

**Surface Mount Matched Impedance Connector**

**1. INTRODUCTION**

1.1. Purpose

Testing was performed on the Tyco Electronics Surface Mount, Matched Impedance Connector (MICTOR\*) to determine its conformance to the requirements of Product Specification 108-1422 Rev. E.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of the MICTOR Connector manufactured by the Personal Computer Business Group. The testing was performed between 24Sep97 and 13Dec98.

1.3. Conclusion

The MICTOR Connector, listed in paragraph 1.5., meets the electrical, mechanical, and environmental performance requirements of Product Specification 108-1422 Rev E.

1.4. Product Description

The MICTOR Connector is designed for board to board applications using two design styles, right angle and vertical. These two piece connector designs accommodate a variety of printed circuit board thicknesses. The plug assemblies are loaded with .008 inch thick MICTOR contacts, in dual row, which mate with hermaphroditic contacts in the receptacle assembly. Ground buss members are located between the dual rows of signal contacts for improved high speed signal transmission.

1.5. Test Samples

The test samples were randomly selected from normal current production lots. The following part numbers were used for test:

Test Group	Quantity	Part Number	Description	Performance Level
1,2,3,4,5	3 each	767003-4	152 position plug assembly	1
1,2,3,4,5	3 each	1-767005-4	266 position vertical plug assembly	1
1,2,3,4,5	3 each	2-767004-8	266 position vertical receptacle assembly	1
2,3,4,5	3 each	767004-4	152 position receptacle assembly	1
2,3,4,5	3 each	767006-7	266 position right angle plug assembly	1
1,3	5 each	767055-7	266 position right angle plug assembly	2
1,3	5 each	767054-7	266 position receptacle assembly	2
1,3	5 each	767056-6	228 position plug assembly	2
1,3	5 each	767054-6	228 position plug assembly	2
1,3	5 each	767057-7	266 position vertical plug assembly	2
1	6 each	767004-4	152 position receptacle assembly	1
1	6 each	767006-4	152 position right angle plug assembly	1

## 1.6. 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	1,5
Termination resistance	3,7	2,4	2,4		2,4
Insulation resistance				2,6	
Dielectric withstanding voltage				3,7	
Random vibration	5				
Mechanical 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)		
Temperature cycling					3(c)

**NOTE**

- (a) See paragraph 1.5.  
 (b) Numbers indicate sequence in which tests are performed.  
 (c) Precondition samples with 3 cycles durability.

**2. SUMMARY OF TESTING**

2.1. Examination of Product - All Groups

All samples submitted for testing were selected from normal current production lots. They were inspected and accepted by the Product Assurance Department of the Personal Computer Business Group.

2.2. Termination Resistance - Groups 1, 2, 3 and 5

All termination resistance measurements, taken at 100 milliamperes DC and 50 millivolts open circuit voltage has less than a 10 milliohm increase ( $\Delta R$ ) in resistance when the initial measurements were compared to the final measurements.

Test Group	Number of Samples	Condition	Termination Resistance		
			Min	Max	Mean
Signal Contacts					
1	336	After mechanical	-20.82	3.22	-0.426
2	214	After temperature life	-7.77	7.36	0.849
3	273	After mixed flowing gas	-1.35	6.46	0.323
5	206	After temperature cycling	-2.19	0.00	-0.711
Ground Buss Contacts					
1	24	After mechanical	-0.07	0.13	-0.073
2	12	After temperature life	-0.09	0.18	0.077
3	12	After mixed flowing gas	0.03	0.34	0.123
5	12	After temperature cycling	-0.04	0.07	0.016

**NOTE** All values in milliohms.

2.3. Insulation Resistance - Group 4

All insulation resistance measurements were greater than 10,000 megohms.

2.4. Dielectric Withstanding Voltage - Group 4

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

2.5. Random Vibration - 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.

2.6. Mechanical Shock - Group 1

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

2.7. Durability - Group 1

No physical damage occurred to the samples as a result of mating and unmating the connector 25 times for Level 1 contacts and 500 times for Level 2 contacts.

2.8. Mating Force - Group 1

All mating force measurements were less than 152 ounces maximum average per module. A module consists of 38 signal contacts and 1 bus bar.

2.9. Unmating Force - Group 1

All unmating force measurements were greater than 19 ounces minimum average per module.

2.10. Thermal Shock - Group 4

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

2.11. Humidity/Temperature Cycling - 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.

2.12. Temperature Life - 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.

2.13. Mixed Flowing Gas - 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.

2.14. Temperature Cycling - Group 5

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

**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 1). The test current was maintained at 100 milliamperes DC with an open circuit voltage of 50 millivolts DC.

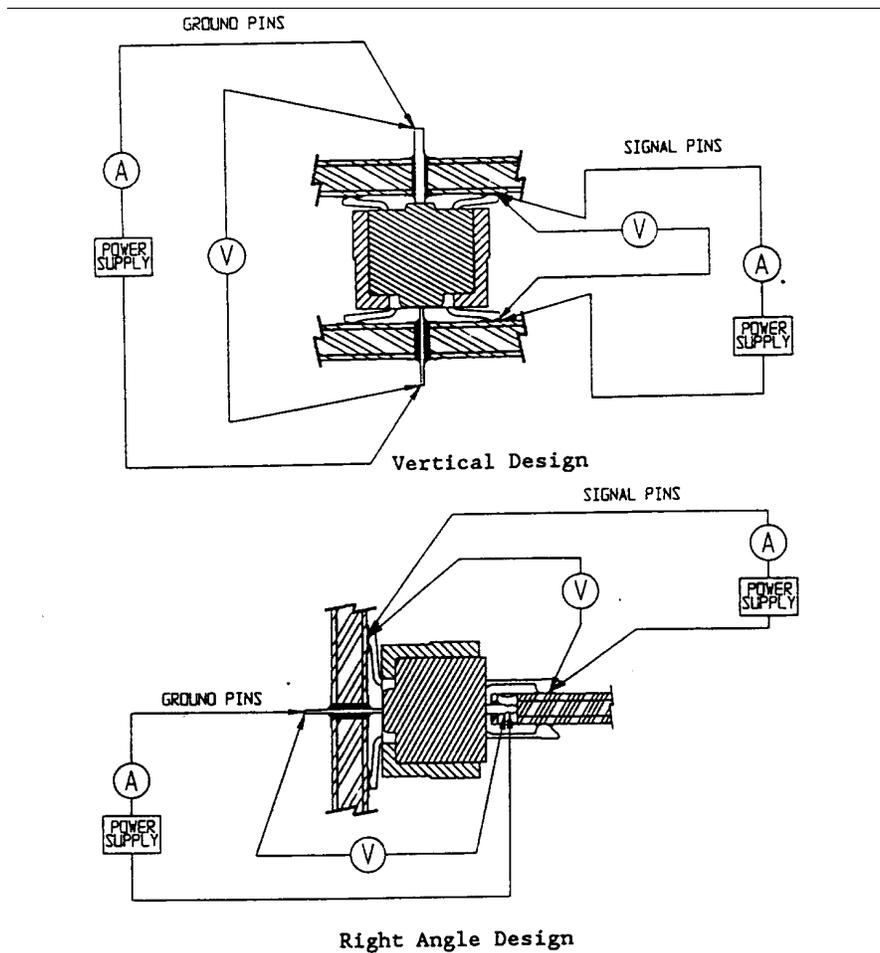


Figure 1  
Typical Termination Resistance Measurement Points

3.3. Insulation Resistance

Insulation resistance was measured between adjacent signal contacts and between all signal contacts and all ground contacts, using a test voltage of 10 volts DC. This voltage was applied for 2 minutes before the resistance was measured.

3.4. Dielectric Withstanding Voltage

A test potential of 500 volts AC was applied between the adjacent signal contacts and between all signal contacts and all ground contacts. This potential was applied for 1 minute and then returned to zero.

### 3.5. Random Vibration

Mated connectors 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 at 50 Hz was 0.025 G<sup>2</sup>/Hz. The spectrum sloped up at 6 dB per octave to a PSD of 0.10 G<sup>2</sup>/Hz at 100 Hz. The spectrum was flat at 0.10 G<sup>2</sup>/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 0.025 G<sup>2</sup>/Hz. The root-mean square amplitude of the excitation was 11.95 GRMS. The samples were subjected to this test for 90 minutes in each of the 3 mutually perpendicular axes, for a total test time of 4.5 hours. The connectors were monitored for discontinuities greater than 1 microsecond, using a current of 100 milliamperes in the monitoring circuit.

### 3.6. Mechanical Shock

Mated connectors were subjected to a mechanical shock test, having a half sine 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. The connectors were monitored for discontinuities greater than 1 microsecond, using a current of 100 milliamperes in the monitoring circuit.

### 3.7. Durability

Connector assemblies were mated and unmated 25 times for Level 1 contacts and 500 times for Level 2 contacts at a rate not exceeding 600 per hour.

### 3.8. Mating Force

The force required to mate connector assemblies was measured, using a free floating fixture with the rate of travel at 1 inch per minute maximum.

### 3.9. Unmating Force

The force required to unmate connector assemblies was measured using a free floating fixture with the rate of travel at 1 inch per minute maximum.

### 3.10. Thermal Shock

Mated connectors were subjected to 5 cycles of temperature extremes with each cycle consisting of 30 minutes at each temperature. The temperature extremes were -55 and 125°C. The transition between temperatures was less than 1 minute.

### 3.11. Humidity/Temperature Cycling

Mated connectors 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 2).

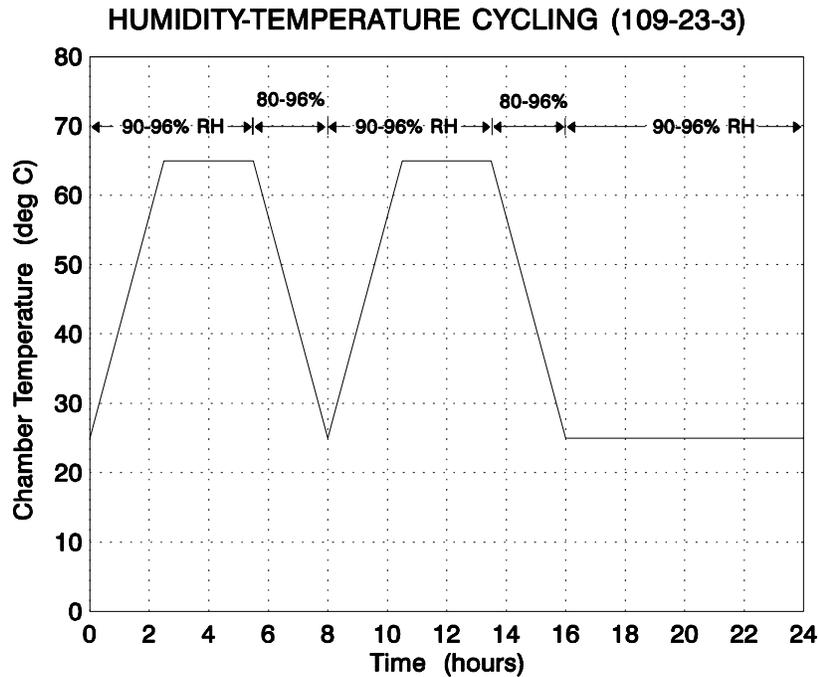


Figure 2  
Typical Humidity/Temperature Cycling Profile

3.12. Temperature Life

Mated samples were exposed to a temperature of 118°C for 792 hours.

3.13. Mixed Flowing Gas, Class II

Mated connectors 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<sub>2</sub> at 10 ppb, NO<sub>2</sub> at 200 ppb, and H<sub>2</sub>S at 10 ppb.

3.14. Temperature Cycling

Mated connectors were subjected to 1024 cycles of temperature extremes with each cycle consisting of 30 minutes at each temperature. The temperature extremes were -40 and 60°C. The transition between temperatures was less than 30 minutes.