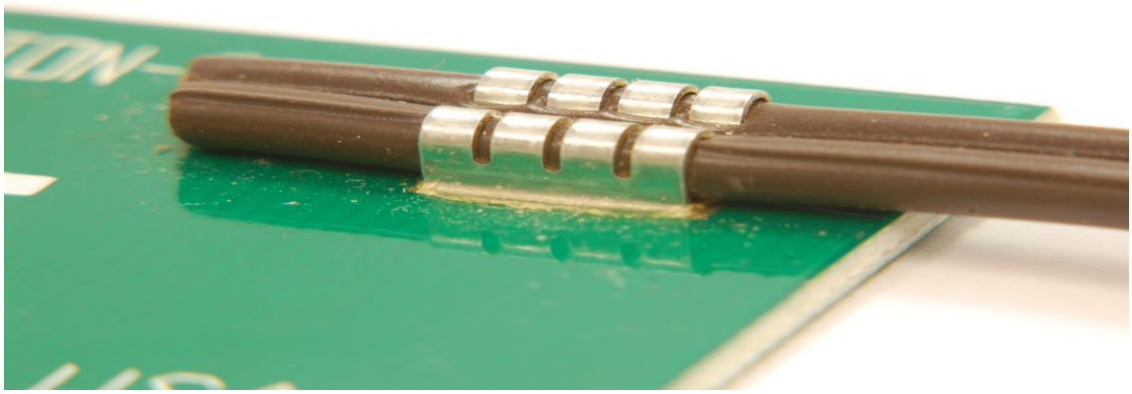
ZMC Test Document:
Part# 1300-T

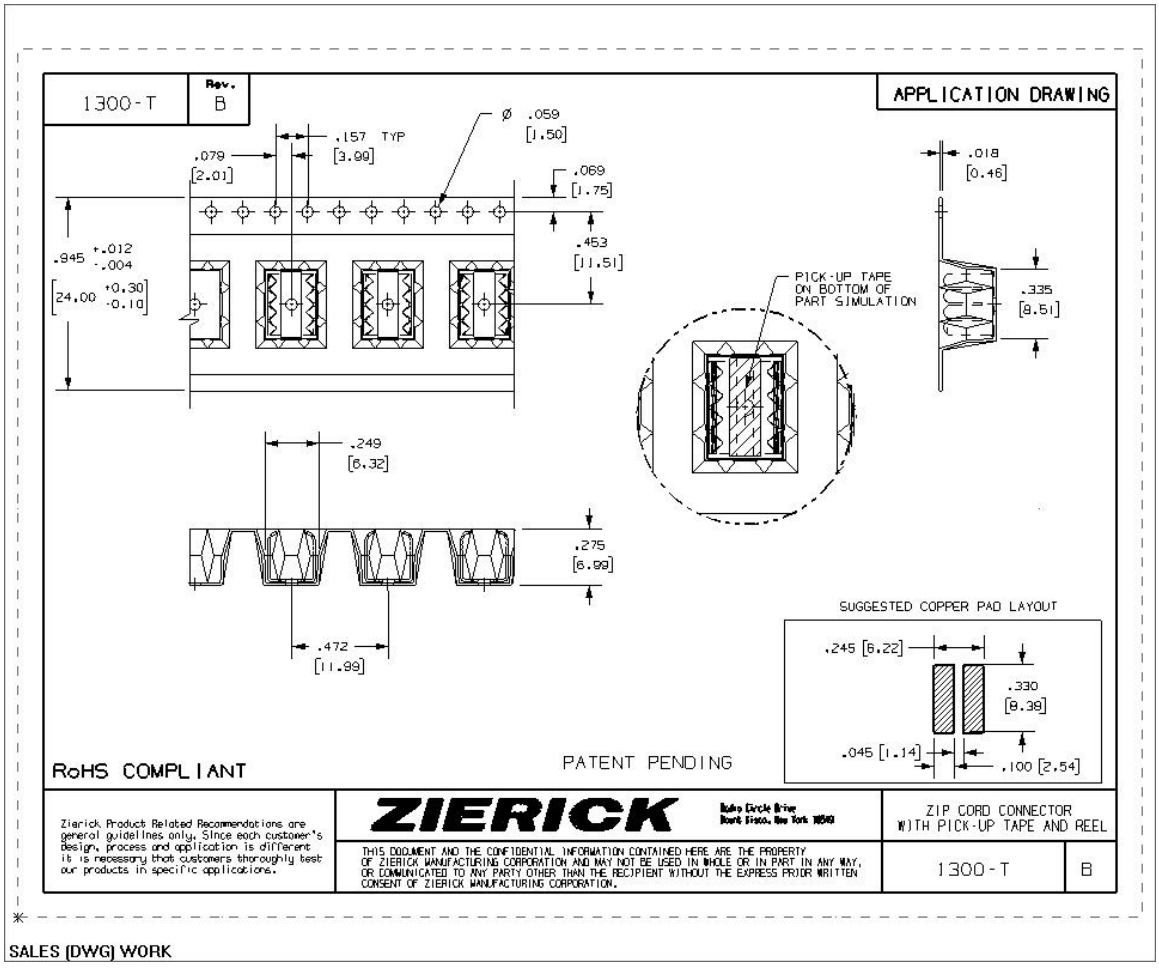
Description: A patent pending "Arched Finger" wire-to-board SMT crimp connector specifically designed for use with 18 AWG paired wires and industry standard "Zip Cord".



Uses and Advantages

- This "Paired" Connector features a patent-pending design that wraps/arches over both zip cord wires and pierces them in ONE crimping action.
- The Kapton® tape isolates and orients the two connectors to assure accurate positioning on the board.
- The pair of connectors offer excellent strain relief as well as low contact resistance.
- Zierick provides a variety of hand-held and automated crimping tools for this part.
- Available in pocket tape format.

Zierick Part Number: 1300-T
SMT Wire-to-Board, Paired Wire ("Zip Cord") Crimp Connector



Scope of This Document

This document contains the following test data:

X	**Contact Resistance Before and After Thermal Shock**
X	**Heat Rise**
X	**Pull Force, X-Y-Z Axes**
X	**Hi Pot**
X	**Crimp Force, Crimp Height**

Executive Summary

- Data indicate low Contact Resistance both before and after Thermal Shock exposure. There was no visible degradation on any part as per specifications after the Thermal Shock test. This connector pair was tested for 25 Thermal Shock cycles. (Table 1.)
- Heat Rise Testing indicates the connector will accept amperage with an upper limit of 9A (zipcord, SPT-1). (Table 2.)
- The force tests show relatively high amounts of force are required to pull the wire pair from the connectors. (Tables 3A-C.)
- Hi-Pot Test results suggest the connector will accept more voltage than would normally be used. (Table 4.)
- Crimp Force is still well within the capabilities of an FR-4 PCB, yet TWO wires are terminated in one crimping action. (Table 5.)

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A. Low-Level Contact Resistance (LLCR) Before And After Thermal Shock Environmental Testing

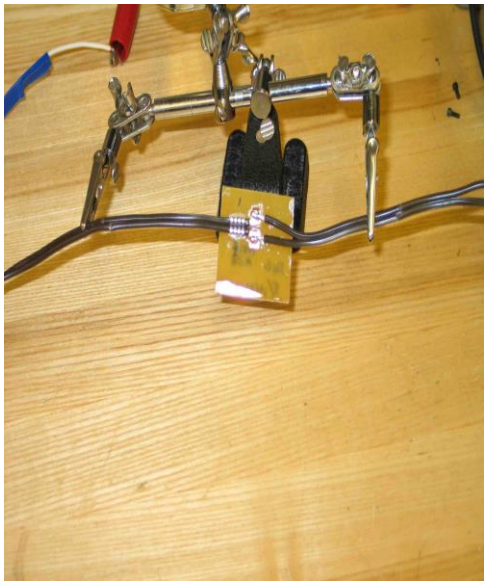
Test Specifications:	**Part Number:**	**1300-T**
Description:	This test determines a baseline for LLCR and shows any degradation after Thermal Shock testing	
Follows Standards:	EIA-364-23 (LLCR), EIA-364-32C (Thermal Shock)	
Wire Gauge:	18 AWG	
Wire Type:	Standard Zip cord	
Temp Range:	-55° to 85° Celsius	
Cycles:	25	

Test Methods

A lead wire and the terminal were soldered to pads on a standard FR-4 PCB. An 18 AWG Zip cord wire was crimped to the connector.

Contact Resistance tests were performed per EIA specs before and after Thermal Shock testing at 25 cycles.

Test Setup



Test Results -Table 1

Sample Number	Baseline Low Level Contact Resistance, mΩ	Resistance After 25 Thermal Shock Cycles, mΩ
1	4.1	6.9
2	4.4	9.1
3	4.4	9.4
4	4.0	8.0
5	4.9	8.2
6	4.3	7.6
7	4.1	7.4
8	4.4	7.6
9	4.0	9.5
10	4.3	8.0
Average	**4.3**	**8.2**

Conclusions/Interpretations

- LLCR: Note that EIA specifies a 6" wire lead on each side of the test points and this wire contributes to the total resistance. The initial resistance is minimal and the average increase after 25 Thermal Shock cycles is only 4 milliohms. The modest resistance increase is not enough to be significant in these applications.
- Thermal Shock: There were no mechanical failures observed (as described by EIA Standard) after Thermal Shock treatment.

B. Heat Rise Testing

Test Specifications	**Part Number:**	**1300-T**
Description:	Approximate Peak Ampacity	
Follows Standard:	EIA/ECA-364-70B, Test Condition 5, Test Method 3, Free Air	
Wire Gauge:	18 AWG	
Wire Type:	Standard Zip cord	
Ambient Temp, degrees	22.3° C	

Test Methods

As with the LLCR Tests, connectors are re-flowed to a pad on the PCB. One Zip Cord pair is soldered to a 2 oz. copper pad and the other is crimped in the connector(s).

Test Setup

Test Results – Table 2

Current	8A	9A	10A
Sample Number	Temperature Rise, degrees C	Temperature Rise, degrees C	Temperature Rise, degrees C
1	7.6	9.7	11.8
2	16.5	20.6	25.3
3	15.8	20.2	25.6
4	13.1	20.4	21.8
5	20.1	25.1	28.4
6	23.6	28.9	32.6
7	17.0	20.9	25.7
8	16.3	20.8	24.1
9	20.8	27.0	31.2
10	21.2	26.4	32.2
Average	**17.2**	**22**	**25.9**

Conclusions/Interpretations

The Heat Rise (Ampacity) test was conducted in open air. The test connectors easily handled up to 9 amps without exceeding the accepted temperature increase of 30 degrees C.

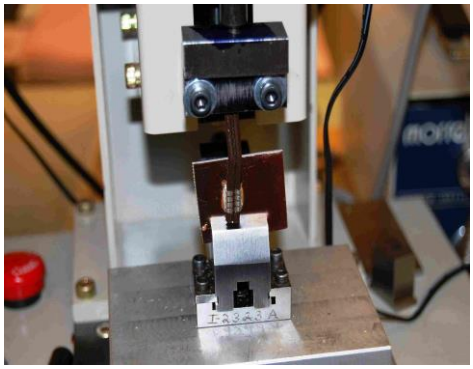
C. Pull Force Testing

Test Specifications		**Part Number:**	**1300-T**
Description:	Tests performed using a certified pull force gauge		
Follows Standard:	EIA 364-08		
Wire Gauge:	18		
Wire Type:	Standard Zip cord		
Samples Tested:	5 per axis		

Test Method

The connector(s) were soldered to a PCB using standard procedures then subjected to pull forces on the X, Y and Z axes as pictured below. The X-axis test pulls the wire on the long axis of the connector, or the way the wire was inserted. The Y-axis test pulls sideways on the short axis of the connector. The Z-axis test pulls the wire perpendicular to the PCB.

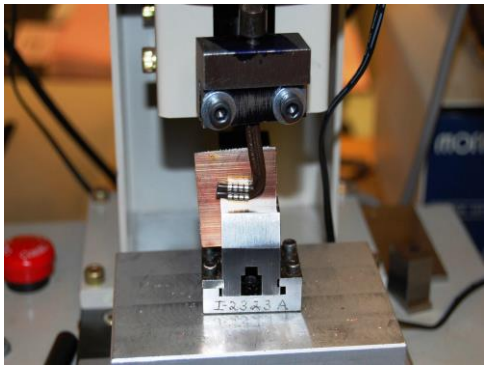
X-Axis Test Setup



X-Axis Test Results – Table 3A

Sample Number	Force Withstood X-Axis, Lbs
1	23.7
2	30.4
3	27.6
4	26.5
5	24.2
Minimum	23.7

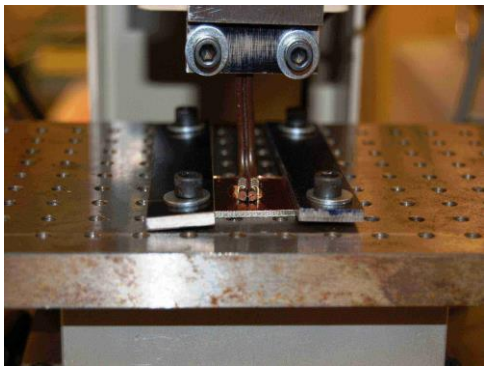
Y-Axis Test Setup



Y-Axis Test Results – Table 3B

Sample Number	Force Withstood Y-Axis, Lbs
1	23.3
2	23.1
3	19.7
4	20.8
5	21.8
Minimum	19.7

Z-Axis Test Setup



Z-Axis Test Results – Table 3C

Sample Number	Force Withstood Z-Axis, Lbs
1	18.1
2	16.5
3	17.4
4	18.4
5	16.6
Minimum	16.5

Conclusions/Interpretations

The force tests show relatively high amounts of force are required to pull the wire pair from the connectors. It is unlikely this amount of force would be generated in electronic applications.

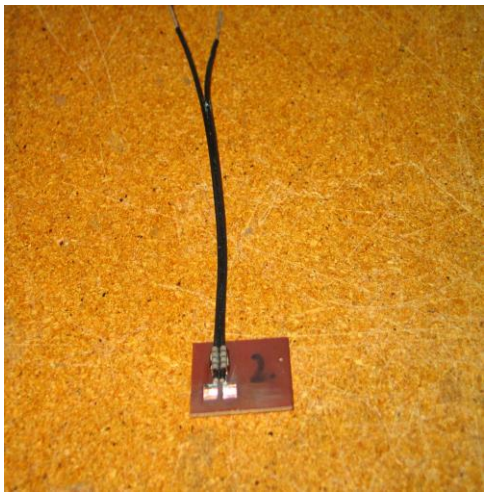
D. Hi-Pot Testing

Test Specifications		**Part Number:**	**1300-T**
Description:	Voltage Loading		
Follows Standard:	EIA 364-20		
Wire Gauge:	18 AWG		
Wire Type:	Standard Zip cord		
Voltage:	Increased until leakage/breakdown		

Test Method

The connector is soldered to the board, wires crimped and voltage is passed. Pictures below.

Test Setup



Test Results – Table 4

Sample Number	Leakage/ Breakdown Voltage
1	2300
2	2300
3	2400
4	2400
5	3000
6	2700
7	2700
8	3000
9	2500
10	2700
Minimum	**2300 V**

Conclusions/Interpretations

The test results indicate leakage occurred at voltages far exceeding those expected for typical use.

E. Crimp Force Testing

Test Specifications		**Part Number:**	**1300-T**
Description:	Measurement of crimp force and crimped connector height		
Wire Gauge:	18 AWG		
Wire Type:	Standard Zip cord		

Test Methods

Connectors are soldered to a standard FR-4 board. Zip cord wire is inserted. The force of crimping is measured with a calibrated force gauge. The height of the resulting connection is measured.

Test Setup

Test Results – Table 5

Sample Number	Crimp Force, lbs	Crimp Height, inches
1	442	0.130
2	421	0.130
3	444.5	0.130
4	579.5	0.131
5	421.5	0.131
6	441.5	0.133
7	446	0.129
8	470.5	0.132
9	486.5	0.130
10	585.5	0.128
Average	**473.9**	**0.130**

Conclusions/Interpretations

This is a two-wire crimp in one action. The crimp force recorded will not stress a standard PCB. The resulting connection height is no higher than zip cord wire lying on top of the PCB.

F. Fact

All connectors and components on a PCB are part of an engineered system. Variations in the wire, the type of board, proximity of other components and the soldering/manufacturing processes will influence test results.

Zierick's Engineers are available to discuss the specifics of your application.

G. Final Thoughts

The #1300-T is designed to provide an inexpensive solution to terminate 2-wire bundles or "zip cord" to PCBs. Zierick offers hand crimp tools as well as an inexpensive pneumatic crimp press for higher volume applications.

H. Contact Us

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