AMP

QUALIFICATION TEST REPORT

AMPOWER* WAVE CRIMP SYSTEM,
ACTION PIN* HEADER AND PLUG

501-210 Rev. 0

Product Specification: 108-1410 Rev. 0
CTL No.: CTL9983-060
Date: January 27, 1993
Classification: Unrestricted
Prepared By: Terrance M. Shingara

*Trademark

Corporate Test Laboratory Harrisburg, Pennsylvania

Table of Contents

(R9983TSa)

AMP INCORPORATED
HARRISBURG, PENNSYLVANIA 17105 PHONE: 717-564-0100 TWX: 510-657-4110
CORPORATE TEST LABORATORY

Qualification Test Report
AMPOWER WAVE CRIMP SYSTEM,
ACTION PIN HEADER AND PLUG

1. Introduction

1.1 Purpose

Testing was performed on AMP's AMPOWER Wave Crimp ACTION PIN Header and Plug to determine its conformance to the requirements of AMP Product Specification 108-1410 Rev.0.

1.2 Scope

This report covers the electrical, mechanical, and environmental performance of the AMPOWER Wave Crimp ACTION PIN Header and Plug manufactured by the Strategic Products Center, Phoenix Az. The testing was performed between August 20,1992 and January 22, 1993.

1.3 Conclusion

The AMPOWER Wave Crimp ACTION PIN Header and Plug meets the electrical, mechanical, and environmental performance requirements of AMP Product Specification 108-1410 Rev. 0.

1.4 Product Description

The AMPOWER Wave Crimp System ACTION PIN contact header and plug terminates insulated flat copper cable to a circuit board. The header is equipped with ACTION PIN contact feature tails on .100 centers. This feature allows the header tails to make reliable contact with plated through holes in a .093 thick circuit board simply by pushing the tails into the board instead of soldering then to the board.

The contacts are copper alloy, silver plated on the contact surface and tin-lead plated on the ACTION PIN surface. The housings are Polyester, black, glass filled, UL94V-0.

1.5 Test Samples

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

Test Group	Quantity	Part Number	Description
1,2,3,4,5	8 ea.	765210-2	.020 mil Cu Cable
1,2,3,4,5	8 ea.	765210-1	.010 mil Cu Cable
1,2,3,5	16 ea.	765181-1	Plug Housing
1,2,3,5	16 ea.	765182-1	Strain Relief
1,2,3,4,5	16 ea.	765189-3	Transition
1,2,3,4,5	16 ea.	765190-2	Insert
1,2,3,5,6	16 ea.	765335-1	Header Housing
1,2,3,4,5,6	16 ea.	765256-3	Contact Header

1.6 Qualification Test Sequence

Test or Examination	1	2	3	4	5	6
	Test Groups					
Examination of Product	1,10	1,10	1,9	1,3	1,3	1,4
Termination Resistance	3,7	2,8				
Dielectric Withstanding Voltage			3,7			
Insulation Resistance			2,6			
T-Rise vs. Current		3,9				
Vibration	5	7				
Physical Shock	6					
Mating Force	2					
Unmating Force	8					
Contact Retention, Header					2	
Contact Retention, Plug	9					
Header Insertion Force						2
Header Extraction Force						3
Crimp Tensile				2		
Durability	4					
Housing Lock Strength			8			
Thermal Shock			4			
Humidity-Temperature Cycling		5	5			
Mixed Flowing Gas		4				
Temperature Life		6				

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 Strategic Products Center, Phoenix Az.

2.2 Termination Resistance, Dry Circuit - Groups 1,2

All termination resistance measurements, taken at 100 milliamperes dc. and 50 millivolts open circuit voltage, were less than 1.0 milliohms initially and 2.0 milliohms after, testing.

Test Group	No. of Samples	Condition	Min.	Max.	Mean
1	32	Initial	0.33	0.48	0.411
		After Mechanical	0.32	0.49	0.391
2	32	Initial	0.24	0.41	0.327
		After Current Rating	0.25	0.38	0.317

All values in milliohms

2.3 Dielectric Withstanding Voltage - Group 3

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

2.4 Insulation Resistance - Group 3

All insulation resistance measurements were greater than 5000 megohms.

2.5 Temperature Rise vs. Current - Group 2

All samples had a temperature rise of less than 30°C above ambient when a specified current was applied.

Wire Size	Test Current	Temperature Rise Above Ambient (Max)
20 mil	45	25.6°
10 mil	30	21.8°

All Temperatures in Degrees Celsius

2.6 Vibration - Groups 1,2

No discontinuities of the contacts were detected during vibration.(Group 1 only) Following vibration, no cracks, breaks, or loose parts on the connector assemblies were visible

2.7 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.

2.8 Mating Force - Group 1

All mating force measurements were less than 20 pounds per connector pair.

2.9 Unmating Force - Group 1

All unmating force measurements were greater than 1.0 pound per connector pair.

2.10 Contact Retention Header - Group 5

No physical damage occurred to either the contacts or the headers, and no contacts dislodged from the housings as a result of applying an axial load of 3 pounds to the contacts.

2.11 Contact Retention Plug - Group 1

No physical damage occurred to either the contacts or the plugs, and no contacts dislodged from the housings as a result of applying an axial load of 45 pounds to the contacts.

2.12 Header Insertion Force - Group 6

The force required to insert the ACTION PIN contact into the test board was less than 480 pounds.

2.13 Header Extraction Force - Group 6

The force required to extract the ACTION PIN contact from the test board was greater than 48 pounds.

2.14 Crimp Tensile - Group 4

All tensile values were greater than 30 pounds for .010 mil cable and greater than 40 pounds for .020 mill cable.

2.15 Durability - Group 1

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

2.16 Housing Lock Strength - Group 3

Mated connectors did not unmate with a 25 pound axial load applied.

2.17 Thermal Shock - Group 3

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

2.18 Humidity-Temperature Cycling - Groups 2,3

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

2.19 Mixed Flowing Gas - Group 2

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.

2.20 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.

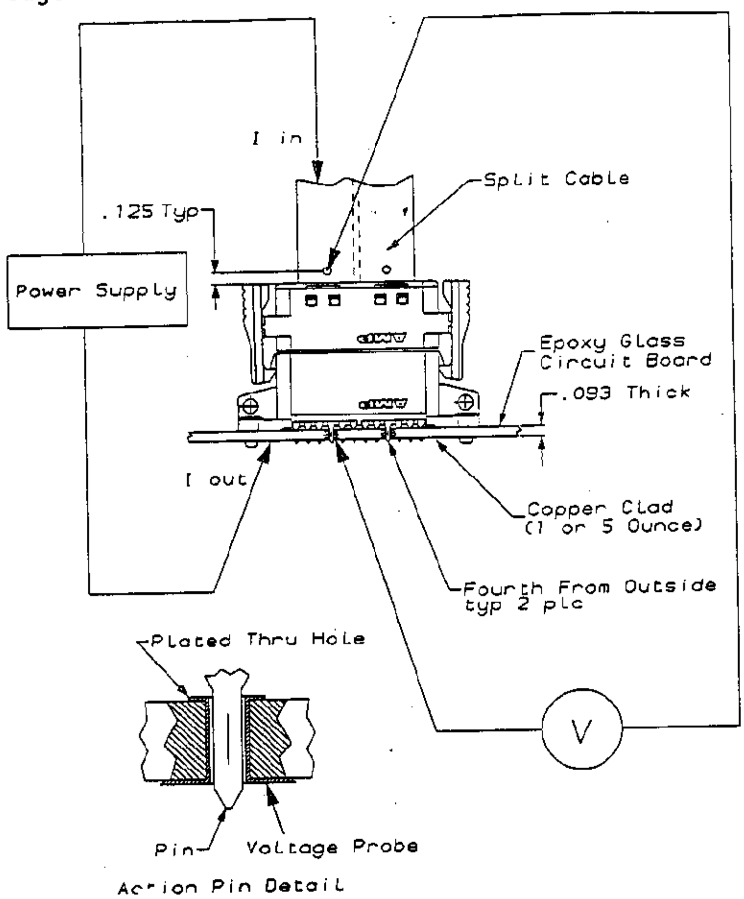
3. Test Methods

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.



Typical Termination Resistance Measurement Points

3.3 Dielectric Withstanding Voltage

A test potential of 1500 vac was applied between the adjacent contacts and between both cables and conductive foil wrapped around the plastic housings. 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 two minutes before the resistance was measured.

3.5 Temperature Rise vs Specified Current

Connector temperature was measured, while energized at the specified ac current. Thermocouples were attached to the connectors to measure their temperatures. This temperature was then subtracted from the ambient temperature to find the temperature rise. When three readings at five minute intervals were the same, the readings were recorded.

3.6 Vibration, Sine

Mated connectors were subjected to sinusoidal vibration, having a simple harmonic motion with an amplitude of 0.06 inch, double amplitude. The vibration frequency was varied logarithmically between the limits of 10 and 500 Hz and returned to 10 Hz in 15 minutes. This cycle was performed 13 times in each of three mutually perpendicular planes, for a total vibration time of 9 hours. Connectors, in test group 1, were monitored for discontinuities greater than one microsecond, using a current of 100 milliamperes in the monitoring circuit.

3.7 Physical Shock

Mated connectors were subjected to a physical 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 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.

3.8 Mating Force

The force required to mate plug and header assemblies was measured, using a free floating fixture with the rate of travel at 0.5 inch/minute.

3.9 Unmating Force

The force required to unmate plug and header assemblies was measured, using a free floating fixture with the rate of travel at 0.5 inch/minute.

3.10 Contact Retention, Header

An axial load of 3 pounds was applied to all six contact simultaneously. The force was applied in a direction that would cause the contacts to dislodge from the housing.

3.11 Contact Retention, Plug

An axial load of 45 pounds was applied to each cable. The force was applied in a direction that would cause the contacts and cable to dislodge from the housing.

3.12 Header Insertion Force

The test board was mounted on a free floating fixture, the ACTION PIN header was inserted into the test board and an axial load was applied until the header was fully seated into the test board.

3.13 Header Extraction Force

A test board, with header installed, was clamped to a stationary fixture. An increasing axial load was applied to the header, causing it to separate from the test board. This force was measured.

3.14 Crimp Tensile

An axial load was applied to each sample at a crosshead rate of 1.0 inch per minute. This load was increased until the cable separated from the crimped contact.

3.15 Durability

Connectors were mated and unmated 100 times at a rate not exceeding 600 per hour.

3.16 Housing Lock Strength

An increasing axial load was applied to mated connector assemblies. The force was applied in a direction normal to the plane of the connector. The force was applied until the connector housing latches released.

3.17 Thermal Shock

Mated connectors were subjected to 25 cycles of temperature extremes, with each cycle consisting of 30 minutes at each temperature. The temperature extremes were -55°C and 85°C. The transition between temperatures was less than one minute.

3.18 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°C and 65°C twice, while the relative humidity was held at 95%. During five of the first nine cycles, the connectors were exposed to a cold shock at -10°C for 3 hours.

3.19 Mixed Flowing Gas, Class III

Mated connectors were exposed for 20 days to an 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 Cl_2 at 20 ppb, NO_2 at 200 ppb, and H_2S at 100 ppb.

3.20 Temperature Life

Mated samples were exposed to a temperature of 140°C for 720 hours.

4. Validation

Prepared by:

Terrance M. Shingara 1/22/93

Terrance M. Shingara
Test Engineer
Design Assurance Testing
Corporate Test Laboratory

Reviewed by:

Richard A. Groft 1/27/93

Richard A. Groft
Supervisor
Design Assurance Testing
Corporate Test Laboratory

Approved by:

R K Grebe 2/2/93

Robert Grebe
Manager
Strategic Products Center, Phoenix Az.