Connector, CHAMP*, Blindmate, .050 Series I

1. INTRODUCTION

1.1. Purpose

Testing was performed on the AMP* CHAMP* Blindmate Connector to determine its conformance to the requirements of AMP Product Specification 108-1548 Rev. O.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of the CHAMP Blindmate Connector manufactured by the Global Personal Computer Division. The testing was performed between June 10, 1996 and November 15, 1996.

1.3. Conclusion

The CHAMP Blindmate Connector, listed in paragraph 1.5., met the electrical, mechanical, and environmental performance requirements of AMP Product Specification 108-1548 Rev O.

1.4. Product Description

The CHAMP Blindmate .050 series I connectors are available in both 40 and 80 position styles. The contacts are phosphor bronze with gold plating in the mating areas and tin-lead plating on the opposite end. The housing material is black polyester with a UL94V-O rating.

1.5. Test Samples

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

Test Group	Quantity	Part Nbr	Description
1,2,3,4	5 ea.	787312-1	80 Position Straddle Mount Plug
1,2,3	5 ea.	787535-1	80 Position Right Angle extended height Receptacle
1	5 ea.	787596-1	80 Position Vertical extended height Receptacle
2,4	5 ea.	787311-1	80 Position Vertical Receptacle
1,2	5 ea.	787319-1	80 Position Vertical Plug

* Trademark
I Indicates change

1.6. Qualification Test Sequence

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

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 randomly selected from current production lots. A Certificate of Conformance was issued by the Product Assurance Department of the Global Personal Computers Division. 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 and 2

All termination resistance measurements, taken at 100 milliamperes maximum and 50 millivolts open circuit voltage had a maximum increase in resistance (ΔR) of less than 15 milliohms.

Test Group	Nbr of Data points	Condition	Change in Resistance Min	Max	Mean
1	400	After Mechanical	-1.87	+7.83	+0.359
2	800	After Current Rating	-4.66	+5.92	+0.620

All values in milliohms

2.3. Dielectric Withstanding Voltage - Group 3

No dielectric breakdown or flashover occurred.

2.4. Insulation Resistance - Group 3

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

2.5. Temperature Rise vs Current - Group 2

With 2 amperes of current flowing in through contacts 34 and 35 (in parallel) and out through contacts 74 and 75 (in parallel), the maximum temperature rise above ambient was less than 30°C. With 3 amperes of current flowing in through contacts 2, 3 and 4 (in parallel) and out through contacts 41, 42 and 43 (in parallel), had a maximum temperature rise above ambient of less than 30°C. The current rating (30°C temperature rise) for a single contact was established at 3.35 amperes.

2.6. Solderability - Group 4

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

2.7. Vibration - Groups 1 and 2

No discontinuities were detected during vibration (Test Group 1 only). Following vibration, no cracks, breaks, or loose parts on the connector assemblies were visible.

2.8. Physical Shock - Group 1

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

2.9. Mating Force - Group 1

All mating force measurements were less than 110 grams per contact.

2.10. Unmating Force - Group 1

All unmating force measurements were greater than 15 grams per contact.

2.11. Durability - Group 1

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

2.12. Thermal Shock - Group 3

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

2.13. Humidity-Temperature Cycling - Group 3

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

2.14. Mixed Flowing Gas - Group 3

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

2.15. 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 (Figure 1). The test current was maintained at 100 milliamperes maximum with a 50 millivolt open circuit voltage.

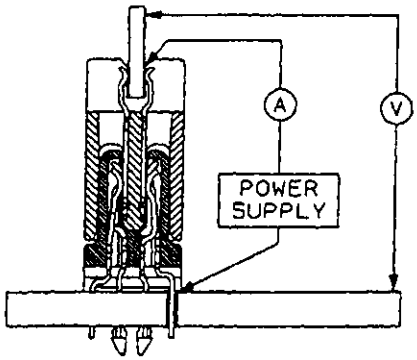

Figure 1
Typical Termination Resistance Measurement Points

3.3. Dielectric Withstanding Voltage

A test potential of 300 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. Temperature Rise vs Specified Current

Temperature rise curves were produced by measuring individual contact temperatures at 5 different current levels. These measurements were plotted to produce a temperature rise vs current curve. Thermocouples were attached to the contacts to measure their temperatures. The ambient temperature was then subtracted from this measured temperature to find the temperature rise. When the temperature rise of 3 consecutive readings taken at 5 minute intervals did not differ by more than 1°C the temperature measurement was recorded.

3.6. 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, and 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, and 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 ± 5°C.

3.7. 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. (Test group 1 only). Connectors were energized with a test current of 1.5 amperes DC. (Test group 2 only).

3.8. 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 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.

3.9. 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 force per contact was calculated.

3.10. 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 force per contact was calculated.

3.11. Durability

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

3.12. Thermal Shock

Mated connectors were subjected to 5 cycles of thermal shock with each cycle consisting of 30 minute dwells at -55 and 105°C. The transition between temperatures was less than 1 minute.

3.13. 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 2)

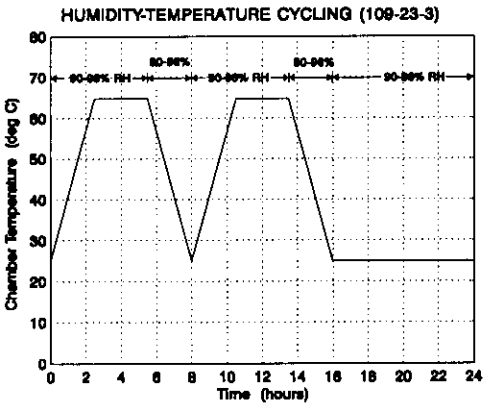

Figure 2
Typical Humidity-Temperature Cycling Profile

3.14. 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.

3.15. Temperature Life

Mated samples were exposed to a temperature of 105°C for 1000 hours.

4. VALIDATION

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