

The product described in this document has not been fully tested to ensure performance to the requirements outlined below. Therefore AMP makes no representation or warranty express or implied that the product will comply with these requirements. Further AMP may change these requirements based upon the results of additional testing and evaluation. Contact AMP GB Engineering for further details.

## 1. SCOPE

### 1.1 Content

This specification covers performance, test and quality requirements for a special "AMP 2 position 4.80mm high Battery Connector. The connector is designed to make a connection between the battery cells of a battery-pack and the system printed circuit board through and intermediate PC Board in the battery pack. The contacting end to the battery is of spring type, while the connection to the system PC board is of the surface mount soldering type, representing 2 solder joints per contact.

### 1.2 Qualification.

When tests are performed on subject product, procedures specified in this Product Specification shall be used. All inspection shall be performed using application inspection plan and product drawings.

## 2. APPLICABLE DOCUMENTS.

The following documents form 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 the product drawings, product drawings will take precedence. In the event of conflict between requirements of this specification and referenced documents, this specification shall take precedence.

### 2.1 AMP Documents.

107-3262 Packaging Specification. (I/O Connector).  
114-3211 Application Specification.  
GB 39-99 Test Report.

### 2.2 AMP Drawings.

C-699905 Battery Connector 2 position SMT

### 2.3 Other Documents.

IEC-68 Basic environmental testing procedures for electric components and electronic equipment.  
IEC-512 Connectors used for frequencies below 3 MHz (Mc/s)  
EIA-481 Packaging standard for EIA pocket tape

### Revision Summary

REV .1.	Preliminary Issue (14 <sup>th</sup> January 1999)
REV .2.	EB00-0315-99
REV .A.	EB00-0669-99
REV .B.	EB00-0282-00

Drawn:- Ian Aspland

Approved:- Frank Wheeler-King

### 3. REQUIREMENTS.

#### 3.1 Design and Construction..

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

#### 3.2 Materials and Finishes.

Contacts:-                               - Copper alloy, post plated with selective gold, gold flash and tin/lead on soldering end.

Housings:-                               - LCP, 30% GF, UL94V-0, Colour Black.

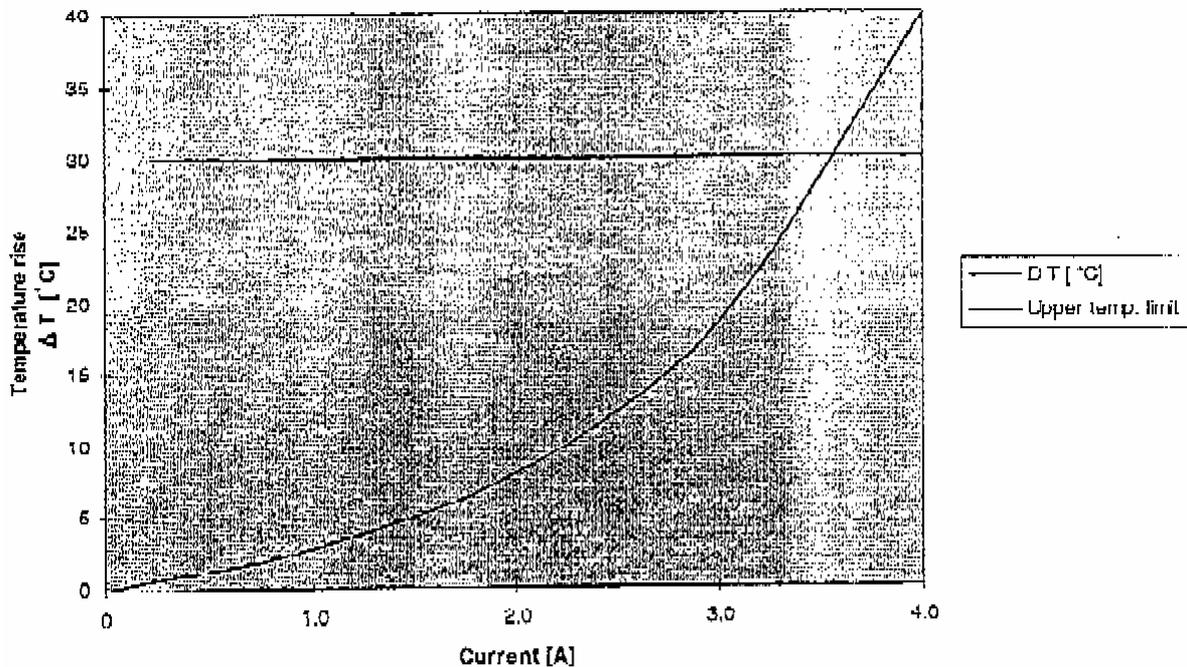
#### 3.3 Ratings.

Voltage                                   - 100 Volts alternating current Peak

Current:                                   - 2 Amperes continuous. (See also curve in Figure .1.)

Temperature                               - -40°C to +85°C

Durability                                 - 5,000 cycles ( $\Delta R$  20m $\Omega$  max.).



**FIGURE .1.**

**3.4 Performance and Test Description.**

The product is designed to meet Electrical, Mechanical and Environmental performance specified in this paragraph as tested per test sequence in Paragraph 3.6. Unless otherwise specified, all tests are to be at ambient environmental conditions per IEC specification 68-1 clause 5.3 and are performed with connectors in mated conditions.

**VISUAL**

<b>Test Description</b>	<b>Performance Requirements or severity</b>	<b>Procedure</b>
<b>3.4.1</b> Examination of product	Meets requirements or product drawing.	Visual, Dimensional and Functional per applicable inspection plan. In accordance with IEC 512-2. Test 1a. Magnification x 10
<b>3.4.2</b> Coplanarity Check	To be within 0.15mm.	3-D Measuring equipment

**ELECTRICAL**

<b>Test Description</b>	<b>Performance Requirements or severity</b>	<b>Procedure</b>
<b>3.4.3</b> Termination Resistance "See para 3.5.1"	Max. open voltage 20mV Max. current 100mA. All contacts measured. Termination resistance consists of bulk-connector + contact resistance. Requirement: 15mΩ max (Initial) ΔR 20 mΩ max.	In accordance with IEC 512-2 test 2a.
<b>3.4.4</b> Insulation Resistance	Test Voltage 100 V DC or AC peak, unmated. Duration: 1 minute. Requirement: 1000MΩ min.	In accordance with IEC 512-2 test 3a, method C.
<b>3.4.5</b> Voltage proof.	Test voltage 200 V AC. Duration 1 minute Unmated. Requirement: No break down or flash over.	In accordance with IEC 512-2 test 4a, method C.
<b>3.4.6</b> Current Cycling	100 cycles Requirement:- Termination resistance shall not exceed final value.	In accordance with IEC 512-5 test 9e.
<b>3.4.7</b> Temperature rise versus current.	See curve in figure .1.	In accordance with IEC 512-3 test 5b.

**MECHANICAL**

Test Description	Performance Requirements or severity	Procedure
<b>3.4.8</b> Contact normal force. "See para 3.5.2"	Requirement: As indicated in figure .4.	Force / Deflection curve. Measurement acceptance in figure .2.
<b>3.4.9</b> PC Board attachment strength. "See para 3.5.3"	Requirement: 45N min Points of action see figure.5.	In accordance with IEC 512-8 test 15b.
<b>3.4.10</b> Contact retention in housing "See Para 3.5.4."	35N min / Contact. Points of action see figure.6.	In accordance with IEC 512-8 test 15b.
<b>3.4.11</b> Vibration "See para 3.5.5."	5-150 Hz acceleration - 1.5g 1 Oct./min - 1 hour in each direction. Requirement: No physical damage. No discontinuity > 1 µsec	In accordance with IEC 68-2-6 test Fc.
<b>3.4.12</b> Mechanical Operations "See para 3.5.5."	5,000 mating cycles. Check after each 2000 cycles: Visual, Termination resistance and normal force.	In accordance with IEC 512-5 test 9a.
<b>3.4.13</b> Shipping Endurance.		
Vibration	Sweep 10-150 Hz, acceleration 1.5g, 1 Oct/min 1 hour in each direction.	In accordance with IEC 68-2-6 test Fc.
Random Vibration	Sweep from 10 to 150 Hz, PSD 0.05 g <sup>2</sup> /Hz.	In accordance with IEC 68-2-36 test Fdb.
Deceleration	500 g half sine-wave pulse of 10ms 2 shocks in each direction.	In accordance with IEC 68-2-20 test Ta.

**ENVIRONMENTAL**

Test Description	Performance Requirements or severity	Procedure
<b>3.4.14</b> Damp/Heat Cyclic	25/55°C 12/12 hrs RH 93% - 6 cycles. Unmated in test group 3	In accordance with IEC 68-2-30 test Dp.
<b>3.4.15</b> Heat age test	Temperature 85°C Duration 500 hours	In accordance with IEC 68-2-2 test Ba.
<b>3.4.16</b> Solderability	Solder temp 215°C ±3°C. Dip duration 3 ±0.3 sec Aging 3 (16 hrs at 155°C) unmated. Requirement: Max 5% de-wetting.	In accordance with IEC 68-2-20 test Ta.

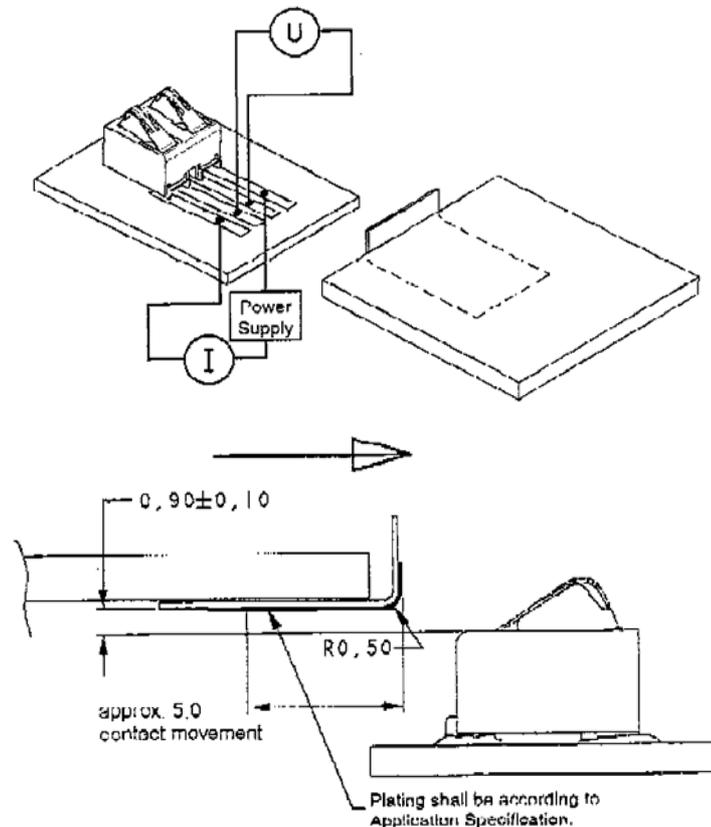
**ENVIRONMENTAL**

Test Description	Performance Requirements or severity	Procedure
<b>3.4.17</b> Resistance to Soldering Heat. "See para 3.5.6."	2 cycles of IR-soldering heat-curve specified in figure .6. Requirement: No cracks, chips or melting.	In accordance with EIA-J spec RX-0102-102 para 3.3.4.
<b>3.4.18</b> Rapid Change of Temperature	-40°C/85°C 2hrs/2hrs 5 cycles unmated. Change-over time < 3 min.	In accordance with IEC 68-2-14 test Na.
<b>3.4.19</b> Salt Spray	2 spraying cycles at 35 ±2°C, each 2 hrs 5 ±1% salt solution with pH6.5-7.2. Storage: 7 days at 40 ±2°C 93% RH after each cycle	In accordance with IEC 68-2-52 test Kb.
<b>3.4.20</b> Artificial Perspiration	Temperature 55°C, unmated (Touchable parts only)	In accordance with NF S 80-77

**3.5 Additional Test and Measuring.**

**3.5.1 Termination Resistance Measurement.**

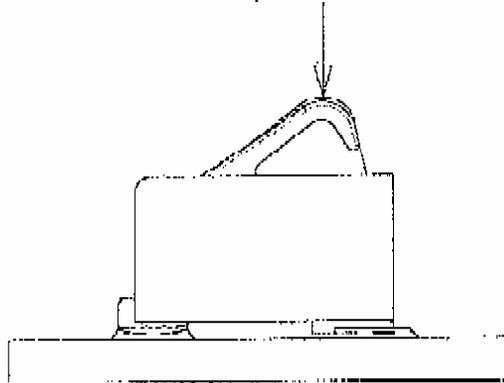
Termination resistance measurement shall be measured as indicated in Figure .2.



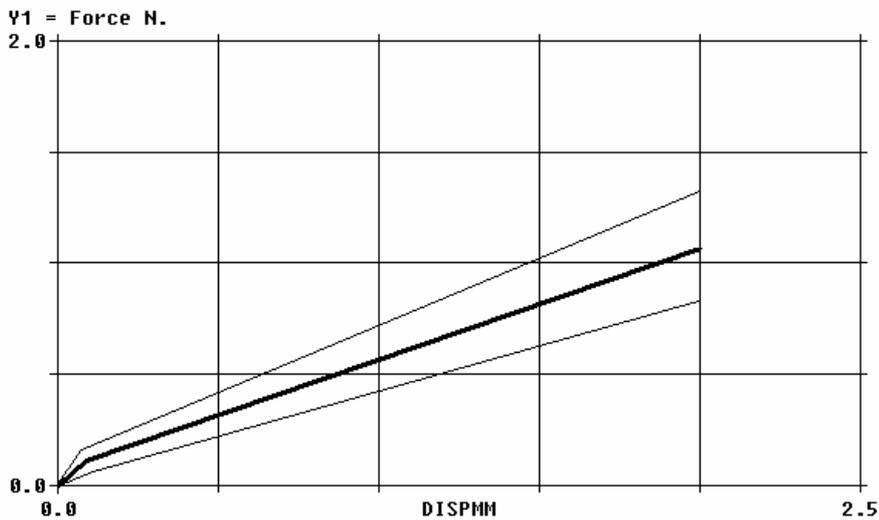
**FIGURE .2.**

**3.5.2 Contact Normal Force..**

Contact normal force shall be measured with point of action as indicated in figure .3.



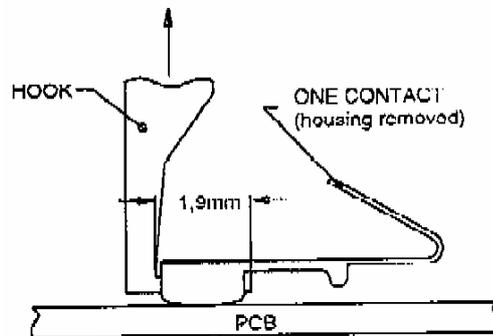
**FIGURE .3.**



**FIGURE .4.**

**3.5.3 PC-Board Attachment Strength.**

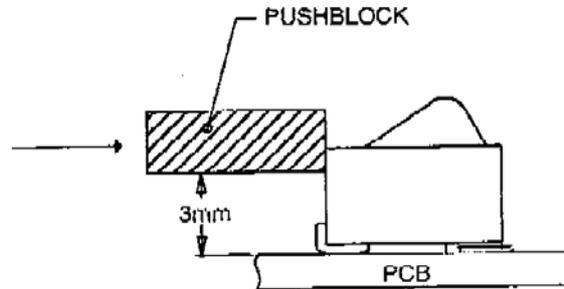
PC-Board attachment strength shall be measured with pulling force point of action as indicated in Figure .5.



**FIGURE .5.**

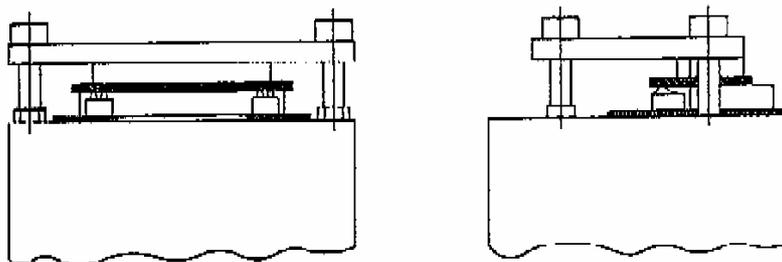
**3.5.4 Contact Retention In Housing.**

Contact retention in housing shall be measured in tear off force point of action as indicated in Figure .6.



**FIGURE .6.**

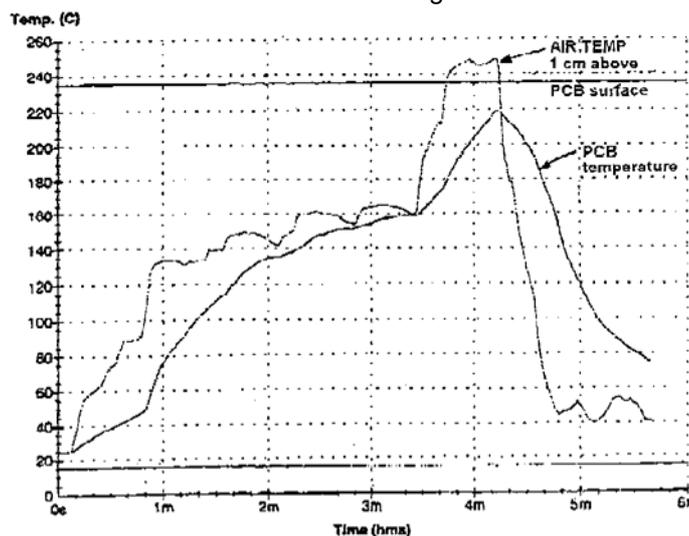
**3.5.5** Test frames for mechanical operation, Vibration and physical shock tests shall simulate the actual application. For configuration details see Figure .7.  
If applicable the actual phone hand set shall be used for optimum simulation.



**FIGURE .7.**

**3.5.6 Resistance To Solder Heat.**

Resistance to solder heat test shall cover the IR soldering heat curve as indicated in Figure .8.



**FIGURE .8.**

**3.6 Product Qualification and Re-Qualification Test Sequence.**

Test or Examination	Test Group							
	1	2	3	4	5	6	7	8
	Test Sequence							
Examination of product	1,8	1,11	1,8	1,7	1,3	1,8	1,5	1,5
Coplanarity Check							2,4	2,4
Termination Resistance	3,6	3,7,10		3,6		2,4,7		
Insulation Resistance			2,6					
Voltage Proof			3,7					
Current Cycling				5				
Temperature-rise Versus Current				4				
Vibration	4							
Contact Normal Force		4,9						
PC-Board Attachment Strength	10							
Contact Retention In Housing		12						
Mechanical Operation		5						
Damp Heat Cyclic	5	6	5					
Heat Age Test		8						
Solderability					2			
Resistance to Soldering Heat	2	2		2			3	
Rapid Change Of Temperature			4					
Salt Spray	7							
Artificial Perspiration						3,6		
Shipping Endurance								3

- a). See Paragraph 4.1.A.  
b). Numbers indicate sequence in which tests are performed.

## 4. QUALITY ASSURANCE PROVISIONS.

### 4.1 Qualification Testing.

#### A. Sample Selection.

Samples shall be prepared in accordance with applicable instructions and shall be selected random from current production.

With exception of test group 8. All test-groups shall consist of a minimum of 8 connectors.

With exception of test groups 5,7 and 8, connectors in each group shall be IR reflow soldered to a PC board enduring the IR heat curve ONCE ONLY and shall be mounted in test frame or pocket phone cases according to the actual application.

#### B. Test Sequence.

Qualification inspection shall be verified by testing samples as specified in paragraph 3.6.

### 4.2 Re-Qualification Testing.

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

### 4.3 Acceptance.

Acceptance is based on verification that the product meets the requirements of paragraph 3.5.

Failures attributed to equipment, test set-up or operator deficiencies shall not disqualify the product.

When product failure occurs, corrective action shall be taken and samples re-submitted for qualification. Testing to confirm corrective action is required before re-submittal.

### 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.