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1. OBJECTIVE

This specification defines the performance, test, quality and reliability requirements of ExpressCard connectors.

2. SCOPE

This specification provides information regarding product features and materials for ExpressCard connectors. All products shall meet ExpressCard Standard, PCMCIA /JEITA.

3. GENERAL

This document is composed of the following sections:

<u>Paragraph</u>	<u>Title</u>
1.0	OBJECTIVE
2.0	SCOPE
3.0	GENERAL
4.0	APPLICABLE DOCUMENTS
4.1	STANDARD AND SPECIFICATIONS
5.0	REQUIREMENTS
5.1	MATERIAL
5.2	FINISH
6.0	CONNECTOR REQUIREMENTS
6.1	EXAMINATION OF PRODUCT
6.2	MATING / UNMATING FORCE
6.3	SOLIDERABILITY
6.4	ELECTRICAL REQUIREMENTS
6.5	DURABILITY TEST REQUIREMENTS
7.0	TEST SEQUENCE
8.0	RECOMMENDED TEMPERATURE PROFILE
9.0	NOTE

4. APPLICATION DOCUMENTS

4.1 Standards and Specifications

- 4.1.1 EIA-364-1000.01, Electrical / Socket Test Procedures Including Environmental Classifications
- 4.1.2 ExpressCard Standard
- 4.1.3 FCI product drawings

5. REQUIREMENT

5.1 Material

- 5.1.1 Terminal The terminal material shall be copper alloy and specified in the product drawing.
- 5.1.2 Housing The housing material shall be rated UL94V-0 and shall be specified in the product drawing.

5.2 Finish

The finish for applicable components shall be specified in product drawings with plating area, plating material and plating thickness.

6. CONNECTOR REQUIREMENTS

6.1 Examination of Product

Samples must comply to applicable FCI product prints.

6.2 Mating / Unmating force


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Table 6-1 Mating / Unmating force

Test Description	Procedure	Requirements
Insertion Force	EIA 364-13 Measure the force to mate the dummy card for module side and, with guiding plates and mechanism assemblies in host side at a maximum rate of 12.5 mm (0.492 inches) per minute.	39N maximum.
Removal Force	EIA 364-13 Measure the force to un-mate the dummy card for module side and, with guiding plates and mechanism assemblies in host side at a maximum rate of 12.5 mm (0.492 inches) per minute.	3.7N min.; 18.5N max.

6.3 Solderability: Per EIA-364-638

Steam age for 1 hour. Contact areas evaluated shall meet 95% minimum coverage.

6.4 Electrical Requirements


Unless otherwise specified, all test and measurements shall be made at:

Temperature	25°C +/- 5°C
Relative humidity	50% Max

Table 6-2 lists ExpressCard connector electrical test procedure and requirements.


Table 6-2 ExpressCard connector electrical requirements

Item	Parameter	Procedure	Requirements
6-4-1	Contact Resistance (LLCR)	EIA 364-23B	Initial: 40 mΩ max Final (after stress): 55 mΩ max (allowable resistance change: 15mΩ)
6-4-2	Insulation Resistance	EIA-364-21, 500V DC	Initial 1000 MΩ min. After test 100 MΩ min.
6-4-3	Dielectric withstanding voltage	EIA 364-20 500Vrms AC for 1 minute	1. No shorting or other damages. 2. Current leakage 1 mA max

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6-4-4	Current rating	EIA 364-70, method 2 1.The samples size is minimum of three mated connectors. 2.The samples shall be soldered on a PCB board with the appropriate footprint. 3.Wire all the voltage pins and all the ground pins in a series circuit. 4.A thermocouple of 30 AWG or less shall be placed toas close to the mating contact as possible. 5.Conduct a temperature rise vs. current test.	0.75 A per pin minimum. The temperature rise above ambient shall not exceed 30 °C. The ambient condition is still air at 25 °C.
6-4-5	Insertion loss (IL)	EIA 364-101	1.7dB max up to 3.125 GHz, ≤-5.5 dB up to 6 GHz
6-4-6	Return loss (RL)	EIA 364-108	≤-10 dB up to 3.125 GHz, ≤-5 dB up to 6 GHz
6-4-7	Crosstalk: NEXT	EIA 364-90	-32 dB max up to 3.125 GHz, ≤-26 dB at 6 GHz
6-4-8	Intra-pair skew	Intra-pair skew must be achieved by design; measurement not required.	5 ps max
6-4-9	Thermal Shock	Cycle the connector or socket between 15 °C ± 3 °C and 85 °C ±3 °C, as measured on the part. Ramps should be a minimum of 2 °C per minute, and dwell times should insure that the contacts reach the temperature extremes (a minimum of 5 minutes). Humidity is not controlled. Perform 10 such cycles.	No evidence of physical damage.
6-4-10	Cyclic Temp & Humidity	EIA-364-31 (Cycle the connector or socket between 25 °C ± 3 °C at 80 % ± 3% RH and 65 °C ± 3 °C at 50 % ± 3% RH. Ramp times should be 0.5 hour and dwell times should be 1.0 hour. Dwell times start when the temperature and humidity have stabilized within the specified levels. Perform 24 such cycles.)	None.
6-4-11	Temperature Life (pre-conditioning)	EIA 364-17, Method A, mated 105 °C for 120 hours	No evidence of physical damage. Meet Contact Resistance (LLCR) requirement.
6-4-12	Temperature Life	EIA-364-17, Method A, mated 105 °C for 72 hours	No evidence of physical damage.Meet Contact Resistance (LLCR) requirement.

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6-4-13	Vibration	EIA-364-28, test condition VII, test condition letter D (15 minutes in each of 3 mutually perpendicular directions. Both mating halves should be rigidly fixed so as not to contribute to the relative motion of one contact against another. The method of fixturing should be detailed in the test report.)	No evidence of physical damage.
6-4-14	Shock	EIA-364-27 Acceleration 490 m/s ² (50G) Duration 11ms Semi-sine wave, velocity change: 3.44 m/s (11.3 ft/s)	No evidence of physical damage.
6-4-15	Durability (pre-conditioning)	EIA-364-09, 50 cycles	No evidence of physical damage.
6-4-16	Durability	EIA-364-09 (see 6.5)	No evidence of physical damage.
6-4-17	Mixed Flowing Gas	EIA-364-65, class IIA, 7 days, For 2 piece connectors, option 2	Meet Contact Resistance (LLCR) requirement.
6-4-18	Reseating	Manually mate / unmate the connectors, 3 cycles.	no evidence of physical damage.

6.5 Durability Test Requirements

- Durability (mating/un-mating) rating of 5000 cycles for the host
- Durability (mating/un-mating) rating of 5000 cycles for the module, with an optional rating of 10000 cycles for high-durability modules at module manufacturers' discretion

When testing a higher durability module connector (rated for 10000 cycles), the durability test procedure for Test Group 7 in EIA 364-1000.01 shall be modified to reflect the requirement of different durability cycles for the host and module connectors. After 5000 cycles, the LLCR shall be measured. Starting from the 5001-th cycle, a new host connector shall be used to mate with the high-durability module connector.

7. TEST SEQUENCE



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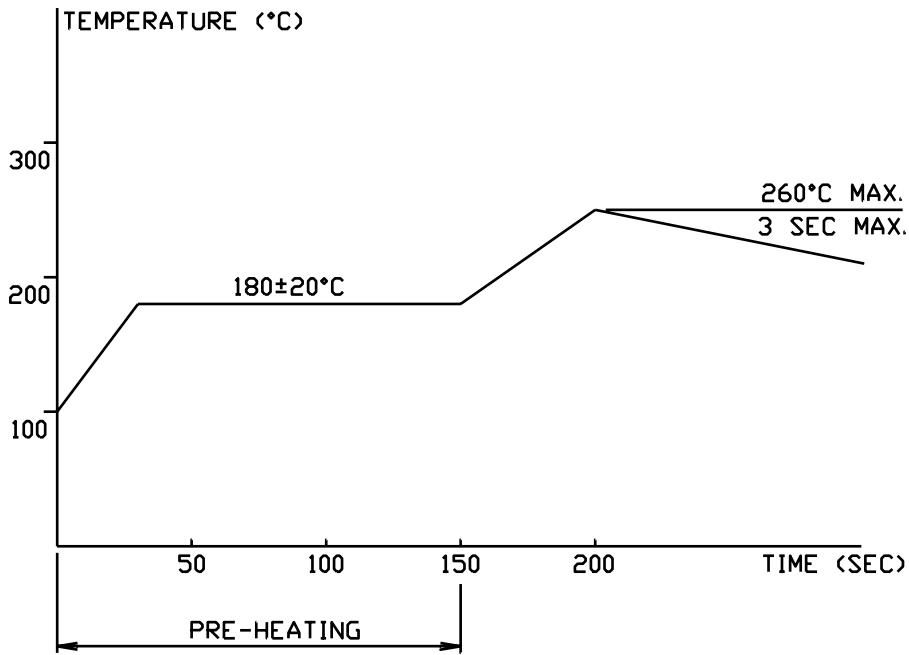
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TABLE 7-1 Qualification Testing Matrix

TEST	PARA	TEST GROUP	TEST GROUP	TEST GROUP	TEST GROUP	TEST GROUP	TEST GROUP	TEST GROUP	TEST GROUP
		1	2	3	4	5	6	7	8
TEST	PARA	TEST SEQUENCE							
Examination of Product	6.1	1	1	1	1	1	1	1	1
Total Mating / Un-mating Force	6.2					2			
Solderability	6.3					3			
Low Level Contact Resistance	6.4.1	2,5,7	2,5,8,10	2,5,7,9	2,5,7,9,11			3,5	
Insulation Resistance	6.4.2		7						
DWV	6.4.3							2,6	
Contact Current Rating	6.4.4								2
Insertion Loss	6.4.5						2		
Return Loss	6.4.6						3		
Crosstalk	6.4.7						4		
Intra-pair skew	6.4.8						5		
Thermal Shock	6.4.9		4		8				
Cyclic Temp and Humidity	6.4.10		6						
Temperature Life (pre-conditioning)	6.4.11			4	4				
Temperature Life	6.4.12	4							
Vibration	6.4.13			6					
Shock	6.4.14			8					
Durability (pre-conditioning)	6.4.15	3	3	3	3				
Durability	6.4.16							4	
Mixed Flowing Gas	6.4.17				6				
Reseating	6.4.18	6	9		10				
Sample Quantity / Group		5	5	5	5	3	3	5	3


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8. RECOMMENDED TEMPERATURE PROFILE



RECOMMENDED LEAD-FREE TEMPERATRURE PROFILE

9. NOTE
NA

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