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**Serial Attached SCSI (SAS) Connector**

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**1.0 SCOPE**

This specification covers the requirements for product performance, test methods and quality assurance provisions of Serial Attached SCSI (SAS) Connector consisting of 22 blade contacts of 1.27 mm pitch and 7 blade contacts of 0.80 mm pitch. The applicable part numbers are as follow:

Plug Part Number	Receptacle Part Number
84958-X	1735104-X
1735078-X	1735164-X
1735183-X	1735234-X
1735236-X	1735105-X
1735099-X	1735368-X
1735610-X	
2229630-X	

**2.0 APPLICABLE DOCUMENTS**

The following documents form 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.

**2.1 TE Specifications**

- A. 109-5000 Test Specification, General Requirements for Test Methods
- B. 501-51057 Qualification Test Report on Connector, SAS Plug 15+7+7P

**2.2 Commercial Standards and Specifications**

- A. EIA Electronic Industries Association

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## 3.0 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

#### A. Blade Contact

Material: Brass

Finish : 0.76 $\mu$ m min Au on mating area and 1.91 $\mu$ m min Sn on solder area, over 1.27 $\mu$ m min Ni on entire contact

#### B. Housing

Material: High Temperature Thermoplastics, Glass Filled

Flame Class Rating: UL 94V-0

### 3.3 Ratings

Voltage: 200V AC

Current: 1.5A max continuous, 2.5A 1.5s peak and 6A 1ms peak pre-charge per contact for power 500mA max continuous per contact for signal

Temperature: -40°C to 85°C (inclusive of temperature rise)

### 3.4 Performance Requirements and Test Descriptions

The product is designed to meet the electrical, mechanical and environmental performance requirements specified in Figure 1.

#### 3.4.1 Test Environment

All tests shall be performed in the environmental conditions listed below, unless otherwise specified.

Temperature: 15°C to 35°C

Humidity: 20% to 80% RH

Atmospheric Pressure: 650 to 800mm Hg

#### 3.4.2 Test Specimens

The test specimens used for tests shall be conforming to the applicable product drawing(s).

Unless otherwise specified, no sample shall be used.

The tests conducted are for the header only.

### 3.5 Test Requirements and Procedures Summary

Para	Test Items	Requirements	Procedures
3.5.1	Examination of Product	Meets requirements of product drawing.	Visually, dimensionally and functionally inspected per applicable inspection plan.
<b>Electrical Requirements</b>			
3.5.2	Insulation Resistance	1000 M $\Omega$ min.	Subject a voltage of 500 V DC for 1 minute between adjacent contacts per EIA 364-21.
3.5.3	Dielectric Withstanding Voltage	No breakdown or flashover.	Subject a voltage of 500 V AC for 1 minute between adjacent contacts per EIA 364-20 Method B.
3.5.4	Low Level Contact Resistance	30 m $\Omega$ max initial. 15 m $\Omega$ max change from initial.	Subject a voltage of 20 mV max open circuit at a current of 100 mA max on mated connector assemblies per EIA 364-23.
3.5.5	Temperature Rise (apply only to 15 positions)	Temperature rise shall not exceed 30 °C after 96 hours (45 minutes ON and 15 minutes OFF per hour). Ambient condition is 25 °C at still air.	Wire contact P1, P2, P8 & P9 in parallel for power. Wire contact P4, P5, P6, P10 & P12 in parallel for return. Apply 6 A total DC current to parallel contacts P1, P2, P8 & P9 and return from parallel contact P4, P5, P6, P10 & P12.
3.5.6	Solderability	Solderable area shall have a solder coverage of 95% min.	Test solderable portion of contact per Tyco 109-11-11.
3.5.7	Soldering Heat Resistivity	See note (a)	Test connector per EIA 364-56B, Procedure 6, Level 4.
<b>Mechanical Requirements</b>			
3.5.8	Mating Force	Backplane: 25 N max. Cable: 50 N max., initial and after durability	Mate connector assemblies at a rate of 25 mm per minute per EIA 364-13.
3.5.9	Unmating Force	Backplane: 5 N min. Cable: 20 N min., initial and after durability	Unmate connector assemblies at a rate of 25 mm per minute per EIA 364-13.

3.5.10	Durability	See note (a).	Mate and unmate connector assemblies at a rate of 200 cycles/hour max for 500 cycles (backplane) or 25 cycles (cable) per EIA 364-09.
3.5.11	Vibration (Random)	Discontinuity < 1 microsecond.	Vibrate mated connector assemblies to 3.10 g's RMS, 1 hour in 3 perpendicular planes per EIA 364-28, Condition VII, Letter D.
3.5.12	Physical Shock	Discontinuity < 1 microsecond.	Subject mated connector assemblies at 50 g's with ½ sine wave (11 milliseconds) shock in x, y & z axis (total 18 shocks) per EIA 364-27, Condition A.
<b>Environmental Requirements</b>			
3.5.13	Humidity	See note (a).	Subject mated connector assemblies to 96 hours at 40 °C with 90~95% relative humidity per EIA 364-31, Method II, Condition A.
3.5.14	Temperature Life	See note (a).	Subject mated connector assemblies to 85 °C for 500 hours per EIA 364-17, Method A, Condition III.
3.5.15	Thermal Shock	See note (a).	Subject mated connector assemblies to 10 cycles between -55 °C and 85 °C per EIA 364-32, Condition I.
3.5.16	Mixed Flowing Gas	See note (a).	Expose half of samples unmated for 7 days then mated for 7 additional days and expose other half of samples mated for full 14 days per EIA 364-65, Class 2A.

Note:

(a) Shall meet visual requirements, show no physical damage, and shall meet requirements of additional tests as specified in the Test Sequence in Figure 2.

Figure 1

### 3.6 Product Qualification Test Sequence

Test Item	Test Group						
	1	2	3	4	5	6	7
	Test Sequence (a)						
Examination of Product	1,5	1,9	1,8	1,8	1,7	1,5	1,3
Low Level Contact Resistance	2,4	3,7	2,4,6		4,6	2,4	
Insulation resistance				2,6			
Dielectric Withstanding Voltage				3,7			
Temperature Rise			7				
Solderability							2
Soldering Heat Resistivity						3	
Mating Force		2					
Unmating force		8					
Durability	3	4(b)			2(b)		
Vibration (Random)		5					
Physical Shock		6					
Reseating (manually plug/unplug 3 time)			5		5		
Humidity				5			
Temperature Life			3				
Thermal Shock				4			
Mixed Flowing Gas					3		

Note:

- (a) Numbers indicate sequence in which the tests are performed.
- (b) Preconditioning, 20 cycles for the 50-durability cycle requirement, 50 cycles for the 500-durability cycle requirement. The mating and unmating cycle is at the maximum rate of 200 cycles per hour.

Figure 2

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## 4.0. QUALITY ASSURANCE PROVISIONS

### 4.1 Qualification Testing

#### A. Sample Selection

Samples shall be selected at random from current production. The number of test points will correspond to the number of positions on the connector.

#### B. Test Sequence

Qualification inspection shall be verified by testing samples as specified in Figure 1 and 2.

#### C. Test sequence shall be serialised for tractability.

### 4.2 Re-Qualification Testing

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

### 4.3 Acceptance

Acceptance is based upon verification that product meets requirements of Figure 1 and 2. Failures attributed to equipment, test set-up or operator deficiencies shall not disqualify 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 Tyco quality inspection plan will specify sampling acceptable quality level to be used. Dimensional and functional requirements shall be accordance with applicable product drawing and specification.