

3.5 mm AV PLATFORM CONNECTOR

INDEX

Index 1

1.	Scope	2
1.1	Content.....	2
1.2	Qualification.....	2
2.	Applicable Documents	2
2.1	TE Connectivity documents	2
2.2	Other documents	2
3.	Requirements	3
3.1	Design and construction	3
3.2	Ratings	3
3.3	Main Functional Requirements	3
3.4	Performance requirements and test descriptions.....	4
3.5	Product qualification and re-qualification test sequence	5
3.6	Additional Test and Measuring Details.....	8
4.	Quality assurance provisions	12
4.1	Re-qualification testing	12
4.2	Acceptance.....	12
4.3	Quality conformance inspection.....	12
Figure 1: Example of Audio Video Connector		2
Figure 2: Connector side circuit diagram		3
Figure 3: Contact Resistance Measurement		8
Figure 4: Test frame		8
Figure 5: Bending test explanation.....		9
Figure 6: Retention force measurement.....		9
Figure 7: Normal Force board spring Force measurement		10
Figure 8: Peel off measurement.....		10
Figure 9: Soldering profile.....		11

PRELIMINARY

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DATE 29 August 13

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DATE

1. SCOPE

1.1 Content

This specification covers performance-, test and quality requirements for the TE Connectivity 3.5 mm Audio Video platform connector. The connector is designed to connect a 3.5 mm Audio Video plug to a mobile device. The contacts of the receptacle (device side) are flexible; the plug is made with solid rings on the outside.

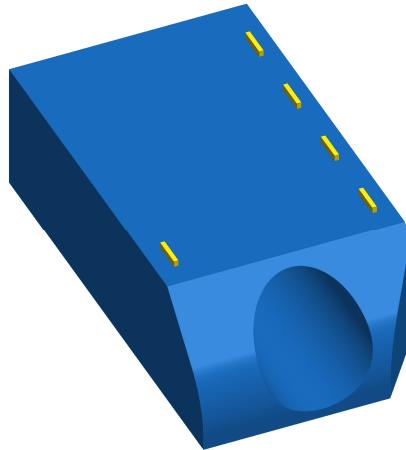


Figure 1: Example of Audio Video Connector

1.2 Qualification

When tests are performed on subject product, procedures specified in this Product Specification 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 revision of the document applies. In the event of conflict between the requirements in this specification and the 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 TE Connectivity documents

109-1 General Requirements for Test Specifications

2.2 Other documents

IEC 60512	Basic testing procedures and measuring methods for electromechanical components of electronic equipment.
IEC 60068	Basic environmental testing procedures
JEITA EIAJ RC-5325A	4 Pole miniature concentric plugs and jacks

3. REQUIREMENTS

3.1 Design and construction

Products shall be of design, materials, construction and physical dimensions as specified on the applicable product drawing.

3.2 Ratings

- A. Voltage: 12 Volts DC
- B. Current: 2 Amperes DC
- C. Temperature: -25°C to 70°C
- D. Storage temperature: -40°C to 85°C
- E. Durability: 6000 cycles

3.3 Main Functional Requirements

3.3.1 Jack & Plug connections

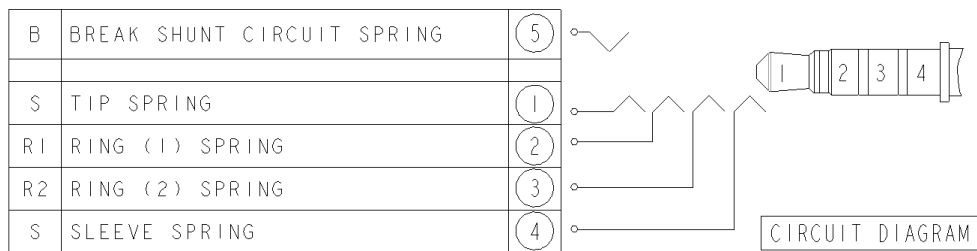


Figure 2: Connector side circuit diagram

3.4 Performance requirements and test descriptions

The product is designed to meet electrical, mechanical and environmental performance specified in this Paragraph.

Unless otherwise specified, all tests (see details in §3.5) are performed at ambient environmental conditions per IEC specification 60068-1 clause 5.3 and are performed with connectors in mated conditions. Explaining figures can be found in §3.6

Minimum sample size per test group is 5.

		Test groups									
		Solderable connectors					None solderable connectors				
		A	B	C	D	E	F	G	H	I	
		Test Sequence									
3.5.1	Examination of product	1, 19	1	1,6	1,6	1,6	1,18	1,5,8	1,7	1,5	
3.5.2	Contact resistance	3,8, 12, 16	3,5	3	3,5	3,5	2,7,11, 15	2,4,7	2,6	2,4	
3.5.3	Temperature rise					4		6			
3.5.4	Insulation Resistance	4,9, 13, 17					3,8,12, 16				
3.5.5	Dielectric Strength	5,10 , 14, 18					4,9,13, 17				
3.5.6	Mating-/ unmating Force			4					3,5		
3.5.7	Durability cycles 6000 times			5					4		
3.5.8	Retention Forces of contacts										
3.5.9	Wrenching (Bending) Strength for jack & plug (for rigid soldered connectors)		4								
3.5.10	Normal force board spring							3			
3.5.11	Peel off strength										
3.5.12	Rapid change of temperature	11					10				
3.5.13	Dry heat	7					6				
3.5.14	Cold	6					5				
3.5.15	Salt mist				4					3	
3.5.16	Resistance to Soldering heat	2	2	2	2	2					
3.5.17	Damp/Heat Cyclic	15									

3.5 Product qualification and re-qualification test sequence

Visual			
§	Test Title	Performance / Severity Requirements	Procedure
3.5.1	Examination of product	Meets applicable requirements specified on product drawing and application specification.	Visual, dimensional and functional per applicable inspection plan. In acc. with IEC 60512-1-1 Magnification 10x

Electrical			
§	Test Title	Performance / Severity Requirements	Procedure
3.5.2	Contact resistance	<p>Measuring points shall be as indicated in Figure 3: Contact Resistance Measurement.</p> <p>Requirements: Initial maximum 60 mΩ per contact. After testing maximum 100 mΩ per contact.</p> <p>Values include bulk resistance of contacts and golden gauge (subtract any additional resistance, by preference use for voltage and amperes separate tracks to exclude their resistance).</p>	<p>Mate connector with Dry circuit In acc. with IEC 60512-2-1 20mV, 100mA maximum with 4 wire method and with Gold plated gauge according EIAJ RC-5325A</p> <p>See §3.6.1 Figure 3</p>
3.5.3	Temperature rise	<p>Requirement: ΔT 30°C max. at 2A only for signal contacts not applicable for the Break Shunt circuit spring. ΔT measured on each contact.</p>	In acc. with IEC 60512-5-1
3.5.4	Insulation Resistance	<p>Minimum 100MΩ. Unmated connector with 500 VDC between adjacent contacts for 1 minute.</p>	In acc. with IEC 60512-3-1
3.5.5	Dielectric Strength	<p>No Voltage breakdown Unmated Connector with 400 VAC between adjacent contacts for 1 minute.</p>	In acc. with IEC 60512-5-2

Mechanical			
§	Test Title	Performance / Severity Requirements	Procedure
3.5.6	Mating/unmating force	Mating force maximum 25N. Unmating force between 5N and 25N. Speed 10 mm/min	Measure insertion- and extraction force with test gauge according JIS C 6560. Connector mounted in test frame as described in the application spec, example in Figure 4: Test frame. If measured with field plug values may be 30% lower.
3.5.7	Durability cycles 6000 times	No effects that could impair normal operation. Contact resistance measured every 1000 cycles according §3.5.2 and mating/unmating force according §3.5.6	Mate connector 4-10 times/ min including pause between mating/unmating. Measure insertion- and extraction force with test gauge according JEITA EIAJ RC-5325A. Durability cycles performed with 4 position AV plug according JEITA EIAJ RC-5325A. Connector mounted in test frame as in Figure 4: Test frame. In acc. with IEC 60512-9-1.
3.5.8	Retention Forces of Contacts for solderable connectors.	Apply force of 1 N min. at point of action indicated in Figure 6: Retention force measurement. Speed: 0.1 mm/s	See also §3.6.4.
3.5.9	Wrenching (Bending) Strength for jack & plug	The AV jack has to withstand the following forces applied: Vertical 40N Horizontal 40N Testing till breakage.	Test set up according suitable application spec. Connectors are mounted in these mechanics act as “device casing”. See §3.6.3 for example mechanics
3.5.10	Normal force applicable for compressive spring type	Use gage of $\varnothing 0.50\text{mm}$. Requirement: 0.2N min by minimum working range.	See § 3.6.5, Figure 7: Normal Force board spring Force measurement
3.5.11	Peel off strength applicable for connectors design for PWB soldering	4 Directions along PWB with XXN load	Push close to PWB as possible

Environmental			
§	Test Title	Performance / Severity Requirements	Procedure
3.5.12	Rapid change of temperature	-40/85°C, 30min / 30min, Transition time: <300 sec. Number of cycles: 25 Recovery time: 1 hour Requirement: Contact resistance as per §3.5.2.	In acc. with IEC 60512-11-4
3.5.13	Dry heat	Temperature: 85°C Duration: 96 hrs. Recovery time: 1 hour	In acc. with IEC 60512-11-9
3.5.14	Cold	Temperature -40°C Duration 96hrs. Recovery time: 1hr	In acc. with IEC 60512-11-10
3.5.15	Salt Mist	Temperature 35±2°C, 100% RH Salt mist: 5±1% salt solution Duration 2 hrs, after each period store parts in climate chamber at 40°C / 93% RH for 22 hrs. Total 3 cycles Requirement: No mechanical damage	In acc. with IEC 60512-11-6
3.5.16	Resistance to Soldering heat	3 cycles of IR soldering heat-curve as specified in Figure 9: Soldering profile. Requirements: No cracks, chips or melting.	In accordance with EIA-JRX-0102-102 See §3.6.6
3.5.17	Damp/Heat Cyclic	Temperature 25-55°C, RH 90-100% for 6 cycles of 24 hours each. Transition time: 3hours. Recovery: 2 hours at 25°C, RH 75%. Requirements: No physical damage. Contact resistance. Insulation resistance.	In accordance with IEC 60068-2-30-Db.

3.6 Additional Test and Measuring Details

3.6.1 Contact resistance

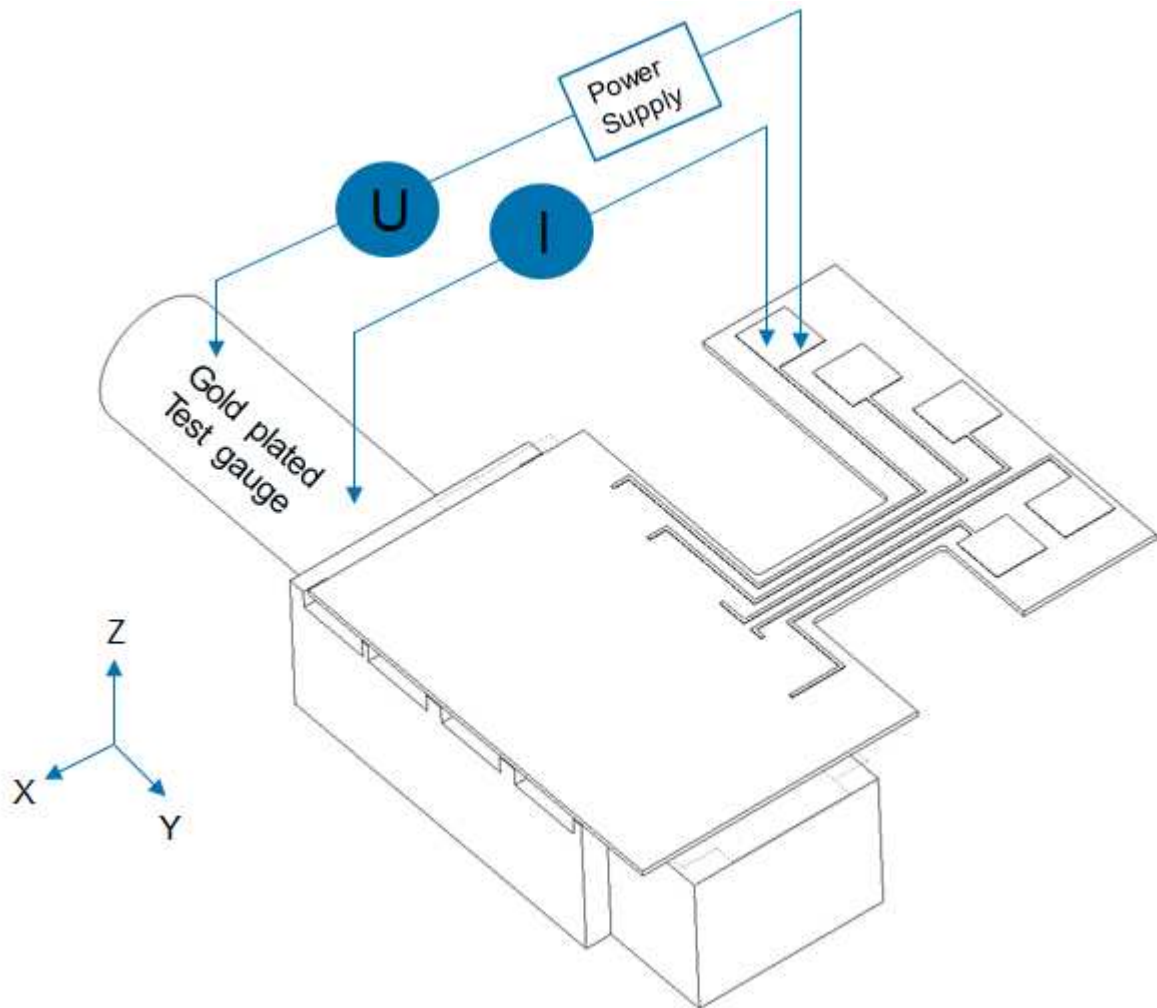


Figure 3: Contact Resistance Measurement

3.6.2 Test Frames

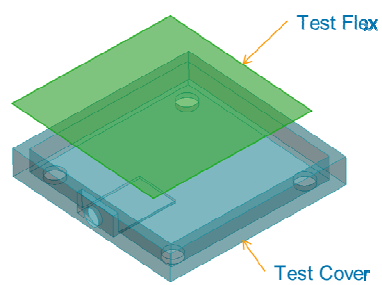


Figure 4: Test frame

Figure 4. Examples of a test cover

3.6.3 Bending test

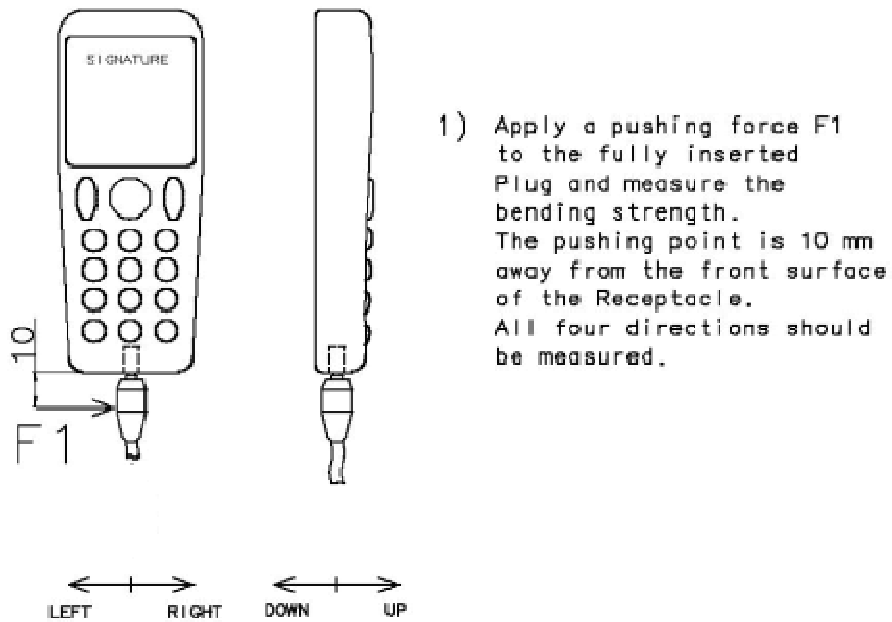


Figure 5: Bending test explanation

3.6.4 Retention Force of contacts

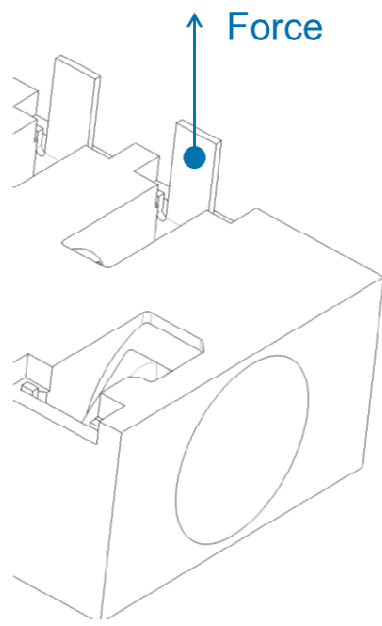


Figure 6: Retention force measurement

3.6.5 Normal Force of board spring

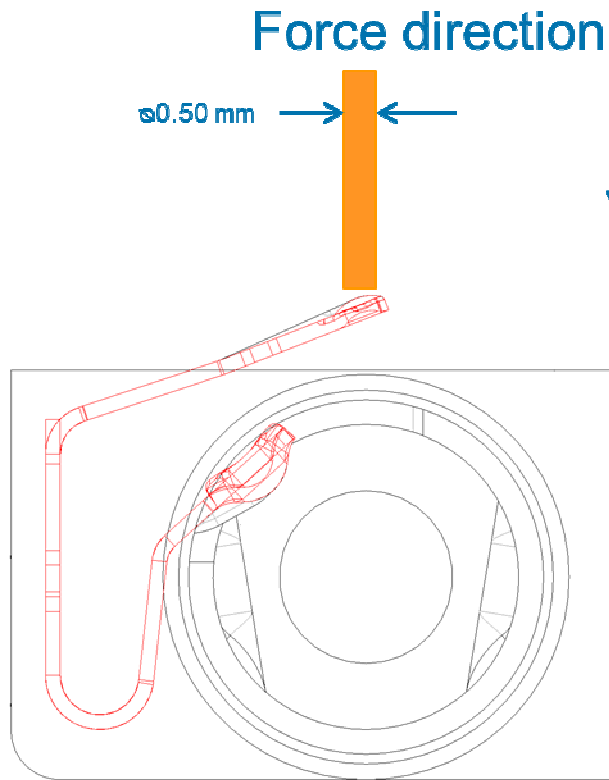


Figure 7: Normal Force board spring Force measurement

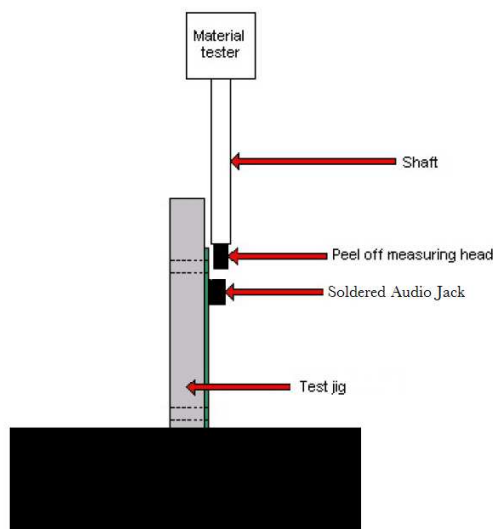


Figure 8: Peel off measurement

3.6.6 Resistance to solder heat

Resistance to soldering-heat test shall cover the IR-soldering heat-curve as indicated in Figure 9: Soldering profile
 Ref. IPC/JEDEC J-STD-020B with increased T peak.

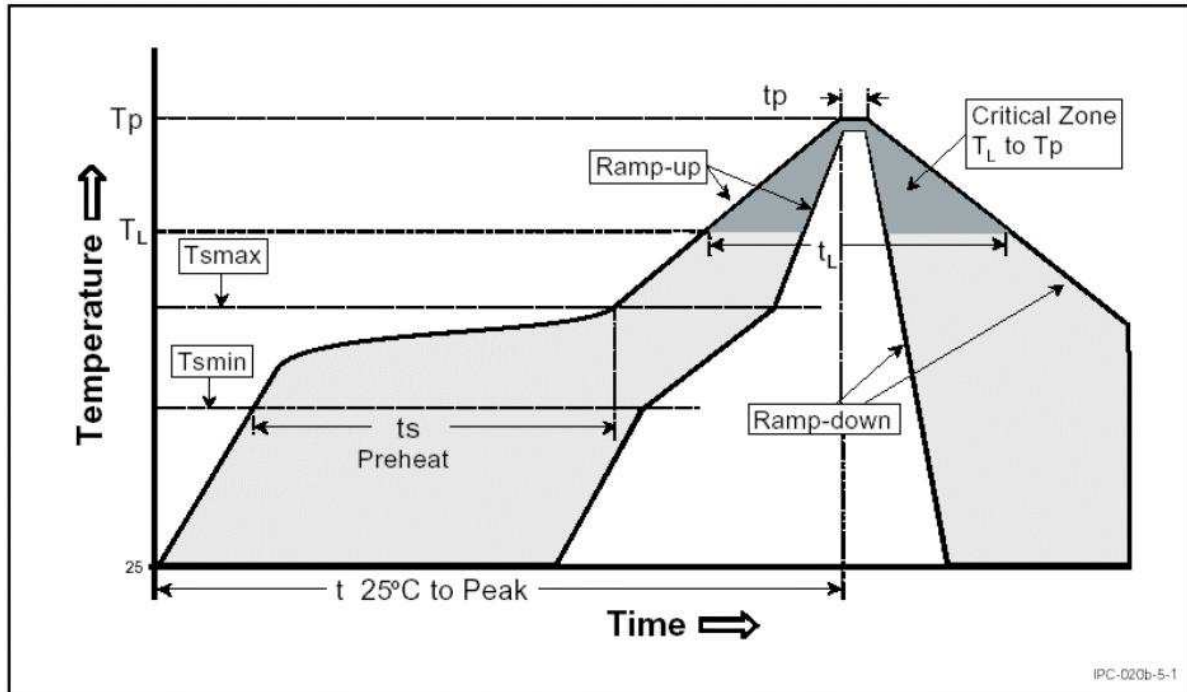


Figure 9: Soldering profile

Method of heat transfer	a) Forced hot air convection (reflow) b) Vapour Phase soldering
Average temperature gradient in preheating	3.0 K/s
Temperature gradient in reflow	3.0 K/s
Preheating condition	max.200°C/ max. 180s
Time above 200°C	not defined
Time above 217°C	60 – 150s
Time above 230°C	not defined
Peak temperature	max 260°C
Temperature gradient in cooling	max. 6 K/s
Total reflow profile duration ¹⁾	480 s max
Reflow capability	3 times

4. QUALITY ASSURANCE PROVISIONS

A. Sample selection

Samples shall be prepared in accordance with applicable instructions and randomly selected from running production. All test-groups shall consist of a minimum of 5 connectors.

B. Test sequence

Qualification inspection shall be verified by testing samples as specified in §3.4

4.1 Re-qualification testing

If 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 product, quality and reliability engineering.

4.2 Acceptance

Acceptance is based upon verification that product meets requirements of paragraph 3.3.

Failures attributed to equipment, test set-up, applied customer components or operator deficiencies shall not disqualify the product. When product failure occurs, corrective action shall be taken and samples resubmitted for requalification.

Testing to confirm corrective action is required before re-submittal.

4.3 Quality conformance inspection

Applicable TE Connectivity 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.