AMPMODU* Micro Interconnect Plug and Receptacle Connectors

1. INTRODUCTION

1.1. Purpose

Testing was performed on AMPMODU* Micro Interconnect Plug and Receptacle Connectors to determine their conformance to the requirements of Product Specification 108-1955 Revision A.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of AMPMODU Micro Interconnect Plug and Receptacle Connectors. Testing was performed at the Engineering Assurance Product Test Laboratory between 07May02 and 17Jul02. The test file number for this testing is CTL G522-002. This documentation is on file at and available from the Engineering Assurance Product Test Laboratory.

1.3. Conclusion

The AMPMODU Micro Interconnect Plug and Receptacle Connectors listed in paragraph 1.5., conformed to the electrical, mechanical, and environmental performance requirements of Product Specification 108-1955 Revision A.

1.4. 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
1,2,3,4,6	5 each	1-1375870-8	40 position vertical SMT receptacle assembly
1,2,3,4	5 each	1-1375875-8	40 position plug housing
1	5	1445339-1	4 position vertical SMT receptacle assembly
1	5	1445340-1	4 position plug housing
5	5	1375875-8	20 position plug housing

Figure 1

1.5. Environmental Conditions

Unless otherwise stated, the following environmental conditions prevailed during testing:

- Temperature: 15 to 35°C
- Relative Humidity: 25 to 75%

* Trademark
I Indicates change

1.6. Qualification Test Sequence

Test or Examination	Test Group (a)					
	1	2	3	4	5	6
	Test Sequence (b)					
Initial examination of product	1	1	1	1	1	1
Low level contact resistance	3,7	2,4	2,4			
Insulation resistance				2,6		
Withstanding voltage				3,7		
Solderability						2
Vibration	5					
Mechanical shock	6					
Durability	4					
Mating force	2					
Unmating force	8					
Plug contact retention					2	
Thermal shock				4		
Humidity-temperature cycling				5		
Temperature life		3(c)				
Mixed flowing gas			3(c)			
Final examination of product	9	5	5	8	3	3

NOTE
(a) See paragraph 1.4.
(b) Numbers indicate sequence in which tests are performed.
(c) Precondition specimens with 10 durability cycles.

Figure 2

2. SUMMARY OF TESTING

2.1. Initial Examination of Product - All Test Groups

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

2.2. Low Level Contact Resistance - Test Groups 1, 2 and 3

All low level contact resistance measurements, taken at 100 milliamperes maximum and 20 millivolts maximum open circuit voltage were less than 25 milliohms initially and after testing.

2.3. Insulation Resistance - Test Group 4

All insulation resistance measurements were greater than 500 megohms.

2.4. Withstanding Voltage - Test Group 4

No dielectric breakdown or flashover occurred.

2.5. Solderability - Test Group 6

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

2.6. Vibration - Test Group 1

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

2.7. 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.

2.8. Durability - Test Group 1

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

2.9. Mating Force - Test Group 1

All mating force measurements were less than the specified limits, see Figure 3.

Connector Size	Mating Force N [lbf] maximum	Unmating Force N [lbf] minimum	Connector Size	Mating Force N [lbf] maximum	Unmating Force N [lbf] minimum
4	24.9 [5.6]	1.3 [0.3]	24	60.9 [13.7]	8.0 [1.8]
6	15.1 [3.4]	2.2 [0.5]	26	65.8 [14.8]	8.9 [2.0]
8	20.5 [4.6]	2.7 [0.6]	28	71.2 [16.0]	9.3 [2.1]
10	25.4 [5.7]	3.6 [0.8]	30	76.1 [17.1]	10.2 [2.3]
12	30.3 [6.8]	4.0 [0.9]	32	81.0 [18.2]	10.7 [2.4]
14	35.6 [8.0]	4.9 [1.1]	34	86.3 [19.4]	11.6 [2.6]
16	40.5 [9.1]	5.3 [1.2]	36	91.2 [20.5]	12.0 [2.7]
18	45.8 [10.3]	6.2 [1.4]	38	96.5 [21.7]	12.9 [2.9]
20	50.7 [11.4]	6.7 [1.5]	40	101.4 [22.8]	13.3 [3.0]
22	55.6 [12.5]	7.6 [1.7]			

Figure 3
Mating/Unmating Forces

2.10. Unmating Force - Test Group 1

All unmating force measurements were greater than the specified limits, see Figure 3.

2.11. Plug Contact Retention - Test Group 5

All plug contact retention force measurements were greater than 9.3 N [2.1 lbf].

2.12. Thermal Shock - Test Group 4

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

2.13. Humidity-temperature Cycling - Test Group 4

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

2.14. Temperature Life - Test Group 2

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

2.15. Mixed Flowing Gas - Test Group 3

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

2.16. Final Examination of Product - All Test Groups

Specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.

3. TEST METHODS

3.1. Initial Examination of Product

A Certificate of Conformance was issued stating that all specimens in this test package were produced, inspected, and accepted as conforming to product drawing requirements, and were manufactured using the same core manufacturing processes and technologies as production parts.

3.2. Low Level Contact Resistance

Low level contact resistance measurements 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. Withstanding Voltage

A test potential of 250 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. Solderability

Specimens were preconditioned with 8 hours of steam aging. Following this, a solder paste with a composition of 63 SN/37 Pb RMA, Visc/KPS 1000 ± 10%, with a mesh of -325 +500 was placed onto a stencil with pad geometry, opening and thickness that was appropriate for the specimens being tested. Solder paste was printed onto 4.5 X 4.5 X .0395 inch ceramic substrate. The screen was removed and the specimens were placed onto the solder paste. The specimens were then processed through an infrared oven which exposed them for 60 seconds to temperatures between 150 and 170°C and to 60 seconds between 215 and 230°C. After reflow, the specimens were removed from the substrates and allowed to cool. Specimens were cleaned with alcohol in an ultrasonic cleaner for 5 minutes. Specimens were then examined using 10X magnification.

3.6. Vibration, Random

Mated specimens were subjected to a random vibration test, specified by a random vibration spectrum, with excitation frequency bounds of 20 and 500 Hz. The spectrum was flat at 0.02 G^2/Hz from 20 to 500 Hz. The root-mean square amplitude of the excitation was 3.10 GRMS. This was performed for 15 minutes in each of 3 mutually perpendicular planes for a total vibration time of 45 minutes. Specimens were monitored for discontinuities of 1 microsecond or greater using a current of 100 milliamperes DC.

3.7. Mechanical Shock, Half-sine

Mated specimens 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. Specimens were monitored for discontinuities of 1 microsecond or greater using a current of 100 milliamperes DC.

3.8. Durability

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

3.9. Mating Force

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

3.10. Unmating Force

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

3.11. Plug Contact Retention

The force required to push plug contacts to failure was measured using a tensile/compression device with a free floating fixture and a rate of travel of 12.7 mm [.5 in] per minute.

3.12. Thermal Shock

Mated specimens 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.

3.13. 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 and 65°C twice while maintaining high humidity.

3.14. Temperature Life

Mated specimens were exposed to a temperature of 85°C for 500 hours. Specimens were preconditioned with 10 cycles of durability.

3.15. Mixed Flowing Gas, Class IIA

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.

3.16. Final Examination of Product

Specimens were visually examined for evidence of physical damage detrimental to product performance.