QUALIFICATION TEST REPORT

INTERCONNECTION SYSTEM,
AMPMODU* MOD IV, WIRE TO BOARD
STANDARD PRESSURE GOLD CONTACTS

501-313 Rev. O

Product Specification:	108-25020 Rev. O
CTL No.:	CTL5207-188-047
Date:	August 8, 1995
Classification:	Unrestricted
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* Trademark

Corporate Test Laboratory Harrisburg, Pennsylvania

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(R5207ts)

AMP

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CORPORATE TEST LABORATORY

Qualification Test Report

1. Introduction

1.1 Purpose

Testing was performed on AMP* Interconnection System, AMPMODU Mod IV, Wire to Board Standard Pressure Gold Contacts to determine its conformance to the requirements of AMP Product Specification 108-25020 Rev. O.

1.2 Scope

This report covers the electrical, mechanical, and environmental performance of the AMPMODU Mod IV System manufactured by the Printed Circuit Board Products Group of the Capital Goods Business Unit. The testing was performed between July 28, 1994 and July 21, 1995 (Group 2) and between August 24, 1989 and January 16, 1990 (Groups 1&3).

1.3 Conclusion

The AMPMODU Mod IV System meets the electrical, mechanical, and environmental performance requirements of AMP Product Specification 108-25020 Rev. O.

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1.4 Product Description

This miniature system consists of standard pressure receptacle contacts crimped onto either solid or stranded wire and then inserted into a Mod IV housing. The system is designed to mate with AMPMODU Mod II .025 inch square posts or headers.

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
1,3	90	1-85969-9	Receptacle 15Au BeCu
1,2,3	282	1-87523-5	Receptacle 15Au CuSn/PhBz
2	192	1-87523-8	Receptacle 30Au CuSn/PhBz
1,2,3	282	85969-6	Receptacle 15Au BeCu
2	192	85969-8	Receptacle 30Au BeCu
1,3	90	87523-4	Receptacle 15Au CuSn/PhBz
1,3	90	85969-8	Receptacle 30Au BeCu
1	10	1-87456-0	Housing, 20 Position
3	5	4-87456-0	Housing, 50 Position
2	12	5-87456-3	Housing, 64 Position
1	8	1-103186-0	Header, 15Au
1	2	1-103240-0	Header, 30Au
2	6	3-87215-2	Header, 30Au
2	6	3-87543-2	Header, 15Au

1.6 Qualification Test Sequence

	Test Groups		
Test or Examination	1	2	3
Examination of Product	1,9	1,9	1,8
Termination Resistance, Dry Circuit	3,7	2,7	
Dielectric Withstanding Voltage			3,7
Insulation Resistance			2,6
Temperature Rise vs Current		3,8	
Vibration	5	6	
Physical Shock	6		
Mating Force	2		
Unmating Force	8		
Durability	4		
Thermal Shock			4
Humidity-Temperature Cycling			5
Mixed Flowing Gas		4	
Temperature Life		5	

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 Capital Goods Business Unit.

2.2 Termination Resistance, Dry Circuit - Groups 1,2

All termination resistance measurements, taken at 100 milliamperes DC and 50 millivolts open circuit voltage, were less than 12 milliohms for beryllium copper base metal contacts.

Test Group	Nbr of Data points	Condition	Min	Max	Mean
1	120	Initial	4.74	8.06	6.162
		After Mechanical	4.51	7.51	6.133
2	60	Initial	3.35	6.35	5.094
		After Current Verif.	3.99	9.63	6.389

All values in milliohms

All termination resistance measurements, taken at 100 milliamperes DC and 50 millivolts open circuit voltage, were less than 20 milliohms for copper-tin-phosphor bronze base metal contacts.

Test Group	Nbr of Data points	Condition	Min	Max	Mean
1	80	Initial	5.53	10.23	8.057
		After Mechanical	5.09	11.57	7.667
2	60	Initial	3.64	7.93	6.396
		After Current Verif.	4.89	10.36	7.603

All values in milliohms

2.3 Dielectric Withstanding Voltage - Group 3

No dielectric breakdown or flashover occurred when a test voltage was applied between adjacent contacts.

2.4 Insulation Resistance - Group 3

All insulation resistance measurements were greater than 5,000 megohms.

2.5 Temperature Rise vs Current - Group 2

All samples had a temperature rise of less than 30°C above ambient when 4.4 amperes was applied.

2.6 Vibration - Groups 1,2

No discontinuities of the contacts were detected during vibration (Group 1 only). Following vibration, no cracks, breaks, or loose parts on the connector assemblies were visible.

2.7 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.

2.8 Mating Force - Group 1

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

2.9 Unmating Force - Group 1

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

2.10 Durability - Group 1

No physical damage occurred to the samples as a result of mating and unmating the connector 200 times for contacts with 30μ gold and 75 cycles for contacts with 15μ gold.

2.11 Thermal Shock - Group 3

No evidence of physical damage to either the contacts or the connector was visible as a result of thermal shock.

2.12 Humidity-Temperature Cycling - Group 3

No evidence of physical damage to either the contacts or the connector was visible as a result of exposure to humidity-temperature cycling.

2.13 Mixed Flowing Gas - Group 2

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.

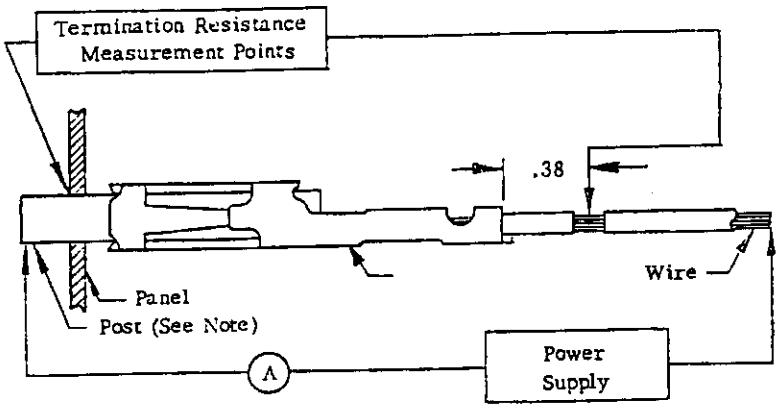

Figure 1
Typical Termination Resistance Measurement Points

3.3 Dielectric Withstanding Voltage

A test potential of 750 volts AC at Sea level, 300 volts AC at 50,000 feet, and 275 volts AC at 70,000 feet were 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 Temperature Rise vs Current

Connector temperature was measured, while energized at various current levels. Thermocouples were attached to the connectors to measure their temperatures. This temperature was then subtracted from the ambient temperature to find the temperature rise. When three readings at five minute intervals were the same, the readings were recorded.

3.6 Vibration, Sine

Mated connectors were subjected to sinusoidal vibration, having a simple harmonic motion with an amplitude of 0.06 inch, double amplitude or 20 G's (whichever is less). The vibration frequency was varied logarithmically between the limits of 10 and 2,000 Hz and returned to 10 Hz in 20 minutes. This cycle was performed 12 times in each of three mutually perpendicular planes, for a total vibration time of 12 hours. Connectors were monitored for discontinuities greater than one microsecond, using a current of 100 milliamperes in the monitoring circuit (Group 1). Samples were energized with 2.4 amperes AC (Group 2).

3.7 Physical Shock

Mated connectors were subjected to a physical 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 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.

3.8 Mating Force

The force required to mate individual connectors was measured using a tensile/compression device and a free floating fixture. The crosshead rate of travel was 1.0 inch/minute. The force per contact was calculated.

3.9 Unmating Force

The force required to unmate individual connectors was measured using a tensile/compression device and a free floating fixture. The crosshead rate of travel was 1.0 inch/minute. The force per contact was calculated.

3.10 Durability

Connectors were mated and unmated at a rate not exceeding 600 cycles 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 -65° and 105°C. The transition between temperatures was less than one minute.

3.12 Humidity-Temperature Cycling

Unmated connectors 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 the relative humidity was held at 95%. (Figure 2)

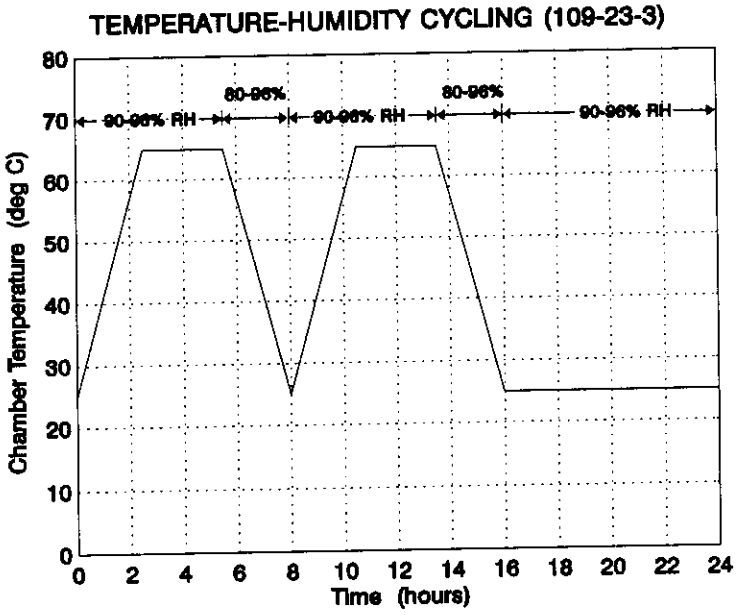

Figure 2
Typical Humidity/Temperature Cycling Curve

3.13 Mixed Flowing Gas, Class II

Mated connectors, with 15 microinch gold plating, 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 10 cycles of durability.

Mixed Flowing Gas, Class III

Mated connectors, with 30 microinch gold plating, were exposed for 20 days to a mixed flowing gas Class III exposure. Class III exposure is defined as a temperature of 30°C and a relative humidity of 75% with the pollutants of Cl_2 at 20 ppb, NO_2 at 200 ppb, and H_2S at 100 ppb. Samples were preconditioned with 10 cycles of durability.

3.14 Temperature Life

Mated samples were exposed to a temperature of 105°C for 500 hours.

4. Validation

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8/18/95

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