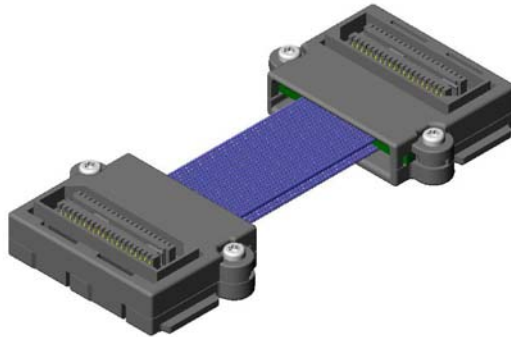




Project Number: NA		Tracking Code: TC0326--0218	
Requested by: John Reid		Date: 6/27/2003	Product Rev: 3
Part #: EQCD-020-06.00-STR-STL-3		Lot #: 6/30/03	Tech: Troy Cook Eng: John Reid
Part description: Micro Co-ax High Speed Cable Assy, 0.8 mm Pitch			Qty to test: 60
Test Start: 07/22/2003		Test Completed: 10/10/2003	



**DVT**

**PART DESCRIPTION**

**EQCD-020-06.00-STR-STL-3**

## 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: DVT, QSE DV-DV.

### 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 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) The ultrasonic procedure can be used with either aqueous or non-aqueous soldering components and follows:
  - a) Sample test boards are to be ultrasonically cleaned after test lead attachment, preparation and/or soldering using the following process.
  - b) Sample test boards are immersed into Branson 3510 cleaner containing Kyzen Ionox HC1 (or equivalent) with the following conditions:
    - i) Temperature: -----55° C +/- 5° C
    - ii) Frequency:-----40 KHz
    - iii) Immersion Time: -----5 to 10 Minutes
  - c) Sample test boards are removed and placed into the Branson 3510 cleaner containing deionized water with the following conditions:
    - i) Temperature: -----55° C +/- 5° C
    - ii) Frequency:-----40 KHz
    - iii) Immersion Time: -----5 to 10 Minutes
  - d) Sample test boards are removed and placed in a beaker positioned on a hot plate with a magnetic stirrer containing deionized water warmed to 55° C +/- 5° C for 1/2 to 1 minute
  - e) Upon removal, the sample test boards are rinsed for 1/2 to 1 minute in room temperature free flowing deionized water.
  - f) After the final rinse, the sample test boards are dried in an air-circulating oven for 10 to 15 minutes at 50° C +/- 5° C
  - g) Sample test boards are then allowed to set and recover to room ambient condition prior to testing.
- 7) Parts not intended for testing LLCR and DWV/IR are visually inspected and cleaned if necessary.
- 8) Any additional preparation will be noted in the individual test procedures.

**FLOWCHARTS**

TEST STEP	GROUP 1 On PC Board, DV 6 Adjacent Signal Lines	GROUP 2 Cable Center 6 Adjacent Signal Lines	GROUP 3 On PC Board, DV GP	GROUP 4 Cable Center GP
01	CCC	CCC	CCC	CCC

Tabulate calculated current at RT, 75° C, 80° C and 95° C  
after derating 20% and based on 105° C

CCC, Temp rise = EIA-364-70

TEST STEP	GROUP 1A DV Top Cable	GROUP 1A DV Bottom Cable
01	IR	IR
02	Data Review	Data Review
03	Thermal Aging	Thermal Aging
04	IR	IR
05	Data Review	Data Review
06	Humidity	Humidity
07	IR	IR

Thermal Aging = EIA-364-17, Test Condition 4, 105 deg C;

Time Condition 'B' (250 hours)

Humidity =EIA-364-31, Test Condition B (240 Hours)

and Method III (+25 ° C to +65 ° C @ 90%RH to 98% RH)

delete steps 7a and 7b

TEST STEP	GROUP 1a DV Top Cable Ambient	GROUP 2a DV Bottom Cable Ambient	GROUP 1b DV Top Cable Thermal	GROUP 2b DV Bottom Cable Thermal	GROUP 1c DV Top Cable Humidity	GROUP 2c DV Bottom Cable Humidity
01	DWV/Working Voltage	DWV/Working Voltage	Thermal Aging	Thermal Aging	Humidity	Humidity
02			DWV/Working Voltage	DWV/Working Voltage	DWV/Working Voltage	DWV/Working Voltage

Thermal Aging = EIA-364-17, Test Condition 4, 105 deg C;

Time Condition 'B' (250 hours)

Humidity =EIA-364-31, Test Condition B (240 Hours)

and Method III (+25 ° C to +65 ° C @ 90%RH to 98% RH)

delete steps 7a and 7b

**FLOWCHARTS Continued**

TEST STEP	GROUP 1A	GROUP 1B
	DV	DV
	GND 0°	GND 90°
<b>01</b>	Pull test, Continuity	Pull test, Continuity

**Secure both cables in the center  
Monitor continuity and pull  
record forces when continuity  
fails.**

TEST STEP	Flex Mode	Pendulum Mode
	GROUP 1	GROUP 2
	DV	DV
	GND, ±90° Bend Shroud	GND, ±35° Bend Shroud
<b>01</b>	Resistance	Resistance
<b>02</b>	5000 Cycles	5000 Cycles
<b>03</b>	Data Review	Data Review
<b>04</b>	Resistance	Resistance
<b>05</b>	10000 Cycles	10000 Cycles
<b>06</b>	Data Review	Data Review
<b>07</b>	Resistance	Resistance
<b>08</b>	15000 Cycles	15000 Cycles
<b>09</b>	Data Review	Data Review
<b>10</b>	Resistance	Resistance
<b>11</b>	20000 Cycles	20000 Cycles
<b>12</b>	Data Review	Data Review
<b>13</b>	Resistance	Resistance
<b>14</b>	25000 Cycles	25000 Cycles
<b>15</b>	Resistance	Resistance

**Cycling with 8 oz. cable loading at 1500 to 3000 /Hour**

## ATTRIBUTE DEFINITIONS

Following is a brief, simplified description of attributes.

### THERMAL AGING:

- 1) EIA-364-17, *Temperature Life with or without Electrical Load Test Procedure for Electrical Connectors*.
  - a) Test Condition 4 at 105° C.
  - b) Test Time Condition B for 250 hours.
- 2) Connectors are mated.

### CYCLIC HUMIDITY:

- 1) Reference document: EIA-364-31, *Humidity Test Procedure for Electrical Connectors*.
  - a) Test Condition B, 240 Hours.
  - b) Method III, +25° C to + 65° C, 90% to 98% Relative Humidity excluding sub-cycles 7a and 7b.
- 2) Connectors are mated.

### TEMPERATURE RISE (Current Carrying Capacity, CCC):

- 1) EIA-364-70, *Temperature Rise versus Current Test Procedure for Electrical Connectors and Sockets*.
- 2) When current passes through a contact, the temperature of the contact increases as a result of  $I^2R$  (resistive) heating.
- 3) The number of contacts being investigated plays a significant part in power dissipation and therefore temperature rise.
- 4) The size of the temperature probe can affect the measured temperature.
- 5) Copper traces on PC boards will contribute to temperature rise:
  - a) Self heating (resistive)
  - b) Reduction in heat sink capacity affecting the heated contacts
- 6) A de-rating curve, usually 20%, is calculated.
- 7) Calculated de-rated currents at three temperature points are reported:
  - a) Ambient
  - b) 75° C
  - c) 80° C
  - d) 95° C
- 8) Typically, neighboring contacts (in close proximity to maximize heat build up) are energized.
- 9) The thermocouple (or temperature measuring probe) will be positioned at a location to sense the maximum temperature in the vicinity of the heat generation area.
- 10) A computer program, *TR 803.exe*, ensures accurate stability for data acquisition.
- 11) Hook-up wire cross section is larger than the cross section of any connector leads/PC board traces, jumpers, etc.
- 12) Hook-up wire length is longer than the minimum specified in the referencing standard.

**ATTRIBUTE DEFINITIONS Continued****DIELECTRIC WITHSTANDING VOLTAGE (DWV):**

To determine if the sockets can operate at its rated voltage and withstand momentary over potentials due to switching, surges, and other similar phenomenon. Separate samples are used to evaluate the effect of environmental stresses so not to influence the readings from arcing that occurs during the measurement process.

## 1) PROCEDURE:

- a) Reference document: EIA-364-20, *Withstanding Voltage Test Procedure for Electrical Connectors*.
- b) Test Conditions:
  - i) Between Adjacent Contacts
  - ii) Mated
  - iii) Mounted
  - iv) Rate of Application 500 V/Sec
  - v) Test Voltage (VAC) until breakdown occurs

## 2) MEASUREMENTS/CALCULATIONS

- a) The breakdown voltage shall be measured and recorded.
- b) The dielectric withstanding voltage shall be recorded as 75% of the minimum breakdown voltage.
- c) The working voltage shall be recorded as one-third (1/3) of the dielectric withstanding voltage (one-fourth of the breakdown voltage).

**INSULATION RESISTANCE (IR):**

To determine the resistance of insulation materials to leakage of current through or on the surface of these materials when a DC potential is applied.

## 1) PROCEDURE:

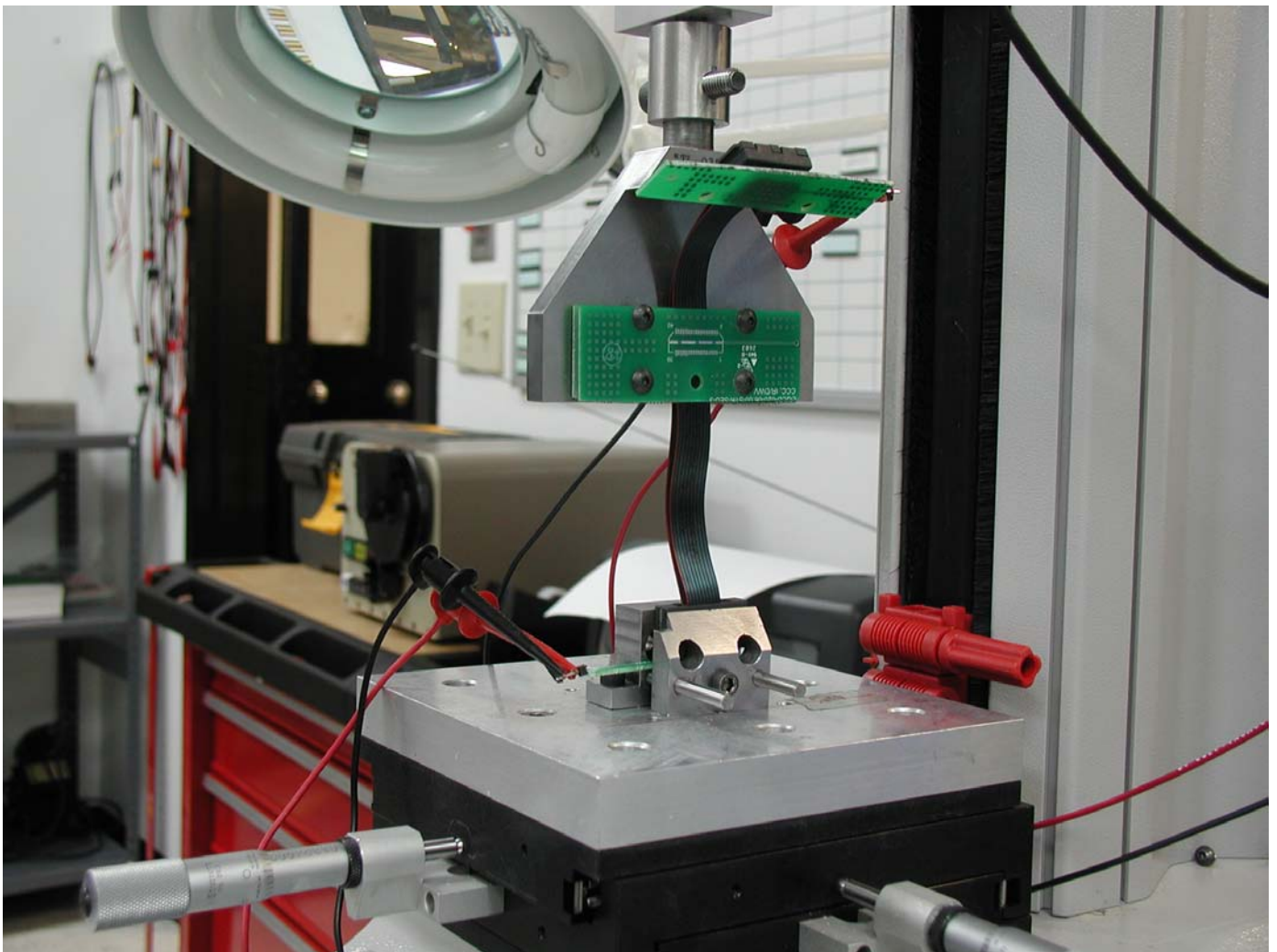
- a) Reference document: EIA-364-21, *Insulation Resistance Test Procedure for Electrical Connectors*.
- b) Test Conditions:
  - i) Between Adjacent Contacts
  - ii) Mated
  - iii) Mounted
  - iv) Electrification Time 2.0 minutes
  - v) Test Voltage (VDC) corresponding to calibration settings for measuring resistances

## 2) MEASUREMENTS:

- a) When the specified test voltage is applied (VDC), the insulation resistance shall not be less than 1000 megohms.

**SUPPLEMENTAL TESTS:**

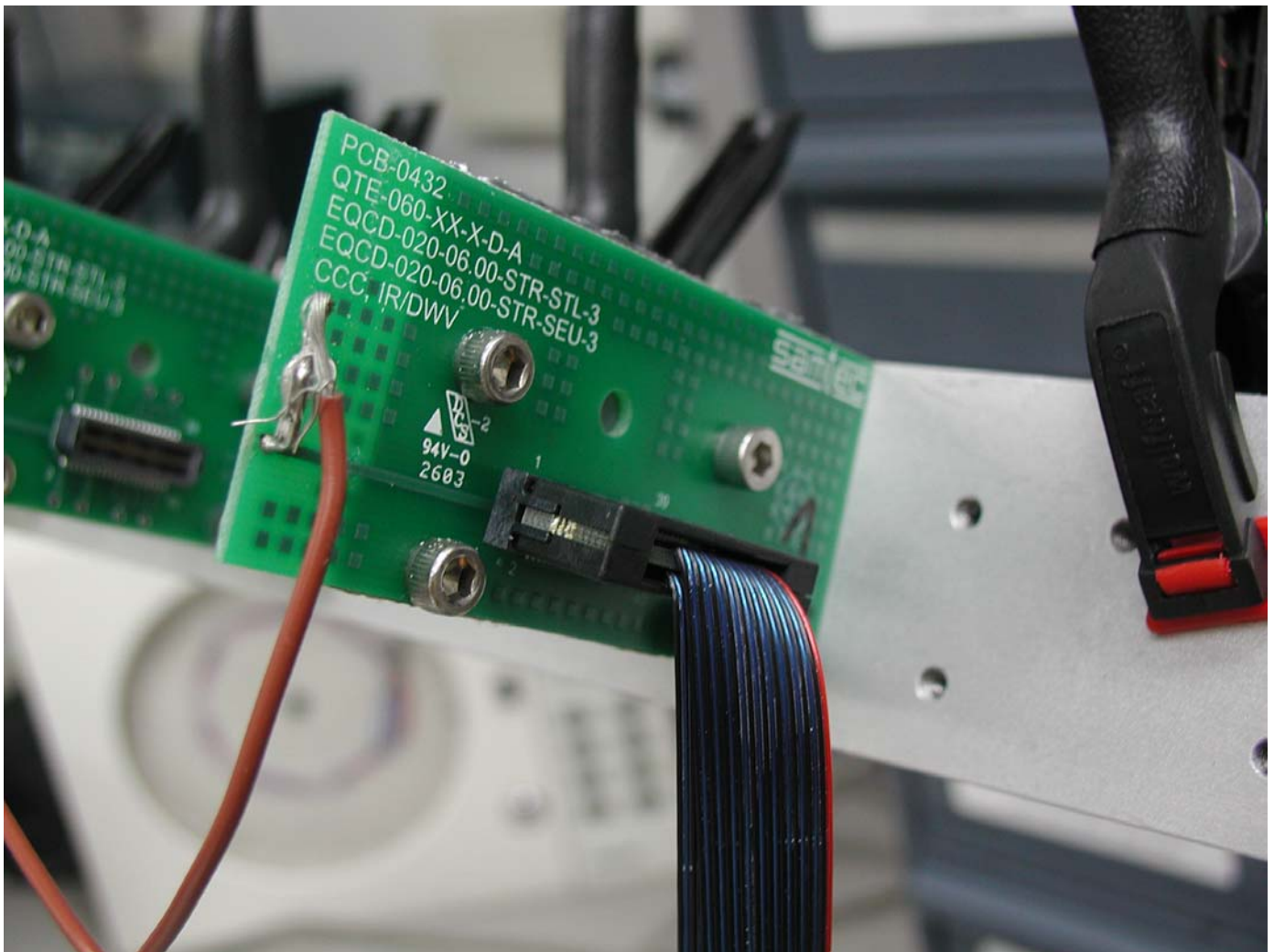
- 1. Connector Pull ... Secure cable near cable center and pull on connector**
  - a. At 90°, right angle to cable**
  - b. At 0°, in-line with cable**



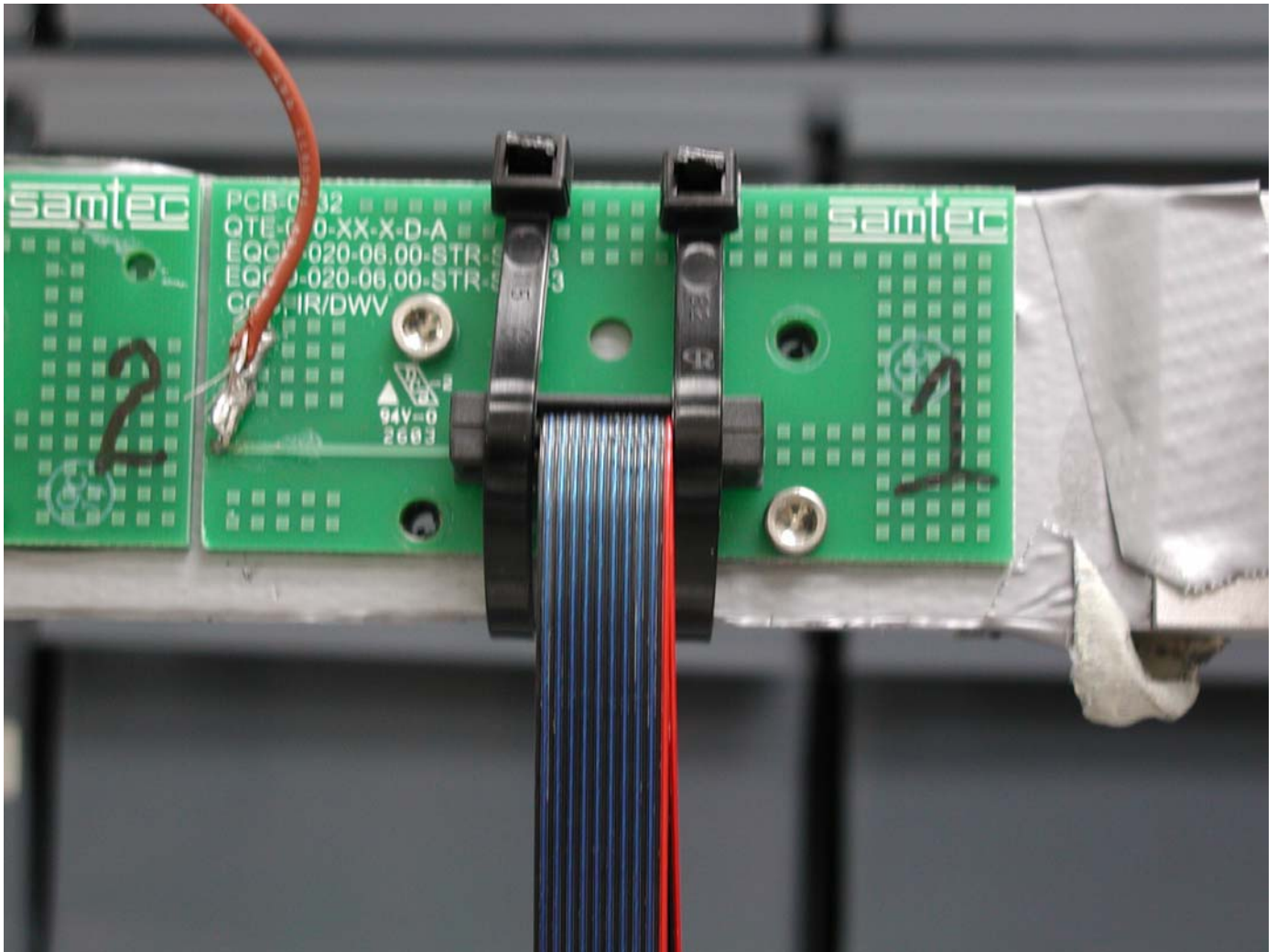
**Fig. 1**  
**0° connector pull. Notice the electrical continuity hook-up wires**

## 2. Cable Durability, Bend up to 25,000 cycles with an 8 oz. load on cable end

### a. $\pm 35^\circ$ Pendulum Mode



**b.  $\pm 90^\circ$  Flex Mode**



**RESULTS****Temperature Rise, CCC At 95°C, relative to 105°C and 20% de-rated**

- **At Cable Termination on PCB**
  - **6 Adjacent Conductors Powered**-----0.36 A
  - **Ground Plane Powered** -----5.4 A
- **At Center of Cable**
  - **6 Adjacent Conductors Powered**-----0.33 A
  - **Ground Plane Powered** -----9.4 A

**Dielectric Withstanding Voltage minimums, DWV**

- **Initial**
  - **Breakdown** ----- 1000 VAC
  - **DWV**-----750 VAC
  - **Working voltage**-----250 VAC
- **Thermal**
  - **Breakdown** -----960 VAC
  - **DWV**-----720 VAC
  - **Working voltage**-----240 VAC
- **Humidity**
  - **Breakdown** -----940 VAC
  - **DWV**-----705 VAC
  - **Working voltage**-----235 VAC

**Insulation Resistance minimums, IR**

- **Initial**-----100,000 Meg  $\Omega$  ----- Pass
- **Thermal**-----50,000 Meg  $\Omega$
- **Humidity**-----100,000 Meg  $\Omega$

**Supplemental – Connector/Cable Pull**

- **0°**----- 60.88 lbs min
- **90°**----- 45.12 lbs min

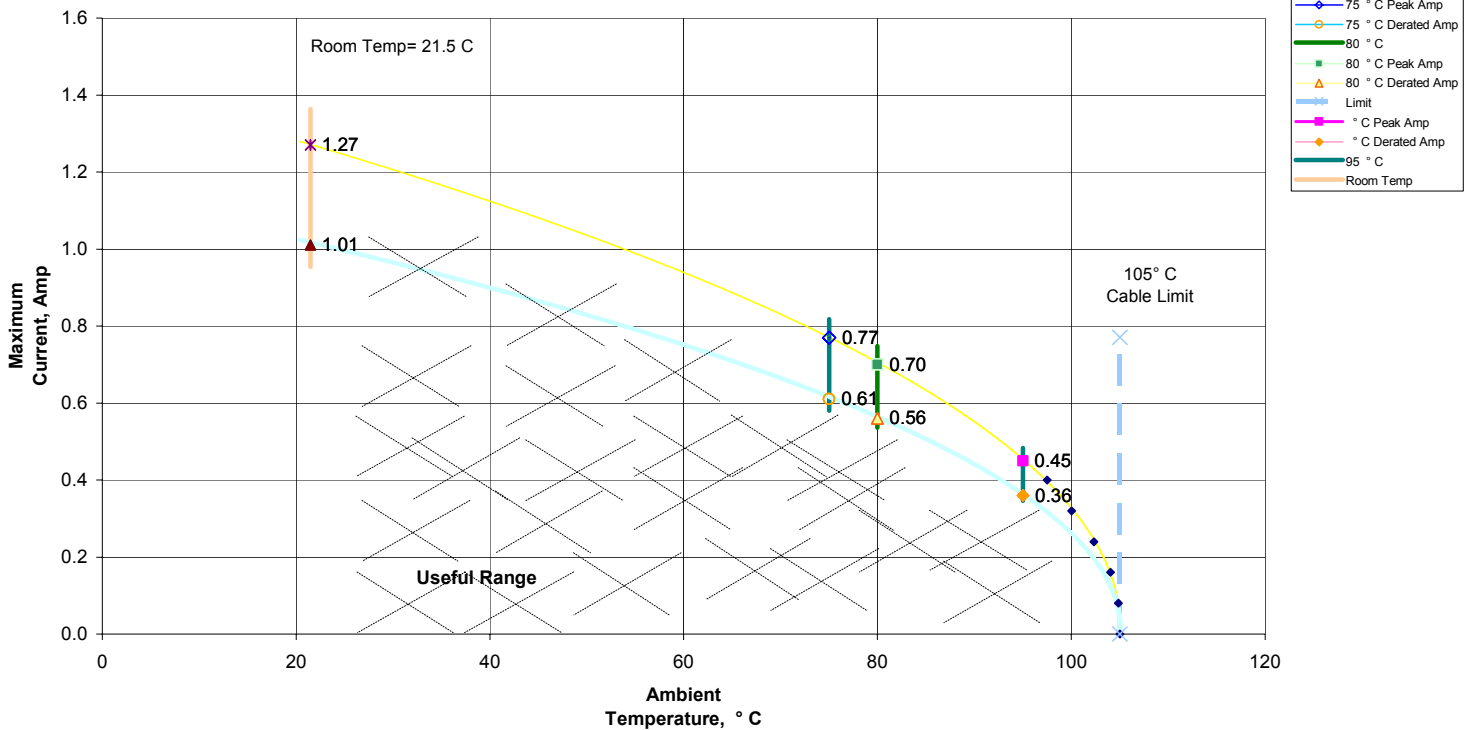
**Supplemental – Cable Bend 25,000 Cycles**

- **0°**----- No Electrical Failures
- **90°**----- No Electrical Failures

**DATA SUMMARIES****TEMPERATURE RISE (Current Carrying Capacity, CCC):**

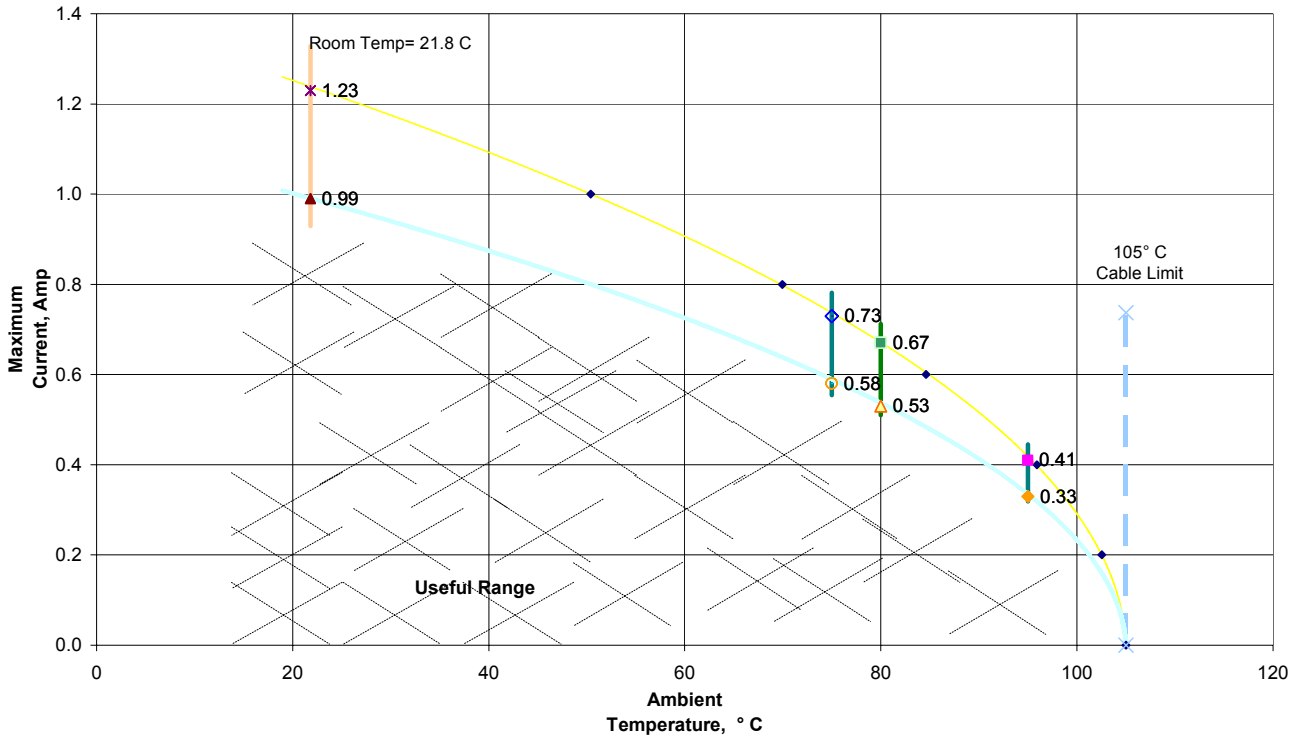
- 1) High quality thermocouples whose temperature slopes track one another were used for temperature monitoring.
- 2) The thermocouples were placed at a location to sense the maximum temperature generated during testing.
- 3) Temperature readings recorded are those for which three successive readings, 15 minutes apart, differ less than 1° C (computer controlled data acquisition).
- 4) Two configurations were tested and temperatures were monitored at the PCB near cable termination and at a point near the center of the cable, remote from the PBC:
  - a) Ground Plane Powered

From TC0326--0218  
6 Adjacent Conductors Powered  
Thermocouple near small PCB on DV Side

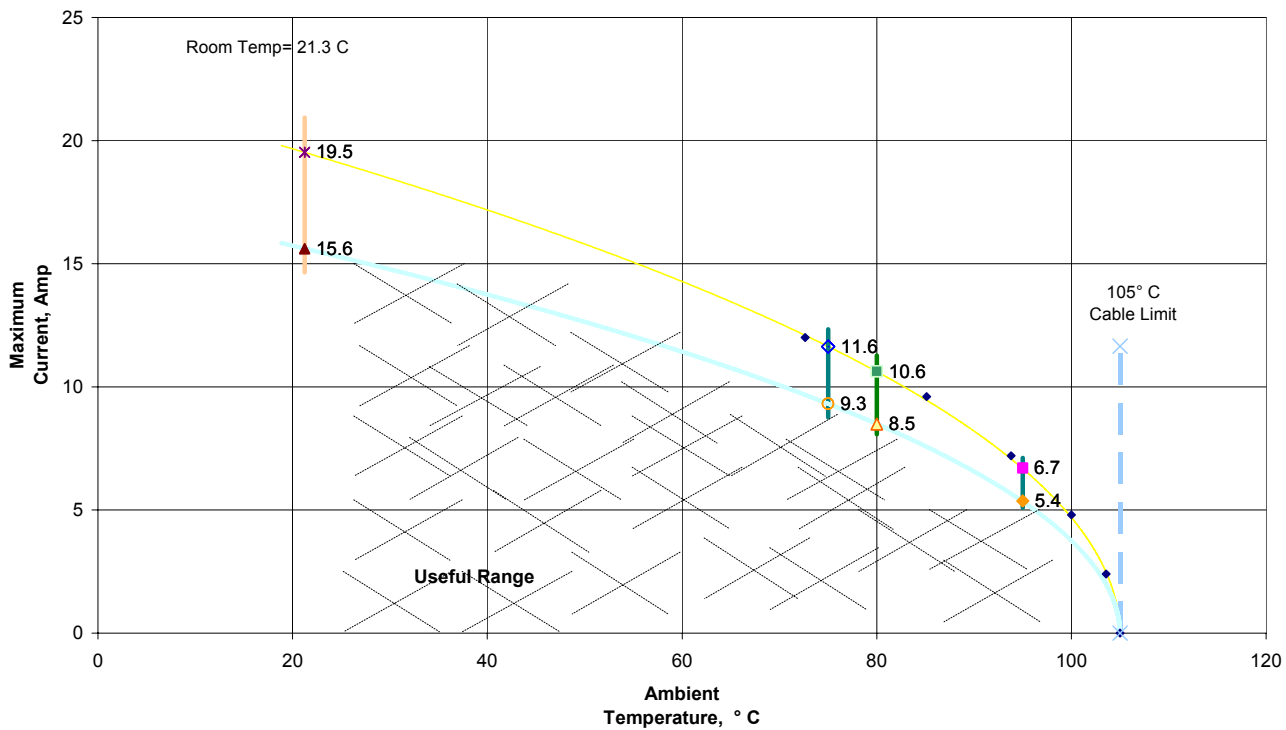


### DATA SUMMARIES Continued

From TC0326--0218  
6 Adjacent Conductors Powered  
Thermocouple between cables

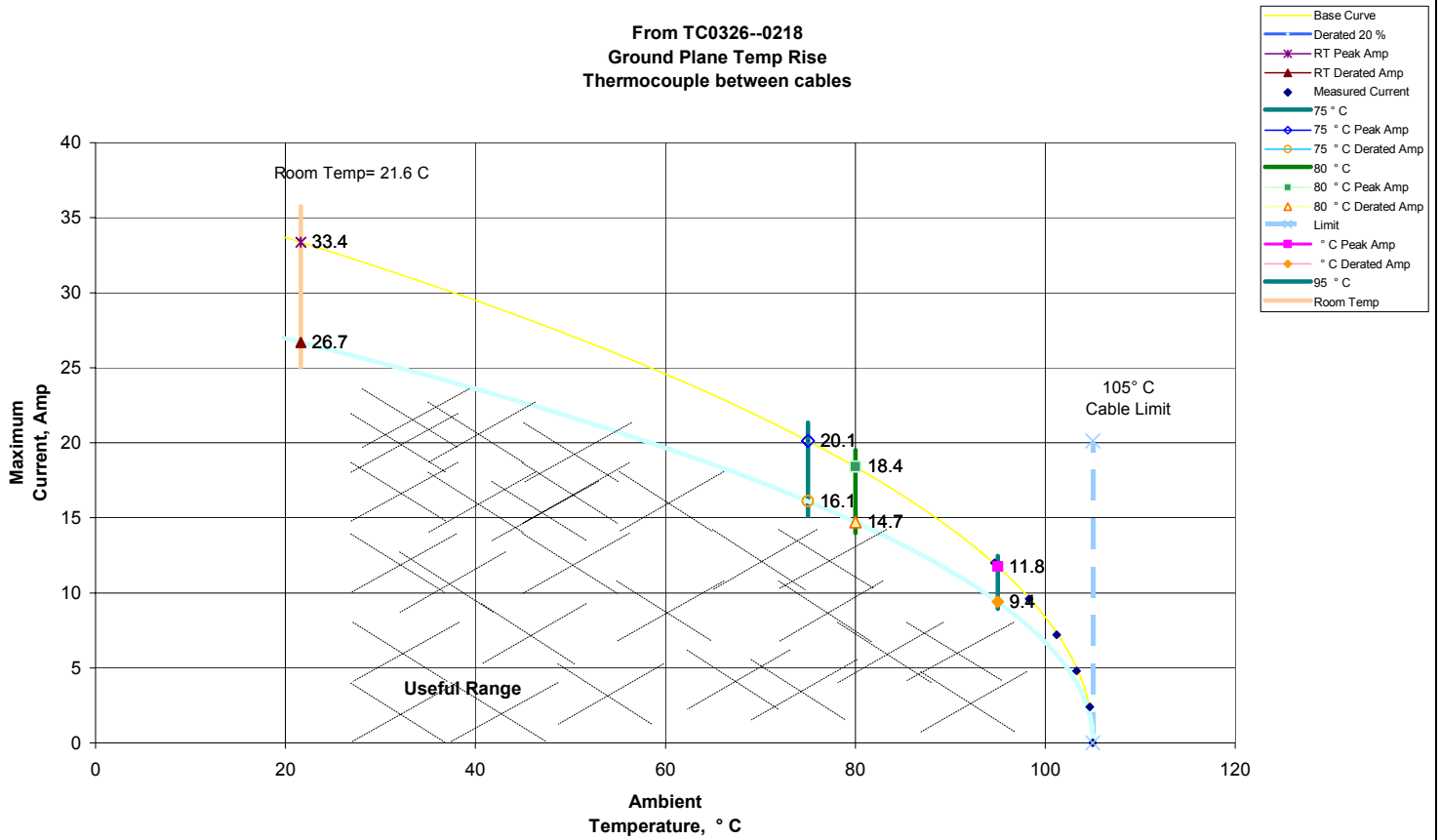


From TC0326--0218  
Ground Plane Temp Rise  
Thermocouple near PCB on DV Side



**DATA SUMMARIES Continued**

**From TC0326--0218  
Ground Plane Temp Rise  
Thermocouple between cables**



**DATA SUMMARIES Continued****DIELECTRIC WITHSTANDING VOLTAGE (DWV):***Voltage Rate 500 VAC Per Sec.**Test Voltage Until Breakdown Occurs***Initial, VAC**

	<b><u>Breakdown Voltage</u></b>	<b><u>DWV</u></b>	<b><u>Working Voltage</u></b>
<b>Average</b>	1020	765	255
<b>Min</b>	1000	750	250
<b>Max</b>	1040	780	260

*Voltage Rate 500 VAC Per Sec.**Test Voltage Until Breakdown Occurs***Thermal, VAC**

	<b><u>Breakdown Voltage</u></b>	<b><u>DWV</u></b>	<b><u>Working Voltage</u></b>
<b>Average</b>	1005	754	251
<b>Min</b>	960	720	240
<b>Max</b>	1050	788	263

*Voltage Rate 500 VAC Per Sec.**Test Voltage Until Breakdown Occurs***Humidity, VAC**

	<b><u>Breakdown Voltage</u></b>	<b><u>DWV</u></b>	<b><u>Working Voltage</u></b>
<b>Average</b>	1145	859	286
<b>Min</b>	940	705	235
<b>Max</b>	1350	1013	338

**DATA SUMMARIES Continued****INSULATION RESISTANCE (IR):**Electrification Time *Two (2) minutes***Initial, Meg Ohms**

	<u>Insulation Resistance</u>
Average	100000
Min	100000
Max	100000

Electrification Time *Two (2) minutes***Thermal, Meg Ohms**

	<u>Insulation Resistance</u>
Average	75000
Min	50000
Max	100000

Electrification Time *Two (2) minutes***Humidity, Meg Ohms**

	<u>Insulation Resistance</u>
Average	100000
Min	100000
Max	100000

**DATA SUMMARIES Continued****SUPPLEMENTAL TESTS: Connector Pull**

Pull DV 0 Degrees

	Force (Lbs)
Minimum	60.88
Maximum	129.98
<b>Average</b>	<b>89.16</b>

Pull DV 90 Degrees

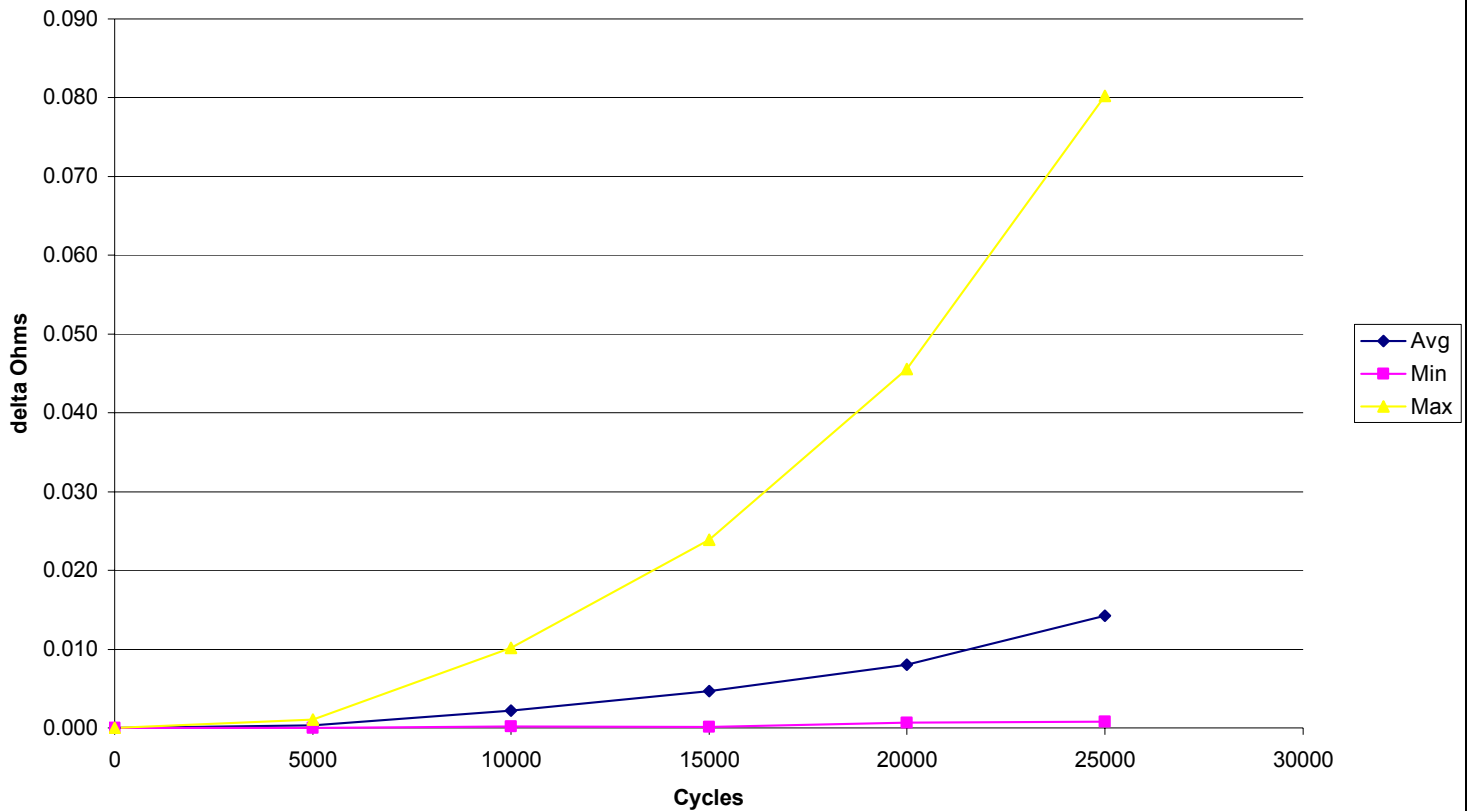
	Force (Lbs)
Minimum	45.12
Maximum	100.13
<b>Average</b>	<b>72.2</b>

**DATA SUMMARIES Continued****SUPPLEMENTAL TESTS: Cable Durability  $\pm 90^\circ$  Flex Mode**

DV End 90 Degrees

		Resistance Change, Ohms/Gnd System					
		Initial	5000 Cycles	10000 Cycles	15000 Cycles	20000 Cycles	25000 Cycles
Avg		0.0000	0.0003	0.0022	0.0047	0.0081	0.0143
Min		0.0000	0.0000	0.0002	0.0002	0.0007	0.0008
Max		0.0000	0.0011	0.0102	0.0239	0.0456	0.0803
St. Dev.		0.0000	0.0003	0.0031	0.0074	0.0142	0.0251

**From TC0337--0280**  
**Ground Durability - DV End**  
 **$\pm 90$  Degree Flex**



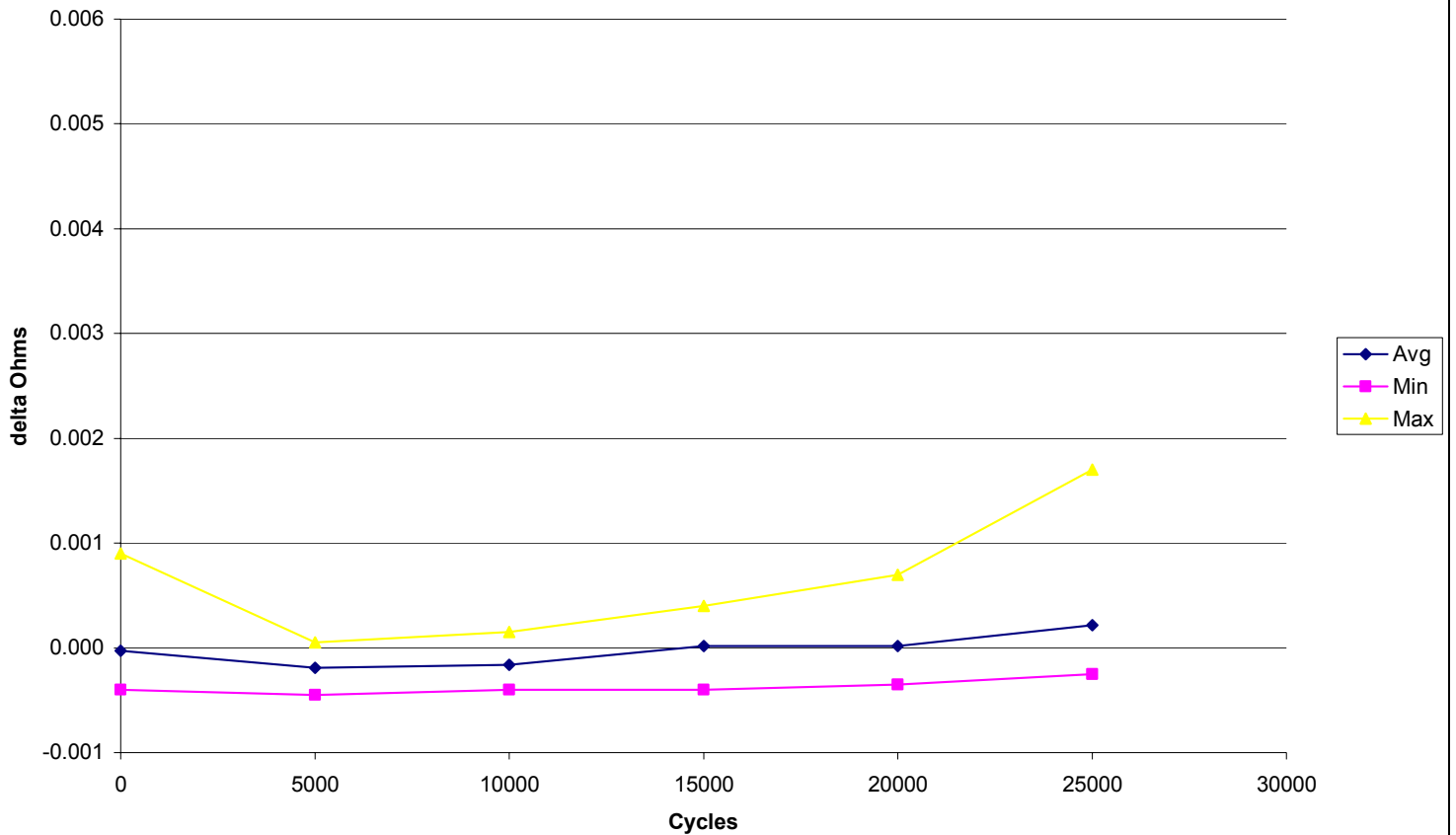
**DATA SUMMARIES Continued**

**SUPPLEMENTAL TESTS: Cable Durability ± 35° Pendulum Mode**

DV 35  
END degrees

Resistance, Ohms/gnd system, +/- 35 Degree Pendulum Mode						
Initial	5000 Cycles	10000 Cycles	15000 Cycles	20000 Cycles	25000 Cycles	
Avg	0.0000	-0.0002	-0.0002	0.0000	0.0000	0.0002
Min	-0.0004	-0.0004	-0.0004	-0.0004	-0.0004	-0.0002
Max	0.0009	0.0001	0.0002	0.0004	0.0007	0.0017
St. Dev.	0.0004	0.0003	0.0004	0.0005	0.0006	0.0012

**Cable Durability - DV End  
± 35 Degree Pendulum Mode**



**DATA****DIELECTRIC WITHSTANDING VOLTAGE (DWV):**

<b>Test Date:</b>	7/15/2003	Initial, VAC
<b>Operator:</b>	Troy Cook	
<b>Temperature (C):</b>	22	
<b>Humidity (RH):</b>	56%	
<b>Pressure (In. Hg):</b>	29.38	
<b>Equipment ID:</b>	STG-01	

<b>Contact Part #:</b>	EQCD- DV
<b>Used In:</b>	N/A

<b>Test Conditions</b>	<b>YES</b>	<b>NO</b>
<b><u>Adjacent Contacts</u></b>	X	
<b><u>Mated</u></b>	X	
<b><u>PC Mounted</u></b>	X	

**Voltage Rate** 500 VAC Per Sec.  
**Test Voltage** Until Breakdown Occurs

Initial, VAC

<b><u>Sample #</u></b>	<b><u>Breakdown Voltage</u></b>	<b><u>DWV</u></b>	<b><u>Working Voltage</u></b>
1	1000	750	250
2	1040	780	260

Sample #1 is top cable, #2 , Bottom

**DATA Continued**

<b>Test Date:</b>	7/15/2003	Thermal, VAC
<b>Operator:</b>	Troy Cook	
<b>Temperature (C):</b>	22	
<b>Humidity (RH):</b>	56%	
<b>Pressure (In. Hg):</b>	29.38	
<b>Equipment ID:</b>	STG-01	

<b>Contact Part #:</b>	EQCD-DV
<b>Used In:</b>	N/A

<b>Test Conditions</b>	<b>YES</b>	<b>NO</b>
<b>Adjacent Contacts</b>	X	
<b>Mated</b>	X	
<b>PC Mounted</b>	X	

Voltage Rate 500 VAC Per Sec.

Test Voltage Until Breakdown Occurs

Thermal, VAC

<b>Sample #</b>	<b>Breakdown Voltage</b>	<b>DWV</b>	<b>Working Voltage</b>
1	1050	788	263
2	960	720	240

Sample #1 is top cable, #2 , Bottom

<b>Test Date:</b>	7/15/2003	Humidity, VAC
<b>Operator:</b>	Troy Cook	
<b>Temperature (C):</b>	22	
<b>Humidity (RH):</b>	56%	
<b>Pressure (In. Hg):</b>	29.38	
<b>Equipment ID:</b>	STG-01	

<b>Contact Part #:</b>	EQCD-DV
<b>Used In:</b>	N/A

<b>Test Conditions</b>	<b>YES</b>	<b>NO</b>
<b>Adjacent Contacts</b>	X	
<b>Mated</b>	X	
<b>PC Mounted</b>	X	

Voltage Rate 500 VAC Per Sec.

Test Voltage Until Breakdown Occurs

Humidity, VAC

<b>Sample #</b>	<b>Breakdown Voltage</b>	<b>DWV</b>	<b>Working Voltage</b>
1	1350	1013	338
2	940	705	235

Sample #1 is top cable, #2 , Bottom

**DATA Continued****INSULATION RESISTANCE (IR):**

<b>Test Date:</b>	7/3/2003	Initial
<b>Operator:</b>	Troy Cook	
<b>Temperature (C):</b>	24	
<b>Humidity (RH):</b>	48%	
<b>Pressure (In. Hg):</b>	29.23	
<b>Equipment ID:</b>	STG-01	

<b>Contact Part #:</b>	EQCD- DV
<b>Used In:</b>	N/A

<b>Test Conditions</b>	<b>YES</b>	<b>NO</b>
<b><u>Adjacent Contacts</u></b>	X	
<b><u>Mated</u></b>	X	
<b><u>PC Mounted</u></b>	X	

Electrification Time *Two (2) minutes*

Initial

<b><u>Sample #</u></b>	<b><u>Insulation Resistance</u></b>
1 (Top)	100000
2 (Bottom)	100000

Sample #1 is top cable, #2 ,  
Bottom

**DATA Continued**

<b>Test Date:</b>	7/15/2003	Thermal
<b>Operator:</b>	Troy Cook	
<b>Temperature (C):</b>	24	
<b>Humidity (RH):</b>	46%	
<b>Pressure (In. Hg):</b>	29.23	
<b>Equipment ID:</b>	STG-01	

<b>Contact Part #:</b>	EQCD-DV
<b>Used In:</b>	N/A

Test Conditions	YES	NO
<u>Adjacent Contacts</u>	X	
<u>Mated</u>	X	
<u>PC Mounted</u>	X	

Electrification Time *Two (2) minutes***Thermal**

<u>Sample #</u>	<u>Insulation Resistance</u>
1 (Top)	50000
2 (Bottom)	100000

Sample #1 is top cable, #2 , Bottom

<b>Test Date:</b>	8/4/2003	Humidity
<b>Operator:</b>	Troy Cook	
<b>Temperature (C):</b>	23	
<b>Humidity (RH):</b>	52%	
<b>Pressure (In. Hg):</b>	29.23	
<b>Equipment ID:</b>	STG-01	

<b>Contact Part #:</b>	EQCD-DV
<b>Used In:</b>	N/A

Test Conditions	YES	NO
<u>Adjacent Contacts</u>	X	
<u>Mated</u>	X	
<u>PC Mounted</u>	X	

Electrification Time *Two (2) minutes***Humidity**

<u>Sample #</u>	<u>Insulation Resistance</u>
1 (Top)	100000
2 (Bottom)	100000

Sample #1 is top cable, #2 , Bottom

Tracking Code: TC0326--0218

Part #: EQCD-020-06.00-STR-STL-3

Part description: Micro Co-ax High Speed Cable Assy, 0.8 mm Pitch

**DATA Continued**

**SUPPLEMENTAL: Connector Pull 0°**

<b>Test Date:</b>	9/11/2003
<b>Operator:</b>	Troy Cook
<b>Temperature (C):</b>	23
<b>Humidity (RH):</b>	57%
<b>Pressure (In. Hg):</b>	29.53
<b>Equipment ID:</b>	TCT-03
<b>Load Cell:</b>	LC-2500N(icell)
<b>Readout ID:</b>	MO-01

<b>Contact Part #:</b>	<u>N/A</u>
<b>Used In:</b>	<u>EQCD-DV-</u> <u>DV</u>

Pull DV 0 Degrees

<u>Sample#</u>	<u>Force (Lbs)</u>
1	76.73
2	110.27
3	60.88
4	129.98
5	67.93

Tracking Code: TC0326--0218

Part #: EQCD-020-06.00-STR-STL-3

Part description: Micro Co-ax High Speed Cable Assy, 0.8 mm Pitch

### DATA Continued

#### SUPPLEMENTAL: Connector Pull 90°

<b>Test Date:</b>	7/31/2003
<b>Operator:</b>	Troy Cook
<b>Temperature (C):</b>	24
<b>Humidity (RH):</b>	47%
<b>Pressure (In. Hg):</b>	29.35
<b>Equipment ID:</b>	TCT-03
<b>Load Cell:</b>	LC-2500N(icell)
<b>Readout ID:</b>	MO-01

<b>Contact Part #:</b>	N/A
<b>Used In:</b>	EQCD-DV-DV

DV 90 Degrees	
<u>Sample#</u>	<u>Maximum Force (Lbs)</u>
1	100.13
2	71.45
3	60.04
4	66.84
5	45.12
6	63.82
7	90.06
8	65.24
9	61.05
10	87.20
11	83.19

**DATA Continued****SUPPLEMENTAL TESTS: Cable Durability  $\pm 90^\circ$  Flex Mode**

	Initial	5000 Cycles	10000 Cycles	15000 Cycles	20000 Cycles	25000 Cycles
<b>Test Date:</b>	9/17/2003	9/17/2003	9/17/2003	9/17/2003	9/18/2003	9/18/2003
<b>Operator:</b>	Troy Cook	Troy Cook	Troy Cook	Troy Cook	Troy Cook	Troy Cook
<b>Temperature (C):</b>	23	23	23	23	23	23
<b>Humidity (RH):</b>	48%	48%	48%	48%	44%	44%
<b>Pressure (In. Hg):</b>	29.53	29.53	29.53	29.53	29.44	29.44
<b>Equipment ID:</b>	MO-01	MO-01	MO-01	MO-01	MO-01	MO-01

DV End 90 Degrees

Cable	Resistance Change, Ohms/Gnd System, +/- 90 Degree Flex Mode					
	Initial	5000 Cycles	10000 Cycles	15000 Cycles	20000 Cycles	25000 Cycles
1	0.0095	0.0096	0.0105	0.0109	0.0121	0.0123
2	0.0097	0.0101	0.0114	0.0130	0.0128	0.0148
3	0.0098	0.0102	0.0122	0.0148	0.0164	0.0216
4	0.0097	0.0097	0.0099	0.0103	0.0114	0.0127
5	0.0094	0.0097	0.0115	0.0127	0.0133	0.0222
6	0.0095	0.0100	0.0109	0.0117	0.0136	0.0148
7	0.0097	0.0099	0.0107	0.0122	0.0142	0.0165
8	0.0100	0.0159	0.1356			
9	0.0097	0.0097	0.0099	0.0098	0.0104	0.0105
10	0.0112	0.0123	0.0214	0.0351	0.0568	0.0915

**DATA Continued****SUPPLEMENTAL TESTS: Cable Durability  $\pm 35^\circ$  Pendulum Mode**

	Initial	5000 Cycles	10000 Cycles	15000 Cycles	20000 Cycles	25000 Cycles
<b>Test Date:</b>	9/24/2003	9/24/2003	9/24/2003	9/25/2003	9/25/2003	9/25/2003
<b>Operator:</b>	Troy Cook	Troy Cook	Troy Cook	Troy Cook	Troy Cook	Troy Cook
<b>Temperature (C):</b>	22	22	22	23	23	23
<b>Humidity (RH):</b>	46%	46%	46%	48%	48%	48%
<b>Pressure (In. Hg):</b>	30	30	30	30	30	30
<b>Equipment ID:</b>	MO-01	MO-01	MO-01	MO-01	MO-01	MO-01
<b>Equipment ID:</b>	HDR - 01	HDR - 01	HDR - 01	HDR - 01	HDR - 01	HDR - 01

DV END 35 degrees

Cable	Resistance, Ohms/Gnd System $\pm 1 35$ Degree Pendulum Mode					
	Initial	5000 Cycles	10000 Cycles	15000 Cycles	20000 Cycles	25000 Cycles
1	0.0098	0.0096	0.0094	0.0097	0.0096	0.0097
2	0.0098	0.0098	0.0098	0.0098	0.0098	0.0099
3	0.0098	0.0097	0.0094	0.0099	0.0099	0.0100
4	0.0094	0.0094	0.0094	0.0094	0.0094	0.0095
5	0.0095	0.0094	0.0094	0.0095	0.0095	0.0096
6	0.0096	0.0096	0.0096	0.0099	0.0099	0.0100
7	0.0097	0.0097	0.0097	0.0097	0.0097	0.0097
8	0.0107	0.0097	0.0099	0.0101	0.0099	0.0101
9	0.0095	0.0093	0.0099	0.0102	0.0105	0.0115

**EQUIPMENT AND CALIBRATION SCHEDULES****Equipment #:** THL-01**Description:** Temperature/Humidity Chart Recorder**Manufacturer:** Dickson**Model:** THDX**Serial #:** 9316255**Accuracy:** Temp: +/- 1C; Humidity: +/-2% RH (0 - 60%) +/- 3% RH (61 - 95%).

... Last Cal: 7/15/02, Next Cal: 7/15/03

**Equipment #:** MO-02**Description:** Multimeter /Data Acquisition System**Manufacturer:** Keithley**Model:** 2700**Serial #:** 0780546**Accuracy:** See Manual

... Last Cal: 6/12/03, Next Cal: 6/12/04

**Equipment #:** MO-04**Description:** Multimeter /Data Acquisition System**Manufacturer:** Keithley**Model:** 2700**Serial #:** 0798688**Accuracy:** See Manual

... Last Cal: 6/12/03, Next Cal: 6/12/04

**Equipment #:** PS-01**Description:** System Power Supply**Manufacturer:** Hewlett Packard**Model:** HP 6033A**Serial #:** (HP) 3329A-07330**Accuracy:** See Manual

... Last Cal: 6/12/03, Next Cal: 6/12/04

**Equipment #:** TC090601-103/105**Description:** IC Thermocouple-103/105**Manufacturer:** Samtec**Serial #:** TC090601-103/105**Accuracy:** +/- 1 degree C**Equipment #:** HPM-01**Description:** Hipot Megommeter**Manufacturer:** Hipotronics**Model:** H306B-A**Serial #:** M9905004**Accuracy:** 2 % Full Scale Accuracy

... Last Cal: 6/12/03, Next Cal: 6/12/04

**Equipment #:** OV-03**Description:** Cascade Tek Forced Air Oven**Manufacturer:** Cascade Tek**Model:** TFO-5**Serial #:** 0500100**Accuracy:** Temp. Stability: +/- .1C/C change in ambient Temp. Stability: +/- .1C/C change in ambient  
... Last Cal: 6/25/02, Next Cal: 6/25/03**Equipment #:** THC-01**Description:** Temperature/Humidity Chamber**Manufacturer:** Thermotron**Model:** SM-8-7800**Serial #:** 30676**Accuracy:** See Manual

... Last Cal: 5/28/2003, Next Cal: 5/28/2004

**Equipment #:** TCT-03**Description:** Dillon Quantrol TC2 Test Stand**Manufacturer:** Dillon Quantrol**Model:** TC2**Serial #:** 02-1033-03**Accuracy:** Speed Accuracy: +/- 5% of indicated speed; Displacement: +/- 5 micrometers.  
... Last Cal: 6/12/03, Next Cal: 6/12/04**Equipment #:** LC-2500N(icell)**Description:** 2500 N Load Cell for Dillon Quantrol**Manufacturer:** Dillon Quantrol**Model:** icell**Serial #:** 01-0132-01**Accuracy:** .10% of capacity  
... Last Cal: 3/27/03, Next Cal: 3/27/04**Equipment #:** MO-01**Description:** Micro-Ohmmeter**Manufacturer:** Keithley**Model:** 580**Serial #:** 9316255**Accuracy:** See Manual

... Last Cal: 6/12/03, Next Cal: 6/12/04

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

... Last Cal: Calibration Not Required