AMPMODU* Mod IV Interconnection System

1. SCOPE

1.1. Content

This specification covers performance, tests and quality requirements for the AMPMODU* Mod IV interconnection system incorporating both standard pressure and short point-of-contact receptacles housed in board mounted flame retardant housings. The mating male header assemblies utilize .025 inch square posts in flame retardant insulating headers and may be shrouded or unshrouded. Receptacles and posts mate on .100 inch centerlines and mount on printed circuit boards.

1.2. Qualification

When tests are performed on the subject product line, procedures specified in Figure 1 shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

1.3. Qualification Test Results

Successful qualification testing on the subject product line was completed on 10May88. Additional testing was completed on 10Jun08 and 04Aug09. The Qualification Test Report number for this testing is 501-68. This documentation is on file at and available from Engineering Practices and Standards (EPS).

2. APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the latest edition of the document applies. In the event of conflict between the requirements of this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between the requirements of this specification and the referenced documents, this specification shall take precedence.

2.1. Tyco Electronics Documents

- 100-15: Material Specification (Steel, Tool, Rod and Bar, UNS T31502, (AISI 02))
- 114-25018: Application Specification (AMPMODU* Mod II and Mod IV Printed Circuit Board Connectors)
- 408-7411: Instruction Sheet (AMPMODU* Mod I and Mod II Receptacle Wave Soldering Technique)
- 501-68: Qualification Test Report (AMPMODU* Mod IV Interconnection System)

2.2. Industry Document

EIA-364: Electrical Connector/Socket Test Procedures Including Environmental Classifications
IEC 60068 - Environmental testing of electromechanical products

2.3. Reference Document

109-197: Test Specification (Tyco Electronics Test Specifications vs EIA and IEC Test Methods)

3. REQUIREMENTS

3.1. Design and Construction

Product shall be of the design, construction and physical dimensions specified on the applicable product drawing.

3.2. Materials

Materials used in the construction of this product shall be as specified on the applicable product drawing.

3.3. Ratings

- Current: 3 amperes maximum for single contact, 2 amperes maximum per contact for fully energized connector.
- Operating Temperature: -65 to 125°C

3.4. Performance and Test Description

Product is designed to meet the electrical, mechanical and environmental performance requirements specified in Figure 1. Unless otherwise specified, all tests shall be performed at ambient environmental conditions.

3.5. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure
Initial examination of product.	Meets requirements of product drawing and Application Specification 114-25018.	EIA-364-18. Visual and dimensional (C of C) inspection per product drawing.
Final examination of product.	Meets visual requirements.	EIA-364-18. Visual inspection.
ELECTRICAL		
Low Level Contact Resistance (LLCR).	12 milliohms maximum.	EIA-364-23. Subject specimens to 100 milliamperes maximum and 20 millivolts maximum open circuit voltage. See Figure 3.
Insulation resistance.	5000 megohms minimum initial.	EIA-364-21. 500 volts DC, 2 minute hold. Test between adjacent contacts of mated specimens.
Withstanding voltage.	One minute hold with no breakdown or flashover.	EIA-364-20, Condition I. Test voltage (rms) .100 CL / .150 CL / Altitude (ft) 750 / 1000 / Sea level 300 / 400 / 50,000 275 / 275 / 70,000 Test between adjacent contacts of mated specimens.
Temperature rise vs current.	30°C maximum temperature rise at specified current.	EIA-364-70, Method 1. Stabilize at a single current level until 3 readings at 5 minute intervals are within 1°C. See Figure 4.

Figure 1 (continued)

Test Description	Requirement	Procedure
MECHANICAL		
Solderability, dip test.	Solderable area shall have a minimum of 95% solder coverage.	EIA-364-52, Category 3. Subject contacts to solderability.
Sinusoidal vibration.	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-28, Test Condition IV. Subject mated specimens to 10 to 2000 to 10 Hz traversed in 1 minute with .06 inch maximum total excursion. Four hours in each of 3 mutually perpendicular planes.
Mechanical shock.	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-27, Condition G. Subject mated specimens to 100 G's sawtooth shock pulses of 6 milliseconds duration. Three shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks.
Durability.	See Note.	EIA-364-9. Mate and unmate 30 µin gold plated specimens for 200 cycles; 15 µin gold plated specimens for 100 cycles; 10 µin gold plated specimens for 25 cycles; and 100 µin tin plated specimens for 75 cycles at a maximum rate of 600 cycles per hour.
Mating force.	9 ounces maximum per contact.	EIA-364-13. Measure force necessary to mate specimens after 1 unmonitored cycle at a maximum rate of .5 inch per minute.
Unmating force.	1.5 ounces minimum per contact.	EIA-364-13. Measure force necessary to unmate specimens during 3rd monitored cycle at a maximum rate of .5 inch per minute.
Contact engaging force.	8 ounces maximum.	EIA-364-37. Size once using gage 1, then measure the force necessary to engage gage 1 on the second insertion to a minimum depth of .211 inch for top entry, or .215 inch plus board thickness for bottom entry. See Figure 5.

Figure 1 (continued)

Test Description	Requirement	Procedure
Contact separating force.	1 ounce minimum for 15 and 30 µin gold plated specimens and 100 µin tin plated specimens. .75 ounce minimum for 10 µin gold plated specimens. .	EIA-364-37. Size twice using gage 1, then insert gage 2 to a depth of .211 inch for top entry, or .215 inch plus board thickness for bottom entry and measure force necessary to separate. See Figure 5.
ENVIRONMENTAL		
Thermal shock.	See Note.	EIA-364-32. Subject mated specimens to 5 cycles between -65 and 125°C with 30 minute dwells at temperature extremes and 1 minute transition between temperatures.
Humidity/temperature cycling.	See Note.	EIA-364-31, Method IV. Subject mated specimens to 10 cycles (10 days) between 25 and 65°C at 80 to 100% RH with -10°C cold shock.
Temperature life.	See Note.	EIA-364-17, Method A, Test Condition 5, Test Time Condition C. Subject mated specimens to 125°C for 500 hours.
Mixed flowing gas.	See Note.	Subject mated samples to environment class III for 21 days. IEC 60068-2-60 (method 4).

NOTE *Shall meet visual requirements, show no physical damage, and meet requirements of additional tests as specified in the Product Qualification and Requalification Test Sequence shown in Figure 2.*

Figure 1 (end)

3.6. Product Qualification and Requalification Test Sequence

Test or Examination	Test Group (a)					
	1	2	3	4	5	6
	Test Sequence (b)					
Initial examination of product	1	1	1	1	1	1
LLCR	5,10	2,5	2,5			2,5,7,9
Insulation resistance				2,6		
Withstanding voltage				3,7		
Temperature rise vs current						3,10
Solderability, dip test					2	
Sinusoidal vibration	8					8(c)
Mechanical shock	9					
Durability	6	3	3			
Mating force	4					
Unmating force	11					
Contact engaging force	2					
Contact separating force	3,7					
Thermal shock				4		
Humidity/temperature cycling		4		5		
Temperature life						6
Mixed flowing gas			4			4
Final examination of product	12	6	6	8	3	11

NOTE

(a) See paragraph 4.1.A.
(b) Numbers indicate sequence in which tests are performed.
(c) Contacts energized for 100% loadings at 1.25 amperes.

Figure 2

4. QUALITY ASSURANCE PROVISIONS

4.1. Qualification Testing

A. Specimen Selection

Specimens shall be prepared in accordance with applicable Instruction Sheets and shall be selected at random from current production. Fretting lubrication shall be applied to tin-lead product. If specimens are soldered, apply after soldering and cleaning per Application Specification 114-25018 or Instruction Sheet 408-7411. Test groups 1, 2 and 3 shall each consist of a minimum of 3 mounted connector assemblies with a minimum of 36 post/receptacle pairs, series wired. Test group 4 shall consist of 3 mated, unmounted and unwired connector assemblies with a minimum of 36 post/receptacle pairs. Test group 5 shall consist of a minimum of 30 receptacles and posts of each soldertail plating variation. Test group 6 shall consist of 3, 36 position header/receptacle assemblies and 5, 34 position header/receptacle assemblies.

B. Test Sequence

Qualification inspection shall be verified by testing specimens as specified in Figure 2.

4.2. Requalification Testing

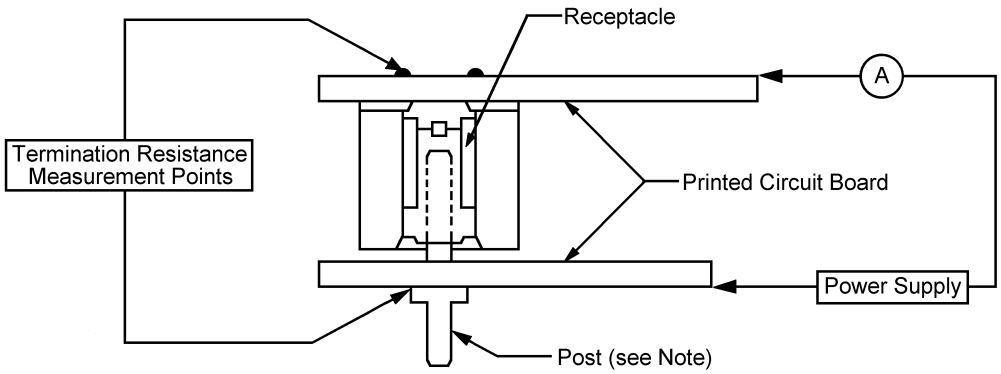
If changes significantly affecting form, fit or function are made to the product or manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of the original testing sequence as determined by development/product, quality and reliability engineering.

4.3. Acceptance

Acceptance is based on verification that the product meets the requirements of Figure 1. Failures attributed to equipment, test setup or operator deficiencies shall not disqualify the product. If product failure occurs, corrective action shall be taken and specimens resubmitted for qualification. Testing to confirm corrective action is required before resubmittal.

4.4. Quality Conformance Inspection

The applicable quality inspection plan shall specify the sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with the applicable product drawing and this specification.



NOTE *Post plating shall be identical to receptacle plating.*

Figure 3
LLCR Measurement Points

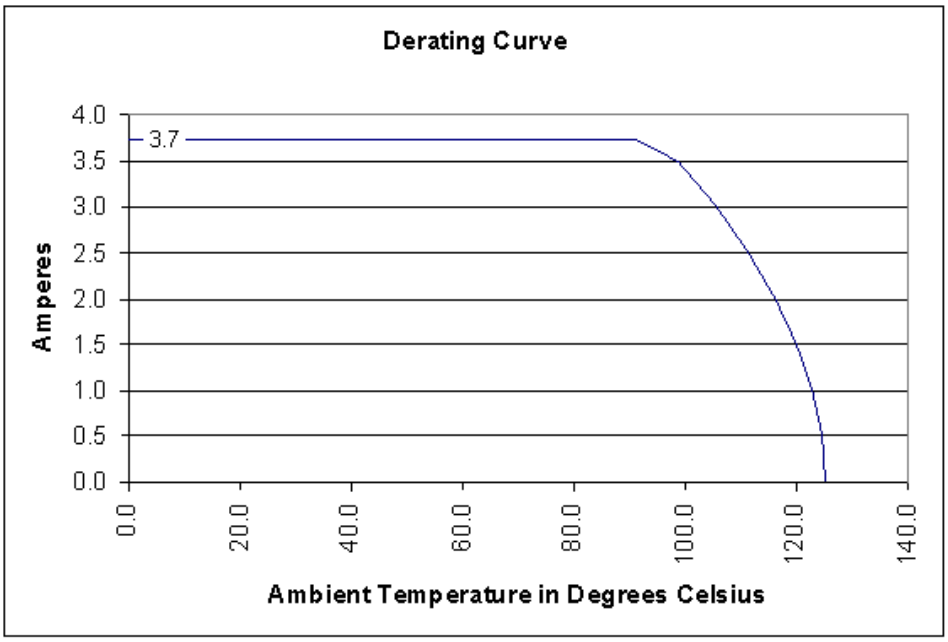


Figure 4A
Current Carrying Capability

Percent Connector Loading	34 Position
Single	1
50%	0.449
100%	0.283

NOTE *To determine acceptable current carrying capacity for percentage connector loading and wire gage indicated, use the Multiplication Factor (F) from the above chart and multiply it times the Base rated Current for a single circuit at the maximum ambient operating temperature shown in Figure 4A.*

Figure 4B
Current Rating

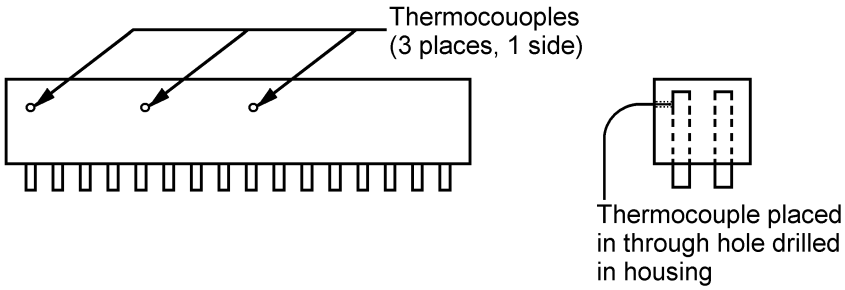
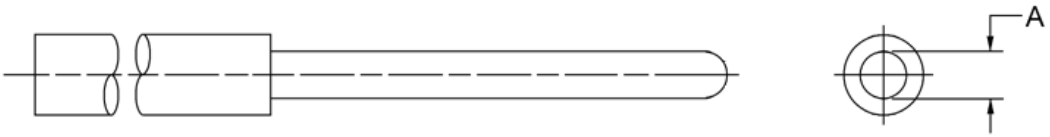


Figure 4C
Thermocouple Placement



Gage Number	"A" Dimension
1	.0260 +.0000/-.0001
2	.0240 +.0001/-.0000

NOTE

1. *Unless otherwise specified, tolerance shall be ±.005 or ±2 degrees as applicable.*
2. *Material shall be AISI 02 tool steel per Material Specification 100-15.*
3. *Heat treat shall be Rockwell C 50 to 55.*
4. *Gage surface shall be clean of contaminants or lubricants.*

Figure 5
Contact Engaging/Separating Force Gages