# Connector, MDI, Surface Mount

## 1. SCOPE

### 1.1. Content

This specification covers performance, tests and quality requirements for the TE Connectivity (TE) surface mount Multi-Directional Interface (MDI) connectors. These connectors are printed circuit board mounted header and receptacle connectors.

### 1.2. Qualification

When tests are performed on subject product line, procedures specified in 109 Series Test Specifications shall be used. All inspections shall be performed using applicable inspection plan and product drawing.

## 2. APPLICABLE DOCUMENTS

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

### 2.1. TE Documents

- 109-1: General Requirements for Test Specifications
- 109 Series: Test Specifications as indicated in Figure 1
- 114-40045: Application Specification
- 501-269: Qualification Test Report

## 3. REQUIREMENTS

### 3.1. Design and Construction

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

### 3.2. Materials

- Boardlock: Brass, matte tin-lead over nickel plating
- Contact:
  - Header: Brass, AMP-DURAGOLD* plating in contact area, tin-lead plating on solder tails, all over nickel plating
  - Receptacle: Phosphor bronze, AMP-DURAGOLD plating in contact area, tin-lead plating on solder tails, all over nickel plating
- Housing:
  - Header: Thermoplastic, black, UL94V-0
  - Receptacle: Thermoplastic, black, UL94V-0

### 3.3. Ratings

- Voltage: 30 volts AC (rms) or 30 volts DC
- Current: Signal applications only
- Temperature: -55 to 105℃

3.4. Performance and Test Description

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

3.5. Test Requirements and Procedures Summary

| Test Description | Requirement | Procedure |
|---|---|---|
| Examination of product. | Meets requirements of product drawing and Application Specification 114-40045. | Visual, dimensional and functional per applicable quality inspection plan. |
| ELECTRICAL | | |
| Termination resistance, dry circuit. | 15 milliohms maximum initial.<br>20 milliohms maximum final. | TE Spec 109-6-1.<br>Subject mated contacts assembled in housing to 50 mv open circuit at 100 ma maximum.<br>See Figure 3. |
| Dielectric withstanding voltage. | 500 vac at sea level.<br>1 minute hold.<br>No breakdown or flashover. | TE Spec 109-29-1.<br>Test between adjacent contacts of mated connector assemblies.<br>Samples shall not be mounted on printed circuit boards. |
| Insulation resistance. | 1000 megohms minimum. | TE Spec 109-28-4.<br>Test between adjacent contacts of mated connector assemblies.<br>Samples shall not be mounted on printed circuit boards. |
| MECHANICAL | | |
| Vibration, random. | No discontinuities greater than 1 microsecond.<br>See Note. | TE Spec 109-21-7, except 10-500 Hz, Test level E, Duration 20 minutes.<br>Subject mated connectors to 5.43 G's rms.<br>See Figure 4. |
| Physical shock. | No discontinuities greater than 1 microsecond.<br>See Note. | TE Spec 109-26-1, except 30 G's.<br>Subject mated connectors to 30 G's half-sine shock pulses of 11 milliseconds duration. 3 shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks.<br>See Figure 4. |
| Mating force. | 15 N maximum. | TE Spec 109-42,<br>Condition A.<br>Measure force necessary to mate connector assemblies using free floating fixtures at rate of .5 inch per minute. |

Figure 1 (continued)

| Test Description | Requirement | Procedure |
|---|---|---|
| Unmating force. | 2 N minimum. | TE Spec 109-42, Condition A. Measure force necessary to unmate connector assemblies at rate of .5 inch per minute. |
| Durability. | See Note. | TE Spec 109-27. Mate and unmate connector assemblies for 2500 cycles at maximum rate of 500 cycles per hour. |
| Solderability. | Solderable area shall have minimum of 95% solder coverage. | TE Spec 109-11-1. Subject contacts to solderability. |
| ENVIRONMENTAL | | |
| Thermal shock. | See Note. | TE Spec 109-22. Subject mated connectors to 25 cycles between -55 and 105℃. |
| Humidity-temperature cycling. | See Note. | TE Spec 109-23-4, Condition B. Subject mated connectors to 10 humidity-temperature cycles between 25 and 65℃ at 95% RH. |
| Mixed flowing gas. | See Note. | TE Spec 109-85-3. Subject mated connectors to environmental class III for 20 days. |
| Temperature life. | See Note. | TE Spec 109-43. Subject mated connectors to temperature life at 105℃ for 1000 hours. |

**NOTE** *Shall meet visual requirements, show no physical damage and shall meet requirements of additional tests as specified in Test Sequence in Figure 2.*

Figure 1 (end)

3.6. Product Qualification and Requalification Test Sequence

| Test or Examination | Test Group (a) | | | | |
|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 |
| | Test Sequence (b) | | | | |
| Examination of product | 1,9 | 1,5 | 1,5 | 1,8 | 1,3 |
| Termination resistance, dry circuit | 3,7 | 2,4 | 2,4 | | |
| Dielectric withstanding voltage | | | | 3,7 | |
| Insulation resistance | | | | 2,6 | |
| Vibration | 5 | | | | |
| Physical shock | 6 | | | | |
| Mating force | 2 | | | | |
| Unmating force | 8 | | | | |
| Durability | 4 | | | | |
| Solderability | | | | | 2 |
| Thermal shock | | | | 4 | |
| Humidity-temperature cycling | | | | 5 | |
| Mixed flowing gas | | | 3(c) | | |
| Temperature life | | 3(c) | | | |

**NOTE**

*(a) See paragraph 4.1.A.*
*(b) Numbers indicate sequence in which tests are performed.*
*(c) Precondition samples with 10 cycles durability.*

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 and shall be selected at random from current production. All test groups shall consist of minimum of 5 header and 5 receptacle connectors each. A minimum of 30 contacts shall be selected and identified. Unless otherwise specified, these contacts shall be used for all measurements.

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 product or manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of original testing sequence as determined by development/product, quality and reliability engineering.

4.3. Acceptance

Acceptance is based on verification that product meets requirements of Figure 1. Failures attributed to equipment, test setup or operator deficiencies shall not disqualify 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 quality inspection plan will specify sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with applicable product drawing and this specification.

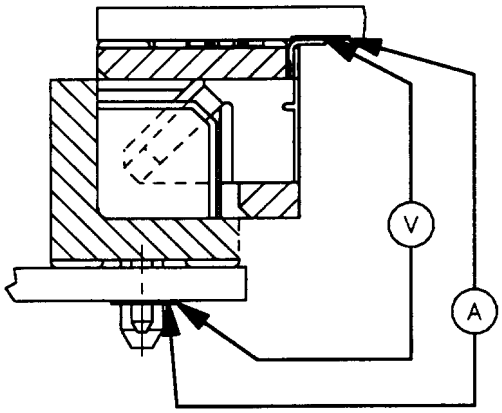


Figure 3
Termination Resistance Measurement Points

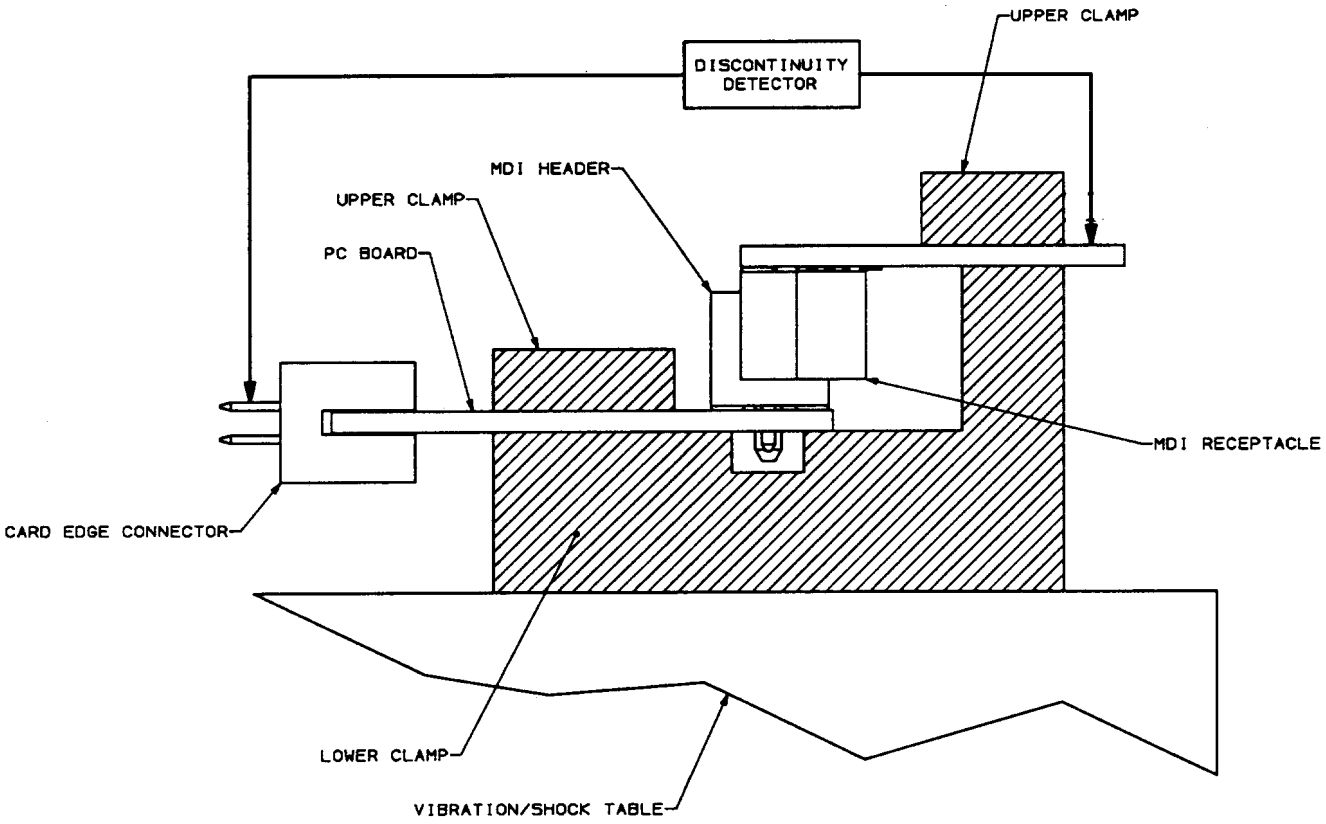


Figure 4
Mounting & Clamping Locations For Vibration & Physical Shock