Connector, Standard Edge

1. INTRODUCTION

1.1. Purpose

Testing was performed on the AMP* Standard Edge Connector to determine its conformance to the
| requirements of AMP Product Specification 108-9039 Rev. J.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of the Standard Edge Connector manufactured by the Global Personal Computer Division. The testing was performed between
| February 10, 1997 and March 3, 1997.

1.3. Conclusion

The Standard Edge Connector, listed in paragraph 1.5, meet the electrical, mechanical, and environmental
| performance requirements of AMP Product Specification 108-9039 Rev J.

1.4. Product Description

AMP Standard Edge connector is a multi-contact, edge board type assembly having contacts of various lengths for plug-on, wire or solder applications. The contacts are Phosphor bronze with gold plating. The
| housings material is Black glass-filled polyester, 94V-0 rated.

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	5	176139-2	52 Position 15 microinch Gold, VALOX 420
1	5	176139-3	52 position 30 microinch Gold, VALOX 420 (s/a 645169-2,-3)
2,3,4	5	176138-2	31 Position 15 microinch Gold, VALOX 420 (s/a 7-530843-0)
2,3,4	5	176138-3	31 Position 30 microinch Gold, VALOX 420 (s/a 645235-1)
4	10	176139-3	52 Position, 30 microinch Gold, VALOX 477

* Trademark
| Indicates change

1.6. Qualification Test Sequence

Test or Examination	Test Groups			
	1	2	3	4
	Test Sequence			
Examination of Product	1,9	1,5	1,5	1,9
Termination Resistance, Dry Circuit	3,7	2,4	2,4	
Dielectric Withstanding Voltage				4,8
Insulation Resistance				3,7
Vibration	5			
Physical Shock	6			
Mating Force	2			
Unmating Force	8			
Contact Retention				2
Durability	4			
Thermal Shock				5
Humidity-Temperature Cycling				6
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 Global Personal Computers Division.

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

All termination resistance measurements, taken at 100 milliamperes DC and 50 millivolts open circuit voltage were less than 10 milliohms.

Test Group	Nbr of Samples	Condition	Min	Max	Mean
1	60	Initial	3.5	3.9	3.60
	60	After Mechanical	3.5	4.6	3.83
2	60	Initial	3.9	7.4	5.47
	60	After Temp Life	4.0	7.3	5.62
3	60	Initial	3.9	7.0	5.39
	60	After Mixed Gas	4.2	7.0	5.54

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 5,000 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 19 ounces per contact pair.

2.8. Unmating Force - Group 1

All unmating force measurements were greater than 1.25 ounces per contact pair.

2.9. Contact Retention - Group 4

No physical damage occurred to either the contacts or the housing, and no contacts dislodged from the housings as a result of applying an axial load of 8.0 pounds to each contact.

2.10. Durability - Group 1

No physical damage occurred to the samples as a result of mating and unmating the connector 250 times for contacts with 30 microinch gold and 100 times for contacts with 15 microinch gold.

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, Steady State - Group 4

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.

2.13. 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.

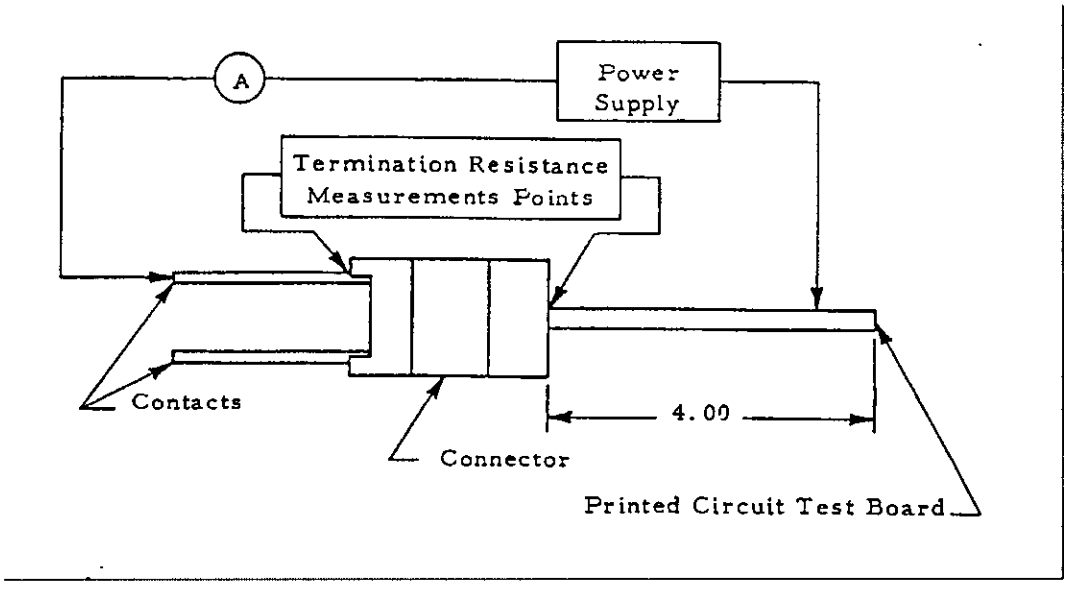

Figure 1
Typical Termination Resistance Measurement Points

3.3. Dielectric Withstanding Voltage

A test potential of 1000 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

Connectors mated with test boards 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 50 Hz was 0.015 G^2/Hz. The spectrum sloped up at 6 dB per octave to a PSD of 0.06 G^2/Hz at 100 Hz. The spectrum was flat at 0.06 G^2/Hz from 100 to 1000 Hz. The spectrum sloped down at 6 dB per octave to the upper bound frequency of 2000 Hz, at which the PSD was 0.015 G^2/Hz. The root-mean square amplitude of the excitation was 9.26 GRMS. The sample were vibrated for a period of 3 minutes in each of 3 mutually perpendicular axes for a total of 9 minutes.

3.6. Physical Shock

Connectors mated with test boards were subjected to a physical shock test, having a half-sine waveform of 50 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 fully mate a test board to each connectors was measured, using a free floating fixture with the rate of travel at 0.5 inch/minute. The maximum average force per contact was calculated.

3.8. Unmating Force

The force required to unmate a test board from each connectors was measured using a free floating fixture with the rate of travel at 0.5 inch/minute.

3.9. Contact Retention

An axial load of 8.0 pounds was applied to each contact and held for 60 seconds. The force was applied in a direction to cause removal of the contacts from the housing.

3.10. Durability

Connectors, with 30 microinch gold plating, and test boards were mated and unmated 250 times at a rate not exceeding 500 per hour. Connectors, with 15 microinch gold plating, and test boards were mated and unmated 100 times at a rate not exceeding 500 per hour.

3.11. 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°C and 85°C. The transition between temperatures was less than one minute.

3.12. Humidity, Steady State

Unmated connectors were subjected to a relative humidity of 90-95% and a temperature of 40°C for a period of 4 days.

3.13. Mixed Flowing Gas, Class II

Connectors mated with test boards 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 5 cycles of durability

3.14. Temperature Life

Connectors mated with test boards were exposed to a temperature of 85°C for 500 hours. Samples were preconditioned with 5 cycles of durability.

4. VALIDATION

Prepared by:

3/4/97

Terrance M. Shingara
Test Engineer
Product Qualification Team
Americas Regional Laboratory

Reviewed by:

3/4/97

Robert S. Druckenmiller
Supervisor
Product Testing
Americas Regional Laboratory

Approved by:

3/11/97

John Assini
Manager
Design Assurance Engineering Practices
Global Personal Computer Business