Interconnection System, AMPMODU* Mod II Receptacle Assemblies

1. INTRODUCTION

1.1. Purpose

Testing was performed on AMPMODU* Mod II receptacle assemblies to determine their conformance to | the requirements of Product Specification 108-25026 Revision D.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of the AMPMODU Mod II receptacle assemblies. Testing was performed at the Americas Regional Laboratory between May88 | and Aug00, additional testing was performed between Jul09 and Oct09. The test file numbers for this | testing are CTL 5182-006, CTL B015590-001 and EA20090053T. This documentation is on file at and available from the Americas Regional Laboratory.

1.3. Conclusion

The AMPMODU Mod II receptacle assemblies listed in paragraph 1.5., conformed to the electrical, mechanical, and environmental performance requirements of Product Specification 108-25026 Revision | D.

1.4. Product Description

The AMPMODU Mod II receptacle assemblies are available in standard and high pressure receptacles housed in board mounted, flame retardant housings. The mating male header assemblies utilize .025 inch square or .025 inch diameter posts in flame retardant insulating headers. The header assemblies may be shrouded or unshrouded. The receptacles and posts mate on .100 or .150 inch centerlines and mount to solderable printed circuit boards.

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
1,3,4,5,6	3 each	1-85930-2	36 position receptacle, 30 µin gold, standard contact style, standard pressure
1,3	3 each	102549-1	72 position receptacle, 15 µin gold, standard contact style, standard pressure
1,3,6	3 each	2-103248-4	36 position receptacle, 15 µin gold, standard contact style, standard pressure
5,6	3 each	1-103177-2	40 position receptacle, 30 µin gold, standard contact style, standard pressure
4	3	1-85927-1	36 position receptacle, 30 µin gold, standard contact style, standard pressure
4,5	3 each	1-86063-4	36 position receptacle, 30 µin gold, standard contact style, standard pressure
4	3	1-86018-1	36 position receptacle, 30 µin gold, standard contact style, standard pressure
1,2	3 each	147424-5	10 position receptacle, 15 µin gold, short point contact style, standard pressure
1,2,3,5	3 each	146762-2	10 position receptacle, 100 µin tin, short point contact style, standard pressure
1	3	535529-1	30 position receptacle, 30 µin gold, short point contact style, high pressure
1,3,6	3 each	5146140-9	20 position double row horizontal receptacle, 10 µin gold short point contact style
	3 each	6-146260-0	20 position header

Figure 1

* Trademark
| Indicates change

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)					
Initial examination of product	1	1	1	1	1	1
Dry circuit resistance	3,7	2,4	2,4			
Insulation resistance				2,6		
Dielectric withstanding voltage				3,7		
Temperature rise vs current						2
Solderability					2	
Vibration	5					
Mechanical shock	6					
Durability	4					
Mating force	2					
Unmating force	8					
Thermal shock				4		
Humidity/temperature cycling			3(c)(e)	5		
Temperature life		3(e)				
Mixed flowing gas			3(d)(e)			
Final examination of product	9	5	5	8	3	3

NOTE

(a) See paragraph 1.5.
(b) Numbers indicate sequence in which tests are performed.
(c) Tin plated specimens.
(d) Gold plated specimens.
(e) 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 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 3

All termination resistance measurements, taken at 100 milliamperes maximum and 20 millivolts maximum open circuit voltage were less than 12 milliohms after testing.

Test Group	Number of Data Points	Condition	Termination Resistance		
			Min	Max	Mean
1	255	Initial	2.02	8.49	5.453
		After mechanical	2.25	11.29	6.096
	50	Initial (short contacts)	3.04	5.07	4.33
		After mechanical	4.16	5.27	4.67
	50	Initial (long contacts)	7.25	9.47	8.06
		After mechanical	6.97	9.19	8.08
2	60	Initial	4.05	5.85	4.999
		After temperature life	4.66	6.31	5.165
3 (Au)	360	Initial	2.15	8.26	6.096
		After mixed flowing gas	2.88	8.34	5.845
	50	Initial (short contacts)	4.11	4.95	4.52
		After mixed flowing gas	4.17	5.09	4.60
	50	Initial (long contacts)	6.81	8.74	7.92
		After mixed flowing gas	7.64	8.88	8.17
3 (Sn)	30	Initial	3.64	5.21	4.758
		After humidity-temperature cycling	3.72	6.07	5.045

NOTE *All values in milliohms.*

Figure 3

2.3. Insulation Resistance - Test Group 4

All insulation resistance measurements were greater than 5000 megohms initially and greater than 1000 megohms after humidity-temperature cycling.

2.4. Dielectric Withstanding Voltage - Test Group 4

No dielectric breakdown or flashover occurred.

2.5. Temperature Rise vs Current - Test Group 6

All specimens had a temperature rise of less than 30°C above ambient when testing a single circuit energized at 3 amperes and all circuits energized at 2 amperes.

2.6. Solderability - Test Group 5

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

2.7. 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.

2.8. 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 for the specified cycles.

- 225 cycles for 30 µin gold plating standard contact style, standard pressure specimens.
- 200 cycles for 30 µin gold plating short point contact style, standard pressure specimens.
- 100 cycles for 15 µin gold plating standard contact style, standard pressure specimens.
- 75 cycles for 15 µin gold plating short point contact style, standard pressure specimens.
- 75 cycles for 100 µin tin plating short point contact style, standard pressure specimens.
- 50 cycles for 30 µin gold plating short point contact style, high pressure specimens.
- 25 cycles for 10 µin gold plating short point contact style.

2.10. Mating Force - Test Group 1

All mating force measurements were less than 6 ounces average per contact for standard pressure contacts and 20 ounces average per contact for high pressure contacts.

2.11. Unmating Force - Test Group 1

All unmating force measurements were greater than .75 ounce average per contact.

2.12. Thermal Shock - Test Group 4

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

2.13. Humidity/temperature Cycling - Test Groups 3 and 4

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

2.14. Temperature Life - Test Group 2

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

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

Where specified, specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.

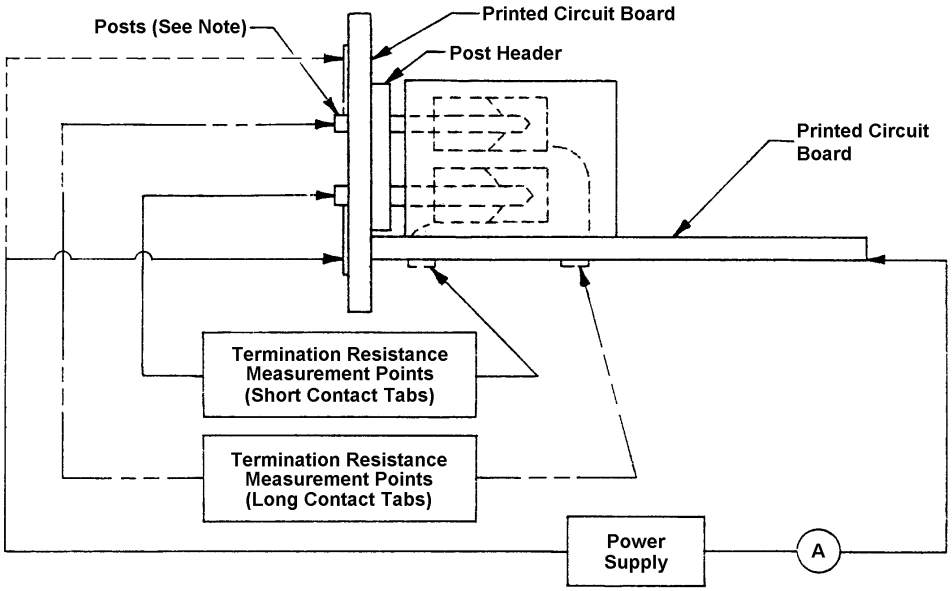
3. TEST METHODS

3.1. Initial Examination of Product

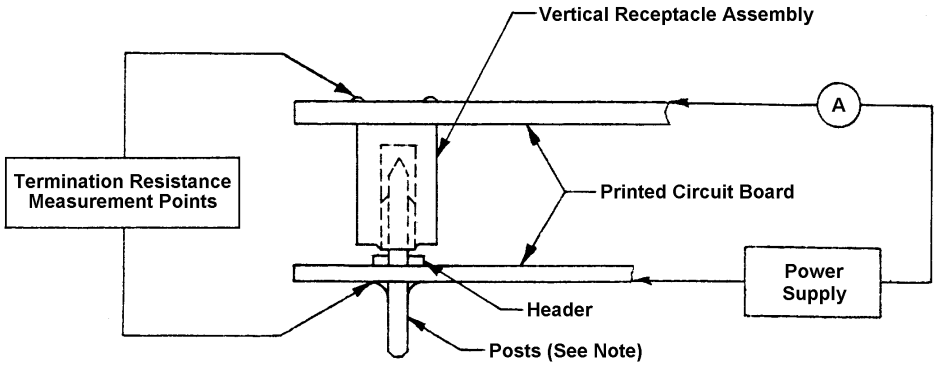
Where specified, specimens were visually examined for evidence of physical damage detrimental to product performance.

3.2. Termination Resistance

Termination resistance measurements at low level current were made using a 4 terminal measuring technique (Figure 4). The test current was maintained at 100 milliamperes maximum with a 20 millivolt maximum open circuit voltage.



Post Header Assembly & Horizontal Receptacle Assembly



Post Header Assembly & Vertical Receptacle Assembly

Figure 4
Typical Dry Circuit Resistance Measurement Points

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

- For .100 inch centerline contacts
  - 750 volts AC at sea level
  - 300 volts AC at 50000 feet
  - 275 volts AC at 70000 feet
- For .150 inch centerline contacts
  - 1000 volts AC at sea level
  - 400 volts AC at 50000 feet
  - 275 volts AC at 70000 feet

3.5. Temperature Rise vs Current

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 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 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°C.

3.7. Vibration, Sinusoidal

Mated specimens were subjected to sinusoidal vibration. The frequency was varied logarithmically between the approximate limits of 10 and 2000 Hz and returned to 10 Hz in approximately 20 minutes. This cycle was performed 12 times in each of 3 mutually perpendicular planes for a total vibration time of 12 hours. Specimens were monitored for discontinuities of 1 microsecond or greater using a current of 100 milliamperes DC.

3.8. Mechanical Shock, Sawtooth

Mated specimens were subjected to a mechanical shock test, having a sawtooth waveform of 100 gravity units (g peak) and a duration of 6 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 manually mated and unmated at a maximum rate of 600 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 rate of travel of 0.5 inch per minute. The average force per contact was calculated.

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 rate of travel of 0.5 inch per minute. The average force per contact was calculated.

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 125°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. During 5 of the first 9 cycles, the specimens were exposed to a cold shock of -10°C for 3 hours. Specimens in test group 3 were preconditioned with 10 cycles of durability (Figure 5).

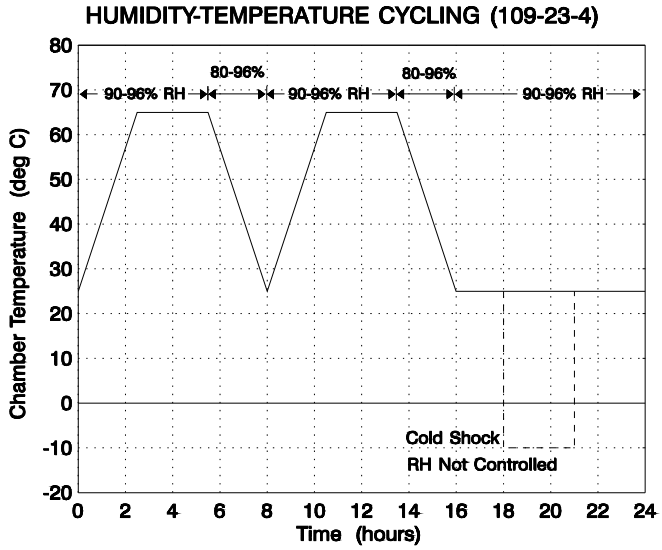


Figure 5
Typical Humidity/Temperature Cycling Profile

3.14. Temperature Life

Mated specimens were exposed to a temperature of 125°C for 500 hours. Specimens were preconditioned with 10 cycles of durability.

3.15. Mixed Flowing Gas, Class II

Mated specimens 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. Specimens were preconditioned with 10 cycles of durability.

3.16. Final Examination of Product

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