QUALIFICATION TEST REPORT

CONNECTOR, MDI,
SURFACE MOUNT

501-269 Rev. O

Product Specification:	108-1503 Rev. O
CTL No.:	CTL2657-006-001
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Classification:	Unrestricted
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Table of Contents

(R2657TS)

AMP

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CORPORATE TEST LABORATORY

Qualification Test Report

1. Introduction

1.1 Purpose

Testing was performed on AMP* Multi-Directional Interface (MDI) Surface Mount Connector to determine its conformance to the requirements of AMP Product Specification 108-1503 Rev. O.

1.2 Scope

This report covers the electrical, mechanical, and environmental performance of the MDI Connector manufactured by the Interconnection Components & Assemblies Product Division of the Capital Goods Business Unit. The testing was performed between June 6, 1994 and August 16, 1994.

1.3 Conclusion

The MDI Connector meets the electrical, mechanical, and environmental performance requirements of AMP Product Specification 108-1503 Rev. O.

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1.4 Product Description

The Multi-Directional Interface connector is designed for printed circuit board (PCB) to printed circuit board applications. The connector consists of a 6-position PCB connector for through-hole applications and a 6-position PCB receptacle for use in surface mount technology. The connector can be mated horizontally (0°), vertically (90°), or any angle between 0° and 90°.

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	23	787090-1	MDI Receptacle
1,2,3,4,5	23	787089-1	MDI Plug

1.6 Qualification Test Sequence

	Test Groups				
Test or Examination	1	2	3	4	5
Examination of Product	1,9	1,5	1,5	1,8	1,3
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				
Solderability					2
Thermal Shock				4	
Humidity-Temperature Cycling				5	
Mixed Flowing Gas			3		
Temperature Life		3			

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 Capital Goods Business Unit.

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

All termination resistance measurements, taken at 100 milliamperes DC maximum and 50 millivolts maximum open circuit voltage were less than 15 milliohms initially and 20 milliohms after testing.

Test Group	Nbr of Samples	Condition	Min	Max	Mean
1	30	Initial	3.54	4.91	4.277
		After Mechanical	4.15	6.80	5.542
2	30	Initial	4.84	7.55	5.690
		After Temp Life	4.67	6.32	5.370
3	36	Initial	3.59	5.23	4.500
		After Mixed Gas	3.81	5.90	4.720

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 15N (4.48 lbs).

2.8 Unmating Force - Group 1

All unmating force measurements were greater than 2N (0.44 lbs).

2.9 Durability - Group 1

No physical damage occurred to the samples as a result of mating and unmating the connector 2,500 times.

2.10 Solderability - Group 5

The contact leads had a minimum of 95% solder coverage.

2.11 Thermal Shock - Group 4

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

2.12 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.

2.13 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.

2.14 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.

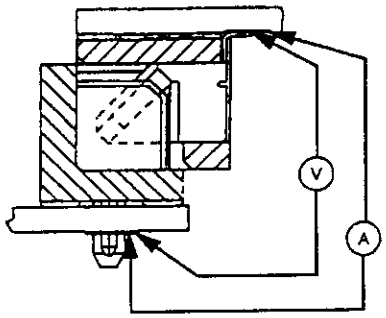

Figure 3
Termination Resistance Measurement Points

Figure 1
Typical Termination Resistance Measurement Points

3.3 Dielectric Withstanding Voltage

A test potential of 500 vac 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 were subjected to a random vibration test, specified by a random vibration spectrum, with excitation frequency bounds of 50 and 2000 hertz. The power spectral density at 5 hz is 0.003 G^2/Hz. The spectrum slopes up at 6 dB per octave to a PSD of 0.06 G^2/Hz at 10 Hz. The spectrum is flat at 0.06 G^2/Hz from 10 to 500 Hz. The root-mean square amplitude of the excitation was 5.43 GRMS. The 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 30 gravity units (g peak) and a duration of 11 milliseconds. Three shocks in each direction were applied along the three mutually perpendicular planes, for a total of 18 shocks. The connectors 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 was measured, using a free floating fixture with a maximum rate of travel at 0.5 inch/minute.

3.8 Unmating Force

The force required to unmate individual connectors was measured using a free floating fixture with a maximum rate of travel at 0.5 inch/minute.

3.9 Durability

Connectors were mated and unmated 2,500 times at a rate not exceeding 500 per hour.

3.10 Solderability

Connector assembly contact solder tails were subjected to a solderability test by immersing them in a nonactive rosin flux for 5 to 10 seconds, allowed to drain for 10 to 60 seconds, then held over molten solder without contact for 2 seconds. The solder tails were then immersed in the molden solder at a rate of approximately one inch per second, held for 3 to 5 seconds, then withdrawn. After cleaning in isopropyl alcohol, the samples were visually examined for solder coverage. The solder used for testing was 60/40 tin lead composition and was maintained at a temperature of 245°C.

3.11 Thermal Shock

Mated connectors were subjected to 25 cycles of temperature extremes with each cycle consisting of 30 minutes at each temperature. The temperature extremes were -55°C and 105°C. The transition between temperatures was less than one minute.

3.12 Humidity-Temperature Cycling

Mated connectors were exposed to 10 cycles of humidity-temperature cycling. Each cycle lasted 24 hours and consisted of cycling the temperature between 25°C and 65°C twice while the relative humidity was held at 95%.

3.13 Mixed Flowing Gas, Class III

Mated connectors were exposed for 20 days to a mixed flowing gas Class III exposure. Class III exposure is defined as a temperature of 30°C and a relative humidity of 75% with the pollutants of $C1_2$ at 20 ppb, NO_2 at 200 ppb, and H_2S at 100 ppb. Samples were preconditioned with 10 cycles of durability.

3.14 Temperature Life

Mated samples were exposed to a temperature of 105°C for 1,000 hours.

4. Validation

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8/12/94

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