1.0 mm Mezzanine Connectors

1. INTRODUCTION

1.1. Purpose

Testing was performed on the Tyco Electronics 1.0 mm Mezzanine Connectors to determine their | conformance to the requirements of Product Specification 108-2246 Revision D.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of the 1.0 mm Mezzanine Connectors. Testing was performed at the Engineering Assurance Product Testing Laboratory between 10Feb97 and 18Sep97. The test file number for this testing is CTL6537-001. Additional testing was performed between 08Jan09 and 29Jan09. The test file number for this testing is EA20090012T. This documentation is on file at and available from the Engineering Assurance Product Testing Laboratory.

1.3. Conclusion

The 1.0 mm Mezzanine Connectors listed in paragraph 1.5., conformed to the electrical, mechanical, | and environmental performance requirements of Product Specification 108-2246 Revision D.

1.4. Product Description

The 1.0 mm Mezzanine Connector is a 2 row 64 position board-to-board connector system available in both 8 and 15 mm stack heights. The housing material is Liquid Crystal Polymer (LCP), the contacts are phosphor bronze.

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
1,2,3,4,5,6	2 each	120521-1	1.0 mm FH receptacle, 8 mm stack height
		120524-1	1.0 mm FH receptacle, 15 mm stack height
		120525-1	1.0 mm FH plug, 8 mm stack height
		120527-1	1.0 mm FH plug, 15 mm stack height
5	5	5146893-1	1.0 mm FH receptacle, 8 mm stack height
	5	5120525-1	1.0 mm FH plug, 8 mm stack height
	5	120524-1	1.0 mm FH receptacle, 15 mm stack height
	5	5120534-1	1.0 mm FH plug, 15 mm stack height
	5	60-1042132-1	Plug PCB
	5	60-1042132-2	Receptacle PCB

Figure 1

* Trademark
| Indicates change

1.6. Environmental Conditions

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

- Temperature: 15 to 35°C
- Relative Humidity: 25 to 80%

1.7. Qualification Test Sequence

Tests Performed	Test Groups (a)					
	1	2	3	4	5	6
	Test Sequence (b)					
Initial examination of product	1	1	1	1	1	1
LLCR	2,5	2,10	2,5		2,4	
Insulation resistance				2,6		
Withstanding voltage				3,7		
Solderability						2
Random vibration	4					
Mechanical shock	3					
Durability		3,7				
Mating force		4,8				
Unmating force		5,9				
Thermal shock			3	4		
Humidity/temperature cycling			4	5		
Temperature life					3	
Mixed flowing gas		6				
Final examination of product	6	11	6	8	5	3

NOTE *(a) See paragraph 1.5.*
(b) Numbers indicate sequence in which tests are performed.

Figure 2

2. SUMMARY OF TESTING

2.1. Initial Examination of Product - All Test Groups

All specimens submitted for testing were representative of normal production lots. A Certificate of Conformance was issued by Product Assurance. Specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.

2.2. Low Level Contact Resistance (LLCR) - Test Groups 1, 2, 3 and 5

All LLCR measurements, taken at 100 milliamperes maximum and 20 millivolts maximum open circuit voltage were less than 24 milliohms initially for 8 mm stack height, 45 milliohms initially for 15 mm stack height, and had a change in resistance (ΔR) of less than 15 milliohms after testing.

Test Group	Number of Data Points	Condition	Termination Resistance		
			Min	Max	Mean
8 mm Stack Height					
1	128	Initial	16.12	18.65	17.115
		After vibration (ΔR)	-0.83	0.63	0.020
2	128	Initial	16.28	18.10	16.898
		After mixed flowing gas (ΔR)	-0.88	1.85	0.464
3	128	Initial	15.75	17.48	16.544
		After humidity/temperature cycling (ΔR)	-0.11	2.96	0.556
5	128	Initial	11.52	12.91	12.11
		After temperature life (ΔR)	-0.37	2.09	0.58
15 mm Stack Height					
1	128	Initial	28.26	31.42	29.372
		After vibration (ΔR)	-0.79	1.05	0.045
2	128	Initial	28.27	30.30	29.091
		After mixed flowing gas (ΔR)	-0.33	2.32	0.752
3	128	Initial	27.72	30.11	28.884
		After humidity/temperature cycling (ΔR)	-0.04	7.26	0.756
5	128	Initial	22.05	27.66	23.66
		After temperature life (ΔR)	-1.41	3.29	0.90

NOTE *All values in milliohms.*

Figure 3

2.3. Insulation Resistance - Test Group 4

All insulation resistance measurements were greater than 1000 megohms.

2.4. Withstanding Voltage - Test Group 4

No dielectric breakdown or flashover occurred.

2.5. Solderability.

All solderable areas had a minimum of 95% solder coverage.

2.6. Random Vibration - Test Group 1

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

2.7. Mechanical Shock - Test Group 1

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

| 2.8. Durability - Test Group 2

| No physical damage occurred as a result of mating and unmating the specimens 25 times before the
| first mating force test and 75 times before the second mating force test.

2.9. Mating Force - Test Group 2

All mating force measurements were less than 0.0625 kg average per contact for 8 mm stack height and 0.0469 kg average per contact for 15 mm stack height.

2.10. Unmating Force - Test Group 2

All unmating force measurements were greater than 0.0234 kg average per contact for 8 mm stack height and 0.0170 kg average per contact for 15 mm stack height.

2.11. Thermal Shock - Test Groups 3 and 4

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

2.12. Humidity/temperature Cycling - Test Groups 3 and 4

No evidence of physical damage was visible as a result of humidity/temperature cycling.

2.13. Temperature Life - Test Group 5

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

2.14. Mixed Flowing Gas - Test Group 2

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

2.15. Final Examination of Product - All Test Groups

Specimens were visually examined and no evidence of physical damage detrimental to product performance was observed.

3. TEST METHODS

3.1. Initial Examination of Product

A Certificate of Conformance was issued stating that all specimens in this test package were produced, inspected, and accepted as conforming to product drawing requirements, and were manufactured using the same core manufacturing processes and technologies as production parts.

3.2. LLCR

LLCR measurements were made using a 4 terminal measuring technique. The test current was maintained at 100 milliamperes maximum with a 20 millivolt maximum open circuit voltage.

3.3. Insulation Resistance

Insulation resistance was measured between adjacent contacts of mated specimens. A test voltage of 250 volts DC was applied for 1 minute before the resistance was measured.

3.4. Withstanding Voltage

A test potential of 250 volts AC was applied between adjacent contacts of mated specimens. This potential was applied for 1 minute and then returned to zero.

3.5. Solderability

Specimen solder tails were subjected to a solderability test. Specimens were steam aged for 1 hour prior to testing. The soldertails were immersed in a nonactivated flux for 5 to 10 seconds, allowed to drain for 10 to 60 seconds and held over molten solder without contact for 2 seconds. The solder tails were then immersed in the molten solder at a rate of approximately 25.4 mm per second, held for 5 seconds and 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 maintained at a temperature of 245 ± 5°C.

3.6. Random Vibration

Mated specimens were subjected to a random vibration test, specified by a random vibration spectrum, with excitation frequency bounds of 50 and 2000 Hz. The Power Spectral Density (PSD) at 50 Hz was 0.015 G^2/Hz. The spectrum sloped up at 6 dB per octave to a PSD of 0.06 G^2/Hz at 100 Hz. The spectrum was flat at 0.06 G^2/Hz from 100 to 1000 Hz. The spectrum sloped down at 6 dB per octave to the upper bound frequency of 2000 Hz at which the PSD was 0.015 G^2/Hz. The root-mean square amplitude of the excitation was 9.26 G's rms. 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, Sawtooth

Mated specimens were subjected to a mechanical shock test, having a sawtooth waveform of 50 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. Durability

Specimens were mated and unmated 25 times before the first mating force test and 75 times before the second mating force test at a maximum rate of 300 cycles per hour.

3.9. Mating Force

The force required to mate individual specimens was measured using a tensile/compression device with a free floating fixture and a rate of travel of 25.4 mm per minute. The average force per contact was calculated. Specimens were preconditioned with 75 durability cycles prior to final mating and unmating measurements being taken.

3.10. Unmating Force

The force required to unmate individual specimens was measured using a tensile/compression device with a free floating fixture and a rate of travel of 25.4 mm per minute. The average force per contact was calculated.

3.11. Thermal Shock

Mated specimens were subjected to 5 cycles of thermal shock with each cycle consisting of 30 minute dwells at -55 and 125°C. The transition between temperatures was less than 1 minute.

3.12. Humidity/temperature Cycling

Mated specimens were exposed to 10 humidity/temperature cycles. Each cycle lasted 24 hours and consisted of cycling the temperature between 25 and 65°C twice while maintaining high humidity.

3.13. Temperature Life

Mated specimens were exposed to a temperature of 110°C for 250 hours.

3.14. Mixed Flowing Gas

Mated specimens were exposed for 7 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.

3.15. Final Examination of Product

Specimens were visually examined for evidence of physical damage detrimental to product performance.