performance requirements of AMP Product Specification 108-1589 Rev A.

1.4. Product Description

The Connector Block, 110XC, Cross Connect contains two sets of IDC slots allowing for various 4 wire gas tight cross connections. The housing material is polycarbonate, UL94V-0. The terminals are phosphor bronze, with bright tin-lead over nickel plating.

1.5. Test Samples

The test samples were representative of normal production lots, and samples identified with the following part numbers were used for test:

Test Group	Quantity	Part Nbr	Description
1,2,3,4,5,6	45	558401-1	4 pair 110XC Connecting Block
1,2,3,4,5,6	9	558839-1	50 pair 110XC Wiring Block

1.6. Environmental Conditions

Unless otherwise stated, the following environmental conditions prevailed during testing:

Temperature: 15 to 35°C
Relative Humidity: 20 to 80%

1.7. Qualification Test Sequence

Test or Examination	Test Groups					
	1	2	3	4	5	6
	Test Sequence (a)					
Examination of product	1,8	1,7	1,5	1,5	1,4	1,5
Termination resistance		2,6	2,4	2,4		
Insulation resistance	2,6					
Dielectric withstanding voltage	3,7					
Tensile strength					3	
Attenuation						2
Near end crosstalk loss						4
Return loss						3
Vibration				3		
Durability		3(b)				
Thermal shock	4	4(b)			2	
Humidity -temperature cycling	5	5(b)				
Temperature life			3			

NOTE

(a) The numbers indicate sequence in which tests were performed.
(b) Perform 100 cycles before thermal shock, 33 cycles after 50 cycles of thermal shock, 33 cycles after 7 days of humidity-temperature cycling, and 34 cycles after 21 days of humidity- temperature cycling.

2. SUMMARY OF TESTING

2.1. Examination of Product - All Groups

All samples submitted for testing were representative of normal production lots. A Certificate of Conformance was issued by the Product Assurance Department. Where specified, samples were visually examined and no evidence of physical damage detrimental to product performance was observed.

2.2. Termination Resistance - Groups 2, 3 and 4

All termination resistance measurements, taken at 100 milliamperes maximum and 20 millivolts maximum open circuit voltage were less than 2.0 milliohms per interface pair initially and had a change in resistance (ΔR) of less than 10 milliohms after testing.

Test Group	Nbr of Data points	Condition	Max
2	80	Initial	0.70
		After Humidity (ΔR)	+1.03
3	40	Initial	0.80
		After Temp Life (ΔR)	+0.63
4	40	Initial	0.78
		After Vibration (ΔR)	+0.19

All values in milliohms

2.3. Insulation Resistance - Group 1

All insulation resistance measurements were greater than 100 megohms.

2.4. Dielectric Withstanding Voltage - Group 1

No dielectric breakdown or flashover occurred.

2.5. Tensile Strength - Group 5

All tensile strength measurements for the top contact, in the horizontal direction were greater than 8 pounds. All tensile strength measurements for the top contact, in the vertical direction were greater than 1.5 pounds. All tensile strength measurements for the bottom contact, in the horizontal direction were greater than 7 pounds.

2.6. Attenuation - Group 6

All attenuation results were within the limits specified in Table 1.

2.7. Near End Crosstalk - Group 6

All near-end crosstalk results were within the limits specified in Table 1.

2.8. Return Loss - Group 6

All return loss results were within the limits specified in Table 1.

Frequency (MHz) See Note (a)	Near End Crosstalk (dB) See Note (b)	Attenuation (dB) See Note (b)	Return Loss (dB) See Note (a)
1.0	65.0	0.1	23
4.0	65.0	0.1	23
8.0	62.0	0.1	23
10.0	60.0	0.1	23
16.0	56.0	0.2	23
20.0	54.0	0.2	23
25.0	52.0	0.2	14
31.25	50.0	0.2	14
62.5	44.0	0.3	14
100.0	40.0	0.4	14

Table 1

NOTE

(a) Per EIA/TIA 568A-1995.
(b) Values derived from a curve defined by frequency boundaries per EIA/TIA 568A-1995.

2.9. Vibration - Group 4

No discontinuities were detected during vibration. Following vibration, no cracks, breaks, or loose parts on the samples were visible.

2.10. Durability - Group 2

No physical damage occurred to the samples as a result of terminating and reterminating each sample 200 times.

2.11. Thermal Shock - Groups 1, 2 and 5

No evidence of physical damage was visible as a result of exposure to thermal shock.

2.12. Humidity-temperature Cycling - Groups 1 and 2

No evidence of physical damage was visible as a result of exposure to humidity-temperature cycling.

2.13. Temperature Life - Group 3

No evidence of physical damage was visible as a result of exposure to temperature life.

3. TEST METHODS

3.1. Examination of Product

Where specified, samples were visually examined for evidence of physical damage detrimental to product performance.

3.2. Termination Resistance

Termination resistance measurements at low level current were made using a 4 terminal measuring technique (Figure 1). The test current was maintained at 100 milliamperes maximum with a 20 millivolt maximum open circuit voltage.

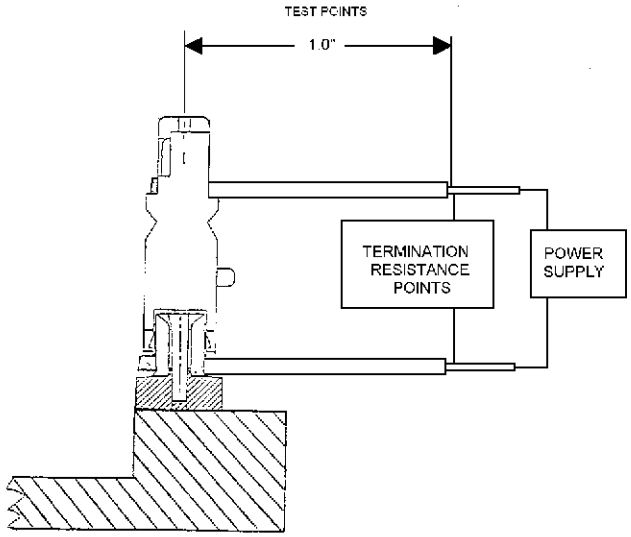

Figure 1
Typical Termination Resistance Measurement Points

3.3. Insulation Resistance

Insulation resistance was measured between adjacent contacts of terminated samples. A test voltage of 100 volts DC was applied for 30 seconds before the resistance was measured.

3.4. Dielectric Withstanding Voltage

A test potential of 1,500 volts AC was applied between the adjacent contacts of terminated samples. This potential was applied for 1 minute and then returned to zero.

3.5. Tensile Strength

The force required to pull the wire out of the 110 contact slot was measured using a tensile/compression device with the rate of travel at 1.0 inch/minute. Top wires were pulled in both the horizontal and vertical direction with reference to the connector body. Bottom wire was pulled in the horizontal direction only.

3.6. Attenuation

A network analyzer was used to measure the scattering parameters S_{11} and S_{21} of the sample. The attenuation was then calculated from these measurements. Attenuation is a loss measurement and is expressed in dB.

3.7. Near End Crosstalk

Sinusoidal frequencies of 1 to 100 MHz were applied to 1 end of the "driven line". The "quiet line" was monitored with a network analyzer to measure any crosstalk signals. The near end crosstalk is expressed in dB.

3.8. Return Loss

Sinusoidal frequencies of 1 to 100 MHz were applied to 1 end of the sample. The opposite end of the sample is terminated in a resistance equal to its characteristic impedance. Return loss is the ratio of incident to reflected power and is expressed in dB.

3.9. Vibration, Sinusoidal

Terminated samples were subjected to sinusoidal vibration, having a simple harmonic motion with an amplitude of 0.06 inch, double amplitude. The vibration frequency was varied uniformly between the limits of 10 and 55 Hz and returned to 10 Hz in 1 minute. This cycle was performed 120 times in each of 3 mutually perpendicular planes for a total vibration time of 6 hours. Samples were monitored for discontinuities of 1 microsecond or greater using a current of 100 milliamperes DC.

3.10. Durability

The top IDC slots were terminated and unterminated 200 times with 24 AWG solid wire using the 110 punch down tool P/N 569994-1 set on low impact setting and blade P/N 569995-1.

3.11. Thermal Shock

Terminated samples were subjected to 100 cycles of thermal shock with each cycle consisting of 30 minute dwells at -40 and 70°C. The transition between temperatures was less than 1 minute.

3.12. Humidity-temperature Cycling

Terminated samples were exposed to 21 cycles of humidity-temperature cycling. Each cycle lasted 24 hours and consisted of cycling the temperature between 25 and 65°C twice while the relative humidity was held at 95%. During 5 of the first 9 cycles, the connectors were exposed to a cold shock at -10°C for 3 hours.

3.13. Temperature Life

Mated samples were exposed to a temperature of 70°C for 500 hours. Samples were preconditioned with 10 cycles of durability.

4. VALIDATION

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