# Power Tap, Right Angle

## 1. INTRODUCTION

### 1.1. Purpose

Testing was performed on the AMP* Right Angle Power Tap, to determine its conformance to the requirements of AMP Product Specification 108-1624 Rev O.

### 1.2. Scope

This report covers the electrical, mechanical, and environmental performance of the Right Angle Power Tap. The testing was performed between 21Jan97 and 21Oct97.

### 1.3. Conclusion

The Right Angle Power Tap, listed in paragraph 1.5., meets the electrical, mechanical, and environmental performance requirements of AMP Product Specification 108-1624 Rev O.

### 1.4. Product Description

The right Angle Power Tap receptacle and pin provides a high current, separable connection to a printed circuit board. The 10 position pin configuration of the receptacle is of the standard Dual Inline Pin (DIP) outline with .300 X .100 inch hole centers. They are designed with ACTION PIN* contacts to provide a low resistance interface with tin plated through holes in the printed circuit board., thereby eliminating the need for soldering. The pin is threaded to a printed circuit board for a board-to-board configuration.

### 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 Nbr | Description |
|---|---|---|---|
| 1,2,3,4 | 50 | 580132-1 | Receptacle Assembly, Right Angle |
| 1,2,3,4 | 50 | 580133-5 | Threaded Power Pin, 0.142 inch, Right Angle |

### 1.6. Environmental Conditions

Unless otherwise started, the following environmental conditions prevailed during testing:

| | |
|---|---|
| Temperature: | 15 to 35°C |
| Relative Humidity: | 20 to 80% |



* Trademark
| Indicates change

1.7. Qualification Test Sequence

| Test or Examination | Test Groups | | | |
|---|---|---|---|---|
| | 1 | 2 | 3 | 4 |
| | Test Sequence (a) | | | |
| Examination of Product | 1,9 | 1,9 | 1,8 | 1,3 |
| Termination Resistance, Dry Circuit | 3,7 | 2,7 | | |
| Insulation Resistance | | | 2,6 | |
| Dielectric Withstand Voltage | | | 3,7 | |
| Temperature Rise vs Current | | 3,8 | | |
| Solderability | | | | 2 |
| Vibration, Sinusoidal | 5 | 6(b) | | |
| Physical Shock | 6 | | | |
| Mating Force | 2 | | | |
| Unmating Force | 8 | | | |
| Durability | 4 | | | |
| Thermal Shock | | | 4 | |
| Humidity - Temperature Cycling | | | 5 | |
| Mixed Flowing Gas | | 4(c) | | |
| Temperature Life | | 5 | | |

**NOTE**

*(a) The numbers indicate sequence in which tests were performed.*
*(b) Discontinuities shall not be measured. Energize at 18°C level for 100% loadings per Amp Specification 109-151.*
*(c) Precondition with 10 cycles of Durability.*

## 2. SUMMARY OF TESTING

2.1. Examination of Product - All Groups

All samples submitted for testing were randomly selected from current production lots. A Certificate of Conformance was issued by the Product Assurance Department of the Americas Manufacturing Business Development. Where specified, samples were visually examined and no evidence of physical damage detrimental to product performance was observed.

2.2. Termination Resistance, Dry Circuit - Groups 1 and 2

All termination resistance measurements, taken at 100 milliamperes DC and 50 millivolts open circuit voltage were less than .3 milliohms initially and .5 finally.

| Test Group | Nbr of Data points | Condition | Min | Max | Mean |
|---|---|---|---|---|---|
| 1 | 5 | Initial | 0.24 | 0.26 | 0.26 |
| | | Final | 0.21 | 0.26 | 0.24 |
| 2 | 30 | Initial | 0.22 | 0.27 | 0.24 |
| | | Final | 0.25 | 0.32 | 0.29 |

All values in milliohms



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2.3. Dielectric Withstanding Voltage - Group 3

No dielectric breakdown or flashover occurred.

2.4. Insulation Resistance - Group 3

All insulation resistance measurements were greater than 1000 megohms.

2.5. Temperature Rise vs Current - Group 2

All samples had a temperature rise of less than 30°C above ambient when tested using a baseline rated current of 37.25 amperes and the correct derating factor value based on the samples wiring configuration.

2.6. Solderability - Group 4

All contact leads had a minimum of 95% solder coverage.

2.7. Vibration - Groups 1 and 2

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

2.8. Physical Shock - Group 1

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

2.9. Mating Force - Group 1

All mating force measurements were less than 10.0 pounds.

2.10. Unmating Force - Group 1

All unmating force measurements were greater than 1 pound.

2.11. Durability - Group 1

No physical damage occurred to the samples as a result of mating and unmating the connector 25 times.

2.12. Thermal Shock - Group 3

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

2.13. Humidity-Temperature Cycling - Group 3

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

2.14. Mixed Flowing Gas - Group 2

No evidence of physical damage was visible as a result of exposure to the pollutants of mixed flowing gas.

2.15. Temperature Life - Group 2

No evidence of physical damage was visible as a result of exposure to an elevated temperature.

## 3. TEST METHODS

### 3.1. Examination of Product

Where specified, samples were visually examined for evidence of physical damage detrimental to product performance.

### 3.2. Termination Resistance, Low Level

Termination resistance measurements at low level current were made using a 4 terminal measuring technique (Figure 1). The test current was maintained at 100 milliamperes DC with a 50 millivolt open circuit voltage.

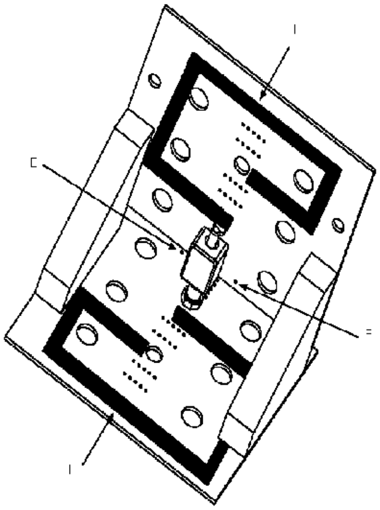

Figure 1
Typical Termination Resistance Measurement Points

### 3.3. Dielectric Withstanding Voltage

A test potential of 1800 volts AC was applied between contacts of 2 separate samples held side by side. This potential was applied for 1 minute and then returned to zero.

### 3.4. Insulation Resistance

Insulation resistance was measured between contacts of 2 separate samples held side by side and insulated from the vise with Teflon. A test voltage of 500 volts DC was applied for 2 minutes before the resistance was measured.

### 3.5. Temperature Rise vs Specified Current

Temperature rise curves were produced by measuring individual contact temperatures at 5 different current levels. These measurements were plotted to produce a temperature rise vs current curve. Thermocouples were attached to individual contacts to measure their temperatures. The ambient temperature was then subtracted from this measured temperature to find the temperature rise. When the temperature rise of 3 consecutive readings taken at 5 minute intervals did not differ by more than 1°C, the temperature measurement was recorded.

3.6. Solderability

Connector assembly contact solder tails were subjected to a solderability test. The soldertails were immersed in a mildly activated rosin flux for 5 to 10 seconds, allowed to drain for 10 to 60 seconds, then held over molten solder without contact for 2 seconds. The solder tails were then immersed in the molten solder at a rate of approximately 1 inch per second, held for 3 to 5 seconds, then withdrawn. After cleaning in isopropyl alcohol, the samples were visually examined for solder coverage. The solder used for testing was 60/40 tin lead composition and was maintained at a temperature of 245 ± 5°C.

3.7. 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 uniformly between the limits of 10 and 55 Hz and returned to 10 Hz in 1 minute. This cycle was performed 120 times in each of 3 mutually perpendicular planes for a total vibration time of 6 hours. Connectors were monitored for discontinuities of 1 microsecond or greater using a current of 100 milliamperes DC (Group 1 only). Samples were energized with 25.8 amperes to create an 18°C temperature rise above ambient (Group 2 only).

3.8. 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 3 mutually perpendicular planes, for a total of 18 shocks. Connectors were monitored for discontinuities of 1 microsecond or greater, using a current of 100 milliamperes.

3.9. Mating Force

The force required to mate individual contacts was measured, using a tensile/compression device with the rate of travel at 1 inch/minute and a free floating fixture.

3.10. Unmating Force

The force required to unmate individual contacts was measured using a tensile/compression device with the rate of travel at 1 inch/minute and a free floating fixture.

3.11. Durability

Connectors were mated and unmated 25 times at a rate of 500 cycles per hour.

3.12. Thermal Shock

Mated connectors were subjected to 5 cycles of temperature extremes with each cycle consisting of 30 minutes at each temperature. The temperature extremes were -55 and 105°C. The transition between temperatures was less than 1 minute.



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3.13. 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 and 65°C twice while the relative humidity was held at 95%. (Figure 2)

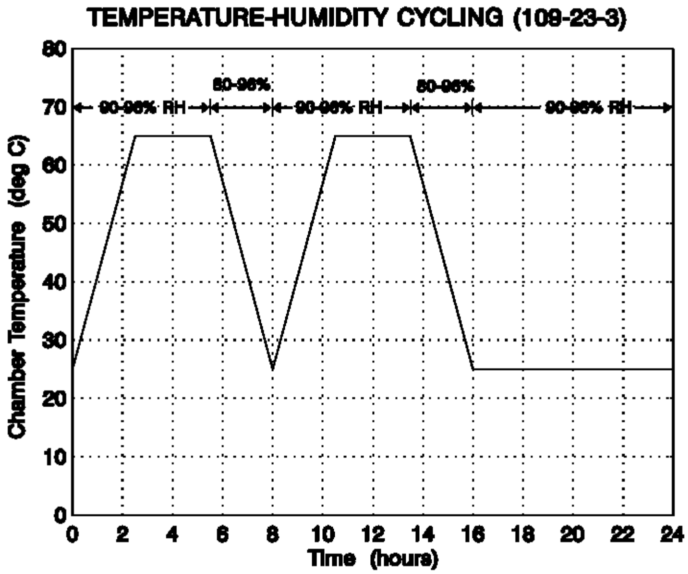


Figure 2
Typical Humidity-Temperature Cycling Profile

3.14. Mixed Flowing Gas, Class II

Mated connectors were exposed for 14 days to a mixed flowing gas Class II exposure. Class II exposure is defined as a temperature of 30°C and a relative humidity of 70% with the pollutants of $Cl_2$ at 10 ppb, $NO_2$ at 200 ppb, and $H_2S$ at 10 ppb. Samples were preconditioned with 10 cycles of durability.

3.15. Temperature Life

Mated samples were exposed to a temperature of 105°C for 1000 hours.

## 4. VALIDATION

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