PRODUCT SPECIFICATION

1. SCOPE

1.1. Content

This specification covers the performance, tests and quality requirements for the multiple COAXICON* Microminiature R.F. Coaxial contacts for use in special cavities of printed circuit board or panel mounted multiple connectors. Connectors of this type include cable and printed circuit board mounted connectors. Cable connectors are intended for use on RG 178 double braid coaxial cable.

1.2. 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 reference documents, this specification shall take precedence.

2.1. AMP Specifications

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. 110-12018:Test Report

3. REQUIREMENTS

3.1. Design and Construction

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

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| LTR | REVISION RECORD | APP | DATE |
|---|---|---|---|
| C | Revise per ECN AJ-3103 | PR | 1/26/88 |
| B | Revise per ECN AJ-2700 | PR | 7/14/87 |

DR D. Benfer 1-28-81
CHK R. Prescott 1-28-81
APP E. Forney 2-2-81
DIST
PAGE 1 OF 8

AMP | AMP INCORPORATED Harrisburg, Pa. 17105

TITLE CONTACTS, COAXIAL, R.F. MICROMINIATURE, MULTIPLE COAXICON

NO 108-12049 | REV C | LOC B

3.2. Material

A. Contact: Brass or beryllium copper, gold over nickel plating
B. Shell: Brass or beryllium copper, gold over nickel plating
C. Grounding post: Brass, gold over nickel plating
D. Spring: Stainless steel
F. Dielectric: Polytetrafluoroethylene

3.3. Ratings

A. Nominal Impedance: 50 ohms
B. Frequency Range: 0-2 GHz
C. Maximum Operating Voltage @ Sea Level: 150 vac (rms)
D. Operating Temperature: -55° to 125°C

3.4. Performance and Test Description

Contacts shall be designed to meet the electrical, mechanical and environmental performance requirements specified in Figure 1

3.5. Test Requirements and Procedure Summary

| Test Description | Requirement | Procedure |
|---|---|---|
| Examination of Product | Meets requirement of product drawing. | Visual, dimensional and functional per applicable inspection plan. |
| ELECTRICAL | | |
| Termination Resistance Dry Circuit | 6 milliohms maximum for center contact; 3 milliohms maximum for outer contact. | Subject mated contacts assembled in housing to 50 mv open circuit at 100 ma maximum, see Figure 3; AMP Spec 109-6-1. |
| Dielectric Withstanding Voltage | Test Voltage (rms) / Altitude Feet: 450 / Sea level; 260 / 25,000; 150 / 70,000. No breakdown or flashover | Test between inner contact and outer shell of mated connector assemblies; AMP Spec 109-29-1 |
| Insulation Resistance | 1000 megohms minimum initial | Test between inner contact and outer shell of mated connector assembly; AMP Spec 109-28-4 |

Figure 1(cont)

| Test Description | Requirement | Procedure |
|---|---|---|
| R.F.Cross Talk | 90 dB minimum over a frequency range of 5 to 2000 MHz. | Position coaxial contact assemblies in adjacent connector cavities and fully mate the connector Transmit a swept frequency signal from 5 to 2000 MHz on one line and measure the coupled signal in the adjacent assembly;AMP Spec 109-53. |
| Voltage Standing Wave Ratio (VSWR) | Straight: 1.22 + .052(F) GHz Right Angle: 1.22 + .084 (F) GHz | Measure VSWR between 0 to 2 GHz using Long line method;AMP Spec 109-9-1. |
| MECHANICAL | | |
| Vibration (a) | No discontinuities greater than 1 microsecond. | Subject mated connectors to a modified 70 G's peak level 10-500 Hz,with 100 ma current applied; AMP Spec 109-21-2. |
| Physical Shock (a) | No discontinuities greater than 1 microsecond. | Subject mated connectors to 50 G's half-sine in 11 milliseconds; 3 shocks in each direction applied along 3 mutually perpendicular planes total 18 shocks; AMP Spec 109-26-1. |
| Mating Force | 1.5 pounds maximum initial. | Measure force necessary to mate connector assembly, incorporating free floating fixtures at a rate 2 inch/minute; AMP Spec 109-42, cond A, calculate force per contact. |
| Unmating Force | 2 ounces minimum final. | Measure force necessary to unmate connector assembly with locking latches removed,at a rate not exceeding 2 inches/minute; AMP Spec 109-42,cond A, calculate force per contact. |

Figure 1(cont)

| Test Description | Requirement | Procedure |
|---|---|---|
| Contact Retention | 6 pounds minimum | Apply an axial load of 6 pounds to the contact in the normal removal direction,at a uniform rate not to exceed one pound per second. Hold at 6 pounds for one minute. Extract and insert,using proper tool, 3 times, repeat above procedure;AMP Spec 109-30. |
| Durability | Termination resistance | Mate and unmate connector assemblies for 100 cycles at a maximum rate of 12 cycles/minute; AMP Spec 109-27. |
| Cable Retention | Contacts shall not separate from the cable or display any electrical discontinuities in the center or outer contact circuits. | Apply 15 pound force to the cable directed longitudinally away from the connector. Equal force shall be applied to the center conductor and braid. Hold for 60 seconds minimum, release tension and check continuity using a simple low voltage test lamp. |
| Solderability<br><br>Resistance to Soldering | Contact pins shall have a solder coverage of 95% minimum.<br>No evidence of physical damage | Subject contacts to solderability;AMP Spec 109-11-5.<br>Subject one connector pair, mounted on PCB to 260°C for 10 seconds; AMP Spec 109-63-3 |
| ENVIRONMENTAL | | |
| Thermal Shock | Contacts shall show no evidence of physical damage. | Subject unmated connectors to 5 cycles between -55° and 125°C; AMP Spec 109-22 |
| Humidity-Temperature Cycling | 500 megohms minimum insulation resistance within 1 to 2 hours after removal from the chamber. | Subject mated connectors to 10 humidity-temperature cycles between 25° and 65°C at 95% RH; AMP Spec 109-23, method III, cond B with cold shock at -10°C less step 7b. |

Figure 1 (cont)

| Test Description | Requirement | Procedure |
|---|---|---|
| Corrosion, Salt Spray | No evidence of physical damage and shall meet requirements of all subsequent testing. | Subject mated connectors to 5% salt concentration for 48 hours; AMP Spec 109-24, cond B. |

(a) Shall remain mated and show no evidence of damage, cracking or chipping.

Figure 1 (end)

3.6. Contact 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 | 1 | 1 | 1 | 1 | 1 |
| Termination Resistance, Dry Circuit | 2,6 | 4,13 | | | 2,6 | |
| Dielectric Withstanding Voltage | 4 | 6,12 | | 3,7 | | 3 |
| Insulation Resistance | 3 | 5,11 | | 2,6 | | 2,6 |
| R.F. Crosstalk | | | 3 | | | |
| Voltage Standing Wave Ratio | | | 2 | | | |
| Vibration | 7 | | | | 4 | |
| Physical Shock | 8 | | | | 5 | |
| Mating Force | | 2,8 | | | 7 | |
| Unmating Force | | 3,9 | | | 8 | |
| Contact Retention | 10 | 14 | | | 10 | |
| Durability | | 7 | | | 3 | |
| Cable Retention | 11 | 15 | | | 11 | |
| Solderability | | | | 4 | | |
| Resistance to Soldering Heat | | | | 5 | | |
| Thermal Shock | 5 | | | | | 4 |
| Humidity-Temperature Cycling | | 10 | | | | 5 |
| Corrosion, Salt Spray | 9 | | | | 9 | |

(a) See Para 4.1.A.
(b) Numbers indicate sequence in which tests are performed.

Figure 2

4. QUALITY ASSURANCE PROVISIONS

4.1. Qualification Testing

A. Sample Selection

Connector housings and contacts shall be prepared in accordance with applicable Instruction Sheets. They shall be selected at random from current production. Test groups 1,2 and 4 shall consist of 12 mated pairs mounted in their respective connectors. Test group 3 shall consist of 4 mated contact pairs. Test groups 1 and 2 shall be assembled to 12 inch lengths of RG 178 double braid coaxial cable, current equalizers shall be attached on the cable 10 inches and 10.5 inches back on the braid and center conductors, respectively. A 3 foot length of cable shall be prepared with equalizers on both the center conductor and shield. The resistance of the conductors shall be measured, and resistance per inch of cable calculated. This value shall be used to determine termination resistance. Test group 4 applies only to PCB contacts.

B. Test Sequence

Qualification inspection shall be verified by testing samples as specified in Figure 2, test groups 1,2,3 and 4 only.

C. Acceptance

(1) Test results from development on pre-qualification samples will be used to determine upper and lower one-sided statistical tolerance limits for 99% reliability at 95% confidence, as follows. Let Xbar and s denote the sample average and standard deviation, respectively, of the test data. Let k denote the normal distribution one-sided tolerance factor for 95% confidence and 99% reliability. The value of k varies with sample size. Values of k are given in various tables, for example, NBS Handbook 91, Factors for One-Sided Tolerance Limits for Normal Distribution. Suitability of the normal distribution for representing the data shall be verified with normal probability plots, goodness of fit tests, etc.

Then the upper one-sided tolerance limit for 99% reliability at 95% confidence is given by Xbar + ks. The interpretation of this tolerance limit is as follows: based on the test data, and assuming a normal distribution for the test data, we can be 95% confident that 99% of the population of values represented by the sample data will not exceed Xbar + ks. For any test parameter for which there is specified an upper requirement which is not to be exceeded, satisfactory performance of the product is achieved when the value of Xbar + ks does not exceed the requirement value.

The lower one-sided tolerance limit for 95% confidence and 99% reliability is given by Xbar - ks. This has a similar interpretation and corresponding application to lower requirement values.

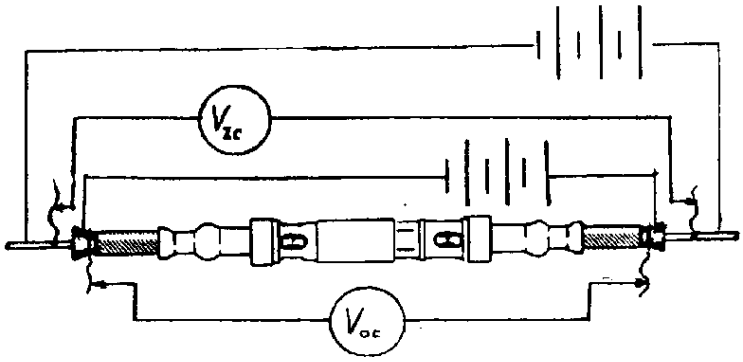
(2) Failures attributed to equipment, test setup, or operator deficiencies shall not disqualify the product. When product failure occurs, corrective action shall be taken and samples resubmitted for qualification.

4.2. Requalification Testing

Requalification shall be established by the cognizant divisional engineering function and may consist of all or any part of the overall qualification program provided that it is conducted within the required time period. In general test groups 4, 5 and 6 shall be used for requalification, samples prepared in the same way except that test groups 4,5,and 6 shall consist of 4 mated pairs while test group 3 shall consist of 2 mated pairs.

4.3. Quality Conformance Inspection

The applicable AMP 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.




Note: a) Measure voltage drop at specified current and calculate resistance.

b) Also measure a 3-foot length of cable and calculate milliohms per inch.

c) Measure distance between voltage probes and subtract an equal length of cable resistance from measurements to determine actual termination resistance.

**Figure 3**

**Termination Resistance Measurement Points**