NETCONNECT*, CHAMP* System 5 Modular Jack Patch Panel

1. INTRODUCTION

1.1. Purpose

Testing was performed on AMP* NETCONNECT* CHAMP* System 5 Patch Panels to determine their conformance to the requirements of AMP Product Specification 108-1576-2 Rev. A.

1.2. Scope

This report covers the electrical transmission performance testing of the System 5 Patch Panels manufactured by the Global Communications Business Unit. Test groups 1, 2, 3 and 4 were performed by the GAD Americas North Product Reliability Center, Winston-Salem, NC. Test group 5 was performed at the Americas Regional Laboratory, Harrisburg, PA. The testing was performed between 06Sep96 and 27Feb98. The test file number for this testing is CTL 1962-000-009. This documentation is on file at and available from the Americas Regional Laboratory.

1.3. Conclusion

The System 5 Patch Panels, listed in paragraph 1.5., met the electrical, electrical transmission, mechanical, and environmental performance requirements of AMP Product Specification 108-1576-2 Rev A..

1.4. Product Description

CHAMP System 5 Patch Panels offer a 25-pair CHAMP System 5 interface on the rear of the panel for a pluggable connection to horizontal distribution cabling. There is a choice of interconnectivity on the front of the panel. Cable management rings are incorporated on all patch panels. All panels meet or exceed Category 5 specifications.

1.5. Test Samples

The test samples were randomly selected from normal current production lots, and the following part numbers were used for testing:

NOTE *For each patch panel, there are 4 individual and identical printed circuit board subassemblies. Five (5) of the subassemblies were actually tested, per 108-1576-2 Rev. A.*

Test Group	Quantity	Part Nbr	Rev	Description
1,5	3	558694-1	O	568A 24 Port Patch Panel
2,3,4	3	556186-1	B	24 Port Patch Panel
1,5	4	1-558693-1	O	50 Position CHAMP Connector
2,3,4	12	229975-1	O	50 Position CHAMP Connector
1	6	1-558048-6	O	8 Position Modular Jack
2,3,4	24	98849-1	O	8 Position Modular Jack
5	6	5-554720-3	O	8 Position Modular Jack
5	2	569537-1	D	568B Patch Panel
5	2	406213-1	A	568A Patch Panel (1 unit high)
5	2	406214-1	A	568B Patch Panel (1 unit high)

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 Groups				
	1	2	3	4	5
	Test Sequence (a)				
Examination of product	1,6	1,5	1,8	1,6	1,5
Termination resistance	2,5	2,4	2,7		
Insulation resistance				2,5	
Near end crosstalk					2
Attenuation					3
Return loss					4
Vibration	3				
Mechanical shock	4				
Durability			3,6(b)		
Thermal shock			4	3	
Humidity -temperature cycling			5	4	
Temperature life		3			

NOTE

(a) The numbers indicate sequence in which tests were performed.
(b) Perform 100 cycles before thermal shock, 33 cycles after 50 cycles of thermal shock, 33 cycles after 7 days of humidity-temperature cycling, and 34 cycles after 21 days of humidity- temperature cycling.

2. SUMMARY OF TESTING

2.1. Examination of Product - All Groups

All samples submitted for testing were randomly selected from current production lots. A Certificate of Conformance was issued by the Global Communications Business Unit. Where specified, samples were visually examined and no evidence of physical damage detrimental to product performance was observed.

2.2. Termination Resistance - Groups 1, 2 and 3

All termination resistance measurements, taken at 100 milliamperes maximum and 20 millivolts maximum open circuit voltage had a change in resistance (ΔR) of less than 20 milliohms after testing.

Test Group	Nbr of Data Points	Condition	Change in resistance Termination Resistance Min	Max	Mean
1	48	After Mechanical	-1.98	+0.88	-0.209
2	40	After Temp Life	-6.88	+3.52	-0.295
3	40	After Humidity	-1.92	+6.18	+1.531

All values in milliohms

2.3. Insulation Resistance - Group 4

All insulation resistance measurements were greater than 100 megohms.

2.4. Attenuation - Group 5

All attenuation results were less than or equal to the limits specified in Table 1.

2.5. Near End Crosstalk - Group 5

All near-end crosstalk results were greater than or equal to the limits specified in Table 1.

2.6. Return Loss - Group 5

All return loss results were greater than or equal to the limits specified in Table 1.

Frequency (MHz) See Note (a)	Near End Crosstalk (dB) See Note (b)	Attenuation (dB) See Note (b)	Return Loss (dB) See Note (a)
1.0	65.0	0.1	23
4.0	65.0	0.1	23
8.0	62.0	0.1	23
10.0	60.0	0.1	23
16.0	56.0	0.2	23
20.0	54.0	0.2	23
25.0	52.0	0.2	14
31.25	50.0	0.2	14
62.5	44.0	0.3	14
100.0	40.0	0.4	14

Table 1

NOTE

(a) Per EIA/TIA 568A-1995.
(b) Values derived from a curve defined by frequency boundaries per EIA/TIA 568A-1995.

2.7. Vibration - Group 1

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

2.8. Mechanical Shock - Group 1

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

2.9. Durability - Group 3

No physical damage occurred to the samples as a result of mating and unmating the samples 200 times.

2.10. Thermal Shock - Groups 3 and 4

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

2.11. Humidity-temperature Cycling - Groups 3 and 4

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

2.12. Temperature Life - Group 2

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

3. TEST METHODS

3.1. Examination of Product

Where specified, samples 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 by using a 4 terminal measuring technique (Figure 1). The test current was maintained at 100 milliamperes DC with an open circuit voltage of 20 millivolts DC.

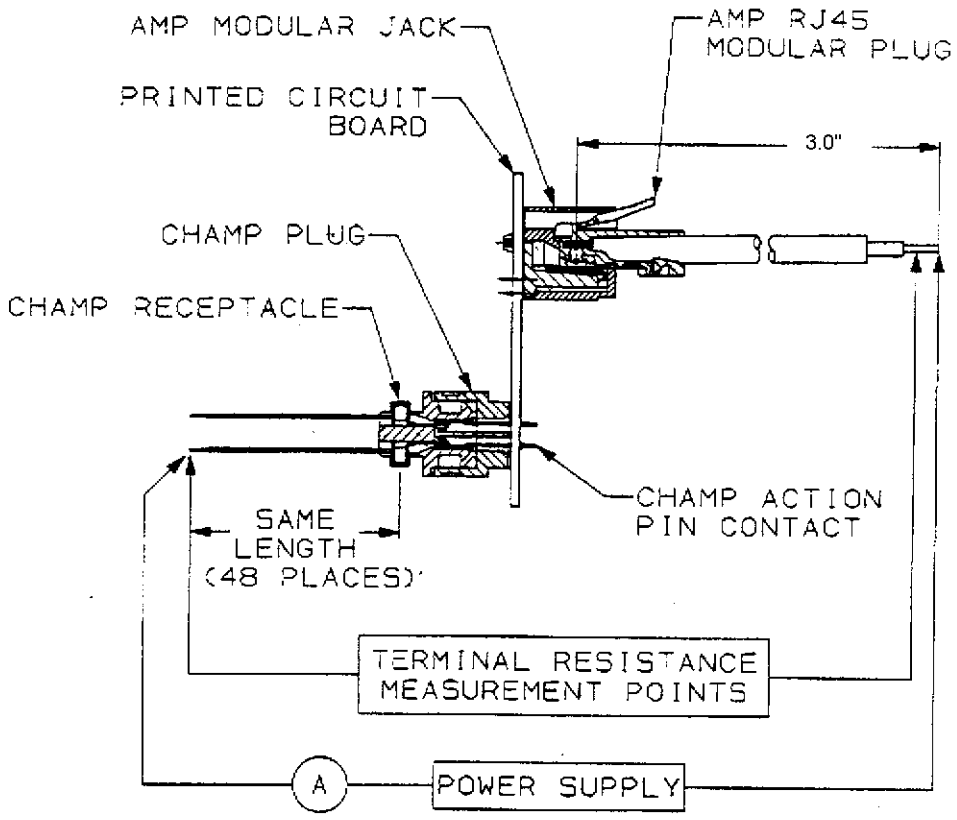

Figure 1
Typical Termination Resistance Measurement Points

3.3. Insulation Resistance

Insulation resistance was measured between adjacent contacts, using a test voltage of 500 volts DC. This voltage was applied for 2 minutes before the resistance was measured.

3.4. Attenuation

A network analyzer was used to measure the scattering parameters S_{11} and S_{21} of the sample. The attenuation was then calculated from these measurements. Attenuation is a loss measurement and is expressed in dB.

3.5. Near End Crosstalk

Sinusoidal frequencies of 1 to 100 MHz were applied to 1 end of the "driven line". The "quiet line" was monitored with a network analyzer to measure any crosstalk signals. The near end crosstalk is expressed in dB.

3.6. Return Loss

The signal passing through a system loses some of its amplitude due to a reflection which returns to the source. In a "good" system, the reflected wave has a small amplitude, so the returning wave can be said to have a high return loss. Return loss is the ratio of incident to reflected power and is expressed in dB.

3.7. Vibration, Sine

Fully assembled Patch Panel was subjected to sinusoidal vibration, having a simple harmonic motion with an amplitude of 0.03 inch (0.06 inch maximum total excursion). The vibration frequency was varied uniformly between the limits of 10 and 55 Hz and returned to 10 Hz in 5 minutes. This motion was applied for a period of 1 hour and 45 minutes in each of 3 mutually perpendicular planes. Connectors were monitored for discontinuities greater than 1 microsecond, using a current of 100 milliamperes in the monitoring circuit.

3.8. Mechanical Shock

Fully assembled Patch Panel was subjected to a physical 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. The Patch Panel assembly was monitored for discontinuities greater than 1 microsecond, using a current of 100 milliamperes in the monitoring circuit.

3.9. Durability

Both the Modular Jack and the CHAMP plug assemblies were mated and unmated 200 times at a rate not exceeding 10 cycles per minute.

3.10. Thermal Shock

Fully assembled Patch Panel was subjected to 100 cycles of temperature extremes with each cycle consisting of 30 minutes at each temperature. The temperature extremes were -40 and 70°C. The transition between temperatures was less than 1 minute.

3.11. Humidity-temperature Cycling

Fully assembled Patch Panel was exposed to 21 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%. During 5 of the first 9 cycles, the connectors were exposed to a cold shock at -10°C for 3 hours.

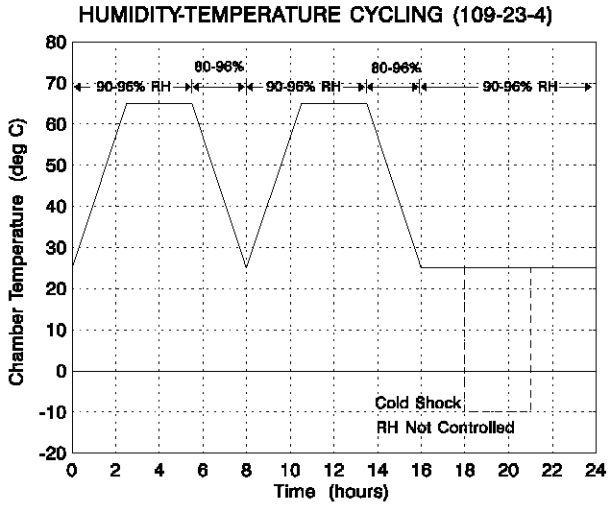

Figure 2
Typical Humidity-Temperature Cycling Profile

3.12. Temperature Life

Fully assembled Patch Panel was exposed to a temperature of 70 °C for 500 hours.

4. VALIDATION

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