



**QUALIFICATION TEST REPORT**

**CONNECTOR, AMP-LATCH<sup>®</sup>,  
UNIVERSAL, I/O PIN**

501-219

Rev.O

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**Corporate Test Laboratory Harrisburg, Pennsylvania**

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(R5131ts)



## AMP INCORPORATED

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CORPORATE TEST LABORATORY

### Qualification Test Report Connector, AMP-LATCH, Universal I/O Pin

#### 1. Introduction

##### 1.1 Purpose

Testing was performed on AMP-LATCH Universal I/O Pin Connector to determine its conformance to the requirements of AMP Product Specification 108-1336. Rev. O.

##### 1.2 Scope

This report covers the electrical, mechanical, and environmental performance of the AMP-LATCH Universal I/O Pin Connector manufactured by the Interconnection Components & Assemblies Division of the Capital Goods Business Unit. The testing was performed between February 1, 1993 and May 3, 1993.

##### 1.3 Conclusion

The AMP-LATCH Universal I/O Pin Connector meets the electrical, mechanical, and environmental performance requirements of AMP Product Specification 108-1336 Rev. O.

#### 1.4 Product Description

The AMP-LATCH Universal I/O Pin Connector is designed to accept AWG 28 and AWG 26 solid or stranded .050 inch centerline ribbon cable. The housing is available in 10 through 64 positions. The contacts are Phosphor Bronze duplex plated Gold on the pin end and bright tin-lead on the cable termination end. The housings are black Thermoplastic.

#### 1.5 Test Samples

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

<u>Test Group</u>	<u>Quantity</u>	<u>Part Nbr</u>	<u>Description</u>
1	5	1-111494-3	64 Pos 30 Au Header
1	5	111494-1	10 Pos 30 Au Header
2	5	1-111491-3	64 Pos 15 Au Header
3,4	5	111494-8	34 Pos 30 Au Header

#### 1.6 Qualification Test Sequence

<u>Test or Examination</u>	<u>Test Groups</u>			
	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>
<u>Examination of Product</u>	1,9	1,6	1,5	1,8
<u>Termination Resistance, Dry Circuit</u>	3,7	2,5	2,4	
<u>Dielectric Withstanding Voltage</u>				3,7
<u>Insulation Resistance</u>				2,6
<u>Vibration</u>	5			
<u>Physical Shock</u>	6			
<u>Mating Force</u>	2			
<u>Unmating Force</u>	8			
<u>Durability</u>	4	3		
<u>Thermal Shock</u>				4
<u>Humidity-Temperature Cycling</u>				5
<u>Mixed Flowing Gas</u>			3	
<u>Temperature Life</u>		4		

The numbers indicate sequence in which tests were performed.

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 Capital Goods Business Unit Group.

2.2 Termination Resistance, Dry Circuit - Groups 1,2,4

All termination resistance measurements, taken at 100 milliamperes DC and 50 millivolts open circuit voltage were less than 15 milliohms.

<u>Test Group</u>	<u>Nbr of Samples</u>	<u>Condition</u>	<u>Min</u>	<u>Max</u>	<u>Mean</u>
1	60	Initial	4.94	13.20	6.496
	60	After Mechanical	4.95	14.81	8.234
2	30	Initial	4.83	6.38	5.326
	30	After Temp Life	5.01	9.46	5.574
3	30	Initial	4.87	5.99	5.194
	30	After MFG	4.81	9.15	5.571

All values in milliohms

2.3 Dielectric Withstanding Voltage - Group 4

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

2.4 Insulation Resistance - Group 4

All insulation resistance measurements were greater than 5000 megohms initially and 1000 megohms after test.

2.5 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 Physical Shock - Group 1

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

2.7 Mating Force - Group 1

All mating force measurements were less than 12 ounces maximum average per contact.

2.8 Unmating Force - Group 1

All unmating force measurements were greater than 1.5 ounces minimum average per contact.

2.9 Durability - Group 1

No physical damage occurred to the samples as a result of mating and unmating the connector 100 times.

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 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.

2.13 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.

### 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, Low Level

Termination resistance measurements at low level current were made using a four terminal measuring technique (Figure 1). The test current was maintained at 100 milliamperes DC with an open circuit voltage of 50 millivolts DC.

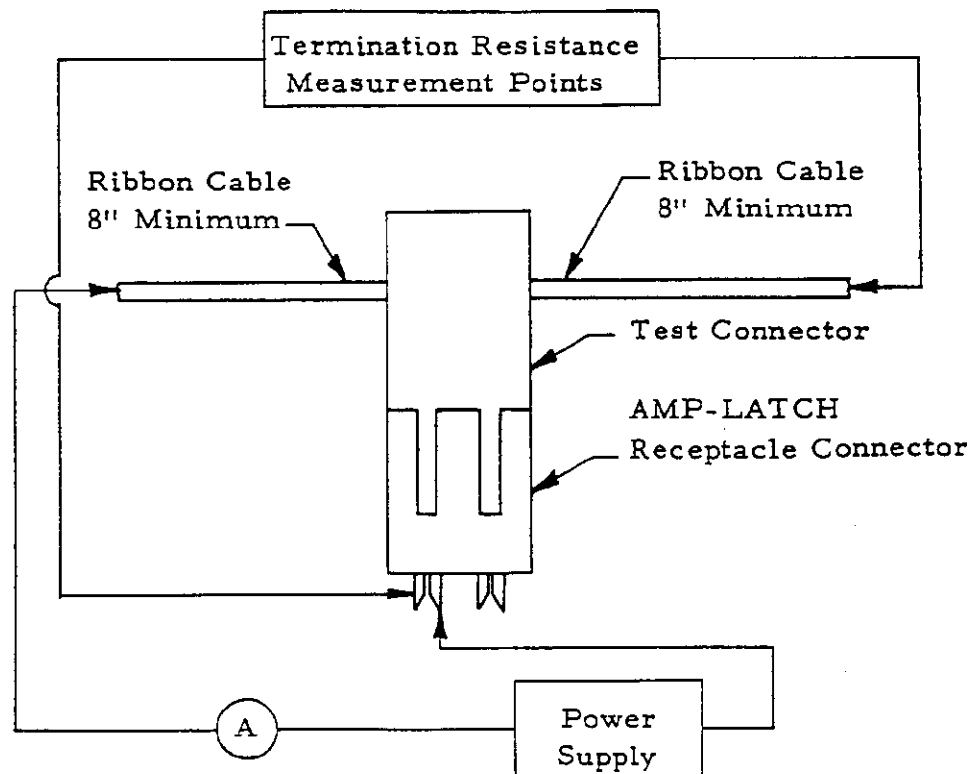


Figure 1  
Typical Termination Resistance Measurement Points

#### 3.3 Dielectric Withstanding Voltage

A test potential of 500 vac was applied between the adjacent contacts. This potential was applied for one minute and then returned to zero.

### 3.4 Insulation Resistance

Insulation resistance was measured between adjacent contacts, using a test voltage of 500 volts DC. This voltage was applied for 2 minutes before the resistance was measured.

### 3.5 Vibration, Random

Mated connectors were subjected to a random vibration test, specified by a random vibration spectrum, with excitation frequency bounds of 5 and 500 hertz. The power spectral density at 5 hz is  $0.00375 \text{ G}^2/\text{Hz}$ . The spectrum slopes up at 12 dB per octave to a PSD of  $0.06 \text{ G}^2/\text{Hz}$  at 10 Hz. The spectrum is flat at  $0.06 \text{ G}^2/\text{Hz}$  from 10 to 500 Hz. The root-mean square amplitude of the excitation was 5.43 GRMS.

### 3.6 Physical Shock

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

### 3.7 Mating Force

The force required to mate individual connectors was measured, using a free floating fixture with the rate of travel at 0.5 inch/minute. The average force per contact was calculated.

### 3.8 Unmating Force

The force required to unmate individual connectors was measured using a free floating fixture with the rate of travel at 0.5 inch/minute. The average force per contact was calculated.

### 3.9 Durability

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

### 3.10 Thermal Shock

Unmated connectors were subjected to 5 cycles of temperature extremes with each cycle consisting of 30 minutes at each temperature. The temperature extremes were  $-65^\circ\text{C}$  and  $105^\circ\text{C}$ . The transition between temperatures was less than one minute.



### 3.11 Humidity-Temperature Cycling

Unmated connectors were exposed to 10 cycles of humidity-temperature cycling. Each cycle lasted 24 hours and consisted of cycling the temperature between 25°C and 65°C twice while the relative humidity was held at 95%.

### 3.12 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  $\text{Cl}_2$  at 20 ppb,  $\text{NO}_2$  at 200 ppb, and  $\text{H}_2\text{S}$  at 100 ppb. Samples were preconditioned with 10 cycles of durability before exposure.

### 3.13 Temperature Life

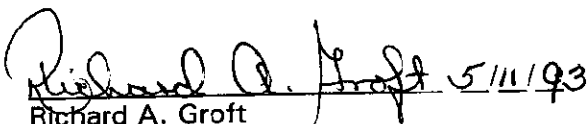
Mated samples were exposed to a temperature of 105°C for 500 hours.

4. Validation

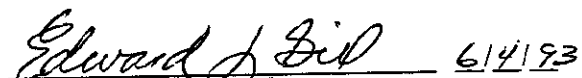
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