



Project Number:		Tracking Code: TC0819--1718	
Requested by: John Reid		Date:06/03/2008	Product Rev: 0
Part #: TCMD-120-SR		Lot #: 5/5/2008	Tech: Eric Fox Eng: Troy Cook
Part description: TCMD			Qty to test: 30
Test Start: 05/05/2008	Test Completed: 5/27/2008		

**QUALIFYING STRAIN RELIEF EXTENSION OF TCMD**

**PART DESCRIPTION**

**TCMD-120-SR**

Tracking Code: TC0819--1718	Part #: TCMD-120-SR
Part description: TCMD	

## **CERTIFICATION**

All instruments and measuring equipment were calibrated to National Institute for Standards and Technology (NIST) traceable standards according to ISO 10012-1 and ANSI/NCSL 2540-1, as applicable.

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### **SCOPE**

To perform the following tests: Qualifying strain relief extension of TCMD.

### **APPLICABLE DOCUMENTS**

Standards: EIA Publication 364

### **TEST SAMPLES AND PREPARATION**

- 1) All materials were manufactured in accordance with the applicable product specification.
- 2) All test samples were identified and encoded to maintain traceability throughout the test sequences.
- 3) After soldering, the parts to be used for LLCR and DWV/IR testing were cleaned according to TLWI-0001.
- 4) Either an automated cleaning procedure or an ultrasonic cleaning procedure may be used.
- 5) The automated procedure is used with aqueous compatible soldering materials.
- 6) Parts not intended for testing LLCR and DWV/IR are visually inspected and cleaned if necessary.
- 7) Any additional preparation will be noted in the individual test sequences.
- 8) Solder Information: Lead Free Wave Solder/Hand Solder

**FLOWCHARTS****Connector Pull**

TEST STEP	5 Pieces GROUP 1	5 Pieces GROUP 2
	DV SIG 0°	DV SIG 90°
01	Pull test, Continuity	Pull test, Continuity

Secure both cables in the center

Monitor continuity and pull

record forces when continuity fails.

**Resistance, SIG Continuity**

TEST STEP	10 Pieces GROUP 1	10 Pieces GROUP 1A
	DV End 90° SIG	DV End 35° SIG
01	Resistance	Resistance
02	1000 Cycles	5000 Cycles
03	Resistance	Resistance
04	Data Review	Data Review
05	2000 Cycles	10000 Cycles
06	Resistance	Resistance
07	Data Review	Data Review
08	3000 Cycles	15000 Cycles
09	Resistance	Resistance
10	Data Review	Data Review
11	4000 Cycles	20000 Cycles
12	Resistance	Resistance
13	Data Review	Data Review
14	5000 Cycles	25000 Cycles
15	Resistance	Resistance

## ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

### CONNECTOR PULL:

- 1) Secure cable near center and pull on connector
  - a. At 90°, right angle to cable

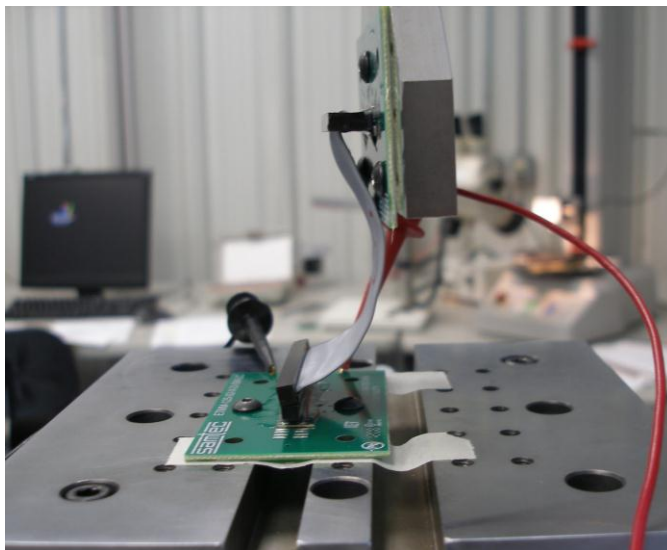


Fig. 1

(Typical set-up, actual parts depicted.)

90° Connector pull, notice the electrical continuity hook-up wires.

- b. At 0°, in-line with cable

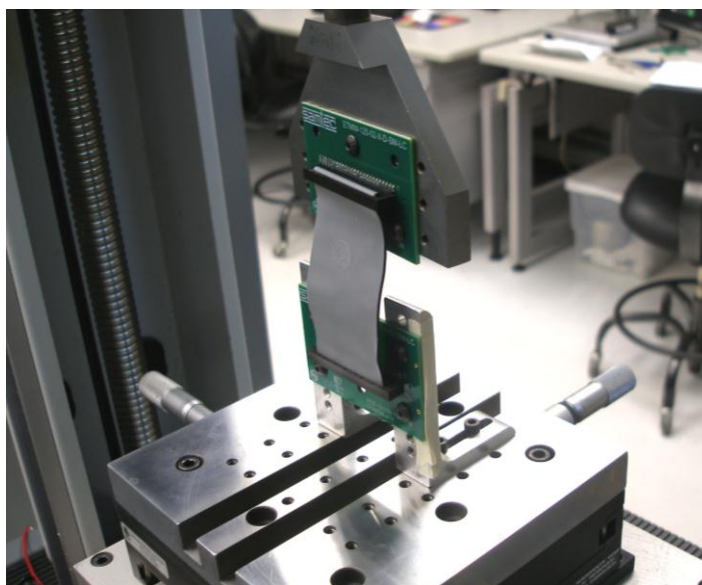


Fig. 2

0° Connector pull

**CABLE DURABILITY:**

- 1) Oscillate and monitor electrical continuity for open circuit indication.
  - a.  $\pm 35^\circ$  Pendulum Mode, **bend up to 25,000 cycles with 8 oz. load on cable end.**
  - b.  $\pm 90^\circ$  Flex Mode, **bend up to 5,000 cycles with 8 oz. load on cable end.**

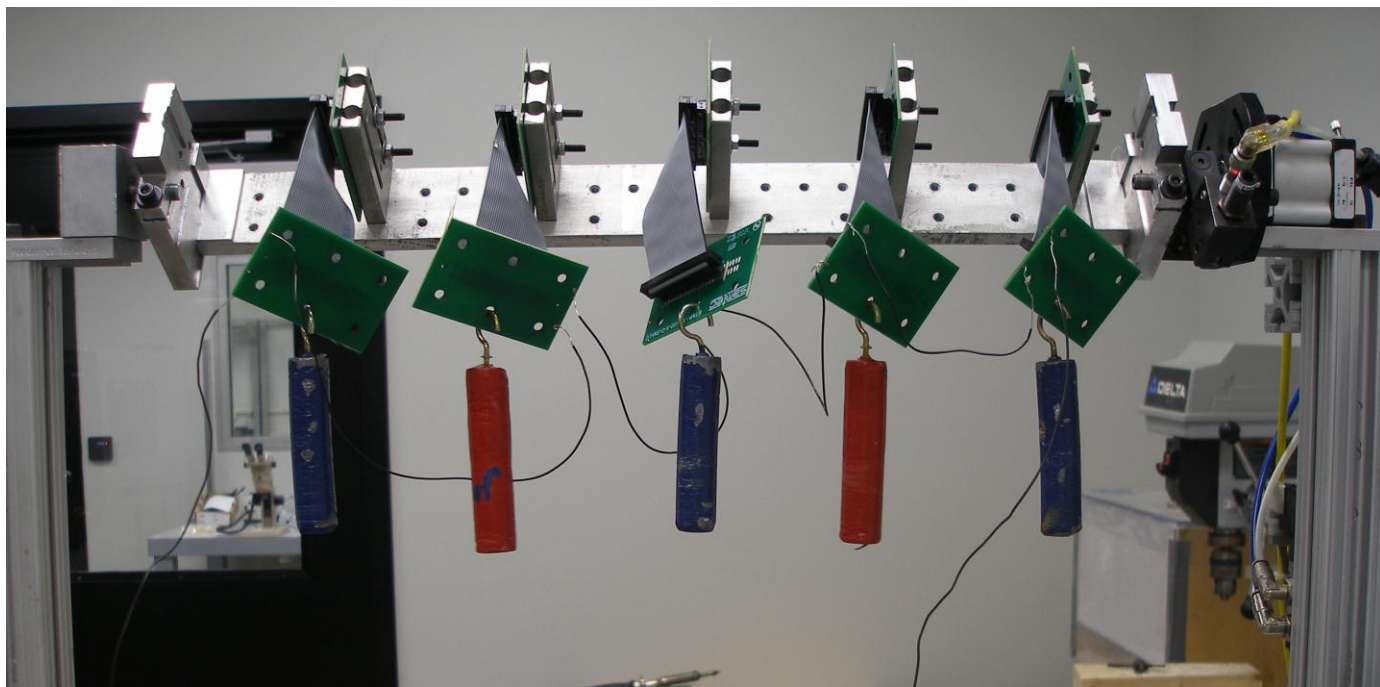


Fig. 3  
(Typical set-up, actual part is depicted.)

**RESULTS**

**Supplemental – Connector/Cable Pull**

- 0° ----- 20.00 lbs min
- 90° ----- 20.50 lbs min

**Supplemental – Cable Bend up to 25,000 Cycles**

- ±35° Pendulum Mode ----- First Failure at 5638
- ±35° Pendulum Mode ----- Last Failure at 24,118
- ±90° Flex Mode ----- First Failure at 341
- ±90° Flex Mode ----- Last Failure at 1,032

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## DATA SUMMARIES

### CONNECTOR PULL

	<i>0 Deg.</i>	<i>90 Deg.</i>
Pull DV	Force (Lbs)	Force (Lbs)
Minimum	20.00	20.50
Maximum	34.00	26.00
Average	30.5	22.6

### CABLE BEND

35 DEGREE	Resistance, Ohms					
	Initial	After 5000	After 10000	After 15000	After 20000	After 25000
Avg	1.4320	1.2860	1.4525	1.6500	1.5800	N/A
Min	1.3700	1.2500	1.3400	1.6500	1.5800	N/A
Max	1.4800	1.3200	1.5400	1.6500	1.5800	N/A
St. Dev.	0.0449	0.0336	0.0984	N/A	N/A	N/A
Count	5	5	4	1	1	0

90 DEGREE	Resistance, Ohms
	Initial
Avg	1.1900
Min	1.1300
Max	1.2900
St. Dev.	0.0693
Count	4

**DATA****CONNECTOR PULL**

	<b><i>0 Deg.</i></b>	<b><i>90 Deg.</i></b>
<b>Sample#</b>	<b>Maximum Force (Lbs)</b>	<b>Maximum Force (Lbs)</b>
1	33.50	23.50
2	33.50	21.50
3	20.00	26.00
4	34.00	20.50
5	31.50	21.50

**CABLE BEND****Resistance, mOhms**

<b>35 Degree</b>						
<b>Cable</b>	<b>Initial</b>	<b>After 5000 Cycles</b>	<b>After 10000 Cycles</b>	<b>After 15000 Cycles</b>	<b>After 20000 Cycles</b>	<b>After 25000 Cycles</b>
1	1.47	1.25	1.34	1.65	1.58	Failed 24118
2	1.41	1.25	1.40	Failed*		
3	1.37	1.31	1.53	Failed 14363		
4	1.48	1.30	1.54	Failed 13326		
5	1.43	1.32	Failed 5638			

\*Failed due to operator error

**Resistance, mOhms**

<b>90 Degree</b>		
<b>Cable</b>	<b>Initial</b>	<b>Cycles</b>
1	1.17	Failed 1032
2	1.29	Failed 900
3	1.17	Failed 819
4	1.13	Failed 341



**EQUIPMENT AND CALIBRATION SCHEDULES****Equipment #:** TCT-01**Description:** Test Stand**Manufacturer:** Chatillon**Model:** TCD-1000**Serial #:** 05 23 00 02**Accuracy:** Speed Accuracy: +/-5% of max speed; Displacement: +/- .5% or +/- .005, whichever is greater.

... Last Cal: 5/24/07, Next Cal: 5/31/08

**Equipment #:** MM-01**Description:** True RMS Multimeter**Manufacturer:** Fluke**Model:** 87 III**Serial #:** 74660176**Accuracy:** See Manual

... Last Cal: 06/14/07, Next Cal: 06/14/08

**Equipment #:** LC-1000**Description:** Chatillon 1000 Lb Load Cell**Manufacturer:** Chatillon**Model:** Remote-1000**Serial #:** E36263**Accuracy:** +/- 0.3% of Full Scale +/- 1 LSC

... Last Cal: 5/29/07, Next Cal: 5/30/08

**Equipment #:** HDR - 01**Description:** HDR Flex Tester**Manufacturer:** Samtec Inc.**Model:** AT-1440-000**Serial #:** AT-1440-000**Accuracy:** N/A

... Last Cal: No Calibration Required, Next Cal:

**Equipment #:** Null**Description:****Manufacturer:****Model:****Serial #:****Accuracy:**

... Last Cal: , Next Cal: