



QUALIFICATION TEST REPORT

AMPLIMITE HD-22, Right Angle and
Straight Posted Boardmount Connectors

501-104

Rev. 0

Product Specification: AMP 108-1092
CTL No.: CTL5889-047-014
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Table of Contents

1.	Introduction	Page 1
1.1	Purpose	Page 1
1.2	Scope	Page 1
1.3	Conclusion	Page 1
1.4	Product Description	Page 2
1.5	Test Samples	Page 2
1.6	Qualification Test Sequence	Page 3
2.	Summary of Testing	Page 3
2.1	Examination of Product	Page 3
2.2	Termination Resistance, Dry Circuit	Page 3
2.3	Dielectric Withstanding Voltage	Page 4
2.4	Insulation Resistance	Page 4
2.5	Temperature Rise vs. Current	Page 4
2.6	Vibration	Page 5
2.7	Physical Shock	Page 5
2.8	Mating Force	Page 5
2.9	Unmating Force	Page 5
2.10	Durability	Page 5
2.11	Solderability	Page 5
2.12	Thermal Shock	Page 5
2.13	Humidity-Temperature Cycling	Page 6
2.14	Industrial Mixed Flowing Gas	Page 6
2.15	Temperature Life	Page 6
3.	Test Methods	Page 6
3.1	Examination of Product	Page 6
3.2	Termination Resistance, Dry Circuit	Page 6
3.3	Dielectric Withstanding Voltage	Page 8
3.4	Insulation Resistance	Page 8
3.5	Temperature Rise vs Current	Page 8
3.6	Vibration	Page 8
3.7	Physical Shock	Page 8
3.8	Mating Force	Page 8
3.9	Unmating Force	Page 9
3.10	Durability	Page 9
3.11	Solderability	Page 9
3.12	Thermal Shock	Page 9
3.13	Humidity-Temperature Cycling	Page 9
3.14	Industrial Mixed Flowing Gas	Page 10
3.15	Temperature Life	Page 10
4.	Validation	Page 11

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Qualification Test Report
AMPLIMITE HD-22, Right Angle and
Straight Posted Boardmount Connectors

1. Introduction

1.1 Purpose

Testing was performed on AMP's AMPLIMITE HD-22 Boardmount Connectors to determine if they meet the requirements of AMP Product Specification 108-1092, Rev. 0.

1.2 Scope

This report covers the electrical, mechanical, and environmental performance of the AMPLIMITE HD-22 Boardmount Connectors, manufactured by the Interconnection Components and Assemblies Products Group of the Capital Goods Business Sector (CGBS-Group I). The testing was performed between April 5, 1989 and November 10, 1989.

1.3 Conclusion

The AMPLIMITE HD-22 Boardmount Connectors meet the electrical, mechanical, and environmental performance requirements of AMP Product Specification 108-1092, Rev. 0.

1.4 Product Description

AMPLIMITE HD-22, Straight Posted (S/P) and Right Angle (R/A) Front Metal Shell Connectors are designed for printed circuit board applications. They are available in 15, 26, 44, 62, and 78 position Plugs and Receptacles. Board mounting is accomplished through solderable eyelets or boardlocks in the mounting legs, and 4-40 threaded inserts or 4-40 female screwlocks in the mounting flanges.

1.5 Test Samples

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

Test Group	Qty	Part Number	Description
1,3,5,6,7	25	1-748390-2	15 Pos R/A Recp, Au Flash Cts
2,3,4,8	30	748364-1	15 Pos Plug w/Indents
1,2,4	15	1-748390-9	15 Pos R/A Recp, 30 Au Cts
1,5	10	748364-2	15 Pos Plug w/o Indents
3	5	748390-6	15 Pos R/A Recp, 30 Au Cts
8	5	748390-5	15 Pos R/A Recp, 30 Au Cts
8	5	748481-5	26 Pos R/A Recp, 30 Au Cts
8	5	748365-1	26 Pos Plug w/Indents
8	5	748482-5	44 Pos R/A Recp, 30 Au Cts
8	5	748366-1	44 Pos Plug w/Indents
8	5	748394-5	62 Pos R/A Recp, 30 Au Cts
2,4,5,8	30	748367-1	62 Pos Plug w/Indents
2	5	747786-4	62 Pos S/P Recp, 30 Au Cts
2,4,5	20	747786-5	62 Pos S/P Recp, Au Flash Cts
8	5	748483-5	78 Pos R/A Recp, 30 Au Cts
8	5	748368-1	78 Pos plug w/Indents
1,2,3,4,5	1465	748333-5	Pin Cts, Au Flash AWG 26 Wire
1,2,3,4,8	1735	748333-2	Pin Cts, 30 Au AWG 26 Wire
1,3,4,5	15	207908-1	Cable Clamp Package

1.6 Qualification Test Sequence

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

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 production lots. They were inspected and accepted by the Product Assurance Department of CGBS-Group I.

2.2 Termination Resistance, Dry Circuit - Groups 1, 2, 3, 4, 5

All termination resistance measurements, taken at 100 milliamperes dc. and 50 millivolts open circuit voltage, were less than the specification requirements of 15 milliohms maximum initial and 20 milliohms maximum final.

Test Group	No. of Samples	Conn/Plating	Condition	Min.	Max.	Mean
1	75	R/A Au Flash	Initial	7.13	11.88	9.13
1	75	R/A Au Flash	Final	7.05	11.61	9.12
1	70	R/A 30 Au	Initial	6.83	10.59	8.53
1	70	R/A 30 Au	Final	6.80	10.47	8.49
1	310	S/P Au Flash	Initial	3.71	4.46	4.12
1	310	S/P Au Flash	Final	3.76	4.68	4.11
2	70	R/A 30 Au	Initial	6.74	10.22	8.52
2	70	R/A 30 Au	Final	7.02	11.84	8.82
2	310	S/P 30 Au	Initial	3.79	9.01	4.48
2	310	S/P 30 Au	Final	3.93	11.15	6.29
2	310	S/P Au Flash	Initial	3.63	5.88	4.11
2	310	S/P Au Flash	Final	4.02	11.30	5.59
3	75	R/A Au Flash	Initial	6.92	11.51	9.03
3	75	R/A Au Flash	Final	7.00	11.94	9.18
3	75	R/A 30 Au	Initial	7.22	10.74	8.80
3	75	R/A 30 Au	Final	7.08	11.46	8.83
4	70	R/A 30 Au	Initial	6.78	10.47	8.53
4	310	S/P Au Flash	Initial	3.78	5.20	4.29
5	310	S/P Au Flash	Initial	3.78	6.25	4.37
5	310	S/P Au Flash	Final	3.83	9.60	5.07
5	75	R/A Au Flash	Initial	6.91	11.50	8.83
5	75	R/A Au Flash	Final	6.92	11.59	8.94

All values in milliohms

2.3 Dielectric Withstanding Voltage - Group 6

There was no dielectric breakdown, flashover, or leakage current in excess of 1 milliampere between adjacent contacts, and between contacts and the metal shell, when a test voltage of 1000 vac was applied for one minute.

2.4 Insulation Resistance - Group 6

All insulation resistance measurements were greater than the specification requirement of 5000 megohms for initial measurements, and 1000 megohms for measurements taken after test.

2.5 Temperature Rise vs. Current - Group 4

All samples had a temperature rise of less than 30°C above ambient, when the specified current shown below was applied:

Type Connector	Type Contact	Specified Current	No. of Contacts	Temperature Rise above Ambient (Max)
R/A	30 Au	2.0	70	16.2°C
S/P	Au Flash	1.5	310	11.0°C

2.6 Vibration - Group 1

There were no discontinuities of the contacts greater than one microsecond during vibration. Following vibration, there were no cracks, breaks or loose parts on the connector assemblies.

2.7 Physical Shock - Group 1

There were no discontinuities of the contacts greater than one microsecond during physical shock. Following physical shock testing, there were no cracks, breaks or loose parts on the connector assemblies.

2.8 Mating Force - Groups 1, 8

All mating force measurements were less than the maximum specification requirement.

2.9 Unmating Force - Groups 1, 8

All unmating force measurements were less than the maximum specification requirement.

Group No.	Sample Type	Mating Force	Unmating Force	Spec. Limits
1	15 Pos w/o Indents	4.8	3.4	5.6
8	15 Pos w/Indents	21.0	16.3	33.0
8	26 Pos w/Indents	17.0	12.0	38.0
8	44 Pos w/Indents	24.3	20.0	46.0
8	62 Pos W/Indents	19.5	17.5	52.0
8	78 Pos W/Indents	37.5	23.8	58.0

All values are in pounds, and the specification limits apply for both mating and unmating forces.

2.10 Durability - Groups 1, 2, 3, 8

There was no physical damage to the samples, as a result of mating and unmating the connector 100 times for gold flash and 500 times for 30 microinch gold.

2.11 Solderability - Group 7

The contact leads met the requirement of 95% minimum solder coverage.

2.12 Thermal Shock - Group 6

There was no evidence of physical damage to either the contacts or the connector, as a result of thermal shock.

2.13 Humidity-Temperature Cycling - Groups 3, 6

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

2.14 Industrial Mixed Flowing Gas - Group 5

There was no evidence of physical damage to either the contacts or the connector, as a result of exposure to the pollutants of industrial mixed flowing gas.

2.15 Temperature Life - Group 2

There was no evidence of physical damage to either the contacts or the connector, as a result of exposure to a temperature of 105°C for 500 hours.

3. Test Methods

3.1 Examination of Product

The 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.

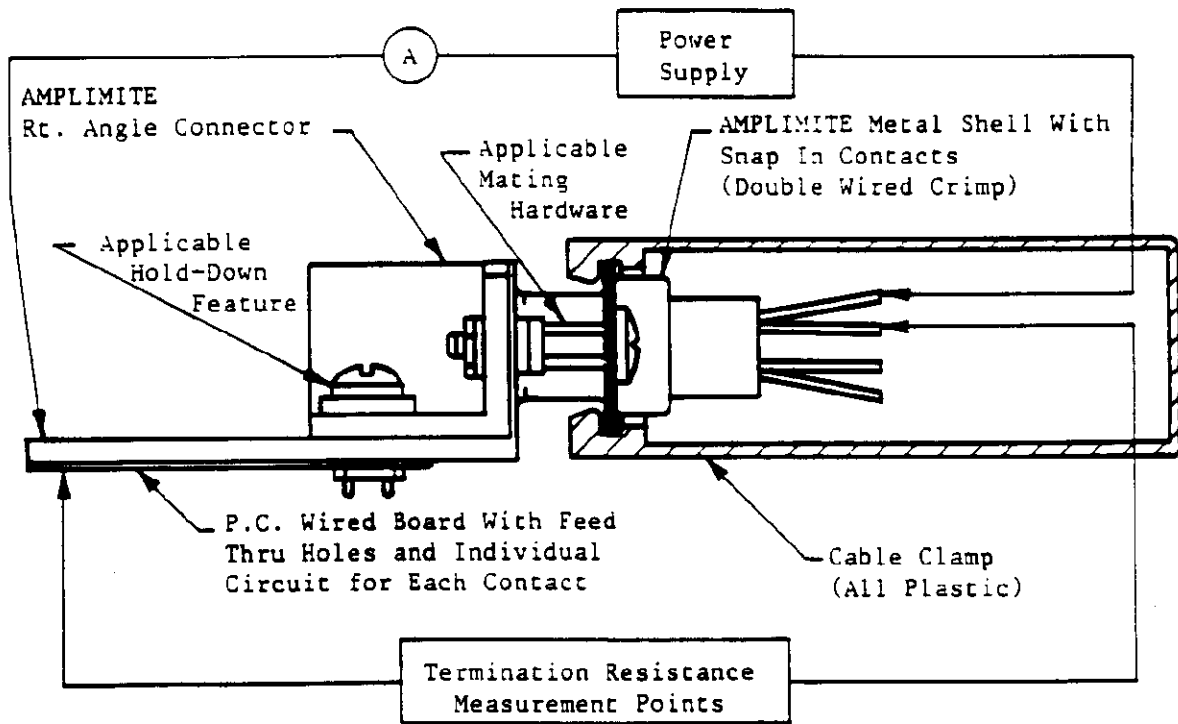
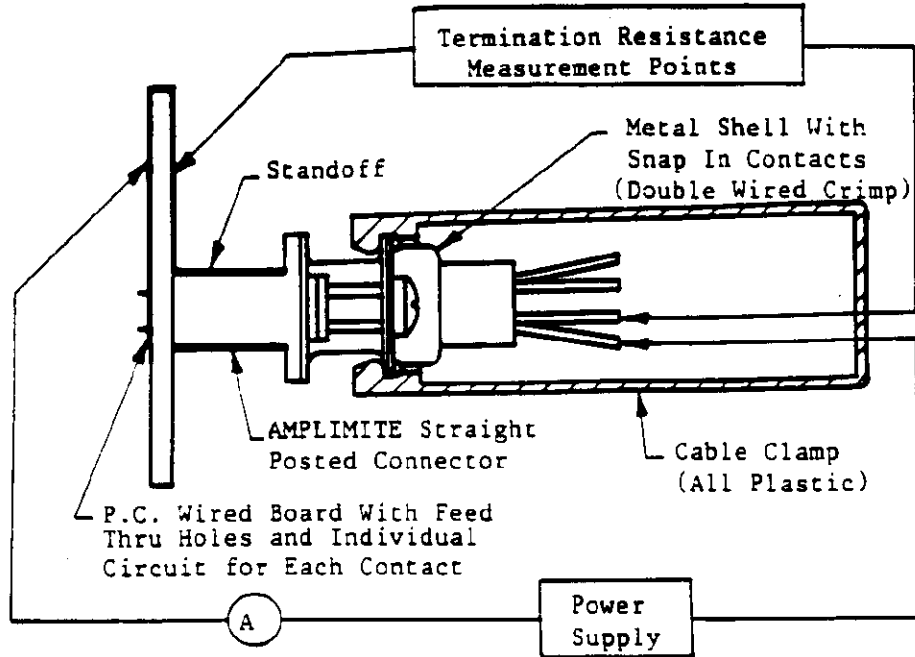


Figure 1
Typical Termination Resistance Measurement Points

3.3 Dielectric Withstanding Voltage

A test potential of 1000 vac was applied between the adjacent contacts. This potential was applied for one (1) 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 one (1) minute, before the resistance was measured.

3.5 Temperature Rise vs. Specified Current

The connector temperature was measured, while energized at the specified current. Thermocouples were attached to the rear of the connectors to measure the 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, Random

Mated connectors were subjected to a random vibration test. The parameters of this test condition are specified by a random vibration spectrum, with excitation frequency bounds of 50 and 2000 hertz. The power spectral density at 50 hz is $0.1 G^2/Hz$. The spectrum slopes up at 6 dB per octave to a PSD of $0.4 G^2/Hz$ at 100 Hz. The spectrum is flat at $0.4 G^2/Hz$ from 100 to 1000 Hz. The spectrum slopes down at 6 dB per octave to the upper bound frequency of 2000 Hz, at which the PSD is $0.1 G^2/Hz$. The root-mean square amplitude of the excitation was 23.91 GRMS.

3.7 Physical Shock

Mated connectors were subjected to a physical shock test, having a half-sine waveform of 50 gravity units (g peak) and a duration of 11 milliseconds. Three (3) 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 fully loaded connectors was measured, using a free floating fixture, with the rate of travel at 1.0 inch/minute.

3.9 Unmating Force

The force required to unmate fully loaded connectors was measured, using a free floating fixture, with the rate of travel at 1.0 inch/minute.

3.10 Durability

Connectors were mated and unmated 100 times for gold flash and 500 times for 30 microinch gold, at a rate not exceeding 200 cycles per hour. The connectors, subjected to Industrial Mixed Flowing Gas, were preconditioned by mating and unmating 10 times before exposure.

3.11 Solderability

The connector assembly contact solder tails were subjected to a solderability test. The solder tails were immersed in a mildly active 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 immersed in the molten solder, at a rate of approximately one inch per second, held for 3 to 5 seconds, then withdrawn. After cleaning in isopropyl alcohol, the samples 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.

3.12 Thermal Shock

Mated connectors were subjected to five cycles of temperature extremes, with each cycle consisting of 30 minutes at each temperature. The temperature extremes were -55°C and 105°C. The transition between temperatures was less than one minute.

3.13 Humidity-Temperature Cycling

Mated connectors were exposed to 10 cycles of humidity-temperature cycling. Each cycle lasted 24 hours and consisted of cycling the temperature between 25°C and 65°C twice, while the relative humidity was held at 95%. During five of the first nine cycles, the connectors were exposed to a cold shock at -10°C for 3 hours.

3.14 Industrial Mixed Flowing Gas, Class III

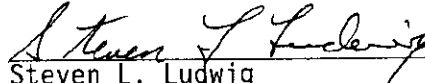
Mated connectors were exposed for 20 days to a Class III exposure in the industrial mixed flowing gas chamber. Class III exposure is defined as an environment with a temperature of 30°C and a relative humidity of 75%. The pollutants and their concentrations were Cl₂ at 20 ppb, NO₂ at 200 ppb, and H₂S at 100 ppb.

3.15 Temperature Life

Mated samples were subjected to 500 hours at an elevated temperature of 105°C.

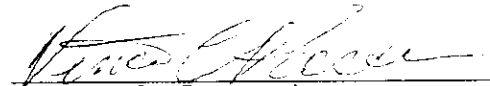
4. Validation

Prepared by:

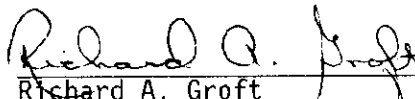


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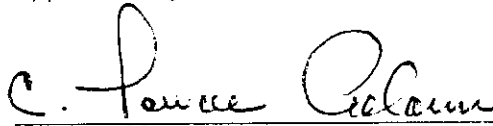


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