

**SD™ Memory Card Adaptor for T-Flash Memory Module**

The product described in this document has not been fully tested to ensure conformance to the requirements outlined herein. Tyco Electronics makes no representation on warranty, express or implied, that the product will comply with these requirements. Further, Tyco Electronics reserves the right to change these requirements based on the results of additional testing and evaluation. Contact Tyco Electronics Engineering for further information, if necessary.

"The product may not perform according to the product specification if precautions have not been taken in the application to provide mechanical stability of the connector in relation to its mating parts".

**1 SCOPE.**

**1.1 Content.**

This specification covers performance, test and quality requirements for \*TYCO-manufactured SD™ Memory Card Adaptor for T-Flash Memory Module. The TF Memory Module is functionally compatible with the SD™ Memory Card but is smaller in dimensions. The TF Memory Module can be inserted into a passive SD™ Memory Card Adaptor and operated as an SD™ Memory Card. An overview of contact names and numbers is given in Figure1.

**1.2 Qualification.**

When tests are performed on subject product, procedures specified in this Design Objective 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 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 TYCO Documents.**

- 501-19086 Test report "SD™ Memory Card Adaptor for T-Flash Memory Module"
- 114-19xxx Application Specification of "SD™ Memory Card Adaptor for T-Flash Memory Module"
- 107-19xxx Packaging Specification of "SD™ Memory Card Adaptor for T-Flash Memory Module"

**2.2 TYCO Drawings.**

- C-1705546 Customer drawing of "SD™ Memory Card Adaptor for T-Flash Memory Module"

**2.3 Other Documents.**

- IEC 60512 Basic testing procedures and measuring methods for electromechanical components and electronic equipment.
- IEC 60068 Basic environmental testing procedures.

ECN: EH10-0330-04

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**3 REQUIREMENTS:**

**3.1 Design and Construction.**

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

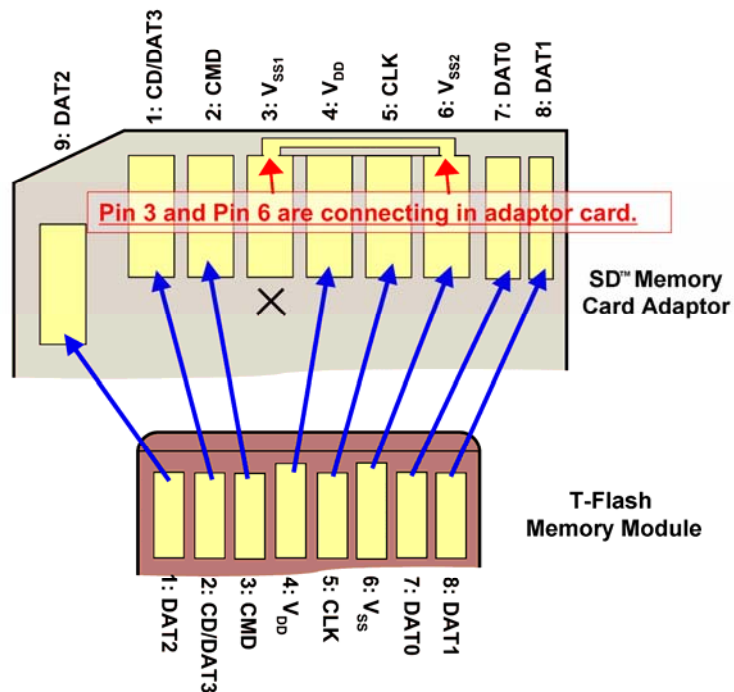
**3.2 Materials and Finish.**

- A. Contact: - Copper alloy, post plated with nickel, selective gold
- B. Housing: - PBT; 17% GF; Flammability UL-94-V0.
- C. Write Protect Key: - PA6/6; Flammability UL-94-V0.

**3.3 Ratings.**

- A. Operating voltage - 5 V DC
- B. Current: DC-Power lines - 150 mA continuous.
- C. Operating temperature - -25°C to +85°C; Rh: 95% max, non-condensing.  
Storage temperature - -40°C to +85°C; Rh: 95% max, non-condensing.
- D. Durability - SD side - 10.000 cycles minimum.  
- T-flash side - 1.000 cycles minimum.

**Pin Connections for  
SD™ Memory Card Adaptor and T-Flash Memory Module**



**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 specified in Para 3.6.

Unless otherwise specified, all tests are performed at ambient environmental conditions per IEC specification 60068-1 clause 5.3 and are performed with connectors in mated condition.

VISUAL			
Para	Test Description	Performance Requirements or Severity	Procedures
3.4.1	Examination of product	Meets requirements of product drawing and applicable instructions on Customer Drawing	Visual, dimensional and functional per applicable inspection plan. In acc. with IEC 60512-1-1 Magnification 10x

ELECTRICAL			
Para	Test Description	Performance Requirements or Severity	Procedures
3.4.2	Termination resistance	Max. open voltage 20 mV. Max. current 100 mA DC. All contacts to be measured. Measuring points shall be as indicated in figure 2. Requirement: 100 mΩ max. (Initial) ΔR 40 mΩ max. (Final)	In acc. With IEC 60512-2-1  (See also par. 3.5.1.)
3.4.3	Insulation resistance UNMATED	Test voltage 100V DC peak. Duration: 1 minute. Test at adjacent contacts. Requirement: 1000 MΩ min. (Initial) Requirement: 100 MΩ min. (Final)	In acc. With IEC 60512-3-1
3.4.4	Voltage proof UNMATED	Test voltage: 500 VAC. Duration 1 minute. Test at adjacent signal contacts Requirement: No break-down or flash-over and current leakage 1mA max.	In acc. With IEC 60512-4-1
3.4.5	Temperature rise	Test current 0,5 A per contact during 5h Requirement: 30°C max rise above ambient temperature	In acc. With IEC 60512-5-1

<b>MECHANICAL</b>			
<b>Para</b>	<b>Test Description</b>	<b>Performance Requirements or Severity</b>	<b>Procedures</b>
<b>3.4.6</b>	Mechanical operation SD side	Mate and unmate SD-side with SD host for 10.000 cycles. Rate: 500 cycles/hour with speed: 10 mm/s	In acc. with IEC 60512-9-1 and EIA-364-B Class 1.1
<b>3.4.7</b>	Mechanical operation T-Flash side	Mate and unmate T-Flash Memory Module with Memory Card Adaptor. Rate: 10 cycles per min with speed: 10 mm/s for 5000 cycles After each 10 cycles stop the insertion and rest for 5 to 10 min.	In acc. with IEC 60512-9-1 and EIA-364-B Class 1.1
<b>3.4.8</b>	Mating Force SD side	Mate Memory Card Adaptor with SD host. Speed 25 mm per min. Except influence of card-lock feature. Requirement: Mating Force: 40 N max.	In acc. with IEC 60512-13-1
<b>3.4.9</b>	Unmating force SD side	Unmate Memory Card Adaptor from SD host. Speed 25 mm per min. Except influence of card-lock feature. Requirement: Unmating Force: 1 N min and 40 N max.	In acc. with IEC 60512-13-1
<b>3.4.10</b>	Mating force T-Flash side	Mate T-Flash Memory Module with Memory Card Adaptor. Speed 25 mm per min. Except influence of card-lock feature. Requirement: Mating Force: 25 N max.	In acc. with IEC 60512-13-1
<b>3.4.11</b>	Unmating force T-Flash side	Unmate T-Flash Memory Module from Memory Card Adaptor. Speed 35 mm per min. Requirement: Extraction Force: 1,5 N min and 10 N max	In acc. with IEC 60512-13-1
<b>3.4.12</b>	Polarization strength T-Flash side	T-Flash Memory Module shall be inserted to the Memory Card Adaptor upside-down Force on T-Flash Memory Module: 50 N Requirement: No functional deformation.	In acc. with IEC 60512-13-5
<b>3.4.13</b>	Bend test T-Flash Memory Module inserted	Support Memory Card Adaptor at both ends and apply 10 N load, 200mm/min at center of MC Adaptor, 3 cycles both faces, (6 bends) hold for 30 s. Requirements: No functional deformation.	

MECHANICAL CONTINUED			
Para	Test Description	Performance Requirements or Severity	Procedures
3.4.14	Torque test T-Flash Memory Module inserted	Fix Memory Card Adaptor at one end and twist opposite end to 0,15 Nm or +/- 2,5° which ever occurs first. Hold the twist for 30 s and repeat for 3 cycles. (see Figure: 5) Requirements: No functional deformation.	NA
3.4.15	Write Protect Switch test	Operate switch 1000 cycles. Operating force between 0,5 N min. and 5,0 N max. Requirements: No functional deformation.	NA
3.4.16	Mechanical shock T-Flash Memory Module inserted	Subject Memory Card Adaptor to an acceleration of 490m <sup>2</sup> /s (50g). Standard holding time 11 ms. Semi-sine wave. Velocity change 3.44 m/s 3 shocks in 6 directions. Requirements: No physical damage No discontinuity > 100 ns T-Flash Card shall not pull away from adaptor.	In acc. with IEC 60512-6-3
3.4.17	Sinusoidal vibration T-Flash Memory Module inserted	10-2000 Hz sweeping, 20 m/s <sup>2</sup> (2g) peak amplitude, 5 min. per 1 cycle. 10 cycles per each of 3 mutual perpendicular axes (see Figure: 3). Requirements: No physical damage No discontinuity > 100 ns T-Flash Card shall not pull away from adaptor.	In acc. with IEC 60512-6-4
3.4.18	Drop test T-Flash Memory Module inserted	Drop from 1.5 m on all six faces on hard vinyl floor. Requirement: T-Flash MM must remain in MC adaptor module	In acc. with IEC 60512-7-1

ENVIRONMENTAL			
Para	Test Description	Performance Requirements or Severity	Procedures
3.4.19	Flammability	Minimum V-2	UL94
3.4.20	Rapid change of temperature	-55°/85°C, 0,5 hrs / 0,5 hrs, 5 cycles	In acc. with IEC 60512-11-4
3.4.21	Damp/heat cyclic	25/40°C 12 hrs / 12 hrs RH 95% - 10 cycles	In acc. with IEC 60512-11-12
3.4.22	Damp/heat steady state	96 hours at 40°C, 90 to 95 % RH, mated.	In acc. with IEC 60512-11-3
3.4.23	Dry heat	Temperature 85°C Duration 96 hrs.	In acc. with IEC 60512-11-9
3.4.24	Cold	Temperature -25°C Duration 96 hrs mated.	In acc. with IEC 60512-11-10
3.4.25	Hydrogen Sulfide	0,1 PPM hydrogen sulfide 40°C, approx. 80% RH; Duration 240 hours; mated	In acc. with JEIDA 38

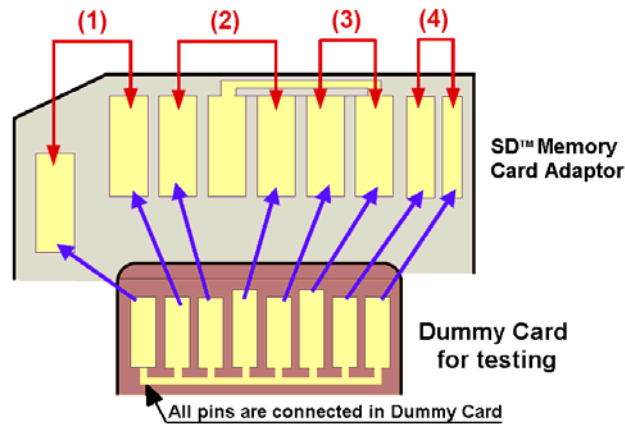
**3.5 Additional Test and Measuring Details.**

**3.5.1 Termination resistance measurement.**

Bulk resistance of the connector system is between 15 and 25 mΩ, depending on the size and length of the conducting path

Termination resistance shall be measured as schematically indicated in figure 2.

**Termination Resistance Measurements 1 to 4**



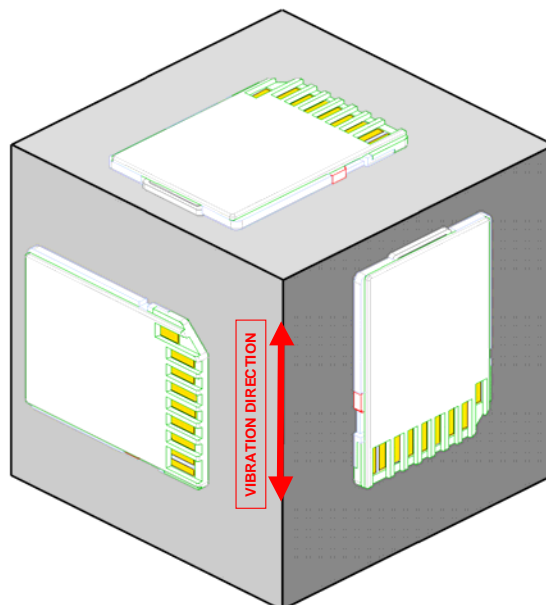
**Figure 2**

**3.5.2 Vibration test conditions.**

Vibration test conditions shall be as follows:

The Memory Card Adaptor is mounted onto a fixture during the test with double sided adhesive tape. The test is done with a Memory Card Adaptor and a T-Flash Memory Module inserted.

An electrical circuit is checking that no electrical contact interruptions >1 ns occur.



**Figure 3**

### 3.5.3 Bending Test Fixture.

The Bending Test Fixture on the Memory Card Adaptor is as indicated in figure 4. The test is done with a Memory Card Adaptor and a T-Flash Memory Module inserted.

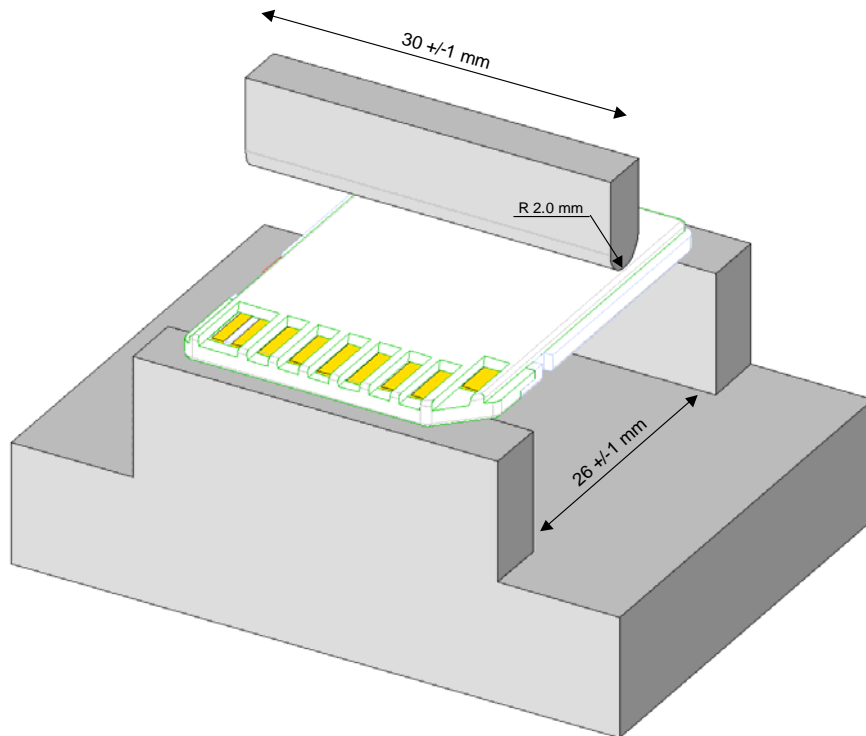


Figure 4

### 3.5.4 Torque Test Fixture.

The Torque Test Fixture on the Memory Card Adaptor is as indicated in figure 5. The test is done with a Memory Card Adaptor and a T-Flash Memory Module inserted.

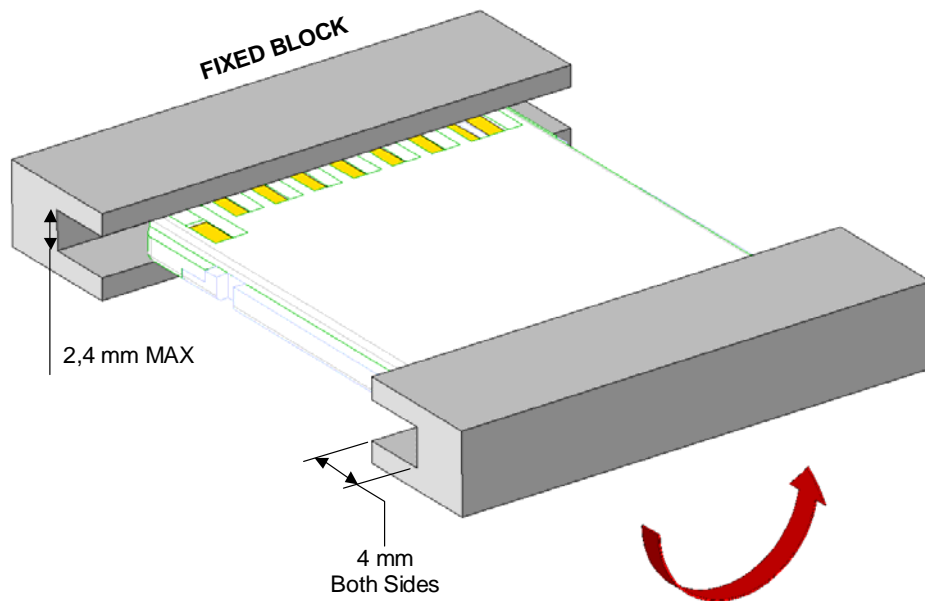


Figure 5



**3.6 Product Qualification and Requalification Test Sequence.**

Test or Examination	TEST-GROUP (a)					
	1	2	3	4	5	6
	TEST-SEQUENCE (b)					
Examination of product	1,17	1,19	1,9	1,5	1,9	1,3,5
Termination resistance	2,6,8,10,12,14	2,16	2,6		2,4,6,8	
Insulation resistance	3,15	3,17	3,7			
Voltage Proof	4,16	4,18	4,8			
Temperature Rise			5			
Mechanical operation SD side		9				
Mechanical operation T-Flash side		10				
Mating force SD side		5,12				
Unmating force SD side		6,13				
Mating force T-Flash side		7,14				
Unmating force T-Flash side		8,15				
Polarization strength T-Flash side				2		
Bend test				3		
Torque test				4		
Write Protect Switch test						2
Mechanical Shock					3	
Sinusoidal Vibration					5	
Drop test					7	
Flammability						4
Rapid change of Temperature	5					
Damp/heat cyclic	7					
Damp/heat stady state	9					
Dry heat	11					
Cold	13					
Hydrogen Sulfide		11				

a) See Para 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. Unless otherwise specified each test groups shall consist of a minimum of 5 connectors of each applicable type. All contacts shall be tested.

###### **B. Test Sequence.**

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

##### **4.2 Requalification Testing.**

If changes significantly affecting form, fit or function are made to product or manufacturing process, product assurance shall coordinate requalification 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 product meets requirements of Para 3.4. Failures attributed to equipment, test set-up, operator deficiencies or customers application constructions, shall not disqualify the product. When product failure occurs, corrective action shall be taken and samples resubmitted for qualification.

Testing to confirm corrective action is required before resubmittal.

##### **4.4 Quality Conformance Inspection.**

Applicable TYCO 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.