PRODUCT SPECIFICATION

1. SCOPE

1.1. Content

This specification covers performance, tests and quality requirements for AMP* HDR connector assembly and its associated Type XI contacts. This connector has been designed for high density pin and socket circuitry applications requiring easy maintenance, ready circuit identification, ease of circuit change and repeated connect-disconnect capabilities.

1.2 Connector Assembly Definition

A connector assembly is a mateable plug connector and receptacle connector. The designation, plug or receptacle, is determined by connector configuration and is independent of the type of contacts the connector contains.

1.3. Connector Configuration

Basic configuration of this multiple position pin and socket connector is rectangular of .100 inch center square grid and Diallyl phthalate or phenolic housing material.

1.4. Contact Configuration

Type XI, size 20 pin and socket contacts are available in three contact configurations as follows:

A. 20 thru 24 AWG range contacts
B. 26 thru 30 AWG range contacts
C. .025 X .025 inch posts

1.5. 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.

*Trademark

Product Code: 5041

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CONTROLLED DOCUMENT This specification is a controlled document per AMP Specification 102-21. It is subject to change and Corporate Standards should be contacted for latest revision.				DR F. Reinhardt 4/18/90 CHK G. Axe 4/19/90 APP J. Kalasky 4/20/90	AMP Incorporated Harrisburg, PA 17105-3608		
					NO 108-10015	REV D	LOC B
D	Revised per EC 0600-0667-93	B/B	8/2/92	PAGE 1 OF 9	TITLE CONNECTOR, HDR (TYPE XI CONTACTS)		
LTR	REVISION RECORD	APP	DATE				

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. 114-10002: Application Specification
E. 501-109: 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. Material

A. Contact: Brass
B. Housing: Diallyl phthalate or phenolic

3.3. Ratings

A. Voltage/Current: 440 vac (sea level) at 3.0 amperes maximum. See Para 3.5.(a)
B. Operating Temperature:
(1) -65 to 125°C DAP
(2) -55 to 150°C Phenolic

3.4. Performance and Test Description

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

3.5. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure
Examination of product.	Meet requirements of product drawing and AMP Spec 114-10002.	Visual, dimensional and functional per applicable inspection plan.

Figure 1

Test Description	Requirement	Procedure
ELECTRICAL		
Termination resistance, specified current.	Wire Size AWG / Test Current amperes / Resistance milliohms maximum (Gold / Tin) 20 — 3.00 — 8.0 / 9.2 24 — 2.25 — 14.5 / 15.5 26 — 1.75 — 22.0 / N/A 30 — 1.00 — 48.0 / N/A .025 X .025 w/28 AWG — 1.25 — 36.0 / N/A	Measure potential drop of mated contacts assembled in housing. Calculate resistance. See Figure 3. AMP Spec 109-25.
Termination resistance, dry circuit.	Wire Size AWG / Resistance milliohms maximum (Gold / Tin) 20 — 8.0 / 16.5 24 — 14.5 / 27.0 26 — 22.0 / N/A 30 — 48.0 / N/A .025X.025 w/28 AWG — 36.0 / N/A	Subject mated contacts assembled in housing to 50 mv open circuit at 100 ma maximum. See Figure 3. AMP Spec 109-6-1.
Dielectric withstanding voltage.	Test Voltage / Altitude Feet 1000 — Sea Level 300 — 50,000 200 — 70,000 No breakdown or flashover.	Test between adjacent positions of mated connector assemblies. AMP Spec 109-29-1.
Insulation resistance.	DAP: 50000 megohms minimum initial. 5000 megohms minimum final. Phenolic: 5000 megohms minimum initial. 100 megohms minimum final.	Test between adjacent contacts of unmated connector assemblies. AMP Spec 109-28-4.
Temperature rise vs current.	30°C maximum temperature rise at specified current.	Measure temperature rise at specified current. See termination resistance, specified current for required currents. AMP Spec 109-45-1.
MECHANICAL		
Vibration, sinusoidal, low frequency.	No discontinuities greater than 1 microsecond.	Subject mated connectors to 10-55-10 Hz traversed in 1 minute at .06 inch total excursion. 2 hours in each of 3 mutually perpendicular planes. AMP Spec 109-21-1.

Figure 1 (cont)

Test Description	Requirement	Procedure
Vibration, sinusoidal low frequency, energized.	See Note (b).	Energize circuit at rated current. Refer to termination resistance, specified current for test current levels. Subject mated connectors to 10-55-10 Hz traversed in 1 minute at .06 inch total excursion. 2 hours in each of 3 mutually perpendicular planes; AMP Spec 109-21-1.
Physical shock.	No discontinuities greater than 1 microsecond.	Subject mated connectors to 75 G's sawtooth shock pulses of 6 milliseconds duration. 3 shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks. AMP Spec 109-26-8.
Mating force.	Plating / Ounces maximum per contact initial Gold: 25 Tin: 50	Measure force necessary to mate connector assembly with jackscrews removed a distance of .150 inch from point of initial contact using free floating fixtures at rate of .5 inch per minute. Calculate force per contact. AMP spec 109-42, Condition A.
Unmating force.	Plating / Ounces minimum per contact final Gold: 1.5 Tin: 1.8	Measure force necessary to unmate connector assembly with jackscrews removed at rate of .5 inch per minute. Calculate force per contact. AMP Spec 109-42, Condition A.
Contact retention.	Material / Axial load pounds minimum DAP: 5.0 Phenolic: 7.5	Apply axial load of 5 pounds to DAP and 7.5 pounds to phenolic. Load to be applied to contacts from mating face side of connector. AMP Spec 109-30.

Figure 1 (cont)

Test Description	Requirement	Procedure
Contact engaging force.	Plating Type: Gold — Ounces maximum per contact: 25; Tin — 50	Size twice using maximum gage pin. During third insertion, measure force required to engage as indicated in Figure 1 at rate of .5 inch per minute to engagement depth of .190 inch. AMP Spec 109-35.
Contact separating force.	Plating Type: Gold — Ounces minimum per contact: .75; Tin — 6	After sizing 3 times using maximum gage pin, measure force required to separate with minimum pin as indicated in Figure 1 at rate of .5 inch per minute from separation depth of .190 inch. AMP Spec 109-35.
Crimp tensile.	Wire Size AWG / Crimp tensile pounds minimum: 20 — 20.0; 24 — 7.5; 26 — 5.0; 30 — 1.3	Determine crimp tensile at rate of 1 inch per minute. AMP Spec 109-16.
Durability.	See Note (b).	Mate and unmate connector assemblies for number of cycles indicated at maximum rate of 300 cycles per hour. AMP Spec 109-27. Plating: Gold — Cycles: 500; Tin — 250
ENVIRONMENTAL		
Thermal shock (a).	See Note (b).	Subject mated connectors to 5 cycles between -65 and 125°C for DAP; -55 and 125°C for Phenolic. AMP Spec 109-22.
Humidity-temperature cycling.	See Note (b).	Subject mated connectors to 10 humidity-temperature cycles between 25 and 65°C at 95% RH. AMP Spec 109-23, Method III, Condition B with low frequency vibration and cold shock at -10°C.

Figure 1 (cont)

Test Description	Requirement	Procedure
Mixed flowing gas.	See Note (b).	Subject mated connectors to environmental class II for 20 days. AMP Spec 109-85-2.
Temperature life	See Note (b).	Subject mated connectors to 125°C for DAP and 150° C for Phenolic. AMP Spec 109-43, Test duration B.

(a) Maximum rated current that can be carried by this product is limited by maximum operating temperature of housings, and temperature rise of contacts, which is 30°C. Variables which shall be considered for each application are: wire size, connector size, contact size, contact material, and ambient temperature.
(b) Shall show no evidence of damage, cracking or chipping.

Figure 1 (end)

3.6. Product Qualification, Requalification and Retention Tests and Sequences

Examination of Product	Test Group (a)				
	1	2	3	4	5
	Test Sequence (b)				
Examination of product (c)	1,10	1,10	1,12	1,10	1,10
Termination resistance, specified current	3			3	
Termination resistance, dry circuit	2,8	3,8		2,8	3,8
Dielectric withstanding voltage			6,10		
Insulation resistance			5,9		
Temperature rise vs current	4,9			4,9	
Vibration, energized	5			5	
Vibration		4			4
Physical shock		5			5
Mating force		2			2
Unmating force		9			9
Contact retention			4		
Contact engaging force			2		
Contact separating force			3		
Crimp tensile			11		
Durability		6			6
Thermal shock			7		
Humidity-temperature cycling			8	6	7
Mixed flowing gas	6	7			
Temperature life	7			7	

(a) See Para 4.1.A.
(b) Numbers indicate sequence in which tests are performed.
(c) In group 3, general condition of contacts shall be noted upon completion of those tests listed in Figure 2

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. Each test group shall be prepared with approximately two foot lengths of wire. Each test group shall consist of 6 connector pairs of the largest configuration and 6 connector pairs of the smallest configuration. Three connector pairs of the largest and 3 connector pairs of the smallest configuration should be wired with the maximum applicable gage wire. Three connector pairs of the largest and 3 housings of the smallest configuration should be wired with the minimum applicable gage wire. For specified current and dry circuit termination resistance measurements, only 5 contact positions shall be tested per connector pair for housings containing 36 contact positions or less. Only 15 contact positions shall be tested per connector pair for housings containing greater than 36 contacts. For contact retention testing, 10 contacts from each of the housings containing 36 contact positions or less shall be evaluated for contact retention. Twenty contacts shall be tested in those connector housings containing greater than 36 contact positions. Ten contacts from each of the group 3 connector assemblies shall be evaluated for crimp tensile.

B. Test Sequence

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

4.2. Retention of Qualification

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

4.3. Requalification Testing

If changes significantly affecting form, fit or function are made to product or manufacturing process, Reliability Engineering shall coordinate requalification testing, consisting of all or part of original testing sequence as determined by Development/Product, Quality, and Reliability Engineering.

4.4. 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.

4.5. 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.

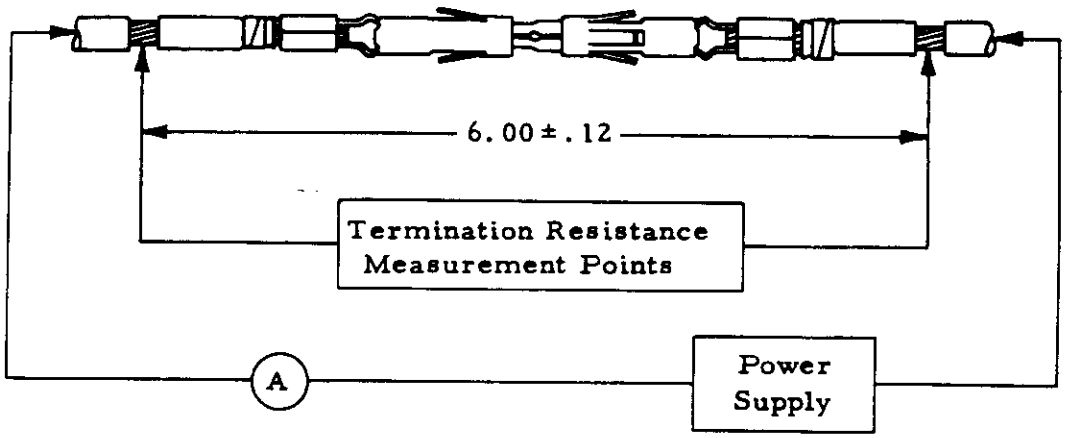
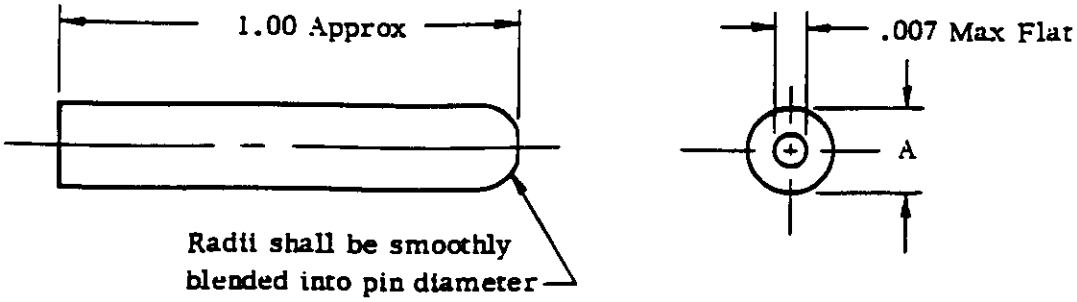


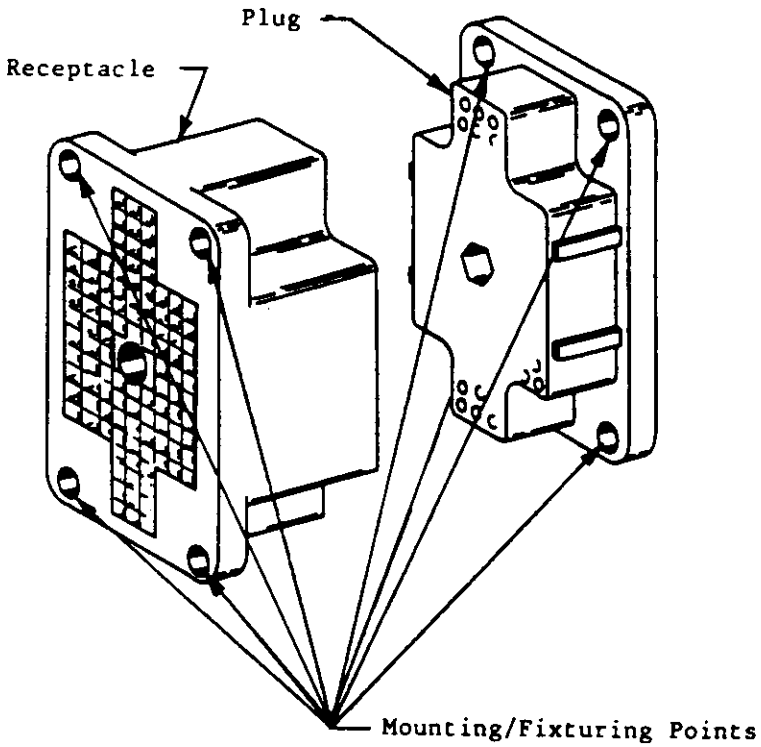
Figure 3
Termination Resistance Measurement Points



Gage No.	"A" Dimension
1 Maximum	+.0000 .0410 -.0001
2 Minimum	+.0001 .0390 -.0000

Note: (1) Heat treat to R_c 68 - 70
(2) Pin to comply with MS 3197
(3) Finish: 6 - 10 microinches RMS

Figure 4
Engaging and Separating Pins



Note: Cable tie downs, 8 inches from rear of the connector

Figure 5
Vibration & Physical Shock Mounting Points