AMPMODU* Mod IV Interconnection System

1. INTRODUCTION

1.1. Purpose

Testing was performed on the Tyco Electronics AMPMODU* Mod IV Interconnection System to determine its conformance to the requirements of Product Specification 108-25022 Revision B.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of the AMPMODU Mod IV Interconnection System. Testing was performed at the Engineering Assurance Product Testing Laboratory between 01Apr87 and 12Apr88. Additional testing was performed between 11Feb08 and 10Jun08 and between 14Oct08 and 04Aug09. The test file numbers for this testing are CTL5220-004, EA20070041T and EA20080913T respectively. This documentation is on file at and available from the Engineering Assurance Product Testing Laboratory.

1.3. Conclusion

The AMPMODU Mod IV Interconnection System listed in paragraph 1.5., conformed to the electrical, mechanical, and environmental performance requirements of Product Specification 108-25022 Revision B.

1.4. Test Specimens

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

Part Number	Description
86396-4	Mod IV receptacle assembly, double row, top entry, vertical, .150 centerline, board mounted
1-87334-6	Mod IV receptacle assembly, single row, top entry, .100 centerline, vertical, board mounted
3-87879-5	Mod IV receptacle assembly, single row, dual tine, dual entry, .100 centerline, vertical, board mounted
87997-3	Mod IV connector assembly, double row, .100 centerline
1-102922-3	Mod IV receptacle assembly, double row, top entry, .100 centerline, vertical, board mounted
3-103176-7	Mod IV receptacle assembly, single row, top entry, .100 centerline, vertical, board mounted
2-103249-5	Mod IV receptacle assembly, double row, top entry, .100 centerline, vertical, board mounted
2-103265-5	Mod IV receptacle assembly, double row, bottom entry, .100 centerline, vertical, board mounted
1-103240-7	Mod IV 34 position double row header, board mounted
1-535598-7	Mod IV 34 position vertical receptacle, board mounted

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
| 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 (LLCR)	5,10	2,5	2,5			2,5,7,9
Insulation resistance				2,6		
Withstanding voltage				3,7		
Temperature rise vs current						3,10
Solderability, dip test					2	
Sinusoidal vibration	8					8(c)
Mechanical shock	9					
Durability	6	3	3			
Mating force	4					
Unmating force	11					
Contact engaging force	2					
Contact separating force	3,7					
Thermal shock				4		
Humidity/temperature cycling		4		5		
Temperature life						6
Mixed flowing gas			4			4
Final examination of product	12	6	6	8	3	11

NOTE
(a) See paragraph 1.4.
(b) Numbers indicate sequence in which tests are performed.
(c) Contacts energized for 100% loadings at 1.25 amperes.

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 (C of C) was issued by Product Assurance. Specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.

2.2. LLCR - Test Groups 1, 2, 3 and 6

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

2.3. Insulation Resistance - Test Group 4

All insulation resistance measurements were greater than 5000 megohms initially.

2.4. 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 tested using a baseline rated current of 3.7 amperes and the correct derating factor value based on the specimens wiring configuration.

2.6. Solderability, Dip Test - Test Group 5

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

2.7. Sinusoidal Vibration - Test Groups 1 and 6

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 Groups 1, 2 and 3

No physical damage occurred as a result of mating and unmating 30 µin gold plated specimens for 200 cycles; 15 µin gold plated specimens for 100 cycles; 10 µin gold plated specimens for 25 cycles; and 100 µin tin plated specimens for 75 cycles at a maximum rate of 600 cycles per hour.

2.10. Mating Force - Test Group 1

All mating force measurements were less than 9 ounces per contact.

2.11. Unmating Force - Test Group 1

All unmating force measurements were greater than 1.5 ounces per contact.

2.12. Contact Engaging Force - Test Group 1

All contact engaging force measurements were less than 8 ounces.

2.13. Contact Separating Force - Test Group 1

All contact separating force measurements were greater than 1 ounce for 15 and 30 µin gold plated specimens and 100 µin tin plated specimens, and greater than .75 ounce for 10 µin gold plated specimens.

2.14. Thermal Shock - Test Group 4

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

2.15. Humidity/temperature Cycling - Test Groups 2 and 4

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

2.16. Temperature Life - Test Group 6

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

2.17. Mixed Flowing Gas - Test Groups 3 and 6

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

2.18. Final Examination of Product - All Test Groups

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

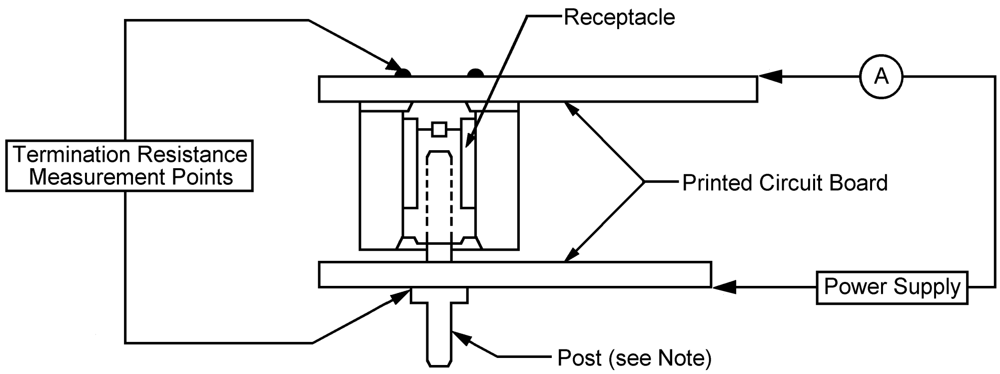
3. TEST METHODS

3.1. Initial Examination of Product

A C o f C 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. LLCR

LLCR measurements were made using a 4 terminal measuring technique (Figure 3). The test current was maintained at 100 milliamperes maximum with a 20 millivolt maximum open circuit voltage.



NOTE *Post plating shall be identical to receptacle plating.*

Figure 3
LLCR 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. Withstanding Voltage

A test potential specified in Figure 4 was applied between the adjacent contacts of mated specimens. This potential was applied for 1 minute and then returned to zero.

Centerline Dimension (inch)		Altitude (feet)
.100	.150	
750	1000	Sea level
300	400	50,000
275	275	70,000

Figure 4
Test Voltage (rms)

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 Dip Test

Specimen contact solder tails were subjected to a solderability test. The soldertails were immersed in a 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. Sinusoidal Vibration

Mated specimens were subjected to sinusoidal vibration, having a simple harmonic motion with an amplitude of .06 inch peak-to-peak. The vibration frequency was varied uniformly between the limits of 10 and 2000 Hz and returned to 10 Hz in 1 minute. This cycle was performed for 4 hours in each of 3 mutually perpendicular planes. Specimens were monitored for discontinuities of 1 microsecond or greater using a current of 100 milliamperes DC.

3.8. Mechanical Shock

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 mated and unmated 200 times for 30 µin gold plated specimens; 100 times for 15 µin gold plated specimens; 25 times for 10 µin gold plated specimens; and 75 times for 100 µin tin plated specimens 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 .5 inch 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 rate of travel of .5 inch per minute.

3.12. Contact Engaging Force

Specimens were mounted in a fixture designed to allow an 8 ounce axial load to be attached to a .0260 inch diameter pin. Contacts were sized once by inserting the pin, and on the second insertion, if the pin engaged to a depth of .211 inch for top entry specimens, the contact was acceptable.

3.13. Contact Separating Force

Specimens were mounted in a fixture designed to allow a .75 or 1 ounce axial load to be attached to a .0240 inch diameter pin. Contacts were sized twice by inserting a .0260 inch diameter pin. For the third insertion, the .0240 inch diameter pin was inserted and suspended from the contact by inverting the specimen. If the pin remained engaged to the .211 depth, the contact was acceptable.

3.14. Thermal Shock

Mated specimens were subjected to 5 cycles of thermal shock with each cycle consisting of 30 minute dwells at -65 and 125°C Transition time between temperatures was 1 minute.

3.15. Humidity/temperature Cycling

Mated specimens were exposed to 10 humidity/temperature cycles. 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.

3.16. Temperature Life

Mated specimens were exposed to a temperature of 125°C for 500 hours.

3.17. 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.

3.18. Final Examination of Product

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