QUALIFICATION TEST REPORT

CONNECTOR, COAXIAL,
50 & 75 OHM COMMERCIAL BNC
DUAL CRIMP TYPE

501-304 Rev. O

Product Specification:	108-1490 Rev. O
CTL No.:	CTL3331-003
Date:	May 9, 1995
Classification:	Unrestricted
Prepared By:	Terrance M. Shingara

Corporate Test Laboratory Harrisburg, Pennsylvania

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AMP

AMP INCORPORATED

HARRISBURG, PENNSYLVANIA 17105 PHONE: 717-231-3222 FAX: 717-231-3283

CORPORATE TEST LABORATORY

Qualification Test Report

1. Introduction

1.1 Purpose

Testing was performed on AMP* 50 & 75 Ohm BNC Commercial Dual Crimp Type Decoupled Coaxial Bulkhead Jack Connector to determine its conformance to the requirements of AMP Product Specification 108-1490 Rev. O.

1.2 Scope

This report covers the electrical, mechanical, and environmental performance of the 50 & 75 Ohm BNC Commercial Dual Crimp Type Decoupled Coaxial Bulkhead Jack Connector manufactured by the Signal Transmission Products Division of the Utility, Networking & Communications Products Group. The testing was performed between January 23, 1995 and May 9,1995.

1.3 Conclusion

The 50 & 75 Ohm BNC Commercial Dual Crimp Type Decoupled Coaxial Bulkhead Jack Connector meets the electrical, mechanical, and environmental performance requirements of AMP Product Specification 108-1490 Rev. O.

* Trademark

1.4 Product Description

The capacitively decoupled BNC connector allows a cost effective and efficient means to reduce noise and eliminate ground loops on coaxial interconnections. The center contact is gold plated. The dielectric material is TEFLON**.

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
1,2,3,4,5,6	3 ea.	414758-1	50 ohm BNC Jack
1,2,3,4,5,6	3 ea.	*221128-1	50 ohm BNC Plug
1,2,3,4,5,6	3 ea.	414614-1	75 ohm BNC Jack
1,2,3,4,5,6	3 ea.	*413589-8	75 ohm BNC Plug

* for testing purposes only

1.6 Qualification Test Sequence

	Test Groups					
Test or Examination	1	2	3	4	5	6
Examination of Product	1,7	1,5	1,5	1,9	1,5	1,4
Termination Resistance, Dry Circuit	2,6	2,4	2,4			
Dielectric Withstanding Voltage				4,8		
Insulation Resistance				3,7		
Capacitance				2		
Voltage Standing Wave Ratio					3	
Shielding Effectiveness					4	
RF High Potential						3
RF Insertion Loss					2	
Corona						2
Vibration	4					
Physical Shock	5					
Durability	3					
Thermal Shock				5		
Humidity-Temperature Cycling				6		
Mixed Flowing Gas			3			
Temperature Life		3				

The numbers indicate sequence in which tests were performed.

** Trademark of E.I. DuPont de Nemours

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 Signal Transmission Products Division.

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

All termination resistance measurements, taken at 100 milliamperes DC and 50 millivolts open circuit voltage, had a maximum increase in resistance (ΔR) less than 1.5 milliohms for the center contact and 3.0 milliohms for the braid.

Test Group	Nbr of Data points	Condition	Min	Max	Mean
		Center Contact			
1	6	After Mechanical	-0.16	+0.40	+0.151
2	6	After Temp Life	-0.14	+1.37	+0.293
3	6	After Mixed Gas	-0.66	+1.11	+0.064
		Braid			
1	5	After Mechanical	+0.01	+0.23	+0.129
2	6	After Temp Life	-1.47	+2.27	+0.647
3	6	After Mixed Gas	-2.39	+1.04	-0.306

All values in milliohms

2.3 Dielectric Withstanding Voltage - Group 4

No dielectric breakdown or flashover occurred when a test voltage was applied between the center contact and braid.

2.4 Insulation Resistance - Group 4

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

2.5 Capacitance - Group 4

All capacitance measurements were within $\pm 10\%$ of the value specified in the applicable product drawing. (10,000 pF for P/N 414758-1 & 414614-1)

2.6 Voltage Standing Wave Ratio - Group 5

All voltage standing wave ratio measurements were less than the specification requirement of 1.30.

2.7 Shielding Effectiveness (75 ohm) - Group 5

When tested through the frequency range of 100 to 2000 MHz, radiation was reduced a minimum of 40dB up to 1500 MHz and a minimum of 20dB up to 2000 MHz.

2.8 RF Hi Pot - Group 6

There was no breakdown or flashover between center contact and braid when a test voltage of 1,000 volts AC at 5 MHz was applied for one minute.

2.9 Insertion Loss - Group 5

All insertion loss results were less than .15 dB

2.10 Corona/Altitude - Group 6

There was no corona discharge greater than 5 picocoulombs at or below a potential of 375 volts AC at an altitude of 70,000 feet.

2.11 Vibration - Group 1

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

2.12 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.

2.13 Durability - Group 1

No physical damage occurred to the samples as a result of mating and unmating the connector 500 times.

2.14 Thermal Shock - Group 4

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

2.15 Humidity-Temperature Cycling - Group 4

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

2.16 Mixed Flowing Gas - Group 3

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.

2.17 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.

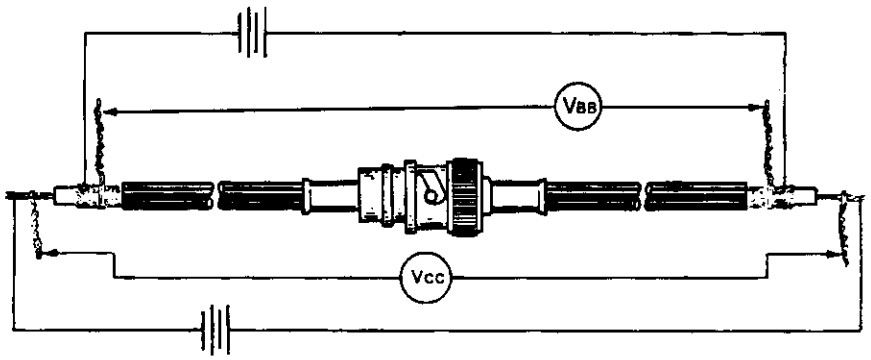

Figure 1
Typical Termination Resistance Measurement Points
(V_{BB} = Voltage drop Braid, V_{CC} = Voltage Drop Center Contact)

3.3 Dielectric Withstanding Voltage

A test potential of 1,500 volts AC was applied between the center contact and braid. This potential was applied for one minute and then returned to zero.

3.4 Insulation Resistance

Insulation resistance was measured between the center contact and the braid, using a test voltage of 500 volts DC. This voltage was applied for two minutes before the resistance was measured.

3.5 Capacitance

Capacitance was measured between the center contact and the braid of unmated connectors, using a test frequency of 60 Hz.

3.6 Voltage Standing Wave Ratio

VSWR was measured on mated samples using an HP8510B network analyzer. The sweep range was 0.5 to 2.0 GHz.

3.7 Shielding Effectiveness

The radiated response from unshielded cable while conductors were excited between 100 and 2000 MHz, was measured. The procedure was repeated, using jacks and plugs terminated to shielded cable. The difference in response is the shielding effectiveness in dB.

3.8 RF High Potential

An RF test potential of 1,000 volts (rms) at 5.0 Megahertz was applied between center contact and the braid of the mated connectors. This potential was applied for 1 minute and then returned to zero.

3.9 RF Insertion Loss

A full Two-Port Calibration was performed on a network analyzer and the insertion loss, S_{21}, of the sample was measured.

3.10 Corona/Altitude

A test voltage of 375 volts AC at a 5 picocoulombs maximum discharge was applied between the center contact and the braid of the mated connectors. This test voltage was applied with a simulated altitude of 70,000 feet.

3.11 Vibration, Sine

Mated connectors were subjected to sinusoidal vibration, having a simple harmonic motion with an amplitude of 0.06 inch, double amplitude or 15 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 9 times in each of three mutually perpendicular planes, for a total vibration time of 9 hours. Connectors were monitored for discontinuities greater than one microsecond, using a current of 100 milliamperes in the monitoring circuit.

3.12 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.

3.13 Durability

Connectors were mated and unmated 500 times at a rate not exceeding 600 per hour.

3.14 Thermal Shock

Mated connectors were subjected to 5 cycles of temperature extremes with each cycle consisting of 30 minutes at each temperature. The temperature extremes were -55°C and 85°C. The transition between temperatures was less than one minute.

3.15 Humidity-Temperature Cycling

Mated connectors were exposed to 10 cycles of humidity-temperature cycling (figure 2). 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.

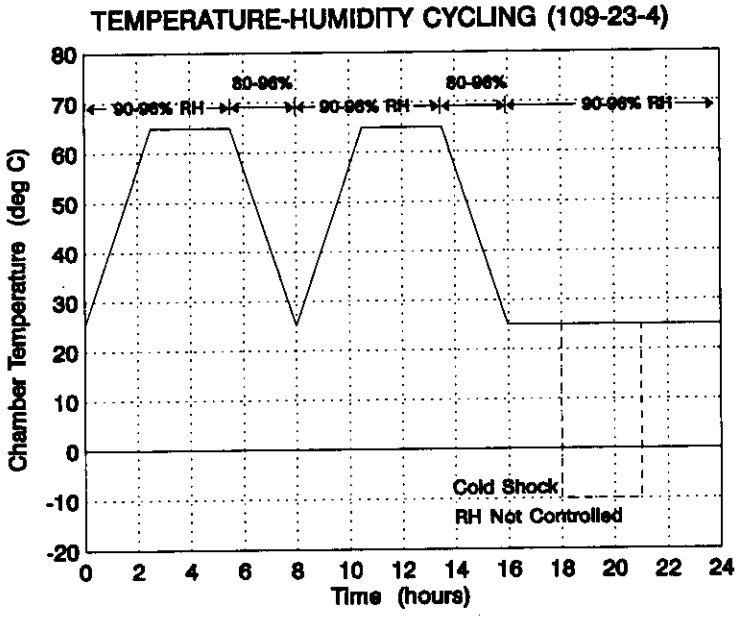

Figure 2
Typical Temperature Cycling with Humidity Cycle

3.16 Mixed Flowing Gas, Class II

Mated connectors 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.

3.17 Temperature Life

Mated samples were exposed to a temperature of 85°C for 96 hours.

4. Validation

Prepared by:

Terrance M. Shingara 5/11/95

Terrance M. Shingara
Test Engineer
Product Qualification Team
Corporate Test Laboratory

Reviewed by:

Robert S. Druckenmiller 5/16/95

Robert S. Druckenmiller
Supervisor
Product Testing
Corporate Test Laboratory

Approved by:

Rene C. Hope 5/30/95

Rene C. Hope
Manager
Product Assurance
Signal Transmission Products Division