

## **SERIAL ATTACHED SCSI-3 (SAS 3.0) RECEPTACLE CONNECTOR SFF-8680 AND SFF-8639 TYPES**

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### **1. SCOPE**

This specification covers the requirements for product performance, test methods and quality assurance provisions of Serial Attached SCSI-3(SAS 3.0) RECEPTACLE CONNECTOR.

### **2. 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 Connectivity (TE) Documents**

- 114-60017 Application Specification
- 501-128804 Qualification Test Report

#### **2.2 Industry Documents**

- EIA-364 Electronic Industries Association
- SFF-8680 Serial Attachment 12 Gb/s 2x Unshielded Connector
- SFF-8639 Multifunction 12 Gb/s 6X Unshielded Connector

#### **2.3 Reference Documents**

- 109-197: Test Specification

## 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

- Contact: Copper Alloy  
Finish: Nickel underplate all over  
Contact area: Au over Ni, Soldering area: Tin over Ni
- Housing: Thermoplastics
- Solder Peg: Copper Alloy  
Finish: Nickel underplate all over  
Soldering area: Tin over Ni

### 3.3 Ratings

- Voltage: 30 VDC
- Current: 1.5A per contact (power),  
Peak Current 2.5A 1.5 s,  
Peak Current Pre-charge 6A 1 ms.  
0.5A per contact (signal)
- Temperature: Operating 0° C to 55° C  
Non-operating -40° C to 85° C

### 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.

### 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.
Electrical Requirements			
3.5.2	Low Level Contact Resistance	30 milliohms max initial. 15 milliohms max change from initial.	EIA 364-23. Subject a voltage of 20 mV max open circuit at a current of 100 mA max on mated connector assemblies.
3.5.3	Insulation Resistance	1000 megaohms min.	EIA 364-21 Subject a voltage of 500 VDC for 1 minute between adjacent contacts of mated connector assemblies.
3.5.4	Dielectric Withstanding Voltage	No breakdown or flashover.	EIA 364-20 Method B. Subject a voltage of 500 VAC for 1 minute between adjacent contacts of mated connector assemblies.
3.5.5	Temperature Rise (applicable to Power section, P1 to P15 only)	Temperature rise shall not exceed 30 →C after 96 hours (45 minutes ON and 15 minutes OFF per hour) in ambient condition of 25 →C still air	EIA-364-70B Wire contact P1, P2, P8 & P9 in parallel for power. Wire contact P4, P5, P6, P10 & P12 in parallel for return. Apply 6 Amp 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.	TE 109-11-11 Solder Temp: 245 ←20C Immersion Duration: 5s Max
3.5.7	Resistance to Soldering Heat	Housing shall be free from blisters, deformation, warpage or melting.	TEC-109-201, Condition B Pre-Heat: 150°C ~ 200°C, 60~180seconds Heat within 5°C of Peak: 20~40 seconds. Peak Temp: 260°C max

Para	Test Items	Requirements	Procedures
<b>Mechanical Requirements</b>			
3.5.8	Mating Force	25N max. per SFF-8680 59N max. per SFF-8639 Initial and after durability	EIA 364-13. Mate connector assemblies at a rate of 25.4 mm per minute.
3.5.9	Un-mating Force	5 N min. per SFF-8680 12N min per SFF-8639 Initial and after durability	EIA 364-13 Un-mate connector assemblies at a rate of 25.4 mm per minute.
3.5.10	Durability (preconditioning)	See note (a).	EIA 364-09 Manually mate and un-mate connector assemblies for 50 cycles at a maximum rate of 500 cycles/hour. Inspect for damage every 10 cycles.
3.5.11	Durability	See note (a).	EIA 364-09 Mate and un-mate connector assemblies for 500 cycles at a maximum rate of 200 cycles/hour.
3.5.12	Vibration	Discontinuity should not exceed 1 microsecond. See note (a).	EIA 364-28, Condition VII, Level D. Subject mated connector assemblies to 3.10G's RMS between 20-500Hz. 30 minutes in each of 3 mutually perpendicular planes. Rigidly fix both mating halves to eliminate relative motion between the contacts.
3.5.13	Mechanical Shock	Discontinuity should not exceed 1 microsecond.	EIA 364-27, Condition A. Subject mated connector to 50G's half- sine shock pulses of 11 milliseconds duration in each X, Y and Z axis (18 shocks total)
3.5.14	Reseating	See note (a).	Subject connectors to 3 manual mate/un-mate cycles.

Para	Test Items	Requirements	Procedures
Environmental Requirements			
3.5.15	Temperature & Humidity	See note (a).	EIA 364-31, Method II, Condition A Subject mated connectors to 96 hours at 40 →C with 90-95% relative humidity for per
3.5.16	Temperature Life	See note (a).	EIA 364-17, Condition III, Method A. Subject mated connector assemblies to 85 →C for 500 hours
3.5.17	Thermal Shock	See note (a).	EIA 364-32, Condition I. Subject mated connector assemblies to 10 cycles between -55 →C and 85 →C, 30 minute dwell at each temperature extreme
3.5.18	Mixed Flowing Gas	See note (a).	EIA 364-65, Class II A. Expose half of the unmated samples for 10 days and then mated for 4 additional days. The other half of the samples are exposed mated for full 14 day test period.
3.5.19	Thermal Disturbance	See note (a).	Subject mated connector assemblies to 10 cycles between 15←3 <sup>0</sup> C and 85←3 <sup>0</sup> C, minimum of 2 <sup>0</sup> C ramp per minute. Dwell time should insure that the contacts reach the extremes, no less than 5 minutes.
3.5.20	Thermal Cycling	See note (a).	Subject mated connector assemblies to 500 cycles between 15←3 <sup>0</sup> C and 85←3 <sup>0</sup> C, minimum of 2 <sup>0</sup> C ramp per minute. Dwell time should insure that the contacts reach the extremes, no less than 5 minutes.
3.5.21	Dust	See note (a).	EIA 364-91 Subject un-mated connectors to benign dust composition 1 hours.
3.5.22	Salt Spray	See note (a).	EIA 364-26, Test Condition B. 5%, 35±2°C, 48hours

Figure 1

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.

### 3.6 Product Qualification Test Sequence

Test Item	Test Group									
	1	2	3	4	5	6	7	8	9	10
	Test Sequence (a)									
Examination of Product	1,11	1,10	1,10	1,10	1,10	1,9	1,3	1,3	1,3	1,5
LLCR	3,9	2,5,7,9	2,5,7,9	2,5,7,9	2,5,7,9					2,4
Insulation Resistance						2,7				
DWV						3,8				
Temperature Rise							2			
Solderability									2	
Resistance to Soldering Heat								2		
Mating Force	2,8									
Un-mating force	4,10									
Durability (preconditionig)		3	3	3	3	4				
Durability	5									
Vibration	6									
Mechanical Shock	7									
Reseating		8	8	8	8					
Temperature & Humidity		6				6				
Temperature Life				4						
Thermal Shock		4				5				
Mixed Flowing Gas			4							
Thermal Disturbance			6		6					
Thermal Cycling				6						
Dust					4					
Salt Spray										3

Figure 2

Note:

(a) Numbers indicate sequence in which the tests are performed.

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## **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 serialized 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 TE 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.