Connector, Card Edge, .050 Series

1. INTRODUCTION

1.1. Purpose

Testing was performed on AMP* .050 centerline card edge connector to determine its conformance to the requirements of AMP Product Specification 108-14034 Rev. A.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of the .050 centerline card edge connector manufactured by the Printed Circuit Board Products Division of the Capital Goods Business Unit Group. The testing was performed between 11Nov94 and 05Apr95. The test file numbers for this testing are CTL 5283-130-016 and CTL 5283-090-014. This documentation is on file at and available from the Americas Regional Laboratory.

1.3. Conclusion

The .050 centerline card edge connector meets the electrical, mechanical, and environmental performance requirements of AMP Product Specification 108-14034 Rev. A.

1.4. Product Description

The .050 inch centerline card edge connector is a multi-contact edgeboard type connector having contacts for solder application. The contacts are phosphor bronze, with gold over nickel or Palladium nickel plating. The housing materials are polyphenylene sulfide (PPS) and Poly 1,4-Cyclohexylenedimethylene Terephthalate (PCT).

1.5. Test Samples

The test samples were randomly selected from normal current production lots. The following part numbers were used for test:

Test Group	Quantity	Part Number	Description
1,3	5 each	145151-1	56 Position (10 PdNi/PPS)
1	5 each	145150-1	56 Position (10 PdNi/PPS)
2,3,4	5 each	145149-1	120 Position(10 PdNi/PCT)
3	5 each	646255-1	60 Position (30Au/PPS)
1,2,3,4	5 each	650231-1	120 Position (30AU/PPS)

1.6. Qualification Test Sequence

Test or Examination	Test Groups			
	1	2	3	4
Examination of Product	1,9	1,5	1,5	1,8
Termination Resistance, Dry Circuit	3,7	2,4	2,4	
Dielectric Withstanding Voltage				3,7
Insulation Resistance				2,6
Vibration	5			
Physical Shock	6			
Mating Force	2			
Unmating Force	8			
Durability	4			
Thermal Shock				4
Humidity-Temperature Cycling				5
Mixed Flowing Gas			3	
Temperature Life		3		

NOTE *The numbers indicate sequence in which tests were performed.*

2. SUMMARY OF TESTING

2.1. Examination of Product - All Groups

All samples submitted for testing were selected from normal current production lots. They were inspected and accepted by the Product Assurance Department of the Printed Circuit Board Products Division.

2.2. Termination Resistance, Dry Circuit - Groups 1, 2 and 3

All termination resistance measurements, taken at 100 milliamperes DC and 50 millivolts open circuit voltage were less than 20 milliohms initially and less than 10 milliohms increase in resistance (ΔR) after testing.

Test Group	Number of Data Points	Condition	Termination Resistance		
			Min	Max	Mean
1	160	Initial	9.71	18.07	14.213
		After Mechanical (ΔR)	-1.07	+0.55	-0.068
2	80	Initial	10.51	17.06	14.318
		After Temperature Life (ΔR)	-0.29	+2.72	+0.416
3	210	Initial	10.58	17.78	14.556
		After Mixed Gas (ΔR)	-0.42	+2.59	+0.450

NOTE *All values in milliohms.*

2.3. Dielectric Withstanding Voltage - Group 4

No dielectric breakdown or flashover occurred when a test voltage was applied between adjacent contacts.

2.4. Insulation Resistance - Group 4

All insulation resistance measurements were greater than 1,000 megohms.

2.5. Vibration - Group 1

No discontinuities of the contacts were detected during vibration. Following vibration, no cracks, breaks, or loose parts on the connector assemblies were visible.

2.6. Physical Shock - Group 1

No discontinuities of the contacts were detected during physical shock. Following physical shock testing, no cracks, breaks, or loose parts on the connector assemblies were visible.

2.7. Mating Force - Group 1

All mating force measurements were less than 8 ounces per contact pair.

2.8. Unmating Force - Group 1

All unmating force measurements were greater than 0.5 ounces per contact pair.

2.9. Durability - Group 1

No physical damage occurred to the samples as a result of mating and unmating the connector 100 times.

2.10. Thermal Shock - Group 4

No evidence of physical damage to either the contacts or the connector was visible as a result of thermal shock.

2.11. Humidity-Temperature Cycling - Group 4

No evidence of physical damage to either the contacts or the connector was visible as a result of exposure to humidity-temperature cycling.

2.12. Mixed Flowing Gas - Group 3

No evidence of physical damage to either the contacts or the connector was visible as a result of exposure to the pollutants of mixed flowing gas.

2.13. Temperature Life - Group 2

No evidence of physical damage to either the contacts or the connector was visible as a result of exposure to an elevated temperature.

3. TEST METHODS

3.1. Examination of Product

Product drawings and inspection plans were used to examine the samples. They were examined visually and functionally.

3.2. Termination Resistance, Low Level

Termination resistance measurements at low level current were made using a four terminal measuring technique (Figure 1). The test current was maintained at 100 milliamperes DC with an open circuit voltage of 50 millivolts DC.

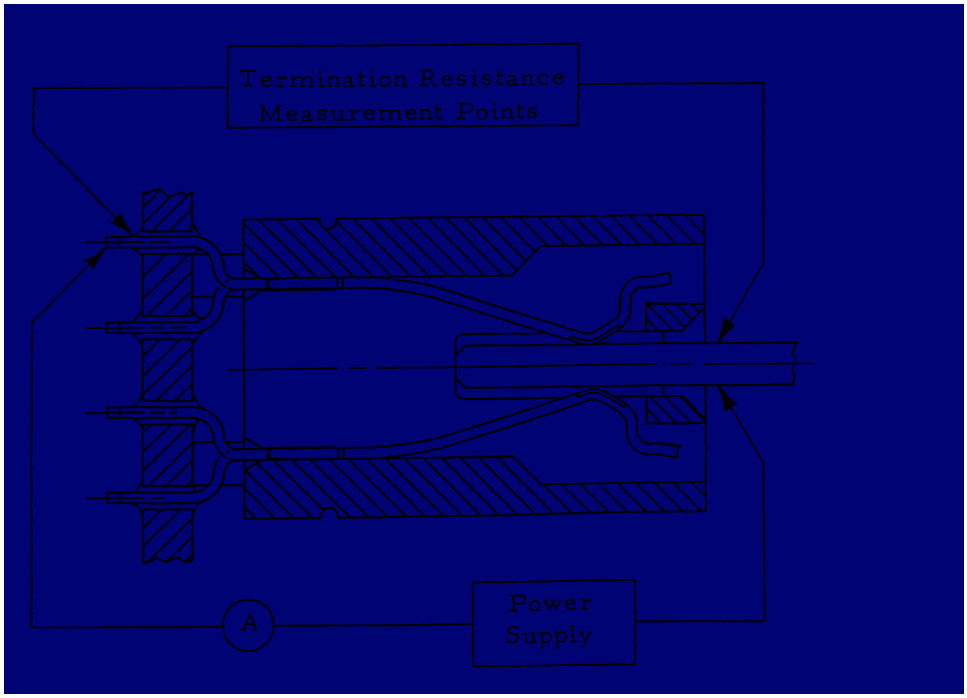

Figure 1
Typical Termination Resistance Measurement Points

3.3. Dielectric Withstanding Voltage

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

3.4. Insulation Resistance

Insulation resistance was measured between adjacent contacts, using a test voltage of 500 volts DC. This voltage was applied for two minutes before the resistance was measured.

3.5. Vibration, Random

Mated connectors and daughter cards were subjected to a random vibration test, specified by a random vibration spectrum, with excitation frequency bounds of 5 and 500 Hz. The power spectral density at 5 Hz is 0.000312 G^2/Hz. The spectrum slopes up at 6 dB per octave to a PSD of 0.005 G^2/Hz at 10 Hz. The spectrum is flat at 0.005 G^2/Hz from 10 to 500 Hz.The root-mean square amplitude of the excitation was 1.57 GRMS. Connectors and daughter cards were monitored for discontinuities greater than one microsecond, using a current of 100 milliamperes in the monitoring circuit.

3.6. Physical Shock

Mated connectors and daughter cards were subjected to a physical shock test, having a sawtooth waveform of 100 gravity units (g peak) and a duration of 6 milliseconds. Three shocks in each direction were applied along the three mutually perpendicular planes, for a total of 18 shocks. The connectors and daughter cards were monitored for discontinuities greater than one microsecond, using a current of 100 milliamperes in the monitoring circuit.

3.7. Mating Force

The force required to mate individual connectors and daughter cards was measured, using a free floating fixture. The crosshead rate of travel was 0.5 inch/minute. The force per contact was calculated.

3.8. Unmating Force

The force required to unmate individual connectors and daughter cards was measured using a free floating fixture. The crosshead rate of travel was 0.5 inch/minute. The force per contact was calculated.

3.9. Durability

Connectors and daughter cards were mated and unmated 100 times at a rate not exceeding 500 per hour.

3.10. Thermal Shock

Unmated connectors were subjected to 5 cycles of temperature extremes with each cycle consisting of 30 minutes at each temperature. The temperature extremes were -55 and 85°C. The transition between temperatures was less than one minute.

3.11. Humidity-Temperature Cycling

Unmated connectors were exposed to 10 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%.

3.12. Mixed Flowing Gas, Class II

Mated connectors and daughter cards were exposed for 14 days to a mixed flowing gas Class II exposure. Class II exposure is defined as a temperature of 30°C and a relative humidity of 70% with the pollutants of Cl_2 at 10 ppb, NO_2 at 200 ppb, and H_2S at 10 ppb. Samples were preconditioned with 3 cycles of durability.

3.13. Temperature Life

Mated samples were exposed to a temperature of 85°C for 1,000 hours. Samples were preconditioned with 3 cycles of durability.

4. VALIDATION

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