QUALIFICATION TEST REPORT

CONNECTOR, Z-PACK*
8 row 2mm HM

501-326 Rev. O

Product Specification:	108-1622 Rev. O
CTL No.:	CTL8053-009-001
Date:	November 20, 1995
Classification:	Unrestricted
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AMP

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CORPORATE TEST LABORATORY

Qualification Test Report

1. Introduction

1.1 Purpose

Testing was performed on AMP* CONNECTOR, 8 Row Z-PACK 2mm HM to determine its conformance to the requirements of AMP Product Specification 108-1622 Rev. O.

1.2 Scope

This report covers the electrical, mechanical, and environmental performance of the CONNECTOR, 8 Row Z-PACK 2MM HM manufactured by the Printed Circuit Board Product Division of the Capital Goods Business Unit. The testing was performed between June 1, 1995 and November 10, 1995.

1.3 Conclusion

The CONNECTOR, 8 Row Z-PACK 2mm HM listed in paragraph 1.5 meet the electrical, mechanical, and environmental performance requirements of AMP Product Specification 108-1622 Rev. O.

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1.4 Product Description

The Z-PACK 8 Row 2mm HM Conector System is a two piece device designed to interconnect 2 printed circuit boards using pin and receptacle connectors. Connectors employ an eight row 2mm x 2mm centerline configuration. Both pin and receptacle connectors are through hole devices with ACTION PIN contacts.

1.5 Test Samples

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

Test Group	Quantity	Part Nbr	Description
1,2,3,4,5	3 ea.	646347-1	200 Position Male Assembly
1,2,3,4,5	4 ea.	646353-1	200 Position Female Assembly
6	4 ea.	646346-1	176 Position Male Assembly
6	4 ea	646352-1	176 Position Female Assembly

1.6 Qualification Test Sequence

	Test Groups					
Test or Examination	1	2	3	4	5	6
Examination of Product	1,19	1,14	1,11	1,10	1,3	1,4
Termination Resistance, Dry Circuit	2,16	2,8,10	2,8	2,7		
Dielectric Withstanding Voltage	4,12,15	4,12	4,7	4,9		
Insulation Resistance	3,11,14	3,11	3,6	3,8		
Vibration	8					
Physical Shock	9					
Polarization Force						2
Mating Force	5,17		9			
Unmating Force	6,18		10			
Retention Force, Contact						4
Retention Force, Module						3
Retention Force, ACTION PIN Contact					2	
Retention Force, Gage	7	5,13				
Durability		6,9		5		
Thermal Shock	10					
Humidity/Temperature Cycling	13					
Humidity, Steady State			5			
Corrosion Atmosphere		7,				
Temperature Life & Electrical Load				6		

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 Capital Goods Business Unit.

2.2 Termination Resistance, Dry Circuit - Groups 1,2,3,4

All termination resistance measurements, taken at 100 milliamperes DC and 20 millivolts open circuit voltage, were less than 50 milliohms initially and had a change in resistance (ΔR) of less than 5 milliohms.

Test Group	Nbr of Data points	Condition	Min	Max	Mean
1	100	Initial	7.62	12.06	9.817
		After Mechanical(ΔR)	-0.01	+2.55	+0.514
2	100	Initial	7.43	14.49	10.075
		After Mixed Gas(ΔR)	-0.69	+1.39	+0.035
		After Durability(ΔR)	-0.72	+0.88	-0.101
3	100	Initial	7.64	12.14	9.799
		After Humidity(ΔR)	-0.57	+0.70	+0.118
4	100	Initial	7.77	12.08	9.936
		After Temp Life(ΔR)	-0.09	+4.42	+1.407

All values in milliohms

2.3 Dielectric Withstanding Voltage - Groups 1,2,3,4

No dielectric breakdown or flashover occurred when a test voltage of 750 volts AC was applied between adjacent contacts.

2.4 Insulation Resistance - Groups 1,2,3,4

All insulation resistance measurements were greater than 10,000 megohms initially and greater than 1,000 megohms after testing.

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 Polarization Force - Group 6

All polarization force measurements were greater than 100N (22.48 lbs).

2.8 Mating Force - Groups 1,3

All mating force measurements were less than 0.75N (2.7 oz) per contact.

2.9 Unmating Force - Groups 1,3

All unmating force measurements were greater than .15N (0.5 oz) per contact.

2.10 Retention Force, Contact - Group 6

All contact remained in the housings after a force of 5N (1.1 lbs) was applied in the mating direction and a force of 10N (2.2 lbs) was applied in the unmating direction.

2.11 Retention Force, Module - Group 6

No physical damage occurred to the module (chicklet) as a result of supplying an axial load of 74N (16.62 lbs) to the module contacts.

2.12 Retention Force, ACTION PIN Contact - Group 5

No physical damage occurred to either the ACTION PIN contacts or the PC Board, and no ACTION PIN contacts dislodged from the PC Board as a result of supplying an axial load of 20N (4.49 lbs) to the ACTION PIN contacts.

2.13 Retention Force, Gage- Groups 1,2

All force measurements required to remove a .355 mm (.014 inch) gage were greater than 15 grams (0.53 ounces).

2.14 Durability - Groups 2,4

No physical damage occurred to the samples as a result of mating and unmating the connector 250 times.

2.15 Thermal Shock - Group 10

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

2.16 Humidity-Temperature Cycling - Group 1

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

2.17 Humidity, Steady State - Group 3

No evidence of physical damage to either the contacts or the connector was visible as a result of exposure to a steady state humidity environment.

2.18 Corrosion Atmosphere - Group 2

No evidence of physical damage to either the contacts or the connector was visible as a result of the corrosion atmosphere exposure.

2.19 Temperature Life & Electrical Load - Group 4

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

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 20 millivolts DC.

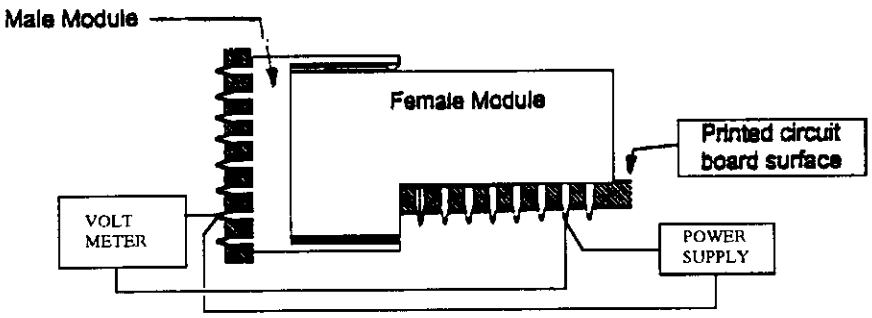

Figure 1
Typical Termination Resistance Measurement Points

3.3 Dielectric Withstanding Voltage

A test potential of 750 volts AC was applied between the adjacent contacts. This potential was applied for one minute and then returned to zero. The rate of rise was 500 volts/seconds. Test samples were board mounted for this test, but the holes in the PC board were enlarged so that the board and it's traces were not part of the measurement.

3.4 Insulation Resistance

Insulation resistance was measured between adjacent contacts, using a test voltage of 100 volts DC. This voltage was applied for two minutes before the resistance was measured. Test samples were board mounted for this test, but the holes in the PC board were enlarged so that the board and it's traces were not part of the measurement.

3.5 Vibration, Sine

Mated connectors were subjected to sinusoidal vibration, having a simple harmonic motion with an amplitude of 0.70 mm (0.06 inch), double amplitude or 50 m/s^2 (5 G's) (whichever is less). The vibration frequency was varied logarithmically between the limits of 10 and 500 Hz and returned to 10 Hz in 6.27 minutes. This cycle was performed 30 times in each of three mutually perpendicular planes, for a total vibration time of 5.66 hours. Connectors were monitored for discontinuities greater than one microsecond, using a current of 100 milliamperes in the monitoring circuit.

3.6 Physical Shock

Mated connectors were subjected to a physical shock test, having a half-sine waveform of 490 m/s^2 (50 gravity units (g peak)) and a duration of 11 milliseconds. Five shocks in each direction were applied along the three mutually perpendicular planes, for a total of 30 shocks. The connectors were monitored for discontinuities greater than one microsecond, using a current of 100 milliamperes in the monitoring circuit.

3.7 Polarization Force

The force required to attempt to mate connectors incorrectly (180° out of phase) was measured using a tensile/compression device and a free floating fixture. The crosshead rate of travel was 12.7 mm/minute (0.5 inch/minute). The force was increased until 100N (22.48 lbs) was applied.

3.8 Mating Force

The force required to mate connectors correctly was measured using a tensile/compression device and a free floating fixture. The crosshead rate of travel was 12.7 mm/minute (0.5 inch/minute).

3.9 Unmating Force

The force required to unmate connectors correctly was measured using a tensile/compression device and a free floating fixture. The crosshead rate of travel was 12.7 mm/minute (0.5 inch/minute).

3.10 Retention Force, Contact

An axial force was applied to each contact in both directions at a maximum rate of 10N/sec(2.25 lbs/sec). The force in the mating direction was 5N (1.125 lbs). The force in the unmating direction was 10N (2.25 lbs). The force was held for 10 seconds.

3.11 Retention Force, Module

An increasing axial load was applied to each module (chicklet) until the module releases from the housing. All forces measured were greater than 74N (16.62 lbs).

3.12 Retention Force, ACTION PIN Contact

An increasing axial load was applied to each ACTION PIN contact until the pin releases from the printed circuit board. All forces measured were greater than 20N (4.49 lbs).

3.13 Retention Force, Gage

After inserting and removing a .381 mm (.015 inch) gage 3 times, the force required to remove a .355 mm (.014 inch) gage was measured. All force measurements were greater than 15 grams (0.53 ounces).

3.14 Durability

Connectors were mated and unmated 250 times at a rate not exceeding 600 cycles per hour.

3.15 Thermal Shock

Mated 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 125°C. The transition between temperatures was less than one minute.

3.16 Humidity-Temperature Cycling

Mated connectors were exposed to 6 cycles of humidity-temperature cycling. Each cycle lasted 24 hours and consisted of cycling the temperature between 25°C and 40°C while the relative humidity was held at 95% as illustrated in Figure 2. During five of the cycles, the connectors were exposed to a cold shock at -55°C for 2 hours. Samples were preconditioned for 16 hours at 125°C.

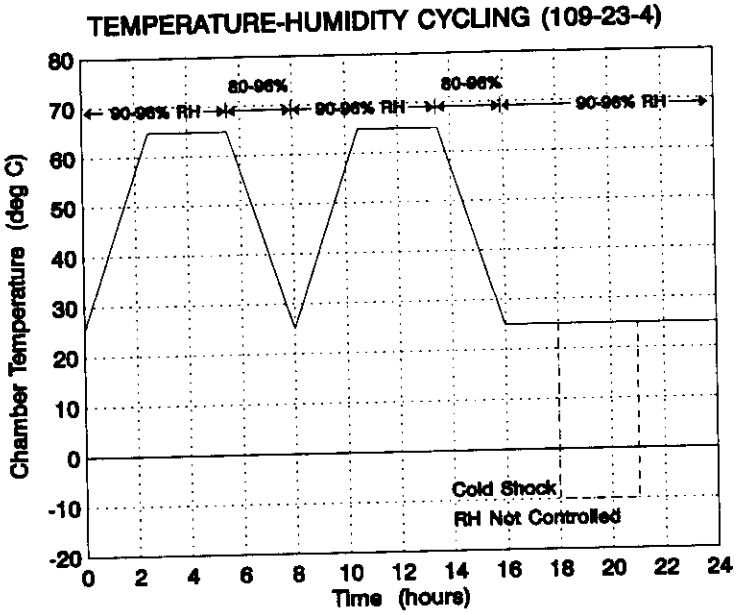

Figure 2
Typical Humidity-Temperature Cycling Cycle

3.17 Humidity, Steady State

Mated connectors were subjected to a relative humidity of 93% and a temperature of 40°C for a period of 21 days.

3.18 Corrosion Atmosphere

Mated and unmated connectors were exposed for 4 days to a corrosion industrial atmosphere. A corrosion industrial atmosphere is defined as a temperature of 23°C and a relative humidity of 75% with the pollutants of H_2S at 0.1 ppm and SO_2 at 0.5 ppm.

3.19 Temperature Life & Electrical Load

Mated samples were exposed to a temperature of 87.5°C for 1000 hours. Samples were energized with 1.25 amps DC which produced a combined sample temperature of 125°C.

4. Validation

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