



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

AMPMODU 2mm HEADER AND RECEPTACLE

1. SCOPE

1.1. Contents

This specification covers the performance and tests requirements for the AMPMODU 2mm BOARD-TO-BOARD CONNECTORS.

1.2. Qualification

When tests are performed on the subject product line, procedures specified in reference specification shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

2. APPLICABLE DOCUMENTS AND FORMS

The following documents and forms constitute 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. Unless otherwise indicated, the latest edition of the document applies.

2.1. Qualification Test Results

502-139202	Test report AMPMODU 2mm BtB Headers (Gold version)
502-139204	Test report AMPMODU 2mm BtB Headers (Tin version)
502-153501	Test report AMPMODU 2mm BtB Receptacles (Gold version)
502-139217	Test report AMPMODU 2mm BtB Receptacles (Tin version)

2.2. Application Specification

114-32259	Application specification AMPMODU 2mm Header
114-32186	Application specification AMPMODU 2mm Receptacles – Board to Board
114-64040	Application specification AMPMODU 2mm Header Platform

2.3. IEC Specification

IEC 60512	Connectors for Electronic Equipment Tests and Measurements.
IEC 60068	Environmental Testing General Procedure

2.4. Reference Documents

109-1	General Requirements for Testing
109-197	TE Connectivity Test Specifications vs EIA and IEC Test Methods

PRELIMINARY

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. Materials

Materials used in the construction of this product shall be as specified on the applicable product drawing. In case of a conflict between this document and the product drawing, Product drawing shall be considered.

Housing	:	High Temperature plastic, UL 94 V0, BLACK.
Receptacle Contact	:	Phosphor Bronze
Header post	:	Brass, Phosphor Bronze
Plating	:	Min 2.0µm Tin or 0.1µm Gold Flash or 0.38µm gold or 0.76µm gold at contact area over Nickel under plating.

3.3. Ratings

Table 1

Voltage	Current	Operating Temperature
125V DC or 125 V AC RMS	2A Maximum	-40 to 125°C for Au Plated Contact
		-40 to 105°C for Sn Plated Contact

4. TEST REQUIREMENTS AND PROCEDURES

4.1. Product is designed to meet the electrical, mechanical and environmental performance requirements specified below:



Unless otherwise specified, all tests shall be performed at ambient environmental conditions per TE specification 109-1

Table 2

TEST DESCRIPTION	REQUIREMENT	PROCEDURE
Examination of product	Meets requirements of product drawing and Application Specification. No physical damage	Visually inspected per applicable quality inspection plan or IEC 60512-1-1 (Visual inspection)
ELECTRICAL		
Temperature rise	42°C maximum (30°C max @1.6A)	Stabilize at a single current level for 1 hour after 3 consecutive readings at 5-minute intervals are within 1°C. Current-carrying capacity tests IEC 60512-5-1
Contact Resistance	Initial: Max 15mΩ Final: Max 30mΩ	IEC 60512-2-1 (Contact resistance – millivolt level method) Contacts assembled in housing to closed circuit current of 100mA max at open circuit voltage of 20mV max.
Insulation Resistance	1000MΩ min. (Initial) 500MΩ min. (Final)	The insulation resistance shall be measured between two adjacent terminations having a minimum spacing using 500VDC

		IEC 60512-3-1, Method C
Voltage proof	Dielectric strength - Connector must withstand potential of 650VAC for 1min, No breakdown or flashover. Current leakage limit to 5mA max.	IEC 60512-4-1 Measured by applying voltage potential to adjacent contacts, and between the grounds in the mated connector assembly.

MECHANICAL

Connector Mating/ Unmating force	Mating: 2.2 N max. Unmating: 0.2N min.	Subject terminated contact and posts to mate and un-mate, to measure the force required to insert and extract by operating at a rate of 25.4mm/min per contact IEC 60512-13-1										
Contact retention in housing	Post/ Receptacle - 5N min	Apply axial pull-off load to contact mounted on housing and measure the force required to dislodge contact from housing. IEC 60512-15-2										
Durability	Contact resistance R≤30mΩ final	IEC 60512-9-1 (Durability). <table border="1" data-bbox="911 846 1325 1041"> <thead> <tr> <th>No. of cycles</th> <th>Plating thickness (min)</th> </tr> </thead> <tbody> <tr> <td>250</td> <td>0.76µm Gold</td> </tr> <tr> <td>100</td> <td>0.38µm Gold</td> </tr> <tr> <td>50</td> <td>0.1µm Gold</td> </tr> <tr> <td>25</td> <td>2µm Tin</td> </tr> </tbody> </table>	No. of cycles	Plating thickness (min)	250	0.76µm Gold	100	0.38µm Gold	50	0.1µm Gold	25	2µm Tin
No. of cycles	Plating thickness (min)											
250	0.76µm Gold											
100	0.38µm Gold											
50	0.1µm Gold											
25	2µm Tin											
Vibration	No electrical discontinuity greater than 1 microsecond.	10-55-10 Hz traversed in 1 minute at 1.52mm amplitude 2 Hours each of 3 mutually perpendicular planes IEC 60512-6-4.										
Physical shock	No electrical discontinuity greater than 1 microsecond.	Subject mated connector, acceleration 50g, half sine wave pulses of 11msec, duration: 3 shocks, in each direction, 18 shocks in total IEC 60512-6-3.										

ENVIRONMENTAL

Dry heat/ Temperature Life (Heat Aging)	Contact resistance shall be met.	Temperature: 85°C Duration: 192 hours. IEC 60512-11-9
Humidity, Steady State	Insulation Resistance (Final) 500MΩ min. Contact resistance shall be met.	Subject mated connectors to steady state humidity at 40°C±2°C and 90-95% R.H for 96 hrs. IEC 60512-11-12
Mixed flow gas	Contact resistance shall be met.	Subject mated samples to environmental class III for 21 days. IEC 60068-2-60 (method 3).
Thermal Shock	Contact resistance shall be met.	Subject mated connector assemblies on 5 cycles -40 °C and +105°C for Tin Plated Contact (+125°C for Gold Plated Contact) for 30 minutes each duration at temperature extremes. IEC 60512-11-4 (Rapid change in Temp/thermal shock)

Solderability	The contact solder tails should be covered by a continuous new solder coating for 95% Minimum of affected area. No Physical damage shall occur	IEC 60512-12-1. Solder bath temp. 235°C Aging 3, 16 hours at 155°C
Resistance to Soldering Heat	No physical damage shall occur. 3 cycles of 260°C peak reflow soldering simulation curve.	TEC 109-201, Condition B (reflow curve 3.3, test method B)

4.2. Product Qualification and Requalification Test Sequence

Table 3

Test or Examination	Test Group					
	1	2 (B)	3 (Y)	4	5	6
	Test Sequence(a)					
Initial examination of product	1	1	1	1	1	1
Contact resistance	3, 7	2, 5, 7, 9	2, 4, 6			
Insulation resistance				2,6		
Voltage Proof				3,7		
Vibration	5	8				
Physical shock	6					
Connector Durability	4		3			
Connector Mating Force	2					
Connector Un-mating force	8					
Contact retention in housing						2
Thermal shock				4		
Humidity, Steady State †		4	5	5		
Dry Heat / Temperature life		6				
Mixed flowing gas †		4	5			
Solderability					2	
Resistance to Soldering heat					3	
Temperature Rise		3, 10				
Final examination of product	9	11	7	8	4	3



NOTE:

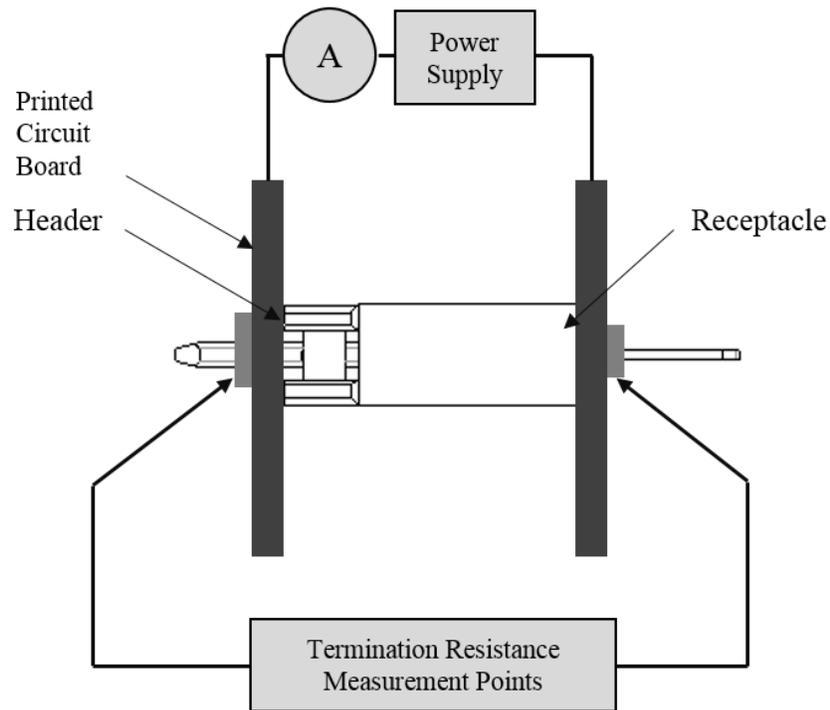
- a - Numbers indicate sequence in which tests are performed.
- † - Humidity, Steady state is for non-noble plating, Mixed flowing gas is for noble plating.

- β - Applicable only for Receptacles.
- γ - Applicable only for Headers.

5. QUALIFICATION TEST

Qualification test shall be performed according to the test methods and requirements specified in Table 2 according to sequence specified by Table 3

Figure 1 – Contact Resistance Measurement Set up



6. QUALITY ASSURANCE PROVISIONS

6.1. Sample Selection

The test specimens to be used for the performance evaluation testing, shall be prepared in accordance with TE Application Specification in Section 2.2 of this document. They shall be selected at random from production. At least 5 connectors of the 6 positions or at least 30 contacts shall be used for each test group.

6.2. Re-qualification testing

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

6.3. Acceptance

Acceptance is based on verification that product meets requirements defined in section 4. 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 resubmitting.

6.4. Quality conformance inspection

Applicable TE quality inspection plan will specify sampling acceptable quality level to be used. Dimensions and functional requirements shall be in accordance with applicable product drawing and this specification.