Connector, CHAMP* .050 Low Profile Docking

1. INTRODUCTION

1.1. Purpose

Testing was performed on the AMP* CHAMP* .050 Low Profile Docking Connector to determine its conformance to the requirements of AMP Product Specification 108-1752 Rev. O.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of the CHAMP .050 Low Profile Docking Connector. Testing was performed at the Americas Regional Laboratory between 09Sep97 and 11Nov97.

1.3. Conclusion

The CHAMP .050 Low Profile Docking Connector, listed in paragraph 1.5., met the electrical, mechanical, and environmental performance requirements of AMP Product Specification 108-1752 Rev O.

1.4. Product Description

The CHAMP .050 Low Profile Docking Connector is a shielded, 200 position, printed circuit board mounted connector system. It includes right angle and vertical plugs and right angle receptacles. The contacts are a copper alloy with gold plating on the mating end, tin-lead plating on the opposite end, all over nickel plating. The housing mate rial is natural polyester, UL94V-O rated.

1.5. Test Samples

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

Test Group	Quantity	Part Nbr	Description
1,3	5	787855-1	Right Angle Docking Plug
1,3	5	787883-1	Right Angle Docking Receptacle
1	5	787887-1	Vertical Docking Plug
1,4	5	787882-1	Right Angle Docking Receptacle
2	5	787913-1	Right Angle Docking Plug
2,5	5	787851-1	Right Angle Docking Receptacle
4	5	787885-1	Right Angle Docking Plug

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
	Test Sequence (a)				
Examination of product	1,9	1,5	1,5	1,8	1,3
Termination resistance	3,7	2,4	2,4		
Insulation resistance				2,6	
Dielectric withstanding voltage				3,7	
Solderability					2
Vibration	5				
Mechanical shock	6				
Mating force	2				
Unmating force	8				
Durability	4				
Thermal shock				4	
Humidity -temperature cycling				5	
Mixed flowing gas			3(b)		
Temperature life		3(b)			

NOTE

(a) The numbers indicate sequence in which tests were performed.
(b) Precondition with 10 cycles of Durability.

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 of the Personal Computer Business Unit. Where specified, samples were visually examined and no evidence of physical damage detrimental to product performance was observed.

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

All termination resistance measurements, taken at 100 milliamperes maximum and 50 millivolts open circuit voltage had a change in resistance (ΔR) of 25 milliohms or less.

Test Group	Nbr of Data points	Condition	Termination Resistance Min	Max	Mean
1	500	After Mechanical	-2.74	+2.05	-0.128
2	248	After Temp Life	-2.79	+1.04	-0.166
3	250	After Mixed Gas	-2.21	+6.71	-0.035

All values in milliohms

2.3. Dielectric Withstanding Voltage - Group 4

No dielectric breakdown or flashover occurred.

2.4. Insulation Resistance - Group 4

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

2.5. Solderability - Group 5

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

2.6. Vibration - Group 1

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

2.7. Mechanical Shock - Group 1

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

2.8. Mating Force - Group 1

All mating force measurements were less than the 0.441N maximum average per contact.

2.9. Unmating Force - Group 1

All unmating force measurements were greater than 0.147N minimum average per contact.

2.10. Durability - Group 1

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

2.11. Thermal Shock - Group 4

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

2.12. Humidity-Temperature Cycling - Group 4

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

2.13. Mixed Flowing Gas - Group 3

No evidence of physical damage 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 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, Low Level

Termination resistance measurements at low level current were made using a 4 terminal measuring technique. The test current was maintained at 100 milliamperes maximum with a 50 millivolt open circuit voltage.

3.3. Dielectric Withstanding Voltage

A test potential of 500 volts AC was applied between the adjacent contacts. This potential was applied for 1 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 2 minutes before the resistance was measured.

3.5. Solderability

Connector assembly contact solder tails were subjected to a solderability test. The soldertails were immersed in a mildly activated 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 molten solder at a rate of approximately 1 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 $\pm$ 5°C.

3.6. Vibration, Random

Mated connectors 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 was 0.000312 G^2/Hz. The spectrum sloped up at 6 dB per octave to a PSD of 0.02 G^2/Hz at 14 Hz. The spectrum was flat at 0.02 G^2/Hz from 14 to 500 Hz. The root-mean square amplitude of the excitation was 3.13 GRMS. This was performed for 15 minutes in each of 3 mutually perpendicular planes for a total vibration time of 45 minutes. Connectors were monitored for discontinuities of 1 microsecond or greater using a current of 100 milliamperes DC.

3.7. Mechanical Shock

Mated connectors were subjected to a mechanical 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 3 mutually perpendicular planes for a total of 18 shocks. Connectors were monitored for discontinuities of 1 microsecond or greater using a current of 100 milliamperes DC.

3.8. Mating Force

The force required to mate individual connectors was measured using a tensile/compression device with the rate of travel at 0.5 inch/minute and a free floating fixture. The average force per contact was calculated.

3.9. Unmating Force

The force required to unmate individual connectors was measured using a tensile/compression device with the rate of travel at 0.5 inch/minute and a free floating fixture. The average force per contact was measured.

3.10. Durability

Connectors were mated and unmated 500 times at a maximum rate of 600 cycles per hour.

3.11. Thermal Shock

Unmated connectors were subjected to 5 cycles of thermal shock with each cycle consisting of 30 minute dwells at -55 and 85°C. The transition between temperatures was less than 1 minute.

3.12. 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 maintaining high humidity. (Figure 1)

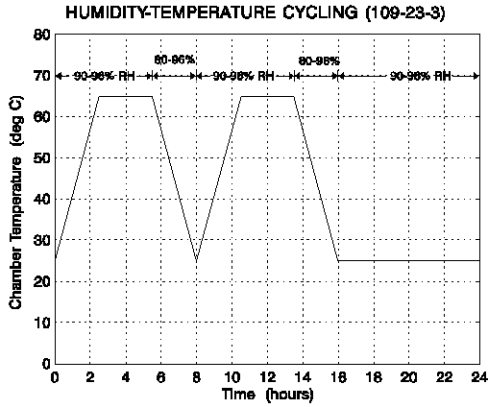

Figure 1
Typical Humidity-Temperature Cycling Profile

3.13. Mixed Flowing Gas, Class II

Mated connectors 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 10 cycles of durability.

3.14. Temperature Life

Mated samples were exposed to a temperature of 85°C for 300 hours. Samples were preconditioned with 10 cycles of durability.

4. VALIDATION

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