Connector, Smart Card

1. SCOPE

1.1. Content

This specification covers performance, tests and quality requirements for the AMP* Smart Card connector. This connector is printed circuit board through hole mounted with 8 data contacts and 2 switch contacts and will
| accept ISO 7810-7816 type smart cards.

1.2. Qualification

When tests are performed on subject product line, procedures specified in AMP 109 series 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. 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. 501-328: 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

A. Data contacts: Phosphor bronze, gold over tin-lead plating on soldertails, all over nickel plating
B. Housing: PPA, PCT, or PBT
C. Switch post: Brass
D. Switch: Phosphor bronze

3.3. Ratings

A. Voltage: 30 vac
B. Current: Signal application only
C. Temperature: -10 to 70°C

3.4. Performance and Test Description

Product is designed to meet electrical, mechanical and environmental performance requirements specified in Figure 1. Unless otherwise specified, all tests shall be performed at ambient environmental conditions per AMP Specification 109-1.

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.	Data contacts: 30 milliohms maximum initial. 30 milliohms maximum final. Switch system: 30 milliohms maximum initial. 50 milliohms maximum final (end of life switch).	AMP 109-6-1. Subject mated contacts assembled in housing to 50 mv maximum open circuit at 100 ma maximum. See Figure 3.
Insulation resistance.	1000 megohms minimum.	AMP Spec 109-28-4. Test between adjacent contacts.
Dielectric withstanding voltage.	500 vac at sea level for data contacts. 250 vac at sea level for switch contacts.	AMP Spec 109-29-1. Test between adjacent contacts.
	MECHANICAL	
Vibration, random.	No discontinuities of 1 microsecond or longer duration. See Note.	AMP Spec 109-21-7, Condition B. Subject samples mated to ISO 7810 PVC Smart Cards to 10-500 Hz. 20 minutes in each of 3 mutually perpendicular planes. See Figure 4.
Physical shock.	No discontinuities of 1 microsecond or longer duration. See Note.	AMP Spec 109-26. Subject mated samples to 10 G's half-sine shock pulses of 11 milliseconds duration. 3 shocks in each direction applied along 3 mutually perpendicular planes, except 4 G's shock pulses in direction of card withdrawal, 18 total shocks. See Figure 4.
Durability.	See Note.	AMP Spec 109-27. Mate and unmate samples for 10000 cycles at maximum rate of 600 cycles per hour.

Figure 1 (cont)

Test Description	Requirement	Procedure
Mating force.	1530 grams maximum.	AMP Spec 109-42, Condition A. Measure force necessary to mate samples at maximum rate of .5 inch per minute.
Unmating force.	300 grams minimum.	AMP Spec 109-42, Condition A. Measure force necessary to unmate samples at maximum rate of .5 inch per minute.
ENVIRONMENTAL		
Thermal shock.	See Note.	AMP Spec 109-22. Subject mated samples to 5 cycles between -10 and 70°C.
Humidity-temperature cycling.	See Note.	AMP Spec 109-23-3, Condition B. Subject mated samples to 10 cycles between 25 and 65°C at 95% RH.
Temperature life.	See Note.	AMP Spec 109-43. Subject mated samples to temperature life at 70°C for 1000 hours.
Mixed flowing gas.	See Note.	AMP Spec 109-85-2. Subject samples with card inserted for signal contacts and without card for switch contacts to environmental class II for 14 days.

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

NOTE

(a) See Para 4.1.A.
(b) Numbers indicate sequence in which tests are performed.
(c) Samples mated to ISO 7810 PVC Smart Cards.
(d) Precondition samples with 10 cycles durability.

Figure 2

4. QUALITY ASSURANCE PROVISIONS

4.1. Qualification Testing

A. Sample Selection

Samples shall be prepared in accordance with applicable Instruction Sheets and shall be selected at random from current production. Test groups 1, 2, and 3 shall consist of a minimum of 5 samples soldered to printed circuit boards. Test group 4 shall consist of a minimum of 5 unmounted samples.

B. Test Sequence

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

4.2. Requalification Testing

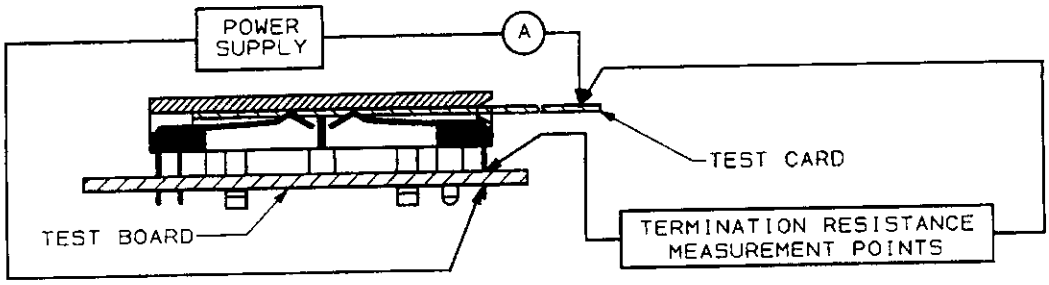
If changes significantly affecting form, fit or function are made to product or manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of original testing sequence as determined by development/product, quality and reliability engineering.

4.3. Acceptance

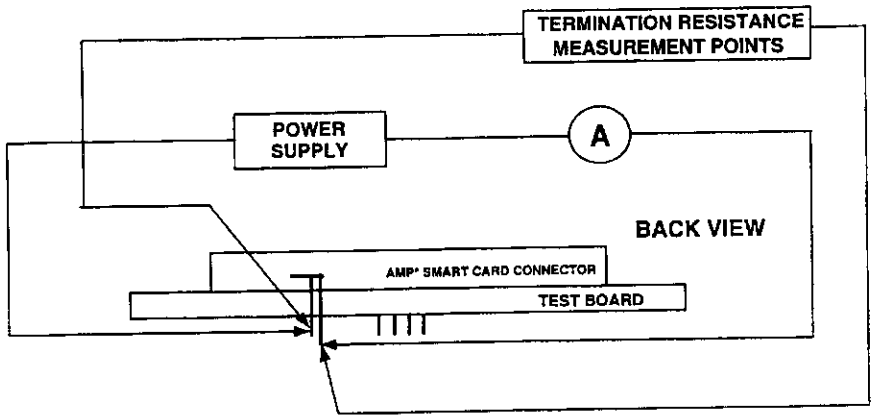
Acceptance is based on verification that product meets requirements of Figure 1. Failures attributed to equipment, test setup or operator deficiencies shall not disqualify product. When product failure occurs, corrective action shall be taken and samples resubmitted for qualification. Testing to confirm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

4.4. Quality Conformance Inspection

Applicable AMP 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.



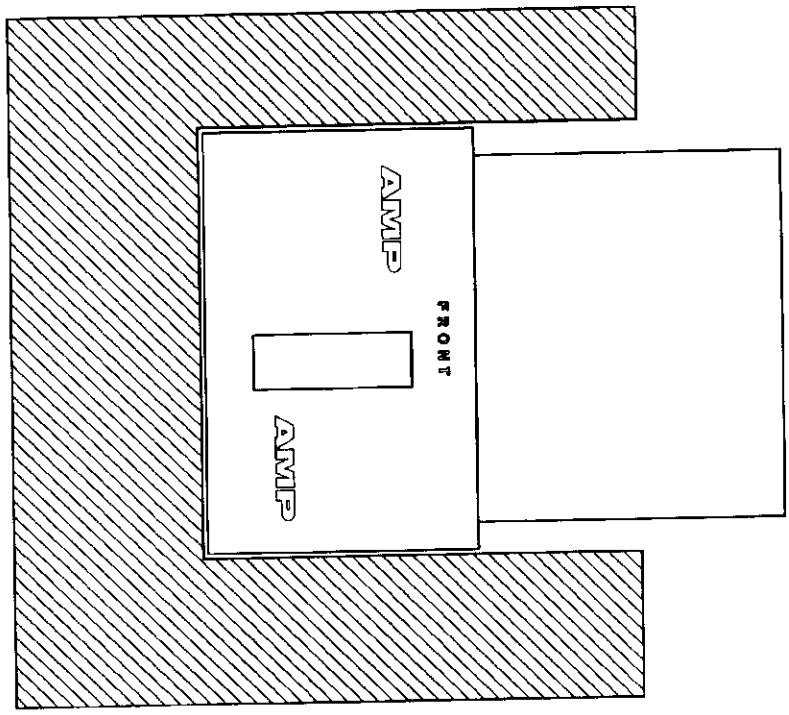
Data Contacts



Switch System

NOTE *Switch system termination resistance testing is performed without mating test card inserted.*

Figure 3
Termination Resistance Measurement Points



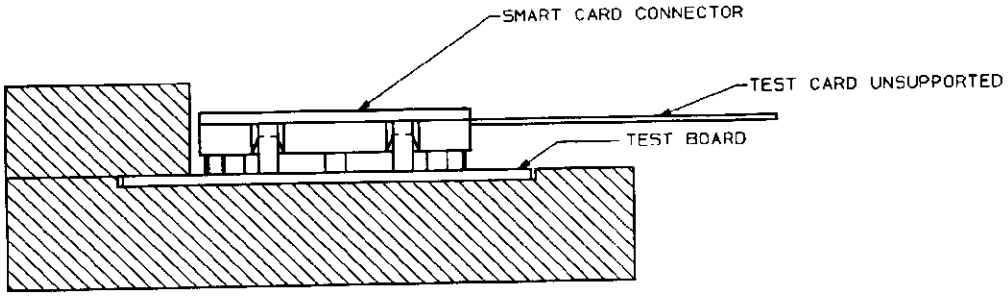


Figure 4
Vibration & Physical Shock Mounting Fixture