Mini UMNL II Header

1. INTRODUCTION

1.1. Purpose

Testing was performed on the AMP* Miniature Universal MATE-N-LOK*II (Mini-UMNL II) header to determine its conformance to the requirements of AMP Product Specification 108-1694 Revision A.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of the Mini UMNL II headers. Testing was performed at the Americas Global Automotive Division Product Reliability Center between Feb99 and Dec99. The test file numbers for this testing are 19990200ACL, 19990201ACL and 19990021ACL. This documentation is on file at and available from the Americas Global Automotive Division Product Reliability Center.

1.3. Conclusion

The Mini UMNL II headers listed in paragraph 1.5., conformed to the electrical, mechanical, and environmental performance requirements of AMP Product Specification 108-1694 Revision A.

1.4. Product Description

The Mini-UMNL II headers provide a compact means of grouping multiple-lead connections in appliances, computers and other commercial equipment and is totally compatible to existing Mini-UMNL product.

1.5. Test Specimens

Test specimens were representative of normal production lots. Specimens identified with the following part numbers were used for test:

Test Group	Quantity	Part Number	Description
1	5	794065-1	8 position tin plated header assembly
	5	794192-1	8 position plug assembly
	40	794221-1	Tin plated socket with 18 AWG wire
2	5	794108-1	24 position header
	5	794214-1	24 position plug
	120	794221-1	Tin plated socket with 18 AWG wire
3	5	794192-1	8 position plug assembly
	5	794193-1	8 position cap assembly
	80	794221-1	Tin plated socket with 18 AWG wire
4	30	794065-1	8 position header assembly
	30	794192-1	8 position plug assembly

Figure 1 (cont)

* Trademark
I Indicates change

LOC B

Test Group	Quantity	Part Number	Description
5	30	794065-1	8 position header assembly
6	5	794065-2	8 position gold plated header assembly
	5	794192-1	8 position plug assembly
	40	794221-3	Gold plated pin with 18 AWG wire

Figure 1 (end)

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

NOTE

(a) See paragraph 1.5.
(b) Numbers indicate sequence in which tests are performed.
(c) Discontinuities shall not be measured. Energize at 18 °C level for 100% loadings per AMP Specification 109-151.
(d) Precondition specimens with 10 cycles durability, tin plated specimens only.
(e) Precondition specimens with 10 cycles durability, gold plated specimens only.

Figure 2

2. SUMMARY OF TESTING

2.1. Examination of Product - All Test Groups

All specimens submitted for testing were representative of normal production lots. A Certificate of Conformance was issued by the Product Assurance Department. Where specified, specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.

2.2. Termination Resistance - Test Groups 1, 2 and 6

All termination resistance measurements, taken at 100 milliamperes maximum and 20 millivolts maximum open circuit voltage were less than 10 milliohms initially and 20 milliohms after testing.

2.3. Insulation Resistance - Test Group 3

All insulation resistance measurements were greater than 1000 megohms.

2.4. Dielectric Withstanding Voltage - Test Group 3

No dielectric breakdown or flashover occurred.

2.5. Temperature Rise vs Current - Test Group 2

All specimens had a temperature rise of less than 30°C above ambient when tested using a baseline rated current of 9.11 amperes and the correct derating factor value based on the specimens wiring configuration.

2.6. Solderability - Test Group 5

All contacts had a minimum of 95% solder coverage.

2.7. Vibration - Test Groups 1 and 2

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

2.8. Mechanical Shock - Test Group 1

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

2.9. Durability - Test Group 1

No physical damage occurred as a result of mating and unmating the specimens 25 times.

2.10. Mating Force - Test Group 1

All mating force measurements were less than 6.7 N [1.5 lb] per circuit.

2.11. Unmating Force - Test Group 1

All unmating force measurements were greater than 1.1 N [.25 lb] per circuit.

2.12. Housing Lock Strength - Test Group 4

All housing lock strength readings were greater than 26.7 N [6 lb].

2.13. Thermal Shock - Test Group 3

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

2.14. Humidity-temperature Cycling - Test Groups 2 and 3

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

2.15. Temperature Life - Test Groups 2 and 6

No evidence of physical damage was visible as a result of exposure to temperature life.

2.16. Mixed Flowing Gas - Test Group 6

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

3. TEST METHODS

3.1. Examination of Product

Where specified, specimens were visually examined for evidence of physical damage detrimental to product performance.

3.2. Termination Resistance

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 20 millivolt maximum open circuit voltage.

3.3. Insulation Resistance

Insulation resistance was measured between adjacent contacts of mated specimens. A test voltage of 500 volts DC was applied for 2 minutes before the resistance was measured.

3.4. Dielectric Withstanding Voltage

A test potential of 1500 volts AC was applied between the adjacent contacts of mated specimens. This potential was applied for 1 minute and then returned to zero.

3.5. Temperature Rise vs 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 individual 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

Specimen contact solder tails were subjected to a solderability test. The soldertails were immersed in a nonactivated/mildly activated/or 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 specimens 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, Sinusoidal

Mated specimens were subjected to sinusoidal vibration, having a simple harmonic motion with an amplitude of 1.5 mm [.06 in], double amplitude. The vibration frequency was varied uniformly between the limits of 10 and 55 Hz and returned to 10 Hz in 1 minute. This cycle was performed 120 times in each of 3 mutually perpendicular planes for a total vibration time of 6 hours. Specimens for test group 1 were monitored for discontinuities of 1 microsecond or greater using a current of 100 milliamperes DC.

3.8. Mechanical Shock, Half-sine

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

3.9. Durability

Specimens were mated and unmated 25 times at a maximum rate of 500 cycles per hour.

3.10. Mating Force

The force required to mate individual specimens was measured using a tensile/compression device with a free floating fixture and a maximum rate of travel of 12.7 mm [.5 in] per minute.

3.11. Unmating Force

The force required to unmate individual specimens was measured using a tensile/compression device with a free floating fixture and a maximum rate of travel of 12.7 mm [.5 in] per minute.

3.12. Housing Lock Strength

Housing lock strength was measured using a tensile/compression device with a free floating fixture and a maximum rate of travel of 25.4 mm [1 in] per minute.

3.13. Thermal Shock

Mated specimens were subjected to 25 cycles of thermal shock with each cycle consisting of 30 minute dwells at -20 and 105°C. The transition between temperatures was less than 1 minute.

3.14. Humidity-temperature Cycling

Mated specimens 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 maintaining high humidity.

3.15. Temperature Life

Mated specimens were exposed to a temperature of 85°C (tin plated) and 105°C (gold plated) for 580 hours.

3.16. Mixed Flowing Gas

Mated specimens were exposed for 14 days to a mixed flowing gas Class IIA exposure. Class IIA 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, H_2S at 10 ppb and SO_2 at 100 ppb. Specimens were preconditioned with 10 cycles of durability.