
Switch, Rotary, Hexadecimal

1. SCOPE

1.1. Content

This specification covers the performance, tests and quality requirements for the AMP* Hexadecimal preprogrammed printed circuit board switch. These switches are 16 step and 10 step rotary, 8-4-2-1 binary, with complement, enclosing type and are intended to fit standard 16 pin DIP receptacles.

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 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. IS 6811: Instruction Sheet
- E. 114-1058: Application Specification
- F. 501-130: 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. Material

- A. Contact: Copper alloy, gold over nickel plating
- B. Housing: Glass filled polyester

3.3. Ratings

- A. Current, nonswitching: 1.0 ampere maximum at 50 vdc (resistive load).
- B. Current, switching: 100 milliamperes maximum at 28 vdc (resistive load).
- C. Temperature: -40° to 70°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 temperature unless otherwise specified.

3.5. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure
Examination of Product.	Meets requirements of product drawing and AMP Spec 114-1058.	Visual, dimensional and functional per applicable quality inspection plan.
ELECTRICAL		
Contact Resistance, Dry Circuit.	100 milliohms maximum initial. 750 milliohms maximum after durability rated electrical load.	AMP Spec 109-6-1. Subject switches to 50 mv maximum open circuit 100 ma maximum. Test all switch positions. See Figures 3 and 4.
Insulation Resistance.	1000 megohms minimum.	AMP Spec 109-28-3. Test between all mutually insulated contacts in "O" position then in "F" position.
Dielectric Withstanding Voltage.	0.3 kvac dielectric withstanding voltage. One minute hold. 10 milliampere maximum leakage current.	AMP Spec 109-29-1. Test between all mutually insulated contacts in "O" position then in "F" position.
Electrical Stability.	Temperature rise shall not exceed 30°C from ambient.	AMP Spec 109-45-1. Subject switch to 50 vdc at 1.0 ampere maximum current until temperature stabilizes. Monitor center position. See Figure 3.
Capacitance.	5 picofarads maximum.	AMP Spec 109-47, Condition E. Test between all mutually insulated contacts in "O" position then in "F" position.
MECHANICAL		
Solderability.	Solderable area shall have a coverage of 95% minimum.	AMP Spec 109-11-3. Subject switch to solderability.
Vibration.	No discontinuities greater than 10 microseconds for closed contacts, or closures of 10 microseconds for open switches. See Note.	AMP Spec 109-21-2. Subject one switch in the "O" position and the other in the "F" position to 10 G's, 10-500 Hz with 100 ma current applied. See Figure 5.

Figure 1 (cont)

Test Description	Requirement	Procedure
Physical Shock.	No discontinuities greater than 10 microseconds for closed contacts, or closures of 10 microseconds for open switches. See Note.	AMP Spec 109-26-1. Subject one switch in the "O" position and the other in the "F" position to 50 G's half-sine shock pulses of 11 milliseconds duration. 3 shocks in each direction applied along the 3 mutually perpendicular planes, total 18 shocks. See Figure 5.
Durability, Rated Electrical Load.	See Note.	AMP Spec 109-27. Mount switch rigidly and rotate shaft bidirectionally for a total of 500 cycles at a rate of 10 cycles per minute. Contacts shall be energized at 28 vdc with a resistive load limiting the current to 125 milliamperes.
Operating Torque.	1 ounce inch minimum from one detent to the next. See Note.	AMP Spec 109-42, Condition B. Rotate switch shaft, with respect to housing both clockwise and counterclockwise, and measure torque required for each detent.
Resistance to Soldering Heat.	See Note.	AMP Spec 109-63-3. Subject product in "OFF" position to solder heat at 260°C for 10 seconds.
ENVIRONMENTAL		
Thermal Shock.	See Note.	AMP Spec 109-22. Subject 2 switches in the "O" position and 2 in the "F" position to 5 cycles between -40 and 70°C.
Humidity-Temperature Cycling.	25 megohms final insulation resistance within 5 minutes of removal from the chamber. See Note.	AMP Spec 109-23-3, Condition A. Subject switches to 4 humidity-temperature cycles between 25 and 65°C at 95% RH.
Temperature Life.	Monitor switch contacts throughout test for electrical discontinuities. See Note.	AMP Spec 109-43, Test Level 2. Subject switches to 70°C for 240 hours with 10 ma current, at 50 mv flowing through closed contacts. Two switches shall be tested in "O" position and 2 in the "F" position.

Figure 1 (cont)

Test Description	Requirement	Procedure
Mixed Flowing Gas.	See Note.	AMP Spec 109-85-2. Subject switches in the "O" position to environmental class II for 20 days.

NOTE *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

Test or Examination	Test Group (a)					
	1	2	3	4	5	6
	Test Sequence (b)					
Examination of Product	1,9	1,8	1,5	1,5	1,3	1,5
Contact Resistance, Dry Circuit	3,7		2,4	2,4		
Insulation Resistance		2,6				
Dielectric Withstanding Voltage		3,7				
Electrical Stability						4
Capacitance						2
Solderability					2	
Vibration	5					
Physical Shock	6					
Durability, Rated Electrical Load	4					
Operating Torque	2,8					
Resistance to Soldering Heat						3
Thermal Shock		4				
Humidity-Temperature Cycling		5				
Temperature Life				3		
Mixed Flowing Gas			3(c)			

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

Figure 2

4. QUALITY ASSURANCE PROVISIONS**4.1. Qualification Testing****A. Sample Selection**

Switches shall be prepared in accordance with applicable Instruction Sheets. They shall be selected at random from current production. All test groups shall consist of 4 switches.

B. Test Sequence

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

4.2. Requalification Testing

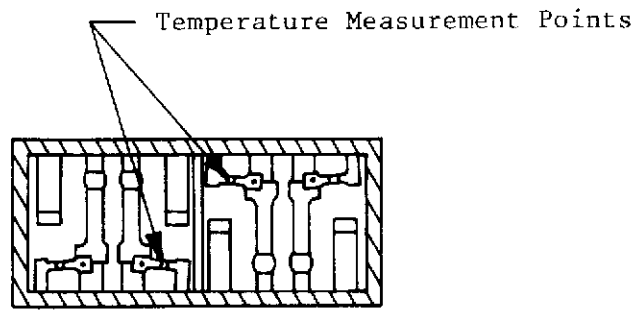
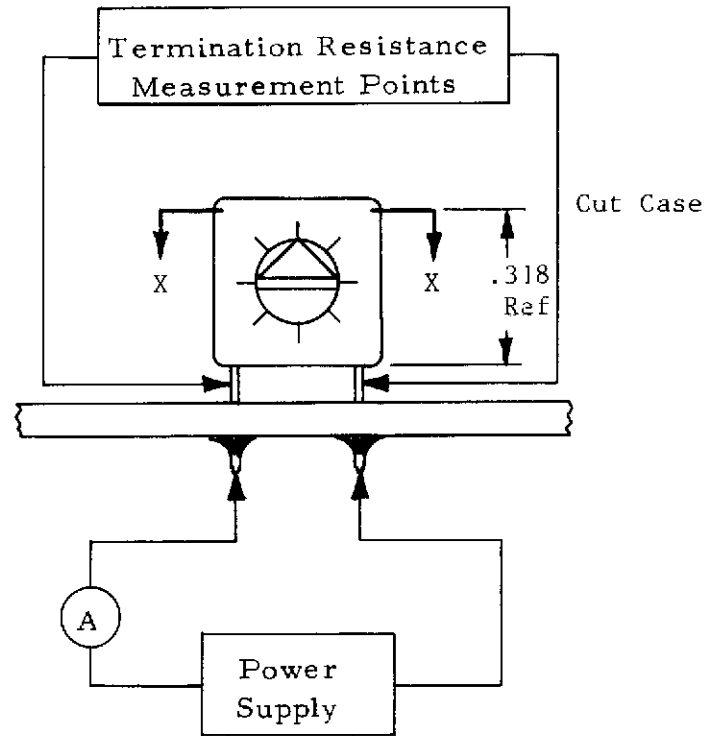
If changes significantly affecting form, fit, or function are made to the product or to the manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of the original testing sequence as determined by development/product, quality, and reliability engineering.

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.

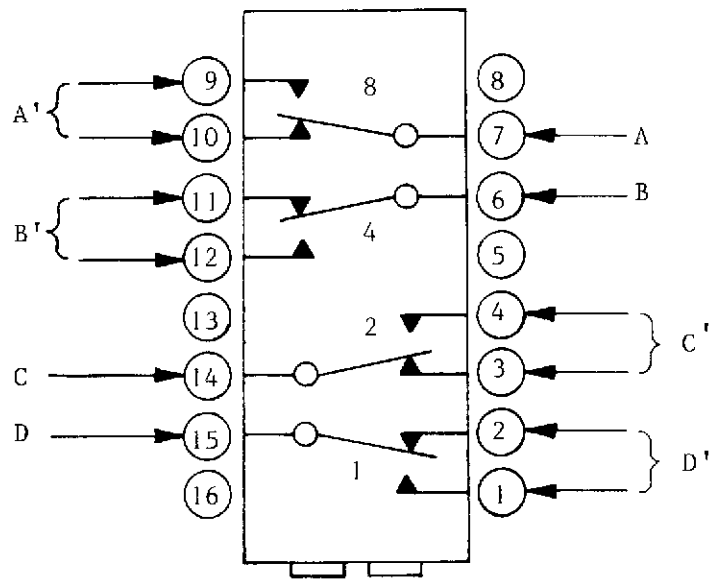
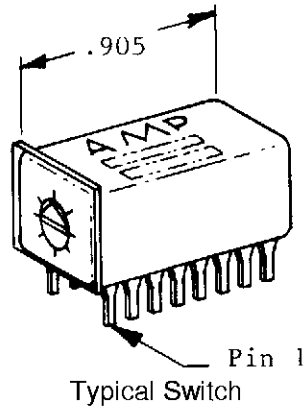
4.4. Quality Conformance Inspection

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.



Section X-X Rotated 90° Counterclockwise

Figure 3
Resistance & Temperature Measurement Points



Pin Configuration Schematic (Position 0)

Figure 4
Electrical Measurement Points

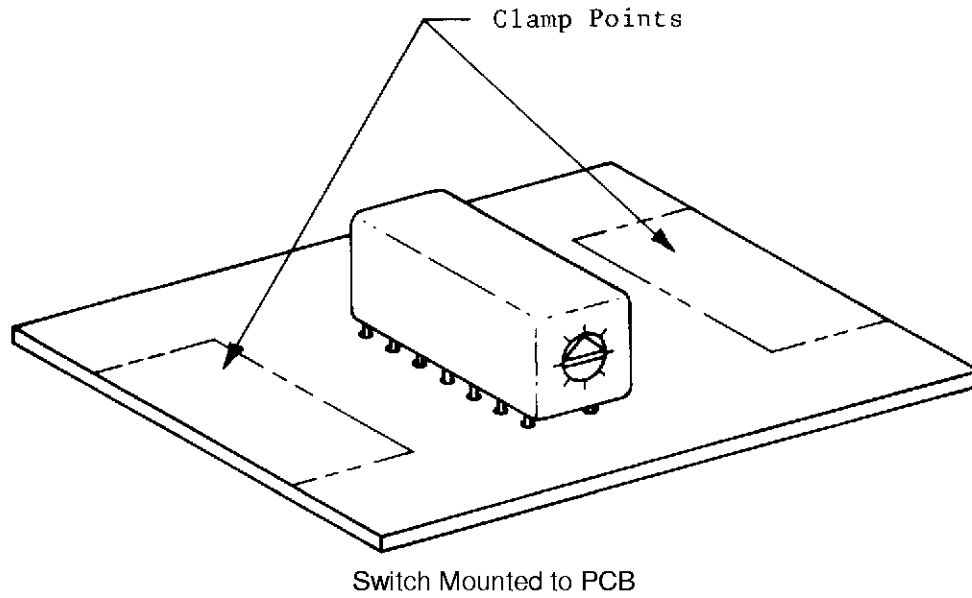


Figure 5
Mounting & Clamping Locations For Vibration & Physical Shock