Giga-Bit Interface Converter Module

1. INTRODUCTION

1.1. Purpose

Testing was performed on the AMP* Giga-Bit Interface Converter (GBIC) Module, Definition "2" Copper High Speed Serial Data Connector (HSSDC), and Definition "2" Copper DB-9 Intraenclosure to determine its conformance to the requirements of AMP Product Specification 108-1787 Revision A.

1.2. Scope

This report covers the electrical, mechanical, and environmental performance of the GBIC Module, Definition "2" Copper HSSDC, and Definition "2" Copper DB-9 Intraenclosure. Testing was performed at the Americas Regional Laboratory between 23Jul99 and 16Aug99. The test file number for this testing is CTL B006780-003A. This documentation is on file at and available from the Americas Regional Laboratory.

1.3. Conclusion

The GBIC Module, Definition "2" Copper HSSDC, and Definition "2" Copper DB-9 Intraenclosure listed in paragraph 1.5., conformed to the electrical, mechanical, and environmental performance requirements of AMP Product Specification 108-1787 Revision A.

1.4. Product Description

The GBIC Module, Definition "2" Copper HSSDC and Definition "2" Copper DB-9 Intraenclosure are an integral part of the Fibre Channel and Gigabit Ethernet. The modules provide a hot-pluggable, blind-mateable, field-installable interface for "Gigabit" signals. When used with HSSDC and DB9 copper cables, distances up to 13 meters are attainable. The module is used with Universal Card Guide and SCA2 connectors to provide a reliable high speed assembly.

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	5 each	887127-1	Passive GBIC connector with HSSDC connector interface
4	5 each	788614-1	Passive GBIC connector with DB-9 connector interface
1,3,4	5 each	787663-3	CHAMP Blindmate media converter module guide assembly

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
I Indicates change

LOC B

1.7. Qualification Test Sequence

Test or Examination	Test Group (a)			
	1	2	3	4
	Test Sequence (b)			
Examination of product	1,10	1,8	1,5	1,10
Termination resistance	3,7		2,4	3,7
Insulation resistance		2,6		
Dielectric withstanding voltage		3,7		
Vibration	5			5
Mechanical shock	6			6
Durability	4			4
Mating force	2			2
Unmating force	9			9
Retention	8			8
Thermal shock		4		
Humidity-temperature cycling		5		
Temperature life			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 Test Groups

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

2.2. Termination Resistance - Test Groups 1, 3 and 4

All termination resistance measurements, taken at 100 milliamperes maximum and 50 millivolts maximum open circuit voltage had a change in resistance (ΔR) of less than 10 milliohms after testing.

Test Group	Number of Data Points	Condition	Termination Resistance		
			Min	Max	Mean
1	20	After mechanical	-3.15	3.48	-1.11
3	20	After temperature life	-2.12	-0.87	-1.57
4	20	After mechanical	-4.03	-2.27	-2.97

NOTE
All values in milliohms.

Figure 3

2.3. Insulation Resistance - Test Group 2

All insulation resistance measurements were greater than 100 megohms.

2.4. Dielectric Withstanding Voltage - Test Group 2

No dielectric breakdown or flashover occurred.

2.5. Vibration - Test Groups 1 and 4

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

2.6. Mechanical Shock - Test Groups 1 and 4

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

2.7. Durability - Test Groups 1 and 4

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

2.8. Mating Force - Test Groups 1 and 4

All mating force measurements were less than 35 Newtons.

2.9. Unmating Force - Test Groups 1 and 4

All unmating force measurements were less than 24 Newtons.

2.10. Retention - Test Groups 1 and 4

No physical damage occurred to either the contacts or the housing, and no contacts dislodged from the housings as a result of supplying an axial load of 125 Newtons to the contacts for a minimum of 1 second.

2.11. Thermal Shock - Test Group 2

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

2.12. Humidity-temperature Cycling - Test Group 2

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

2.13. Temperature Life - Test Group 3

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

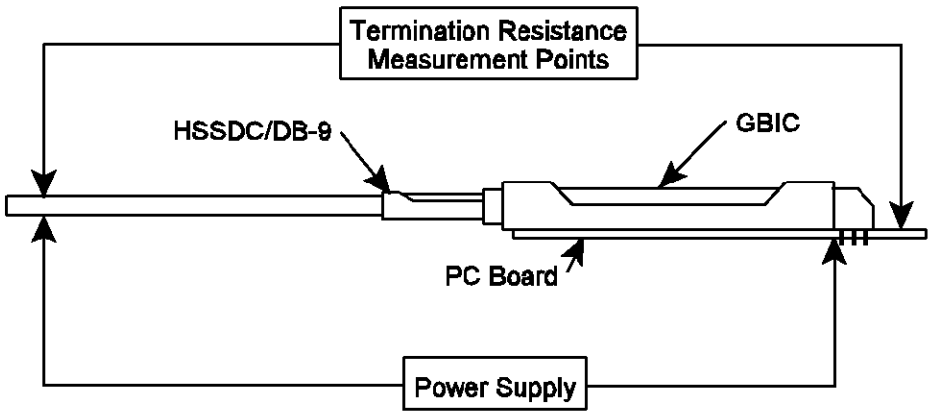
3. TEST METHODS

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 50 millivolt maximum open circuit voltage.



NOTE *Replace the 4 internal board capacitors by soldering a 24 AWG wire across the pads of each capacitor. Determine the GBIC system termination resistance by measuring the specimen as shown.*

Figure 4
Typical Termination Resistance Measurement Points

3.3. Insulation Resistance

Insulation resistance was measured between contacts 12 and 13, and 18 and 19 of mated 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 300 volts AC was applied between contacts 12 and 13, and 18 and 19 of mated specimens. This potential was applied for 1 minute and then returned to zero.

3.5. 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 12 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.

3.6. 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.

3.7. Durability

Specimens were manually mated and unmated 100 times at a maximum rate of 600 cycles per hour.

3.8. 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 12.7 mm [.5 in] per minute.

3.9. 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 12.7 mm [.5 in] per minute.

3.10. Retention

An axial load of 125 Newtons was applied to mated specimens and held for a minimum of 1 second. The force was applied in a direction to cause the locking latches to disengage.

3.11. Thermal Shock

Mated specimens were subjected to 5 cycles of thermal shock with each cycle consisting of 30 minute dwells at -10 and 70°C. The transition between temperatures was less than 1 minute.

3.12. Humidity-temperature Cycling

Mated 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).

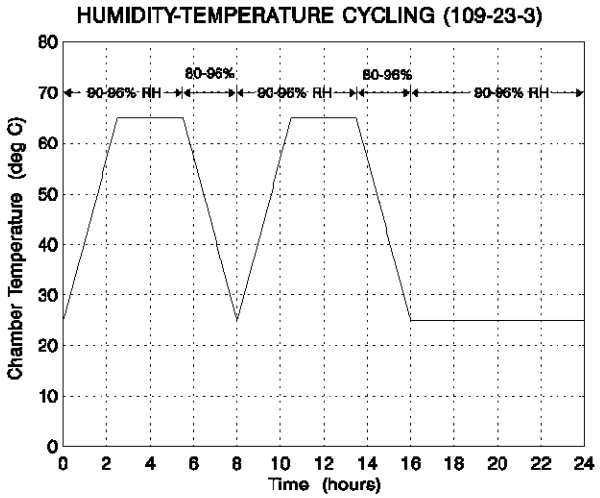


Figure 5
Typical Humidity-Temperature Cycling Profile

3.13. Temperature Life

Mated specimens were exposed to a temperature of 70°C for 500 hours. Specimens were preconditioned with 10 cycles of durability.