



Header, MATE-N-LOK*, Mini-Universal

1. SCOPE

1.1. Content

This specification covers performance, tests, and quality requirements for MATE-N-LOK* mini-universal headers.

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 16 Jul 96. The Qualification Test Report number for this testing is 501-402.

1.4. Revision Summary

Revisions to this specification include:

- Updated format to corporate requirements.
- Updated Heat Resistance to Wave Soldering requirement in Figure 1

2. APPLICABLE DOCUMENTS AND FORMS

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. TE Connectivity Specifications

- 114-16017 Application Specification
- 501-402 Qualification Test Report

2.2. Reference Documents

- 109-1 General Requirements for Testing

3. REQUIREMENTS

3.1. Design and Construction

Product shall be of the design, construction, materials 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 TE drawing.

3.3. Ratings

- A. Voltage Rating: 600 VAC/VDC
- B. Current Rating: See Figure 5 for applicable current carrying capability.
- C. Temperature Rating: -55°C to +105°C

3.4. Performance Requirements and Test Description

The product should meet the electrical, mechanical and environmental performance requirements specified in Figure 1. All tests shall be performed at ambient environmental conditions otherwise specified.

3.5. Test Requirements and Procedure Summary

Test Description	Requirement	Procedure
Examination of Product	Meets requirements of product drawing and AMP Spec 114-16017.	Visual, dimensional and functional per applicable quality inspection plan.
Electrical		
Termination Resistance	10 milliohms maximum initial. 20 milliohms maximum final.	TE Spec 109-6-1 Subject mated contacts assembled on test board to 50 mV maximum open circuit at 100 mA maximum. See Figure 4.
Insulation Resistance	1000 megohms minimum initial. 100 megohms minimum final.	TE Spec 109-28-4 Test between adjacent circuits of free hanging connector mated with header.
Dielectric Withstanding Voltage	1.5 kVAC at sea level.	TE Spec 109-29-1 Test between adjacent circuits of free hanging connector mated with header.
Temperature Rise vs. Current	30°C maximum temperature rise at specified current.	TE Spec 109-45-1 Measure temperature rise vs current. See Figure 5.
Mechanical		
Solderability	Solderable area shall have minimum of 95% solder coverage.	TE Spec 109-11-3 Subject contacts to solderability.
Heat Resistance to Wave Soldering	See Note – with the exception of deformation on board locking feature. See Figure 2.	TE Spec 109-202 Subject contacts to wave soldering.
Vibration, Sinusoidal	No discontinuities of 10 microseconds or longer duration. See Note.	TE Spec 109-21-1 Subject mated samples to 10-55-10 Hz traversed in 1 minute at 0.06 inch total excursion. 2 hours in each of 3 mutually perpendicular planes. See Figure 6.
Physical Shock	No discontinuities of 10 microseconds or longer duration. See Note.	TE Spec 109-26-7 Subject mated samples to 50 G's sawtooth shock pulses of 11 milliseconds duration. 3 shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks. See Figure 6.
Durability	See Note.	TE Spec 109-27 Mate and unmate samples for 20 cycles at maximum rate of 500 cycles per hour.
Mating Force	1.5 pounds maximum per circuit.	TE Spec 109-42, Condition A Measure force necessary to mate samples without locking latches at maximum rate of 0.5 inch per minute.

Figure 1 (continued)

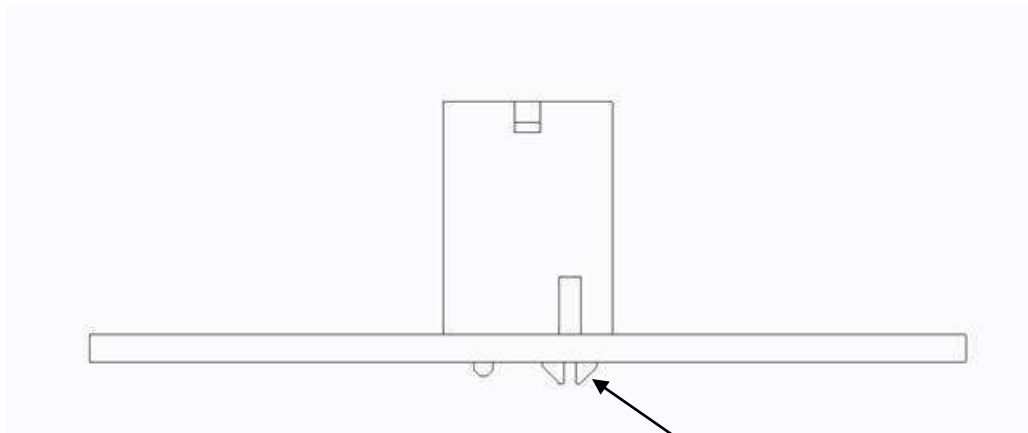
Test Description	Requirement	Procedure
Unmating Force	0.15 pounds minimum per circuit	TE Spec 109-42, Condition A Measure force necessary to unmate samples without locking latches at maximum rate of 0.5 inch per minute.
Housing Lock Strength	6 pounds minimum	TE Spec 109-50 Determine housing lock strength at maximum rate of 0.5 inch per minute.
Environmental		
Thermal Shock	See Note.	TE Spec 109-22 Subject mated samples to 25 cycles between –55°C and 105°C.
Humidity-Temperature Cycling	See Note.	TE Spec 109-23-4, Condition B Subject samples mated with header to 10 cycles between 25°C and 65°C at 95% RH with –10°C cold shock.
Temperature Life	See Note.	TE Spec 109-43 Subject mated samples to temperature life at 105°C for 580 hours.

Figure 1 (end)



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 3.



Deformation permissible in this area of the board locking feature following heat resistance to wave soldering testing.

Figure 2

3.6. Product Qualification and Requalification Test Sequence

TEST OR EXAMINATION	TEST GROUP (a)				
	1	2	3	4	5
	TEST SEQUENCE (b)				
Examination of Product	1, 9	1, 9	1, 9	1, 3	1, 3
Termination Resistance	3, 7	2, 7			
Insulation Resistance			2, 6		
Dielectric Withstanding Voltage			3, 7		
Temperature Rise vs. Current		3, 8			
Solderability				2	
Heat Resistance to Wave Soldering					2
Vibration	5	6			
Physical Shock	6				
Durability	4				
Mating Force	2				
Unmating Force	8				
Housing Lock Strength			8		
Thermal Shock			4		
Humidity-Temperature Cycling		4(c)	5		
Temperature Life		5			

Figure 3


NOTE

- (a) See paragraph 4.2.
- (b) Numbers indicate sequence in which tests are performed.
- (c) Precondition samples with 5 cycles durability.

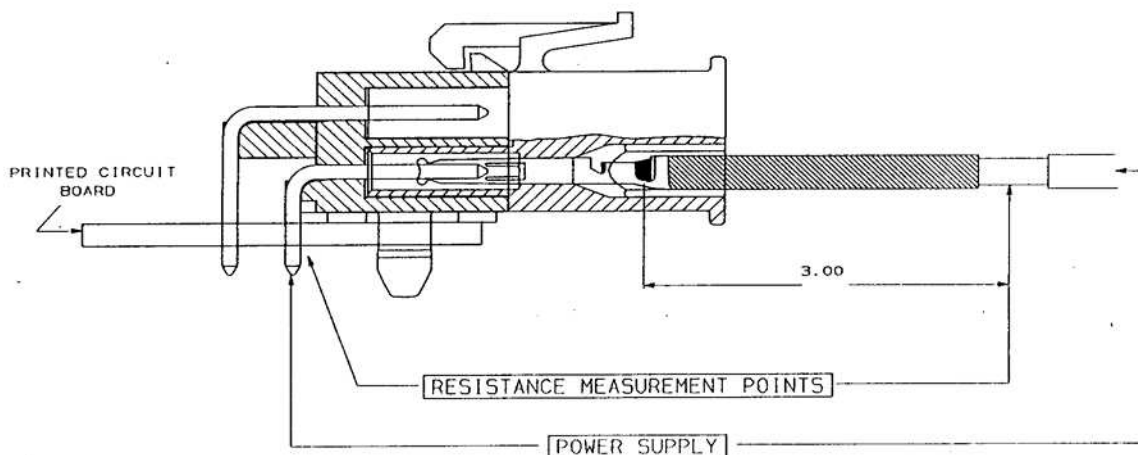
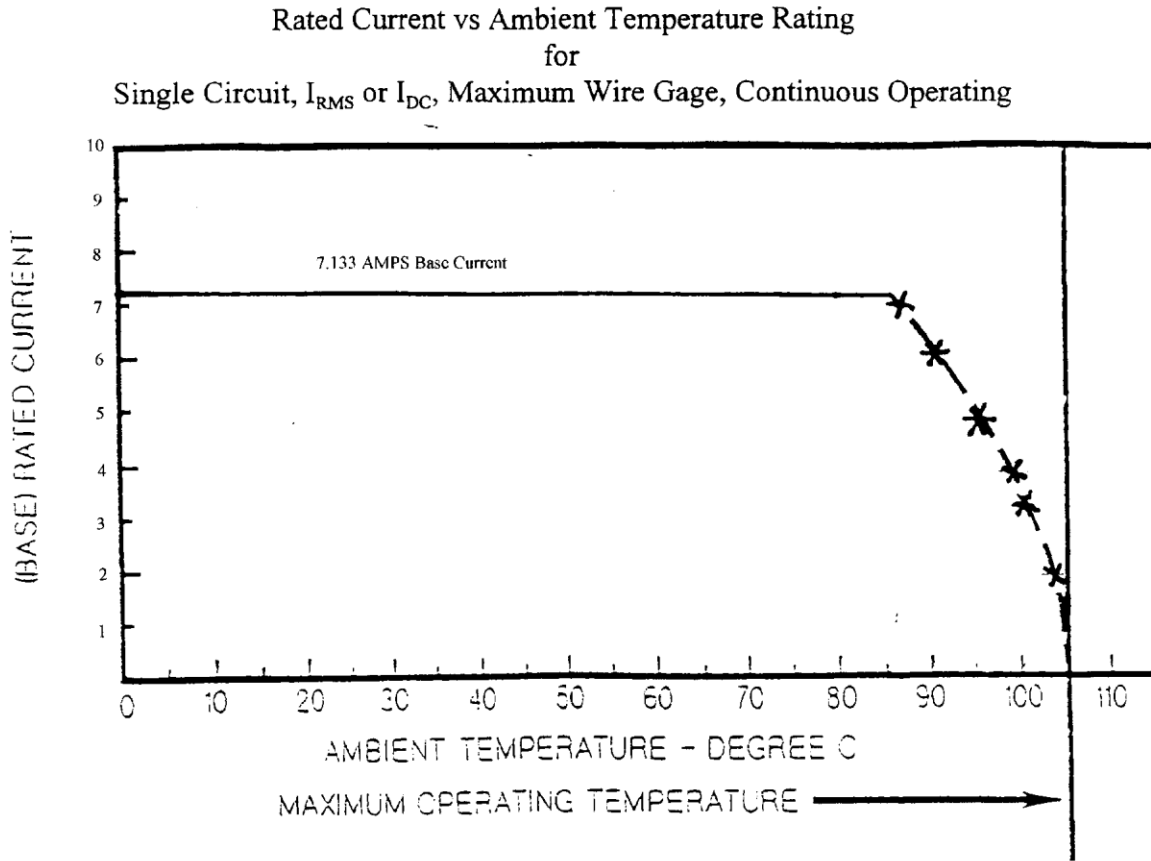


Figure 4: Termination Resistance Measurement Points



Percent Connector Loading Mini UMNL 24 Position Dual Row Wire to Board	Wire Size AWG			
	26	22	20	18
	Multiplication Factor (F)			
Single Contact	0.512	0.694	0.826	1.0
50	0.296	0.401	0.477	0.578
100	0.237	0.321	0.381	0.462

Figure 5: Current Carrying Capability and Current Rating



NOTE

To determine the acceptable current carrying capacity for the 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 as show in the current carrying capability chart.

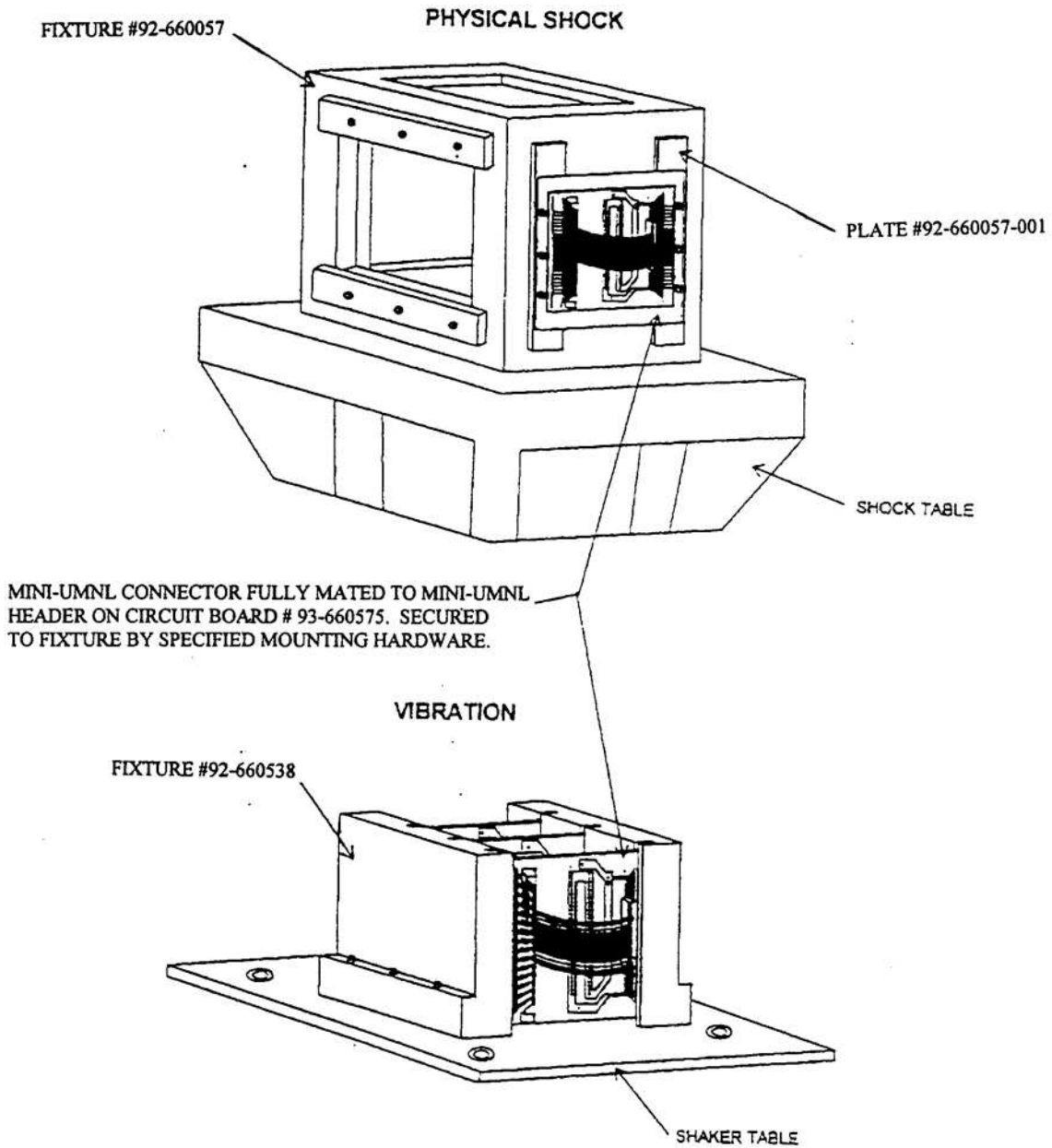


Figure 6: Vibration & Physical Shock Monitoring Fixture

4. QUALITY ASSURANCE PROVISIONS

4.1. Test Conditions

Unless otherwise specified, all the tests shall be performed in any combination of the following test conditions shown in Figure 7.

Temperature	15°C – 35°C
Relative Humidity	45% – 75%
Atmospheric Pressure	86.6 – 106.6 kPa

Figure 7

4.2. Qualification Testing

A. Specimen Selection

Specimens shall be prepared in accordance with applicable instruction sheets and shall be selected at random from current production. All test groups shall consist of 5 random connector assemblies.

B. Test Sequence

Qualification inspection shall be verified by testing specimens as specified in Figure 3.

4.3. 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.

4.4. Acceptance

Acceptance is based on verification that the product meets the requirements in 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.

4.5. 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.