Interconnection System, AMPMODU* Mod IV, Wire To Board, Standard Pressure Gold Contacts

1. SCOPE

1.1. Content

This specification covers performance, tests and quality requirements for AMPMODU* Mod IV interconnection system. This miniature system consists of standard pressure receptacle contacts crimped onto either solid or stranded wire and then inserted into a Mod IV housing. This system is designed to mate with AMPMODU Mod II .025 inch square posts or headers.

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. 114-25003: Application Specification
E. 501-313: Test Report
F. 502-1055: Engineering 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. Contact:
(1) Beryllium copper
(2) Copper-tin-phosphor bronze
B. Housing: Flame retardant thermoplastic, UL94V-0

3.3. Ratings

A. Voltage: 250 vac
B. Current: See Figure 4 for applicable current carrying capability
C. Temperature: -65 to 105°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 and AMP Spec 114-25003.	Visual, dimensional and functional per applicable quality inspection plan.
ELECTRICAL		
Termination resistance.	12 milliohms maximum for beryllium copper. 20 milliohms maximum for copper-tin-phosphor bronze.	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.	5000 megohms minimum initial.	AMP Spec 109-28-4. Test between adjacent contacts of unmated samples.
Dielectric withstanding voltage.	750 vac at sea level. 300 vac at 50000 feet. 275 vac at 70000 feet.	AMP Spec 109-29-1. Test between adjacent contacts of unmated samples.
Temperature rise vs current.	30°C maximum temperature rise at specified current.	AMP Spec 109-45-1. Measure temperature rise vs current. See Figure 4.
Crimp resistance.	Wire Size (AWG) / Test Current (amperes) / Resistance (milliohms max) Initial / Final 20 / 3.0 / 2.0 / 3.0 22 / 3.0 / 3.0 / 5.0 24 / 3.0 / 4.0 / 6.0 See Note (b).	AMP Spec 109-25.
Current cycling.	See Note (b).	AMP Spec 109-51.
MECHANICAL		
Vibration, sinusoidal.	No discontinuities of 1 microsecond or longer duration. See Note (a).	AMP Spec 109-21-4. Subject mated samples to 20 G's between 10-2000-10 Hz traversed in 20 minutes. 4 hours in each of 3 mutually perpendicular planes. See Figure 5.

Figure 1 (cont)

Test Description	Requirement	Procedure
Physical shock.	No discontinuities of 1 microsecond or longer duration. See Note (a).	AMP Spec 109-26-9. Subject mated samples to 100 G's sawtooth shock pulses of 6 milliseconds duration. 3 shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks. See Figure 5.
Durability.	See Note (a).	AMP Spec 109-27. Mate and unmate samples for 200 cycles for 30 μin gold plating and 75 cycles for 15 μin gold plating at maximum rate of 600 cycles per hour.
Mating force.	9 ounces maximum per contact.	AMP Spec 109-42, Condition A. Measure force necessary to mate samples a distance of .230 inch from point of initial contact with housing face at maximum rate of 1 inch per minute.
Unmating force.	1.5 ounces minimum per contact.	AMP Spec 109-42, Condition A. Measure force necessary to unmate samples at maximum rate of 1 inch per minute.
Crimp tensile.	Wire Size (AWG) / Crimp Tensile (pounds minimum): 20 — 17.5; 22 — 11.0; 24 — 7.0; 26 — 4.0; 28 — 2.7; 30 — 1.2; 32 — 1.0. See Note (b).	AMP Spec 109-16.
Contact retention.	Contacts shall not dislodge from normal locking position when a 5 pound axial load is applied. See Note (b).	AMP Spec 109-30.
Contact engaging force.	8 ounces maximum per contact. See Note (b).	AMP Spec 109-35.
Contact separating force.	1 ounce minimum per contact. See Note (b).	AMP Spec 109-35.
ENVIRONMENTAL		
Thermal shock.	See Note (a).	AMP Spec 109-22. Subject unmated samples to 5 cycles between -65 and 105°C.

Figure 1 (cont)

Test Description	Requirement	Procedure
Humidity-temperature cycling.	See Note (a).	AMP Spec 109-23-3, Condition B. Subject unmated samples to 10 cycles between 25 and 65°C at 95% RH.
Temperature life.	See Note (a).	AMP Spec 109-43. Subject mated samples to temperature life at 105°C for 500 hours.
Mixed flowing gas.	See Note (a).	AMP Spec 109-85-2. Subject mated samples with 15 μin gold plating to environmental class II for 14 days.
		AMP Spec 109-85-3. Subject mated samples with 30 μin gold plating to environmental class III for 20 days.

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

(b) Details of test contained in Engineering Report 502-1055.

Figure 1 (end)

3.6. Product Qualification and Requalification Test Sequence

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

(a) See Para 4.1.A.
(b) Numbers indicate sequence in which tests are performed.
(c) Discontinuities shall not be measured. Energize at 18°C level for 100% loadings per AMP Specification 109-151.
(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. Each test group shall consist of minimum of 5 connectors. A minimum of 30 randomly selected contacts distributed between the 5 connectors shall be measured. Contacts shall be crimped in accordance with AMP Specification 114-25003. Test group 1 shall consist of gold plated contacts for minimum and maximum connector sizes crimped to wire. Test group 2 shall consist of gold plated contacts crimped to 20 AWG wire. Test group 3 shall consist of gold plated contacts.

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.

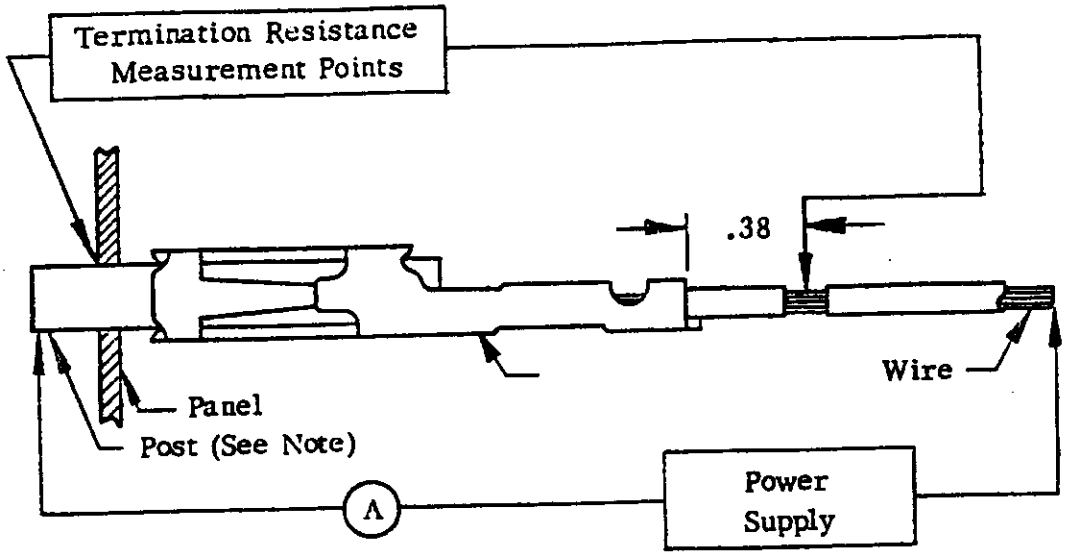

Figure 3
Termination Resistance Measurement Points

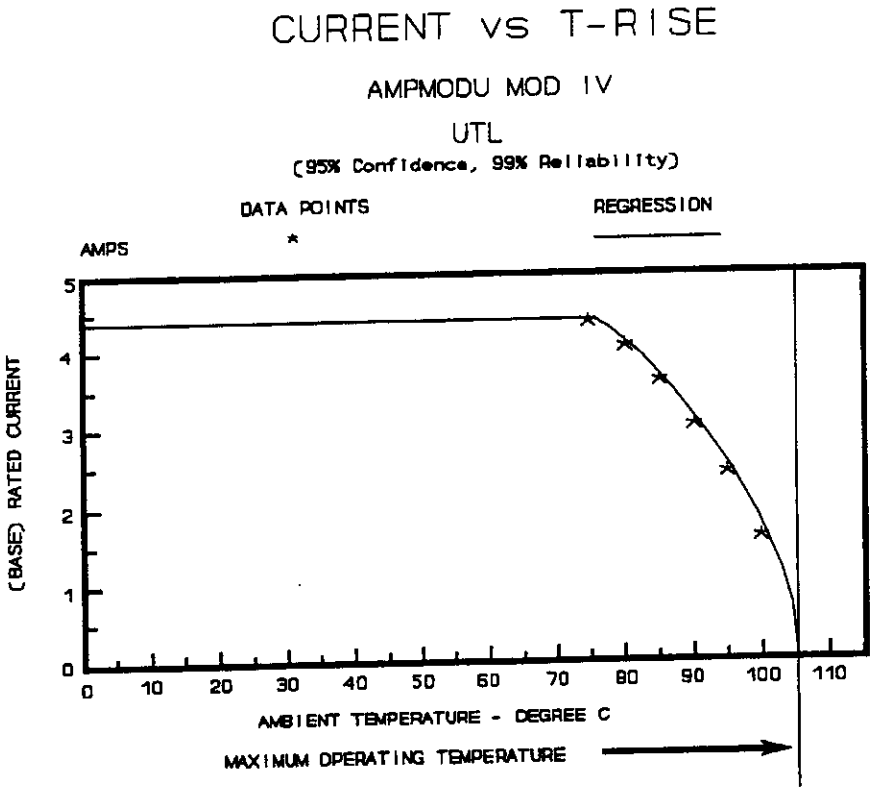

Figure 4A
Current Carrying Capability

Percent Connector Loading	Wire Size AWG						
	32	30	28	26	24	22	20
Single Contact	0.642	0.683	0.728	0.781	0.842	0.914	1.000
50	0.377	0.401	0.428	0.459	0.495	0.537	0.587
100	0.293	0.311	0.332	0.356	0.384	0.416	0.456

Note: To determine acceptable current carrying capacity for percentage connector loading and wire gage indicated, use Multiplication Factor (F) from above chart and multiply it times Base Rated Current for a single circuit at maximum ambient operating temperature as shown in Figure 4A.

Figure 4B
Current Rating

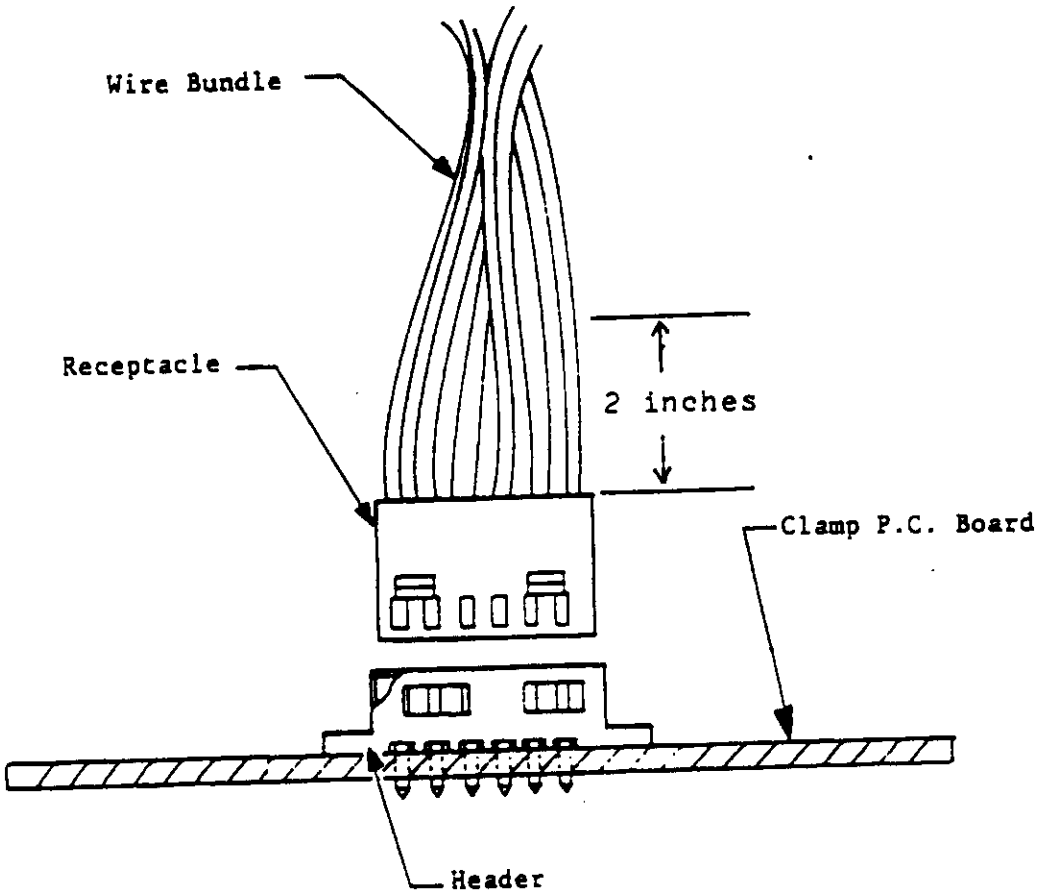

Figure 5
Vibration & Physical Shock Mounting Fixture