.050 Inch Centerline FFC Cable Connector

1. INTRODUCTION

1.1. Purpose

Testing was performed on the TE Connectivity (TE) .050 Inch Centerline Flexible Flat Conductor (FFC) Cable Connector to determine its conformance to the requirements of Product Specification 108-16022 | Revision B.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of the .050 Inch Centerline FFC Cable Connector manufactured by the Interconnection Components and Assemblies Product Division of the Capital Goods Business Unit. Testing was performed between 24Jun94 and | 20Oct94. The test file number for this testing is CTL5706-014-006.

1.3. Conclusion

The .050 Inch Centerline FFC Cable Connector meets the electrical, mechanical, and environmental | performance requirements of Product Specification 108-16022 Revision B.

1.4. Product Description

The cable-to-board .050 inch center FFC receptacle connectors are part of the AMPMODU* System 50 family for terminating FFC cable and flexible etched circuitry. The FFC receptacle uses a dual beam contact with 30 microinches of gold plating. Contacts are supplied preloaded in single housings and as combs for use in double row housings. FFC cable is a planar parallel conductor cable comprised of .026 wide by .003 inch thick copper conductor insulated with a flame retardant polyester film.

1.5. Test Samples

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

Test Group	Quantity	Part Number	Description
1,2,3	3 each	104071-6	.050 header
1,2,3,4,5	3 each	2-487545-7	30 position housing
1,2,3,4,5	90 each	487547-1	Receptacle contact
1,2,3,4,5	90 each	487923-1	FFC solder tabs
6	10	487923-1	FFC solder tabs
1,2,3,4,5	3 each	2-499795-0	.050 FFC cable

Figure 1

| Indicates Change

LOC B

1.6. Qualification Test Sequence

Test or Examination	Test Group (a)					
	1	2	3	4	5	6
	Test Sequence (b)					
Examination of product	1,9	1,5	1,5	1,8	1,3	1,3
Termination resistance	3,7	2,4	2,4			
Insulation resistance				2,6		
Dielectric withstanding voltage				3,7		
Solderability						2(d)
Vibration, sinusoidal	5					
Physical shock	6					
Durability	4					
Contact retention in housing					2	
Mating force	2					
Unmating force	8					
Thermal shock				4		
Humidity-temperature cycling				5(c)		
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 samples with 10 cycles durability.
(d) Applies to solder tab contacts only.

Figure 2

2. SUMMARY OF TESTING

2.1. Examination of Product - All Test Groups

All samples submitted for testing were selected from normal current production. They were inspected and accepted by the Product Assurance Department of the Capital Goods Business Unit.

2.2. Termination Resistance - Test Groups 1, 2 and 3

All termination resistance measurements, taken at 100 milliamperes DC and 50 millivolts open circuit voltage were less than 25 milliohms.

Test Group	Number of Data Points	Condition	LLCR		
			Minimum	Maximum	Mean
1	90	Initial	12.21	17.90	14.779
		After mechanical	12.74	19.82	15.711
2	90	Initial	10.65	20.30	14.715
		After temperature life	11.26	20.49	15.819
3	90	Initial	10.93	17.31	14.697
		After mixed flowing gas	10.89	17.48	14.689

NOTE *All values in milliohms.*

Figure 3

2.3. Insulation Resistance - Test Group 4

All insulation resistance measurements were greater than 5000 megohms.

2.4. Dielectric Withstanding Voltage - Test Group 4

No dielectric breakdown or flashover occurred when a test voltage was applied between adjacent contacts.

2.5. Solderability - Test Group 6

Contact leads had a minimum of 95% solder coverage.

2.6. Vibration, Sinusoidal - Test Group 1

No discontinuities of the contacts were detected during vibration. Following vibration, no cracks, breaks, or loose parts on the connector assemblies were visible.

2.7. Physical Shock - Test Group 1

No discontinuities of the contacts were detected during physical shock. Following physical shock, no cracks, breaks, or loose parts on the connector assemblies were visible.

2.8. Durability - Test Group 1

No physical damage occurred as a result of mating and unmating the connectors 100 times.

2.9. Contact Retention In Housing - Test Group 5

No physical damage occurred to either the contacts or the housing, and no contacts dislodged from the housing as a result of applying an axial load of 2 pounds to the contacts.

2.10. Mating Force - Test Group 1

All mating force measurements were less than 8 ounces per contact.

2.11. Unmating Force - Test Group 1

All unmating force measurements were greater than 1 ounce per contact.

2.12. Thermal Shock - Test Group 4

No evidence of physical damage to either the contacts or the connector was visible as a result of thermal shock.

2.13. Humidity/temperature Cycling - Test Group 4

No evidence of physical damage to either the contacts or the connector was visible as a result of exposure to humidity/temperature cycling.

2.14. Temperature Life - Test Group 2

No evidence of physical damage to either the contacts or the connector was visible as a result of exposure to an elevated temperature.

2.15. Mixed Flowing Gas - Test Group 3

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

3. TEST METHODS

3.1. Examination of Product

Product drawings and inspection plans were used to examine the samples. They were examined visually and functionally.

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 DC with an open circuit voltage of 50 millivolt DC.

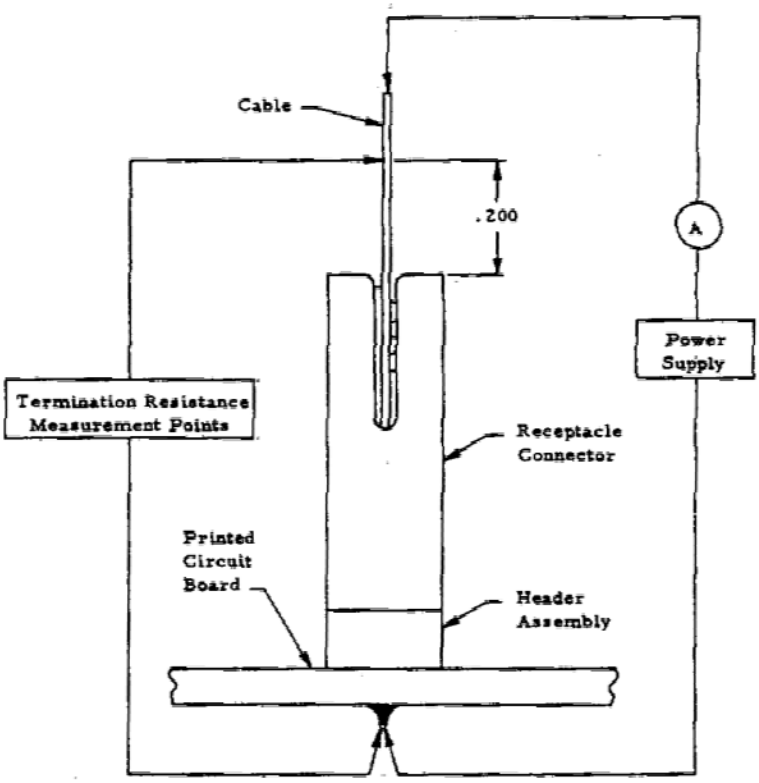

Figure 4
Typical Termination Resistance Measurement Points

3.3. Insulation Resistance

Insulation resistance was measured between adjacent contacts, using a test voltage of 250 volts DC. This voltage was applied for 2 minutes before the resistance was measured.

3.4. Dielectric Withstanding Voltage

A test potential of 300 volts AC was applied between adjacent contacts. 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 by immersing them in a non-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 samples were visually examined for solder coverage. The solder used for testing war 60/40 tin-lead composition maintained at a temperature of 245°C.

3.6. Vibration, Sinusoidal

Mated connectors were subjected to sinusoidal vibration, having a simple harmonic motion with an amplitude of .06 inch, double amplitude or 15 Gs (whichever is less). The vibration frequency was varied logarithmically between the limits of 10 and 2000 Hz and returned to 10 Hz in 20 minutes. This cycle was performed 36 times in each of 3 mutually perpendicular planes for a total vibration time of 36 hours. Connectors were monitored for discontinuities greater than 1 microsecond using a current of 100 milliamperes in the monitoring circuit.

3.7. Physical Shock

Mated connectors were subjected to a physical shock test having a sawtooth waveform of 100 gravity units (g peak) and a duration of 6 milliseconds. Three shocks in each direction were applied along the 3 mutually perpendicular planes for a total of 18 shocks. Connectors were monitored for discontinuities greater than 1 microsecond using a current of 100 milliamperes in the monitoring circuit.

3.8. Durability

Connectors were mated and unmated 100 times at a rate not exceeding 150 per hour.

| 3.9. Contact Retention In Housing

| An axial load of 2 pounds was applied to each contact and held for 60 seconds. The force was applied in a direction to cause removal of the contacts from the housing.

3.10. Mating Force

The force required to mate individual connectors was measured using a free floating fixture with the rate of travel at .5 inch per minute.

3.11. Unmating Force

The force required to unmate individual connectors was measured using a free floating fixture with the rate of travel at .5 inch per minute.

3.12. Thermal Shock

Mated connectors were subjected to 25 cycles of temperature extremes with each cycle consisting of 30 minute dwells at each temperature. The temperature extremes were -55 and 105°C. The transition between temperatures was less than 1 minute.

3.13. Humidity/temperature Cycling

Mated connectors 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 the relative humidity was held at 95%. During 5 of the first 9 cycles, the connectors were exposed to a cold shock at -10°C for 3 hours.

3.14. Temperature Life

Mated samples were exposed to a temperature of 105°C for 500 hours.

3.15. Mixed Flowing Gas, Class III

Mated connectors were exposed for 20 days to a mixed flowing gas Class III exposure. Class III exposure is defined as a temperature of 30°C and a relative humidity of 75% with the pollutants of Cl_2 at 20 ppb, NO_2 at 200 ppb and H_2S at 100 ppb. Samples were preconditioned with 10 cycles of durability.