High Speed Serial Data Connector

1. INTRODUCTION

1.1. Purpose

| Testing was performed on the Tyco Electronics High Speed Serial Data Connector (HSSDC) to
| determine its conformance to the requirements of Product Specification 108-1705 Rev. C.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of the High Speed Serial Data Connector. Testing was performed at the Americas Regional Laboratory between 07Jul97 and
| 13Mar98. The test file number for this testing is CTL 7918-000-005. Additional testing was performed
| between 16Dec03 and 16Feb04. The test file number for this additional testing is CTL 7534-002. This documentation is on file at and available from the Americas Regional Laboratory.

1.3. Conclusion

The High Speed Serial Data Connectors listed in paragraph 1.5., conformed to the electrical,
| mechanical, and environmental performance requirements of Product Specification 108-1705 Rev C.

1.4. Product Description

The High Speed Serial Data Connector is designed for applications requiring extremely high data transfer rates over long distances. This fully shielded connector utilizes the CHAMP* .050 Series II contact interface with gold plated contacts on 1.25 inch centerline. The surface mounted PCB connectors are available in right angle and straddle mount configurations with both six and eight contacts. The connectors are “hot pluggable” with mate first break last ground contacts. The plug connector assembly includes a PCB terminated to plug contacts on one side and cable on the other.

| 1.5. Test Specimens

| Test Specimens were representative of normal production lots. Specimens identified with the following part numbers were used for test:

Test Group	Quantity	Part Number	Description
1,2,3,4,5	23	636180-1	HSSDC Receptacle
1,2,3,4	21	636275	HSSDC Plug Assembly
1,2,3,4	21	636274-1	Cable

Figure 1

1.6. Environmental Conditions

Unless otherwise stated, the following environmental conditions prevailed during testing:

- Temperature: 15 to 35˚C
- Relative Humidity: 20 to 80%

* Trademark
| Indicates change

1.7. Qualification Test Sequence

Test or Examination	Test Group (a)				
	1	2	3	4	5
	Test Sequence (b)				
Examination of product	1,9	1,5	1,5	1,8	1,3
Termination resistance	3,7	2,4	2,4		
Insulation resistance				2,6	
Dielectric withstanding voltage				3,7	
Solderability					2
Vibration	5				
Physical shock	6				
Durability	4				
Mating force	2				
Unmating force	8				
Thermal shock				4	
Humidity-temperature cycling				5	
Temperature life		3(c)			
Mixed flowing gas			3(c)		

NOTE *(a) See paragraph 1.5.*
(b) Numbers indicate sequence in which tests are performed.
(c) Precondition specimens with 10 cycles durability.

Figure 2

2. SUMMARY OF TESTING

2.1. Examination of Product - All Groups

All specimens submitted for testing were representative of normal production lots. A Certificate of Conformance was issued by the Product Assurance Department of Advanced Cable Systems. Where specified, specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.

2.2. Termination Resistance - Groups 1, 2 and 3

All termination resistance measurements, taken at 100 milliamperes maximum and 20 millivolts maximum open circuit voltage were less than 35 milliohms.

Test Group	Number of Data Points	Condition	Termination Resistance		
			Min	Max	Mean
1	40	Initial	20.84	32.08	25.606
		After Mechanical	21.35	32.64	25.898
2	40	Initial	19.32	32.02	26.421
		After Temperature Life	19.15	32.24	26.217
3	40	Initial	20.03	31.75	26.486
		After Mixed Flowing Gas	19.96	31.76	26.613

NOTE All values in milliohms.

Figure 3

2.3. Insulation Resistance - Group 4

All insulation resistance measurements were greater than 1000 megohms.

2.4. Dielectric Withstanding Voltage - Group 4

No dielectric breakdown or flashover occurred.

2.5. Solderability - Group 5

All contact leads had a minimum of 95% solder coverage.

2.6. Vibration - Group 1

No discontinuities were detected during vibration. Following vibration, no cracks, breaks, or loose parts on the specimens were visible.

2.7. Mechanical Shock - Group 1

No discontinuities were detected during mechanical shock. Following mechanical shock testing, no cracks, breaks, or loose parts on the specimens were visible.

2.8. Mating Force - Group 1

All mating force measurements were less than 8.0 pounds.

2.9. Unmating Force - Group 1

All unmating force measurements were greater than 2.0 pounds.

2.10. Durability - Group 1

No physical damage occurred as a result of mating and unmating the specimens 500 times.

2.11. Thermal Shock - Group 4

No evidence of physical damage was visible as a result of exposure to thermal shock.

2.12. Humidity-temperature Cycling - Group 4

No evidence of physical damage was visible as a result of exposure to humidity-temperature cycling.

2.13. Mixed Flowing Gas - Group 3

No evidence of physical damage was visible as a result of exposure to the pollutants of mixed flowing gas.

2.14. Temperature Life - Group 2

No evidence of physical damage was visible as a result of exposure to temperature life.

3. TEST METHODS

3.1. Examination of Product

Where specified, specimens were visually examined for evidence of physical damage detrimental to product performance.

3.2. Termination Resistance

Termination resistance measurements at low level current were made using a 4 terminal measuring technique (Figure 4). The test current was maintained at 100 milliamperes maximum with a 20 millivolt maximum open circuit voltage.

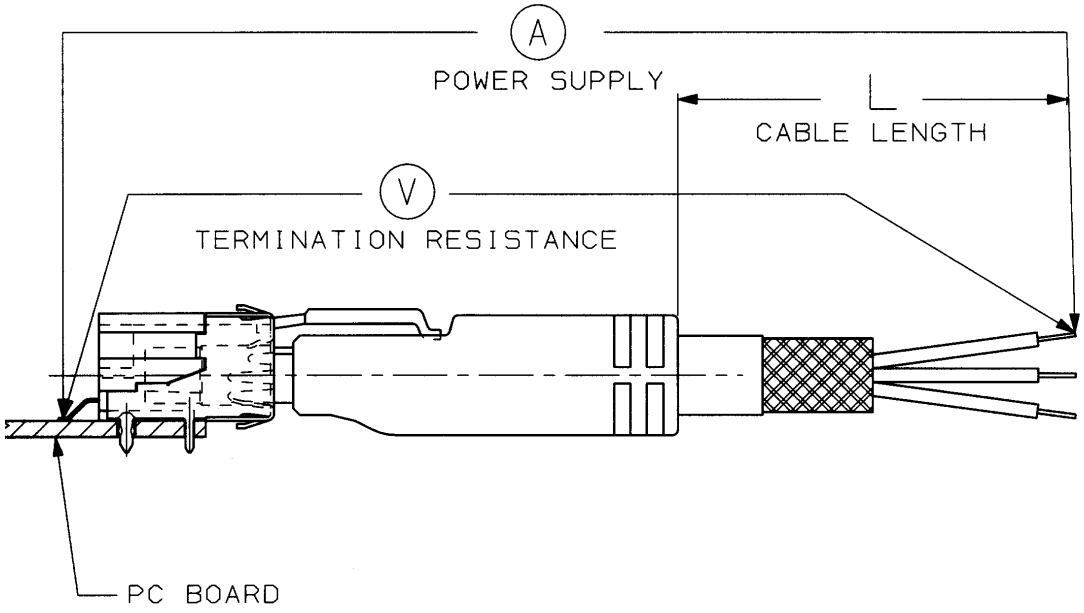

Figure 4
Typical Termination Resistance Measurement Points

3.3. Insulation Resistance

Insulation resistance was measured between adjacent contacts of unmated specimens. A test voltage of 500 volts DC was applied for 2 minutes before the resistance was measured.

3.4. Dielectric Withstanding Voltage

A test potential of 350 volts AC was applied between the adjacent contacts of unmated specimens. This potential was applied for 1 minute and then returned to zero.

3.5. Solderability

Connector assembly contact solder tails were subjected to a solderability test. The soldertails were immersed in a mildly activated rosin flux for 5 to 10 seconds, allowed to drain for 10 to 60 seconds, then held over molten solder without contact for 2 seconds. The solder tails were then immersed in the molten solder at a rate of approximately 1 inch per second, held for 3 to 5 seconds, then withdrawn. After cleaning in isopropyl alcohol, the specimens were visually examined for solder coverage. The solder used for testing was 60/40 tin lead composition and was maintained at a temperature of 245 ± 5°C.

3.6. Vibration, Random

Mated specimens were subjected to a random vibration test, specified by a random vibration spectrum, with excitation frequency bounds of 5 and 500 Hz. The power spectral density at 5 Hz was 0.000312 G^2/Hz. The spectrum sloped up at 6 dB per octave to a PSD of 0.02 G^2/Hz at 14 Hz. The spectrum was flat at 0.02 G^2/Hz from 14 to 500 Hz. The root-mean square amplitude of the excitation was 3.13 GRMS. This was performed for 15 minutes in each of 3 mutually perpendicular planes for a total vibration time of 45 minutes. Specimens were monitored for discontinuities of 1 microsecond or greater using a current of 100 milliamperes DC.

3.7. Mechanical Shock, Half-sine

Mated specimens were subjected to a mechanical shock test having a half-sine waveform of 30 gravity units (g peak) and a duration of 11 milliseconds. Three shocks in each direction were applied along the 3 mutually perpendicular planes for a total of 18 shocks. Specimens were monitored for discontinuities of 1 microsecond or greater using a current of 100 milliamperes DC.

3.8. Mating Force

The force required to mate individual specimens was measured using a tensile/compression device with the rate of travel at 0.5 inch per minute and a free floating fixture.

3.9. Unmating Force

The force required to unmate individual specimens was measured using a tensile/compression device with the rate of travel at 0.5 inch per minute and a free floating fixture.

3.10. Durability

Specimens were mated and unmated 500 times at a maximum rate of 600 cycles per hour.

3.11. Thermal Shock

Unmated specimens were subjected to 5 cycles of thermal shock with each cycle consisting of 30 minute dwells at -65 and 105°C. The transition between temperatures was less than 1 minute.

3.12. Humidity-temperature Cycling

| Unmated specimens were exposed to 10 cycles of humidity-temperature cycling. Each cycle lasted 24 hours and consisted of cycling the temperature between 25 and 65°C twice while maintaining high humidity (Figure 5).

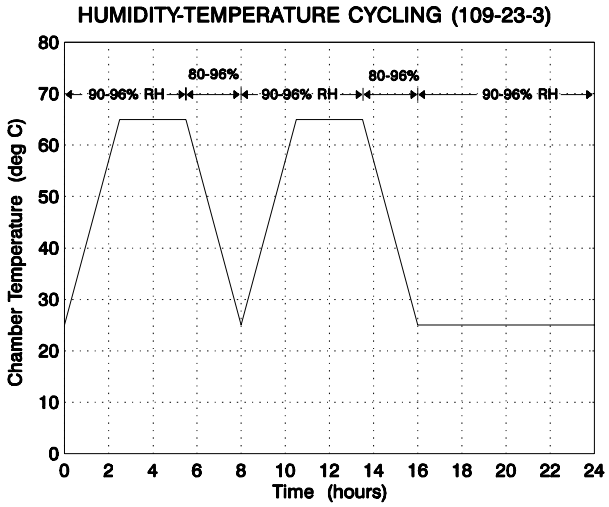

Figure 5
Typical Humidity-Temperature Cycling Profile

3.13. Mixed Flowing Gas, Class II

| Mated specimens were exposed for 14 days to a mixed flowing gas Class II exposure. Class II exposure is defined as a temperature of 30°C and a relative humidity of 70% with the pollutants of Cl_2 at 10 ppb,
| NO_2 at 200 ppb, and H_2S at 10 ppb. Specimens were preconditioned with 10 cycles of durability.

3.14. Temperature Life

| Mated specimens were exposed to a temperature of 105˚C for 500 hours. Specimens were preconditioned with 10 cycles of durability.