# Low Profile CHAMP* Latch Connector

## 1. SCOPE

### 1.1. Content

This specification covers the performance, tests and quality requirements for the Low Profile CHAMP* Latch Plugs and Receptacles (Positions 14, 24, 36 and 50). The connectors are terminated to .050 centerline ribbon cable, 26 through 30 AWG solid or 28 AWG stranded. Mated connector assemblies are suitable for cable to cable, cable to panel, and cable to printed circuit board applications, with various mounting and shielding hardware.

### 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 referenced 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 76: Cross-reference between AMP Test Specifications and Military or Commercial Documents
D. 114-6030 : Connector, Ribbon Cable, CHAMP Latch
E. 501-59: Test Report

## 3. REQUIREMENTS

### 3.1. Design and Construction

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

### 3.2. Materials

A. Contact: Copper alloy 725, with selective gold over nickel plating, IDC slot gold flash over nickel

B. Housing: Polyphenylene oxide, oxygen index 28 minimum

C. Cover: Polyester glass filled resin, UL 94V-O

D. EMI-RFI shields: Zinc alloy, nickel plated

E. Hardware:

(1) Retainer clips: Zinc plated steel
(2) Bail clips: Passivated stainless steel

### 3.3. Ratings

A. Current: 1 ampere maximum, see Para 3.5.(a)
B. Operating Temperature: -40° to 75°C

### 3.4. Performance and Test Description

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

### 3.5. Test Requirements and Procedures Summary

| Test Description | Requirement | Procedure |
|---|---|---|
| Examination of Product | Meets requirements of product drawing and AMP Spec 114-6030. | Visual, dimensional and functional per applicable inspection plan. |
| ELECTRICAL | | |
| Termination Resistance, Dry Circuit (Low Level) | 22 milliohms maximum initial for mated connectors, 12 milliohms maximum initial for unmated connectors. | Subject mated contacts assembled in housing to 50 mv open circuit at 100 ma maximum, see Figure 3; AMP Spec 109-6-1. |

Figure 1 (cont)

| Test Description | Requirement | Procedure |
|---|---|---|
| Dielectric Withstanding Voltage | 1000 vac (rms) at sea level, 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 109-28-4. |
| | MECHANICAL | |
| Vibration | No discontinuities greater than 1 microsecond; no evidence of cracking, breaking or loosening of parts. | Subject mated connectors to 15 G's, 10-2000 Hz with 100 ma current applied; AMP Spec 109-21-3. |
| Physical Shock | No discontinuities greater than 1 microsecond; no evidence of cracking, breaking or or loosening of parts. | 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 109-26-9. |
| Mating Force | 35 pounds maximum initial for 50 position connector. | Measure force necessary to mate connector assembly with locking latches, a distance of .095 from point of initial contact, incorporating free floating fixtures at a rate of 0.5 inch/ minute; AMP Spec 109-42, cond A. |
| Unmating Force | 10 pounds minimum after 200 matings for 50 position connector. | Measure force necessary to unmate connector assembly with locking latches removed, at a rate of 0.5 inch/minute AMP Spec 109-42, cond A. |

Figure 1 (cont)

| Test Description | Requirement | Procedure |
|---|---|---|
| Durability | Mating-unmating; ΔR = 10 milliohms maximum termination resistance, dry circuit. | Mate and unmate connector assemblies for 200 cycles at a maximum rate of 150 cycles/hour; AMP Spec 109-27. |
| | ENVIRONMENTAL | |
| Thermal Shock | Maximum change in termination resistance:<br>Mated connectors:<br>10 milliohms<br>Unmated connectors:<br>5 milliohms<br>- Solid wire<br>Unmated connectors:<br>15 milliohms<br>- Stranded wire. | Subject mated and unmated connectors to 5 cycles between -65 and 90°C; AMP Spec 109-22. |
| Humidity-Temperature Cycling | Maximum change in termination resistance:<br>Mated connectors:<br>10 milliohms<br>Unmated connectors:<br>5 milliohms<br>- Solid wire<br>Unmated connectors:<br>15 milliohms<br>- Stranded wire | Subject mated and unmated 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. |
| Industrial Mixed Flowing Gas | Maximum change in termination resistance:<br>Mated connectors:<br>10 milliohms<br>Unmated connectors:<br>5 milliohms<br>- Solid wire<br>Unmated connectors:<br>15 milliohms<br>- Stranded wire | Subject mated and unmated connectors to environmental class II for 20 days; AMP Spec 109-85-2. |

(a) Maximum rated current that can be carried by this product is limited by maximum operating temperature of housings, which is 75°C and temperature rise of contacts, which is 30°C. Variables which shall be considered for each application are: wire size, connector size, contact material, and ambient temperature.

Figure 1 (end)

3.6. Connectors 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 | 3,7 | 2,5 | | 2,4 | 2,4 | 2,4 |
| Dielectric Withstanding Voltage | | | 3,6 | | | |
| Insulation Resistance | | | 2 | | | |
| Vibration | | 3 | | | | |
| Physical Shock | | 4 | | | | |
| Mating Force | 2,6 | | | | | |
| Unmating Force | 4,8 | | | | | |
| Durability | 5 | | | | | |
| Thermal Shock | | | 4 | | 3 | |
| Humidity-Temperature Cycling | | | 5 | 3 | | |
| Industrial Mixed Flowing Gas | | | | | | 3 |

(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 3 shall consist of a minimum 2 connector pairs with 25 contacts minimum in each connector circuit. Test groups 4, 5 and 6 shall consist of a minimum of two 50 position connectors (unmated) for each wire type and two pairs of mated 50 position connectors wired with 28 AWG solid extruded cable.

B. Test Sequence

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

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 X bar 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 X bar + 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 X bar + 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 X bar + ks does not exceed the requirement value.

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

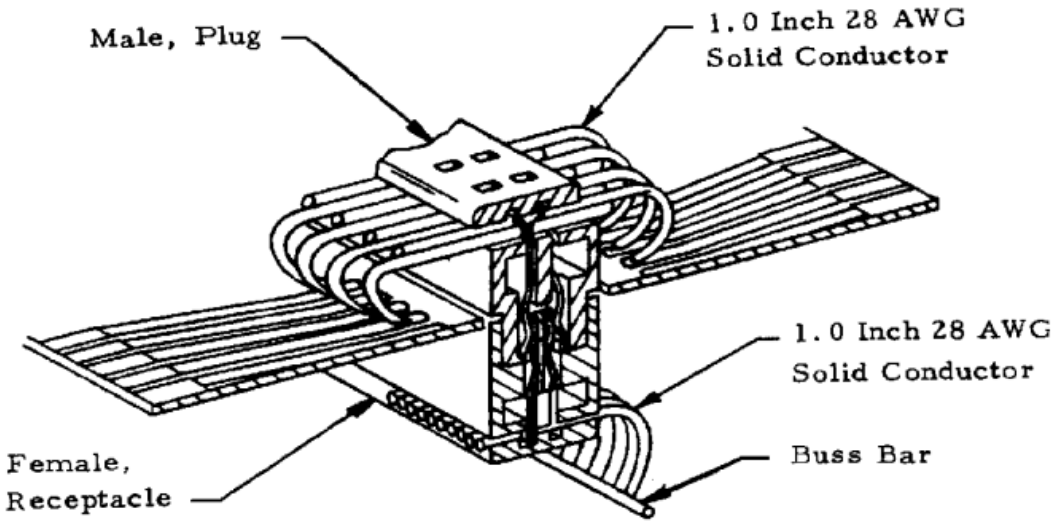
(2) Failures attributed to equipment, test setup, or operator deficiencies shall not disqualify the product. When product failure occurs, corrective action shall be taken and samples resubmitted for qualification.

4.2. Quality Conformance Inspection

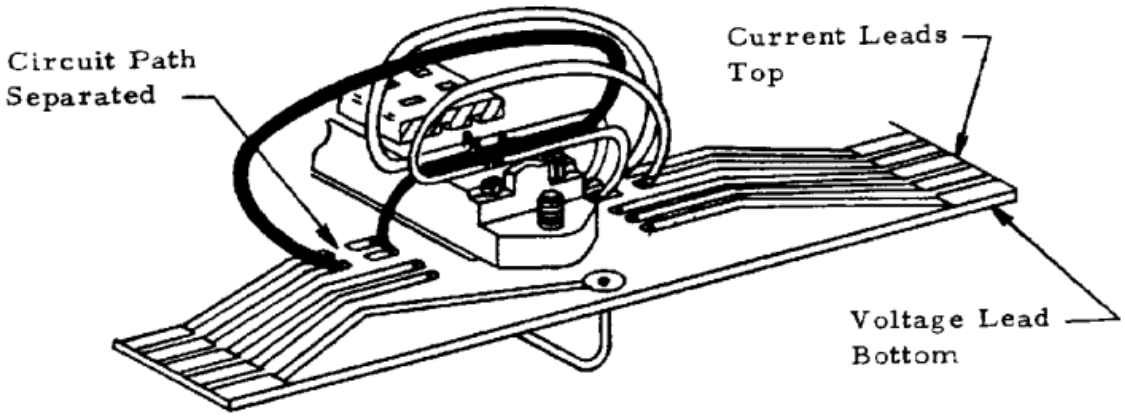
The applicable AMP inspection plan will specify the sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with the applicable product drawing and this specification.

4.3. Retention of Qualification

If, in a 3 year period, no changes to the product or process occur, the product shall be subjected to third group of the testing described in the test sequence, see Figure 2. Justification for exceeding this time limit must be documented and approved by the division manager.




Mated Connector Mounting




Unmated Connector Mounting

Figure 3

Methods of Board Mounting for Termination Resistance Measurement