

PRODUCT SPECIFICATION

1. SCOPE

1.1. Content

This specification covers the performance, tests and quality requirements for the AMP\* Pro-G receptacle connectors and lead assemblies. Connectors of this type are intended to provide a reliable electrical and mechanical connection between transmission cable having signal conductors on .050 inch centerlines, with either single or dual ground conductors and .025 inch square post on .100 x .100 inch centerlines. These posts may be molded into a post header or staked into a printed circuit board.

1.2. Definitions

For the purpose of this specification, the following definitions shall apply:

A. Transmission Cable

A flat, ribbon-like cable made by joining, side-by-side, a number of individual signal and ground conductors arranged in a controlled impedance relationship.

B. Connector

Contains contacts which terminate the signal conductors and a bus bar which terminates all ground conductors. These contacts have spring members which provide electrical connection to the mating .025 square posts.

C. Connector Lead Assembly

A length of transmission cable with a connector assembled to each end.

D. Post Header

A connector containing .025 inch square posts, one end of which mates with the connector contacts.

E. Drain Circuit

Signal circuit programmed to be terminated both in the bus bar and corresponding signal contact.

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		DR <i>Burt L Beckley 10/13/91</i>		<b>AMP</b> AMP Incorporated Harrisburg, PA 17105-3608	
		CHK <i>David M. ... 11/30/91</i>			
		APP <i>J. ... 11/6/92</i>			
		NO	108-12088	REV 0	LOC B
0	Released per ECN CF-0602	<i>BAB</i>	<i>1/7/92</i>	TITLE CONNECTOR, RECEPTACLES, PRO-G, AND LEAD ASSEMBLIES	
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### 1.3. Qualification

When tests are performed on the subject product line, the procedures specified in AMP 109 series specifications shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

## 2. APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extent specified herein. In the event of conflict between the requirements of this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between the requirements of this specification and the referenced documents, this specification shall take precedence.

### 2.1. AMP Documents

- A. 109-1: General Requirements for Test Specifications
- B. 109 Series: Test Specifications as indicated in Figure 1. (Comply with MIL-STD-202, MIL-STD-1344 and EIA RS-364)
- C. Corporate Bulletin 401-76: Cross-reference between AMP Test Specifications and Military or Commercial Documents
- D. 501-160: Test Report

## 3. REQUIREMENTS

### 3.1. Design and Construction

Product shall be of the design, construction and physical dimensions specified on the applicable product drawing.

### 3.2. Materials

- A. Contact: Phosphor bronze, gold over nickel plating
- B. Housing: Polyester PBT 15% glass or 30% glass filled

### 3.3. Ratings

- A. Current: 1 ampere maximum per contact
- B. Operating temperature: -65° to 105°C

### 3.4. Performance and Test Description

The product is designed to meet the electrical, mechanical and environmental performance requirements specified in Figure 1. All tests are performed at ambient environmental conditions per AMP Specification 109-1 unless otherwise specified.

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### 3.5. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure
Examination of Product	Meets requirements of product drawing.	Visual, dimensional and functional per applicable quality inspection plan.
ELECTRICAL		
Termination Resistance, Dry Circuit	$\Delta R = 6$ milliohms maximum.	Subject mated contacts assembled in housing to 50 mv open circuit at 100 ma see Figure 6; AMP Spec 109-6-1.
Dielectric Withstanding Voltage	500 vac (rms) dielectric withstanding voltage, one minute hold. No breakdown or flashover.	Test between adjacent contacts of mated connector assemblies; AMP Spec 109-29-1.
Insulation Resistance	5000 megohms minimum.	Test between adjacent contacts of mated connector assembly; AMP Spec 109-28-3.
Crosstalk, Digital	Percent crosstalk shall not exceed following levels to adjacent line: <div style="text-align: center;">                     Forward      Backward                      75 ohm      7      6                      See Figure 3.                 </div>	Measure forward and backward crosstalk at 2 locations, see Figure 4. Peak crosstalk shall be taken using an input pulse having a 1 nano-second rise time for 10 to 90% level; AMP Spec 109-163.
MECHANICAL		
Vibration, Sinusoidal High Frequency	No discontinuities greater than 1 microsecond. See note (a).	Subject mated connectors to 10 G's, 10-500 Hz with 100 ma current applied; AMP Spec 109-21-2.
Physical Shock	No discontinuities greater than 1 microsecond. See note (a).	Subject mated connectors to 100 G's sawtooth in 6 milliseconds; 3 shocks in each direction applied along the 3 mutually perpendicular planes total 18 shocks; AMP Spec 109-26-3.

Figure 1 (cont)

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Test Description	Requirement	Procedure
Mating Force	.5 pounds maximum per contact.	Measure force necessary to mate connector assembly with locking latches, at a rate of 1 inch/minute; AMP Spec 109-42, cond A, calculate force per contact.
Unmating Force	.093 pounds minimum per contact.	Measure force necessary to unmate connector assembly with locking latches removed, at a rate of 1 inch/minute; AMP Spec 109-42, cond A, calculate force per contact.
Cable Retention	Connectors shall not break or become separated from cable. No loss of continuity.	Apply load of 35 pounds in a direction 90° to the face of the connector then 180° to the face, see Figure 5, at a rate of .5 inch/minute, hold for 1 minute.
Durability	See note (a).	Mate and unmate connector assemblies for 250 cycles at a maximum rate of 10 cycles/minute; AMP Spec 109-27.
Flexing	See note (a).	With no axial force applied bend cable 6 inches from rear of connector 90° then reverse 180° and return to original position, repeat flexing for 25 cycles; AMP Spec 109-6069.
ENVIRONMENTAL		
Thermal Shock	See note (a).	Subject mated connectors to 5 cycles between -55° and 105°C; AMP Spec 109-22.
Humidity-Temperature Cycling	See note (a).	Subject mated connectors to 10 humidity-temperature cycles between 25° and 65°C at 95% RH; AMP Spec 109-23-3, cond A.

Figure 1 (cont)

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Test Description	Requirement	Procedure
Industrial Mixed Flowing Gas	See note (a).	Subject mated connectors to environmental class III for 20 days; AMP Spec 109-85-3
Temperature Life	See note (a).	Subject mated connectors to temperature life at 85°c for 500 hours; AMP Spec 109-43.

(a) Shall meet visual requirements, show no physical damage, and shall meet requirements of additional tests as specified in the Test Sequence in Figure 2.

Figure 1 (end)

3.6. Product Qualification and Requalification Tests and Sequences

Test or Examination	Test Group (a)					
	1	2	3	4	5	6
	Test Sequence (b)					
Examination of Product	1,9	1	1	1,8	1	1
Termination Resistance, Dry Circuit	3,7	2,4	2,4			2,4
Dielectric Withstanding Voltage				3,7		
Insulation Resistance				2,6		
Crosstalk					2	
Vibration	5					
Physical Shock	6					
Mating Force	2					
Unmating Force	8					
Cable Retention					3	
Durability	4					
Flexing						3
Thermal Shock				4		
Humidity-Temperature Cycling				5		
Industrial Mixed Flowing Gas			3(c)			
Temperature Life		3(c)				

(a) See Para 4.1.A.

(b) Numbers indicate sequence in which tests are to be performed

(c) Precondition samples with 10 cycles durability

Figure 2

#### 4. QUALITY ASSURANCE REQUIREMENTS

##### 4.1. Qualification Testing

###### A. Sample Selection

Connector housings and contacts shall be prepared in accordance with applicable Instruction Sheets. They shall be chosen at random from current production. All test groups shall consist of 5 cabled connectors with connectors on both ends. Test group 5 shall consist of 5 cables of 10 foot length with all odd positions grounded.

###### B. Test Sequence

Qualification inspection shall be verified by testing samples as specified in Figure 2.

##### 4.2. Requalification Testing

If changes significantly affecting form, fit, or function are made to the product or to the manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of the original testing sequence as determined by development/product, quality, and reliability engineering.

##### 4.3. Acceptance

Acceptance is based on verification that the product meets the requirements of Figure 1. Failures attributed to equipment, test setup, or operator deficiencies shall not disqualify the product. When product failure occurs, corrective action shall be taken and samples resubmitted for qualification. Testing to confirm corrective action is required before resubmittal.

##### 4.4. Quality Conformance Inspection

The applicable AMP quality inspection plan will specify the sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with the applicable product drawing and this specification.

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X	D	Q				D	Q				X
X	X	X	X	X	X	X	X	X	X	X	X

Notes:

1. Mating face shown
2. D - Driven Conductors
3. Q - Adjacent Conductor
4. X - Drain Locations

$$PC_F \text{ (Percentage Forward Crosstalk)} = \frac{S_3}{S_2} \times 100$$

$$PC_N \text{ (Percentage Backward Crosstalk)} = \frac{S_3}{S_1} \times \frac{(50 + Z_0)^2}{Z_0 (200)} \times 100$$

Where:

- $Z_0$  - Characteristic Impedance of the cable
- $S_1$  - Driving pulse amplitude of TDR when operating into a matched load termination
- $S_2$  - Peak output pulse amplitude from the driven conductor of the lead assembly.
- $S_3$  - Peak output pulse amplitude from the adjacent conductor of the lead assembly

Note: When measuring lead assemblies with impedance other than that of the measuring system, the test fixtures shall have an electrical length of 2 nanoseconds or greater, with the same impedance as the lead assembly being measured. Crosstalk measurement shall be taken on the maximum signal occurring within 1.5 nanoseconds of the start of the crosstalk signal.

Figure 3  
Calculations for Percentage Crosstalk

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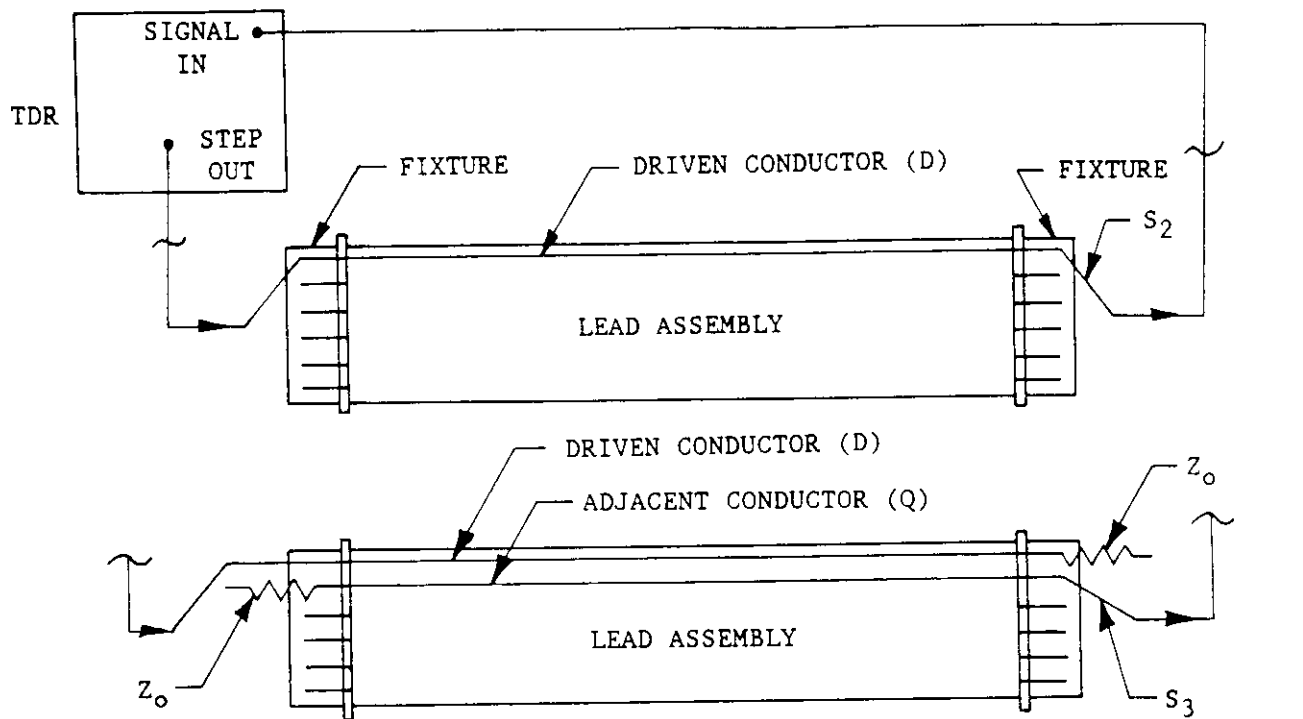
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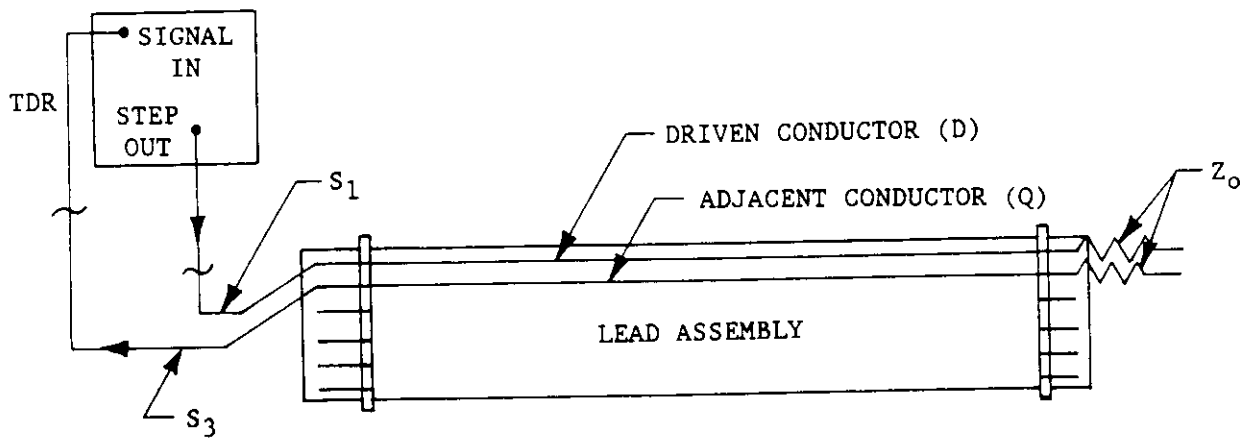
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Forward



Backward

Figure 4  
Crosstalk Procedures

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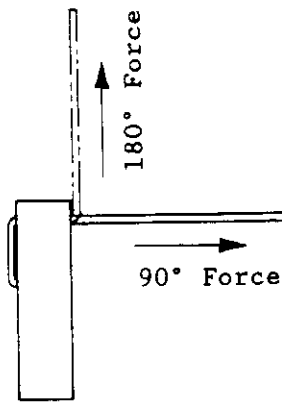


Figure 5  
Cable Retention

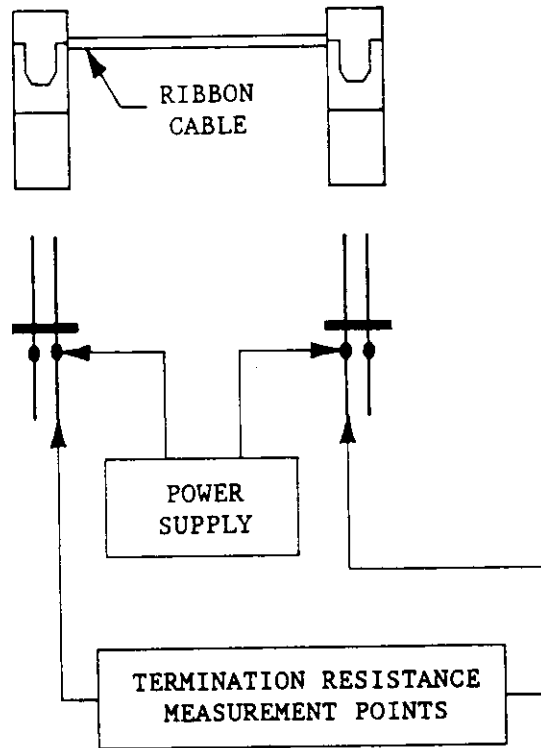


Figure 6  
Termination Resistance Measurement Points, Typical