High Speed Serial Data 2 Connector

1. SCOPE

1.1. Content

This specification covers performance, tests and quality requirements for the Tyco Electronics High Speed Serial Data Connector 2 (HSSDC2) designed for applications requiring extremely high data transfer rates over long distances. A right angle surface mount receptacle with seven high-speed contacts is available. The plug connector assembly includes a printed circuit board terminated to the cable at one end, and an edge card circuit pattern on the other end. The printed circuit board may or may not have equalization circuitry. The shielded cable has four conductors and is available in 18, 24 and 26 AWG. A latch is included in the plug design.

1.2. Qualification

When tests are performed on the subject product line, procedures specified in Figure 1 shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

1.3. Qualification Test Results

Successful qualification testing on the subject product line was completed on 27Apr01. The Qualification Test Report number for this testing is 501-509. This documentation is on file at and available from Engineering Practices and Standards (EPS).

2. APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the latest edition of the document applies. 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. Tyco Electronics Documents

- 109-197: AMP Test Specifications vs EIA and IEC Test Methods
- 114-13028: Application Specification
- 501-509: Qualification Test Report
- 502-1121: Engineering Report

2.2. Commercial Standards

- EIA-364: Electrical Connector/Socket Test Procedures Including Environmental Classifications
- IEEE SFF-8410: HSS Copper Testing and Performance Requirements

3. REQUIREMENTS

3.1. Design and Construction

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

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3.2. Materials

Materials used in the construction of this product shall be as specified on the applicable product drawing.

3.3. Ratings

- Voltage: 30 volts DC
- Current: 0.5 ampere maximum
- Temperature: -10 to 60˚C
- Characteristic Impedance: 100 ohms
- Frequency Range: 0 to 5 Gbps

3.4. Performance and Test Description

Product is designed to meet the electrical, mechanical and environmental performance requirements specified in Figure 1. Unless otherwise specified, all tests shall be performed at ambient environmental conditions per EIA-364.

3.5. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure
Initial examination of product.	Meets requirements of product drawing.	EIA-364-18. Visual and dimensional (C of C) inspection per product drawing.
Final examination of product.	Meets visual requirements.	EIA-364-18. Visual inspection.
ELECTRICAL		
Dry circuit resistance.	70 milliohms maximum. ΔR 20 milliohms maximum.	EIA-364-23. Subject specimens to 100 milliamperes maximum and 20 millivolts maximum open circuit voltage. See Figure 3.
Insulation resistance.	1000 megohms minimum.	EIA-364-21. Test between adjacent contacts of unmated specimens.
Dielectric withstanding voltage.	350 volts AC at sea level. 1 minute hold with no breakdown or flashover.	EIA-364-20, Condition I. Test between adjacent contacts of unmated specimens.
Impedance.	See Note (2).	IEEE SFF-8410.
Eye pattern.	See Note (2).	IEEE SFF-8410.
Insertion loss.	See Note (2).	IEEE SFF-8410.
Return loss.	See Note (2).	IEEE SFF-8410.
Near end crosstalk (NEXT).	See Note (2).	IEEE SFF-8410.

Figure 1 (continued)

Test Description	Requirement	Procedure
	MECHANICAL	
Solderability.	Solderable area shall have a minimum of 95% solder coverage.	EIA-364-638. Subject contacts to solderability.
Vibration, random.	No discontinuities of 1 microsecond or longer duration. See Note (1).	EIA-364-28, Test Condition VII, Condition D. Subject mated specimens to 3.10 G's rms between 20-500 Hz. 15 minutes in each of 3 mutually perpendicular planes.
Mechanical shock.	No discontinuities of 1 microsecond or longer duration. See Note (1).	EIA-364-27, Method H. Subject mated specimens to 30 G's half-sine shock pulses of 11 milliseconds duration. 3 shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks.
Durability.	See Note (1).	EIA-364-9. Mate and unmate specimens for 250 cycles at a maximum rate of 500 cycles per hour.
Mating force.	30 N [6.7 lb] maximum.	EIA-364-13. Measure force necessary to mate specimens at a maximum rate of 12.7 mm [.5 in] per minute.
Unmating force.	10 N [2.25 lb] minimum.	EIA-364-13. After fully depressing the retention latch, measure force necessary to unmate specimens at a maximum rate of 12.7 mm [.5 in] per minute.
Retention force.	Specimens shall remain mated when a force of 75 N [16.9 lb] is applied. No opens detected.	EIA-364-38. Apply specified load in an axial direction.
Side load force.	Specimens shall remain mated when a force of 75 N [16.9 lb] is applied. No opens detected.	EIA-364-38. Applied specified load to the cable plug in a plane parallel to the I/O panel. See Figure 4.
Longitudinal force.	Specimens shall remain mated when a force of 100 N [22.5 lb] is applied. No opens detected.	EIA-364-38. Applied specified load to the cable plug in a plane parallel to the I/O panel. See Figure 5.

Figure 1 (continued)

Test Description	Requirement	Procedure
ENVIRONMENTAL		
Thermal shock.	See Note (1).	EIA-364-32. Subject unmated specimens to 5 cycles between -10 and 70°C.
Humidity-temperature cycling.	See Note (1).	EIA-364-31, Method III. Subject unmated specimens to 10 cycles (10 days) between 25 and 65°C at 80 to 100% RH.
Temperature life.	See Note (1).	EIA-364-17, Method A, Test Condition 2, Test Time Condition C. Subject mated specimens to 70°C for 500 hours.
Mixed flowing gas.	See Note (1).	EIA-364-65, Class IIA. Subject specimens to environmental Class IIA for 7days unmated, and 7 days mated.

NOTE

(1) Shall meet visual requirements, show no physical damage, and meet requirements of additional tests as specified in the Product Qualification and Requalification Test Sequence shown in Figure 2.

(2) This test was not performed as part of the Qualification Test Sequence for product covered by this specification. See Engineering Report 502-1121 for details of these tests.

Figure 1 (end)

3.6. Product Qualification and Requalification Test Sequence

Test or Examination	Test Group (a)							
	1	2	3	4	5	6	7	8
	Test Sequence (b)							
Initial examination of product	1	1	1	1	1	1	1	1
Dry circuit resistance	3,7	2,4	2,4					
Insulation resistance				2,6				
Dielectric withstanding voltage				3,7				
Solderability					2			
Vibration	5							
Mechanical shock	6							
Durability	4							
Mating force	2							
Unmating force	8							
Retention force						2(d)		
Side load force							2(d)	
Longitudinal force								2(d)
Thermal shock				4				
Humidity-temperature cycling				5				
Temperature life		3(c)						
Mixed flowing gas			3(c)					
Final examination of product	9	5	5	8	3	3	3	3

NOTE

(a) See paragraph 4.1.A.
(b) Numbers indicate sequence in which tests are performed.
(c) Precondition specimens with 50 durability cycles.
(d) Test shall be conducted with receptacles soldered to printed circuit boards and mounted to an I/O panel.

Figure 2

4. QUALITY ASSURANCE PROVISIONS

4.1. Qualification Testing

A. Specimen Selection

Specimens shall be prepared in accordance with applicable Instruction Sheets and shall be selected at random from current production. All test groups shall each consist of 6 specimens.

B. Test Sequence

Qualification inspection shall be verified by testing specimens as specified in Figure 2.

4.2. Requalification Testing

If changes significantly affecting form, fit or function are made to the product or manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of the original testing sequence as determined by development/product, quality and reliability engineering.

4.3. Acceptance

Acceptance is based on verification that the product meets the requirements of Figure 1. Failures attributed to equipment, test setup or operator deficiencies shall not disqualify the product. If product failure occurs, corrective action shall be taken and specimens resubmitted for qualification. Testing to confirm corrective action is required before resubmittal.

4.4. Quality Conformance Inspection

The applicable quality inspection plan shall specify the sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with the applicable product drawing and this specification.

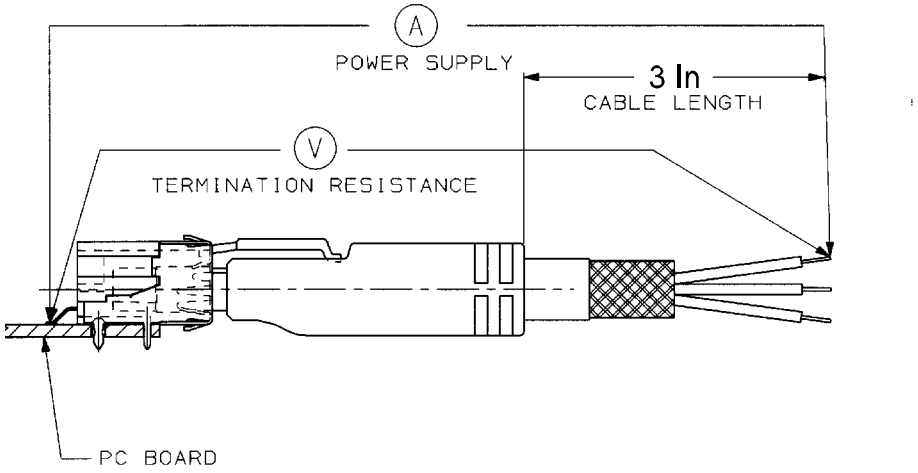


Figure 3
Dry Circuit Resistance Measurement Points

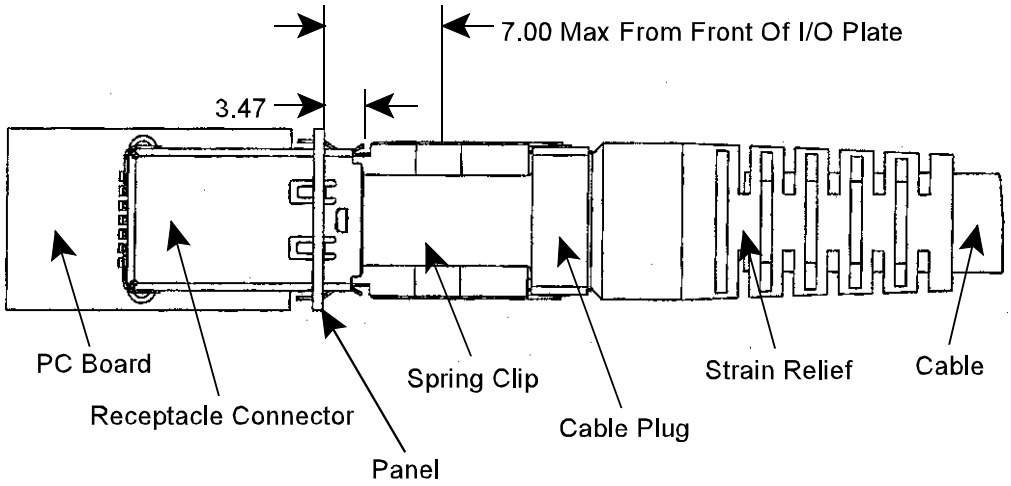


Figure 4
Side Load Force

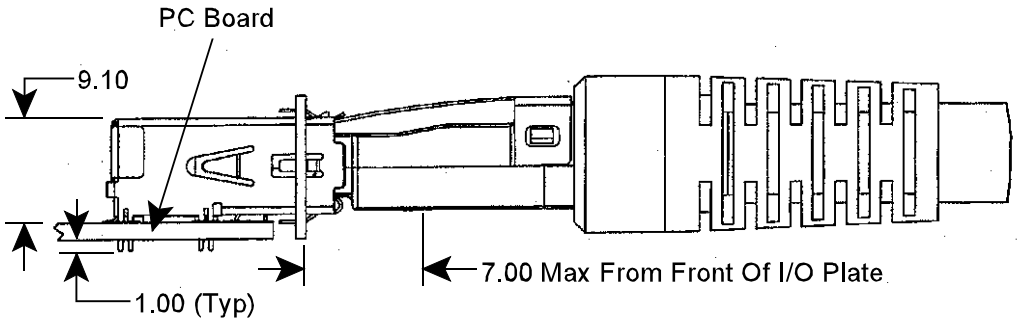


Figure 5
Longitudinal Force