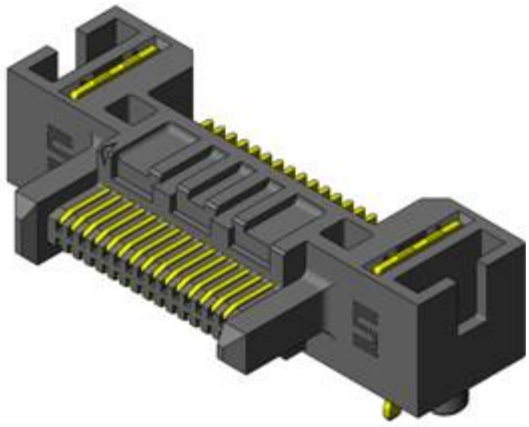
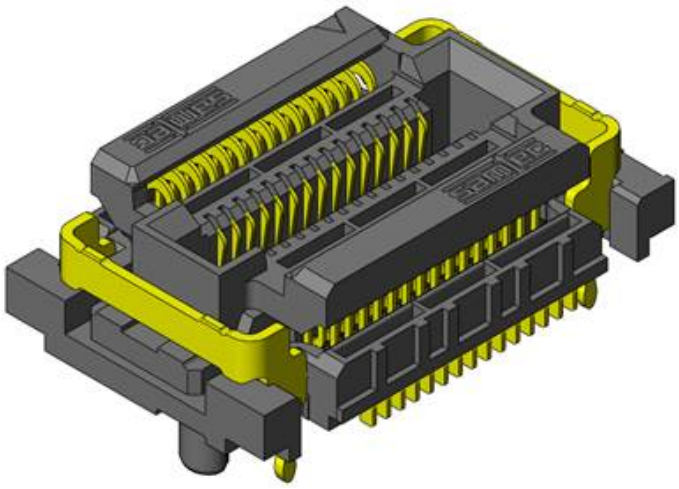
Project Number: Design Qualification Test Report	Tracking Code: 122111_Report_Rev_1		
Requested by: Neal Patterson	Date: 9/5/2012	Product Rev: 1	
Part #: FT5-30-01-L-RA\ FS5-30-04.0-L-DV-TH	Lot #: N/A	Tech: Tony Wagoner	Eng: Eric Mings
Part description: FT5\ FS5			Qty to test: 50
Test Start: 01/18/2011	Test Completed: 02/25/2011		





DESIGN QUALIFICATION TEST REPORT

FT5\ FS5
FT5-30-01-L-RA\ FS5-30-04.0-L-DV-TH

REVISION HISTORY

DATA	REV.NUM.	DESCRIPTION	ENG
9/5/2012	**1**	**Initial Issue**	**KH**

CERTIFICATION

All instruments and measuring equipment were calibrated to National Institute for Standards and Technology (NIST) traceable standards according to IS0 10012-l and ANSI/NCSL 2540-1, as applicable.

SCOPE

To perform the following tests: Design Qualification test. Please see test plan.

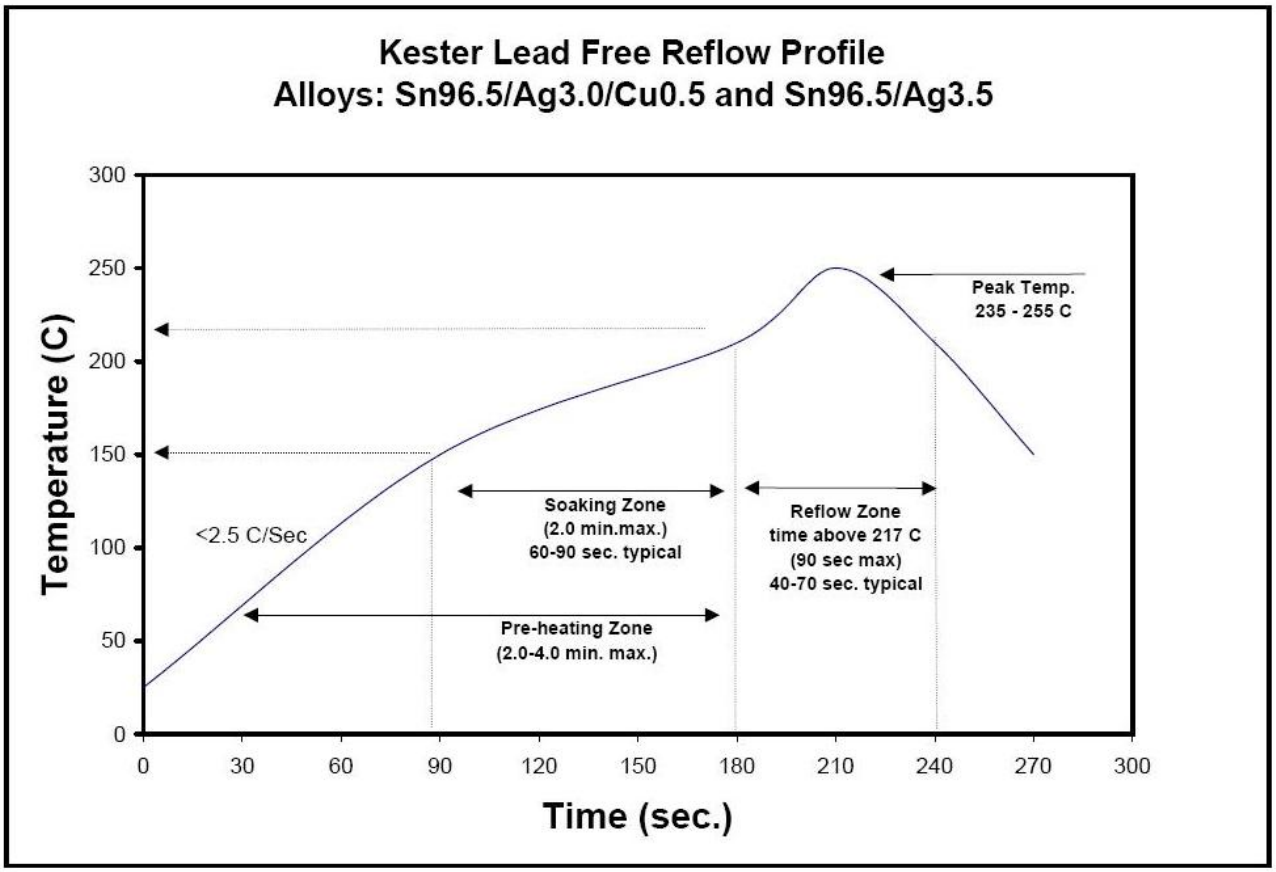
APPLICABLE DOCUMENTS

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) Parts not intended for testing LLCR are visually inspected and cleaned if necessary.
7) Any additional preparation will be noted in the individual test sequences.
8) Solder Information: Lead Free
9) Re-Flow Time/Temp: See accompanying profile.
10) Samtec Test PCBs used: PCB-102978-TST/PCB-102979-TST

TYPICAL OVEN PROFILE (Soldering Parts to Test Boards)



FLOWCHARTS

Gas Tight

TEST STEP	GROUP A1 8 Boards
01	LLCR-1
02	Gas Tight
03	LLCR-2

Gas Tight = EIA-364-36A

LLCR = EIA-364-23, LLCR

20 mV Max, 100 mA Max

Use Keithley 580 or 3706 in 4 wire dry circuit mode

IR & DWV

TEST STEP	GROUP A1 2 Mated Sets Break Down - Pin to Pin	GROUP A2 2 Unmated of Part # Being Tested Break Down - Pin to Pin	GROUP A3 2 Unmated of Mating Part # Break Down - Pin to Pin	GROUP B1 2 Mated Sets Pin to Pin
01	DWV/Break Down Voltage	DWV/Break Down Voltage	DWV/Break Down Voltage	IR & DWV at test voltage (on both mated sets and on each connector unmated)
02				Thermal Shock (Mated and Undisturbed)
03				IR & DWV at test voltage (on both mated sets and on each connector unmated)
04				Cyclic Humidity (Mated and Undisturbed)
05				IR & DWV at test voltage (on both mated sets and on each connector unmated)

DWV on Group B1 to be performed at Test Voltage

DWV test voltage is equal to 75% of the lowest break down voltage from Groups A1, A2 or A3

Thermal Shock = EIA-364-32, Table II, Test Condition I:

-55°C to +85°C 1/2 hour dwell, 100 cycles

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

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

ambient pre-condition and delete steps 7a and 7b

IR = EIA-364-21

DWV = EIA-364-20, Test Condition 1

FLOWCHARTS Continued

Durability/Mating/Unmating/Gaps

FT5-15-01-L-RA / FS5-15-04.0-L-DV-TH

TEST STEP	GROUP B1 8 Boards (largest position submitted)	GROUP B3 8 Boards (smallest position submitted)
01	Contact Gaps	Contact Gaps
02	LLCR-1	Forces - Mating / Unmating
03	Forces - Mating / Unmating	25 Cycles
04	25 Cycles	Forces - Mating / Unmating
05	Forces - Mating / Unmating	25 Cycles (50 Total)
06	25 Cycles (50 Total)	Forces - Mating / Unmating
07	Forces - Mating / Unmating	25 Cycles (75 Total)
08	25 Cycles (75 Total)	Forces - Mating / Unmating
09	Forces - Mating / Unmating	25 Cycles (100 Total)
10	25 Cycles (100 Total)	Forces - Mating / Unmating
11	Forces - Mating / Unmating	
12	Clean w/Compressed Air	
13	Contact Gaps	
14	LLCR-2	
15	Thermal Shock (Mated and Undisturbed)	
16	LLCR-3	
17	Cyclic Humidity (Mated and Undisturbed)	
18	LLCR-4	
19	Forces - Mating / Unmating	

Thermal Shock = EIA-364-32, Table II, Test Condition I:

-55°C to +85°C 1/2 hour dwell, 100 cycles

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

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

ambient pre-condition and delete steps 7a and 7b

Mating / Unmating Forces = EIA-364-13

Contact Gaps / Height - No standard method. Usually measured optically.

Gaps to be taken on a minimum of 20% of each part tested

LLCR = EIA-364-23, LLCR

20 mV Max, 100 mA Max

Use Keithley 580 or 3706 in 4 wire dry circuit mode

FLOWCHARTS Continued

Current Carrying Capacity - Double Row

TEST STEP	GROUP B1 3 Mated Assemblies 2 CONTACTS POWERED	GROUP B2 3 Mated Assemblies 4 CONTACTS POWERED	GROUP B3 3 Mated Assemblies 6 CONTACTS POWERED	GROUP B4 3 Mated Assemblies 8 CONTACTS POWERED	GROUP B5 3 Mated Assemblies ALL CONTACTS POWERED
01	CCC	CCC	CCC	CCC	CCC

(TIN PLATING) - Tabulate calculated current at RT, 65°C, 75°C and 95°C
after derating 20% and based on 105°C
(GOLD PLATING) - Tabulate calculated current at RT, 85°C, 95°C and 115°C
after derating 20% and based on 125°C
CCC, Temp rise = EIA-364-70

Shock / Vibration / nanoSecond Event Detection

TEST STEP	GROUP A1 60 Points
01	Event Detection, Shock
02	Event Detection, Vibration

Mechanical Shock = EIA 364-27 Half Sine,
100 g's, 6 milliSeconds (Condition "C") each axis
Vibration = EIA 364-28, Random Vibration
7.56 g RMS, Condition VB --- 2 hours/axis
Event detection requirement during Shock / Vibration is 50 nanoseconds minimum

Mechanical Shock / Vibration / LLCR

TEST STEP	GROUP A1 192 Points
01	LLCR-1
02	Shock
03	Vibration
04	LLCR-2

Mechanical Shock = EIA 364-27 Half Sine,
100 g's, 6 milliSeconds (Condition "C") each axis
Vibration = EIA 364-28, Random Vibration
7.56 g RMS, Condition VB --- 2 hours/axis
LLCR = EIA-364-23, LLCR
20 mV Max, 100 mA Max
Use Keithley 580 or 3706 in 4 wire dry circuit mode

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

THERMAL SHOCK:

1) EIA-364-32, *Thermal Shock (Temperature Cycling) Test Procedure for Electrical Connectors.*
2) Test Condition 1: -55°C to +85°C
3) Test Time: ½ hour dwell at each temperature extreme
4) Number of Cycles: 100
5) All test samples are pre-conditioned at ambient.
6) All test samples are exposed to environmental stressing in the mated condition.

HUMIDITY:

1) Reference document: EIA-364-31, *Humidity Test Procedure for Electrical Connectors.*
2) Test Condition B, 240 Hours.
3) Method III, +25° C to + 65° C, 90% to 98% Relative Humidity excluding sub-cycles 7a and 7b.
4) All samples are pre-conditioned at ambient.
5) All test samples are exposed to environmental stressing in the mated condition.

MECHANICAL SHOCK (Specified Pulse):

1) Reference document: EIA-364-27, *Mechanical Shock Test Procedure for Electrical Connectors*
2) Test Condition C
3) Peak Value: 100 G
4) Duration: 6 Milliseconds
5) Wave Form: Half Sine
6) Velocity: 12.3 ft/s
7) Number of Shocks: 3 Shocks / Direction, 3 Axis (18 Total)

VIBRATION:

1) Reference document: EIA-364-28, *Vibration Test Procedure for Electrical Connectors*
2) Test Condition V, Letter B
3) Power Spectral Density: 0.04 G^2 / Hz
4) G 'RMS': 7.56
5) Frequency: 50 to 2000 Hz
6) Duration: 2.0 Hours per axis (3 axis total)

NANOSECOND-EVENT DETECTION:

1) Reference document: EIA-364-87, *Nanosecond-Event Detection for Electrical Connectors*
2) Prior to test, the samples were characterized to assure the low nanosecond event being monitored will trigger the detector.
3) After characterization it was determined the test samples could be monitored for 50 nanosecond events

MATING/UNMATING:

1) Reference document: EIA-364-13, *Mating and Unmating Forces Test Procedure for Electrical Connectors.*
2) The full insertion position was to within 0.003" to 0.004" of the plug bottoming out in the receptacle to prevent damage to the system under test.
3) One of the mating parts is secured to a floating X-Y table to prevent damage during cycling.

ATTRIBUTE DEFINITIONS Continued

The following is a brief, simplified description of attributes

LLCR:

1) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets*.
2) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
3) The following guidelines are used to categorize the changes in LLCR as a result from stressing
    a. <= +5.0 mOhms: ---------- Stable
    b. +5.1 to +10.0 mOhms:---------- Minor
    c. +10.1 to +15.0 mOhms: ---------- Acceptable
    d. +15.1 to +50.0 mOhms: ---------- Marginal
    e. +50.1 to +2000 mOhms: ---------- Unstable
    f. >+2000 mOhms:---------- Open Failure

GAS TIGHT:

To provide method for evaluating the ability of the contacting surfaces in preventing penetration of harsh vapors which might lead to oxide formation that may degrade the electrical performance of the contact system.

1) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets*.
2) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
3) The following guidelines are used to categorize the changes in LLCR as a result from stressing
    a. <= +5.0 mOhms:---------- Stable
    b. +5.1 to +10.0 mOhms: ---------- Minor
    c. +10.1 to +15.0 mOhms: ---------- Acceptable
    d. +15.1 to +50.0 mOhms: ---------- Marginal
    e. +50.1 to +2000 mOhms:---------- Unstable
    f. >+2000 mOhms: ---------- Open Failure
4) Procedure:
    a. Reference document: EIA-364-36, *Test Procedure for Determination of Gas-Tight Characteristics for Electrical Connectors, Sockets and/or Contact Systems*.
    b. Test Conditions:
        i. Class II--- Mated pairs of contacts assembled to their plastic housings.
        ii. Reagent grade Nitric Acid shall be used of sufficient volume to saturate the test chamber
        iii. The ratio of the volume of the test chamber to the surface area of the acid shall be 10:1.
        iv. The chamber shall be saturated with the vapor for at least 15 minutes before samples are added.
        v. Exposure time, 55 to 65 minutes.
        vi. The samples shall be no closer to the chamber walls than 1 inches and no closer to the surface of the acid than 3 inches.
        vii. The samples shall be dried after exposure for a minimum of 1 hour.
        viii. Drying temperature 50^{o} C
        ix. The final LLCR shall be conducted within 1 hour after drying.

ATTRIBUTE DEFINITIONS Continued

The following is a brief, simplified description of attributes

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 or Signal-to-Ground
        ii. Electrification Time 2.0 minutes
        iii. Test Voltage (500 VDC) corresponds to calibration settings for measuring resistances.
2) MEASUREMENTS:
3) When the specified test voltage is applied (VDC), the insulation resistance shall not be less than 1000 megohms.

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 or Signal-to-Ground
        ii. Barometric Test Condition 1
        iii. Rate of Application 500 V/Sec
        iv. 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).

ATTRIBUTE DEFINITIONS Continued

The following is a brief, simplified description of attributes

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. 80^{o} C
    c. 95^{o} C
    d. 115^{o} 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.

RESULTS

Temperature Rise, CCC at a 20% de-rating

- **CCC for a 30°C Temperature Rise----------1.8A per contact with 2 adjacent contacts powered**
- **CCC for a 30°C Temperature Rise----------1.4A per contact with 4 adjacent contacts powered**
- **CCC for a 30°C Temperature Rise----------1.2A per contact with 6 adjacent contacts powered**
- **CCC for a 30°C Temperature Rise----------1.1A per contact with 8 adjacent contacts powered**
- **CCC for a 30°C Temperature Rise----------0.5A per contact with all adjacent contacts powered**

Mating\Unmating Forces

FT5-30-01-L-RA\ FS5-30-04.0-L-DV-TH

- **Initial**
  - **Mating**
    - **Min ---------- 3.27 Lbs**
    - **Max---------- 4.28 Lbs**
  - **Unmating**
    - **Min ---------- 2.77 Lbs**
    - **Max---------- 4.07 Lbs**
- **After 25 Cycles**
  - **Mating**
    - **Min ---------- 3.30 Lbs**
    - **Max---------- 4.61 Lbs**
  - **Unmating**
    - **Min ---------- 3.04 Lbs**
    - **Max---------- 4.32 Lbs**
- **After 50 Cycles**
  - **Mating**
    - **Min ---------- 3.43 Lbs**
    - **Max---------- 5.33 Lbs**
  - **Unmating**
    - **Min ---------- 3.51 Lbs**
    - **Max---------- 4.52 Lbs**
- **After 75 Cycles**
  - **Mating**
    - **Min ---------- 3.71 Lbs**
    - **Max---------- 5.59 Lbs**
  - **Unmating**
    - **Min ---------- 3.78 Lbs**
    - **Max---------- 4.83 Lbs**
- **After 100 Cycles**
  - **Mating**
    - **Min ---------- 3.92 Lbs**
    - **Max---------- 6.01 Lbs**
  - **Unmating**
    - **Min ---------- 3.98 Lbs**
    - **Max---------- 4.99 Lbs**
- **After Humidity**
  - **Mating**
    - **Min ---------- 2.65 Lbs**
    - **Max---------- 3.01 Lbs**
  - **Unmating**
    - **Min ---------- 1.15 Lbs**
    - **Max---------- 1.51 Lbs**

RESULTS Continued

Mating\Unmating Forces

FT5-15-01-L-RA\ FS5-15-04.0-L-DV-TH

- **Initial**
  - **Mating**
    - **Min ---------- 2.38 Lbs**
    - **Max---------- 3.25 Lbs**
  - **Unmating**
    - **Min ---------- 2.63 Lbs**
    - **Max---------- 3.33 Lbs**
- **After 25 Cycles**
  - **Mating**
    - **Min ---------- 2.39 Lbs**
    - **Max---------- 3.39 Lbs**
  - **Unmating**
    - **Min ---------- 2.54 Lbs**
    - **Max---------- 3.40 Lbs**
- **After 50 Cycles**
  - **Mating**
    - **Min ---------- 2.37 Lbs**
    - **Max---------- 3.21 Lbs**
  - **Unmating**
    - **Min ---------- 2.66 Lbs**
    - **Max---------- 3.54 Lbs**
- **After 75 Cycles**
  - **Mating**
    - **Min ---------- 2.44 Lbs**
    - **Max---------- 3.38 Lbs**
  - **Unmating**
    - **Min ---------- 2.70 Lbs**
    - **Max---------- 3.74 Lbs**
- **After 100 Cycles**
  - **Mating**
    - **Min ---------- 2.50 Lbs**
    - **Max---------- 3.52 Lbs**
  - **Unmating**
    - **Min ---------- 2.83 Lbs**
    - **Max---------- 3.73 Lbs**

RESULTS Continued

Insulation Resistance minimums, IR

- **Initial**
  - **Mated ---------- 100000Meg Ω ---------- Passed**
  - **Unmated ---------- 100000Meg Ω ---------- Passed**
- **Thermal**
  - **Mated ---------- 100000Meg Ω ---------- Passed**
  - **Unmated ---------- 100000Meg Ω ---------- Passed**
- **Humidity**
  - **Mated ---------- 100000Meg Ω ---------- Passed**
  - **Unmated ---------- 100000Meg Ω ---------- Passed**

Dielectric Withstanding Voltage minimums, DWV

- **Minimums**
  - **Breakdown Voltage ----------860 VAC**
  - **Test Voltage ----------645 VAC**
  - **Working Voltage ----------215 VAC**
- **Initial DWV ----------Passed**
- **Thermal DWV----------Passed**
- **Humidity DWV----------Passed**

LLCR Gas Tight (192 LLCR test points)

- **Initial ---------- 23.6mOhms Max**
- **Gas-Tight**
  - **<= +5.0 mOhms ---------- 192 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ----------0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ----------0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ----------0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms----------0 Points ---------- Unstable**
  - **>+2000 mOhms----------0 Points ---------- Open Failure**

RESULTS Continued

LLCR Durability: (192 LLCR test points)

- **Initial ---------- 27.0mOhms Max**
- **Durability, 100 Cycles**
  - **<= +5.0 mOhms ---------- 192 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**
- **Thermal**
  - **<= +5.0 mOhms ---------- 190 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 2 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**
- **Humidity**
  - **<= +5.0 mOhms ---------- 190 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 2 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**

LLCR Shock & Vibration (191 LLCR test points)

- **Initial ---------- 23.71mOhms Max**
- **Shock &Vibration**
  - **<= +5.0 mOhms ---------- 191 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms ---------- 0 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ---------- 0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ---------- 0 Points ---------- Marginal**
  - **+50.1 to +2000 mOhms ---------- 0 Points ---------- Unstable**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**

Mechanical Shock & Random Vibration:

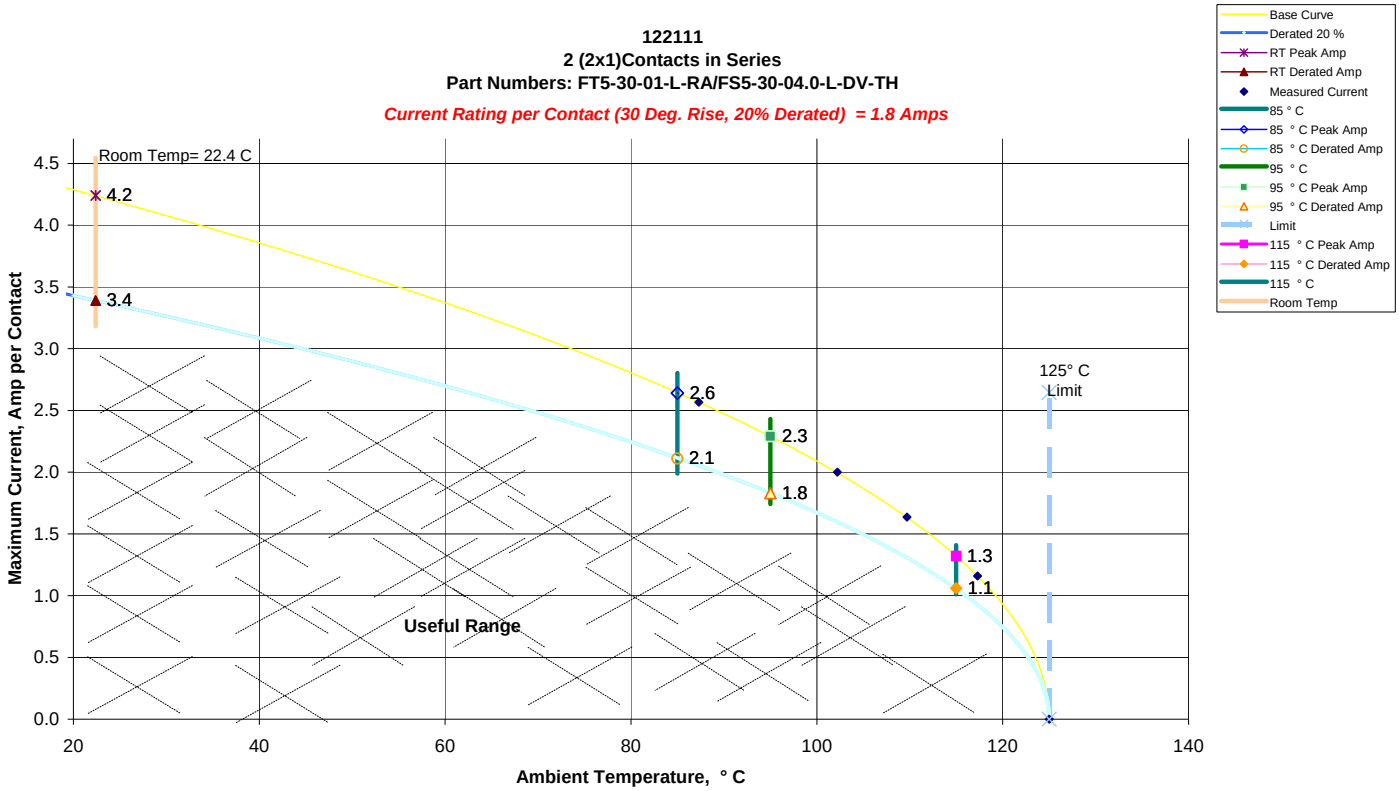
- **Shock**
  - **No Damage ---------- ---------- Pass**
  - **50 Nanoseconds ---------- ---------- Pass**
- **Vibration**
  - **No Damage ---------- ---------- Pass**
  - **50 Nanoseconds ---------- ---------- Pass**

DATA SUMMARIES

TEMPERATURE RISE (Current Carrying Capacity, CCC):

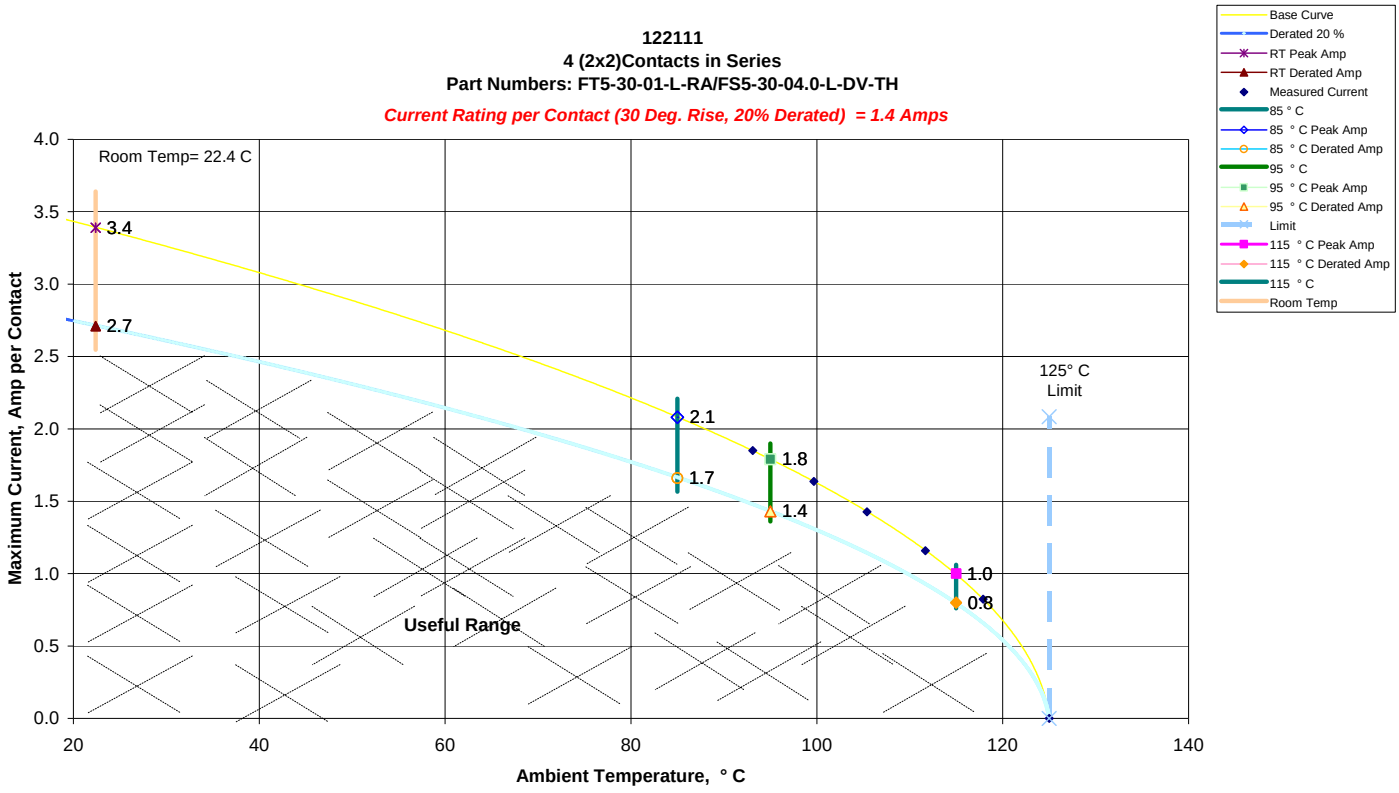
1) High quality thermocouples whose temperature slopes track one another were used for temperature monitoring.
2) The thermocouples were placed at a location to sense the maximum temperature generated during testing.
3) Temperature readings recorded are those for which three successive readings, 15 minutes apart, differ less than 1° C (computer controlled data acquisition).
4) Adjacent contacts were powered:

    a. Linear configuration with 2 adjacent conductors/contacts powered



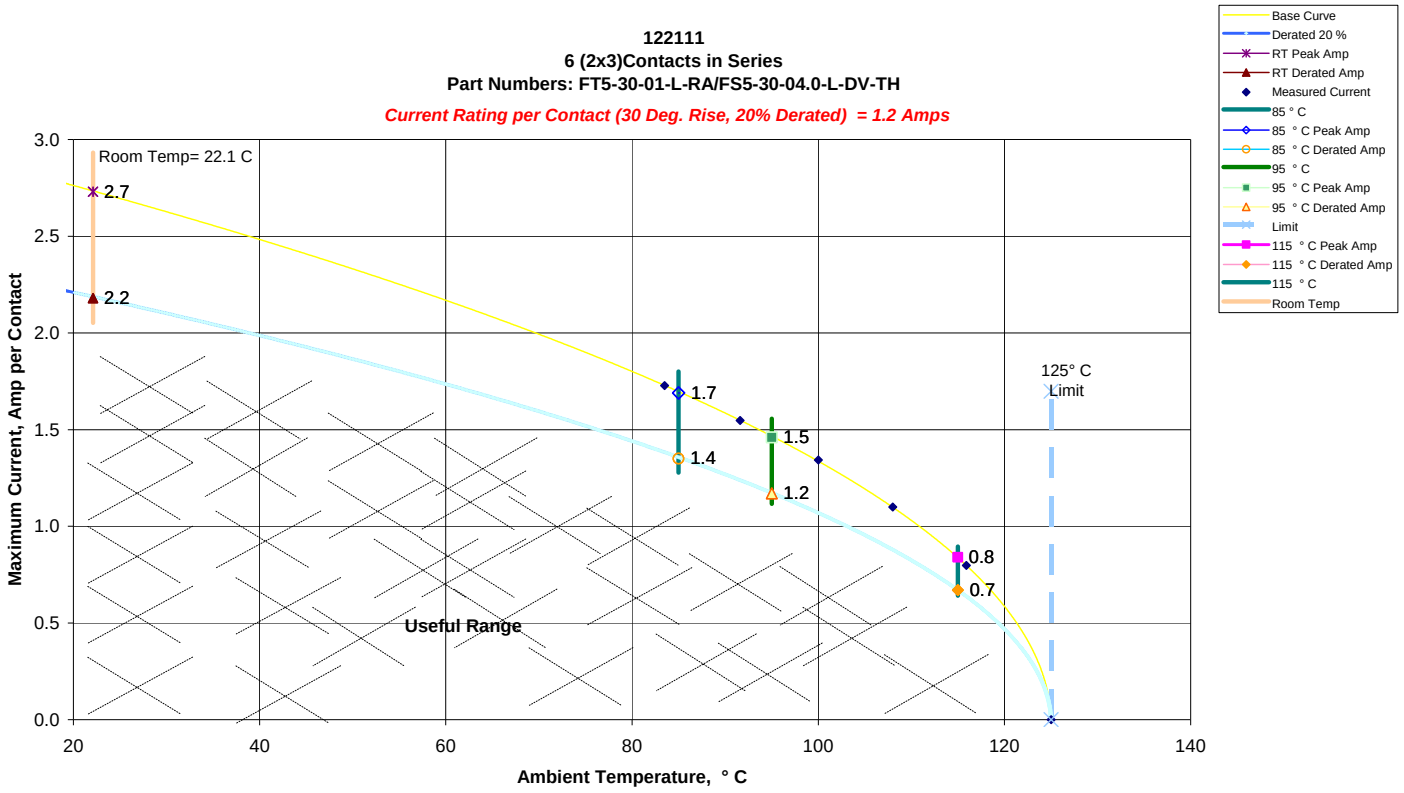
DATA SUMMARIES Continued

b. Linear configuration with 4 adjacent conductors/contacts powered



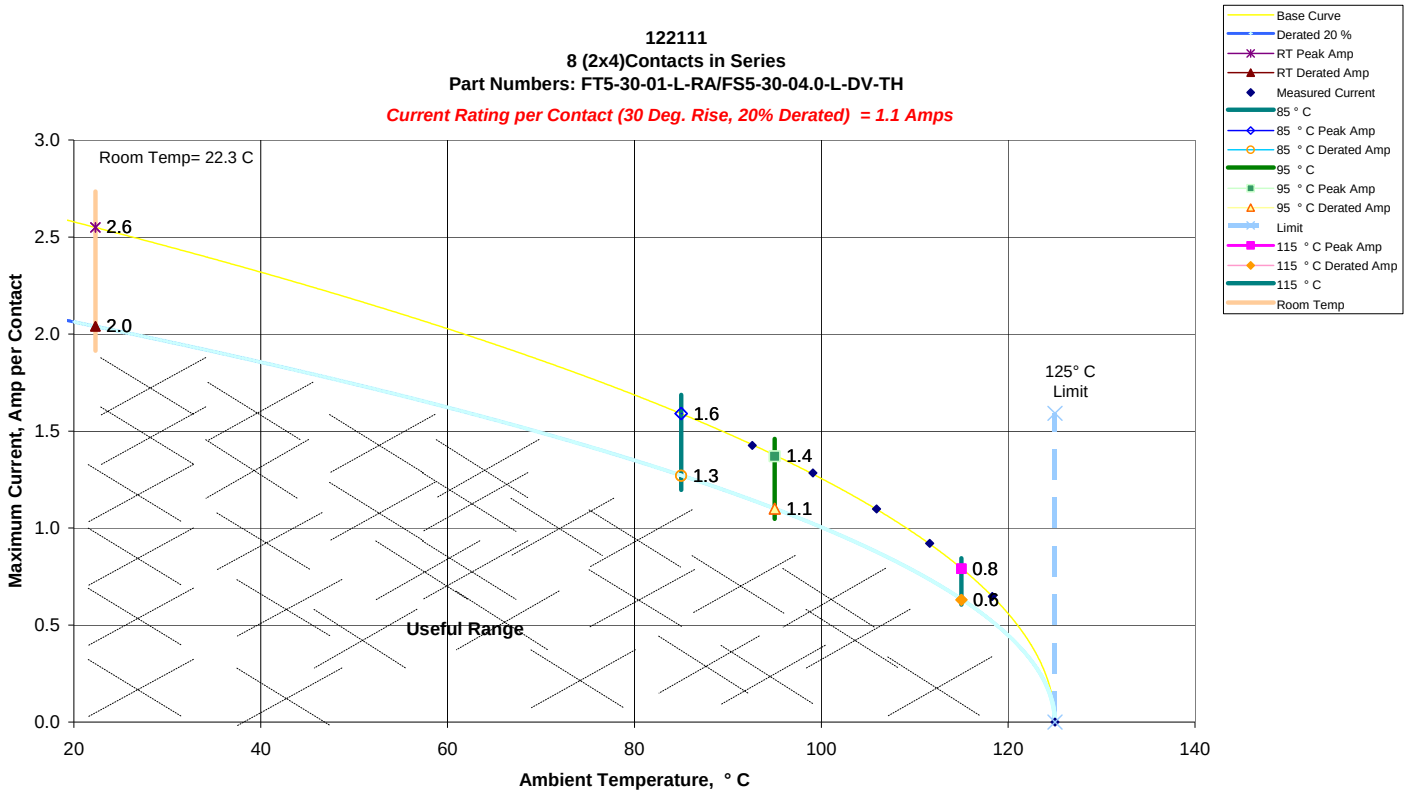
DATA SUMMARIES Continued

c. Linear configuration with 6 adjacent conductors/contacts powered



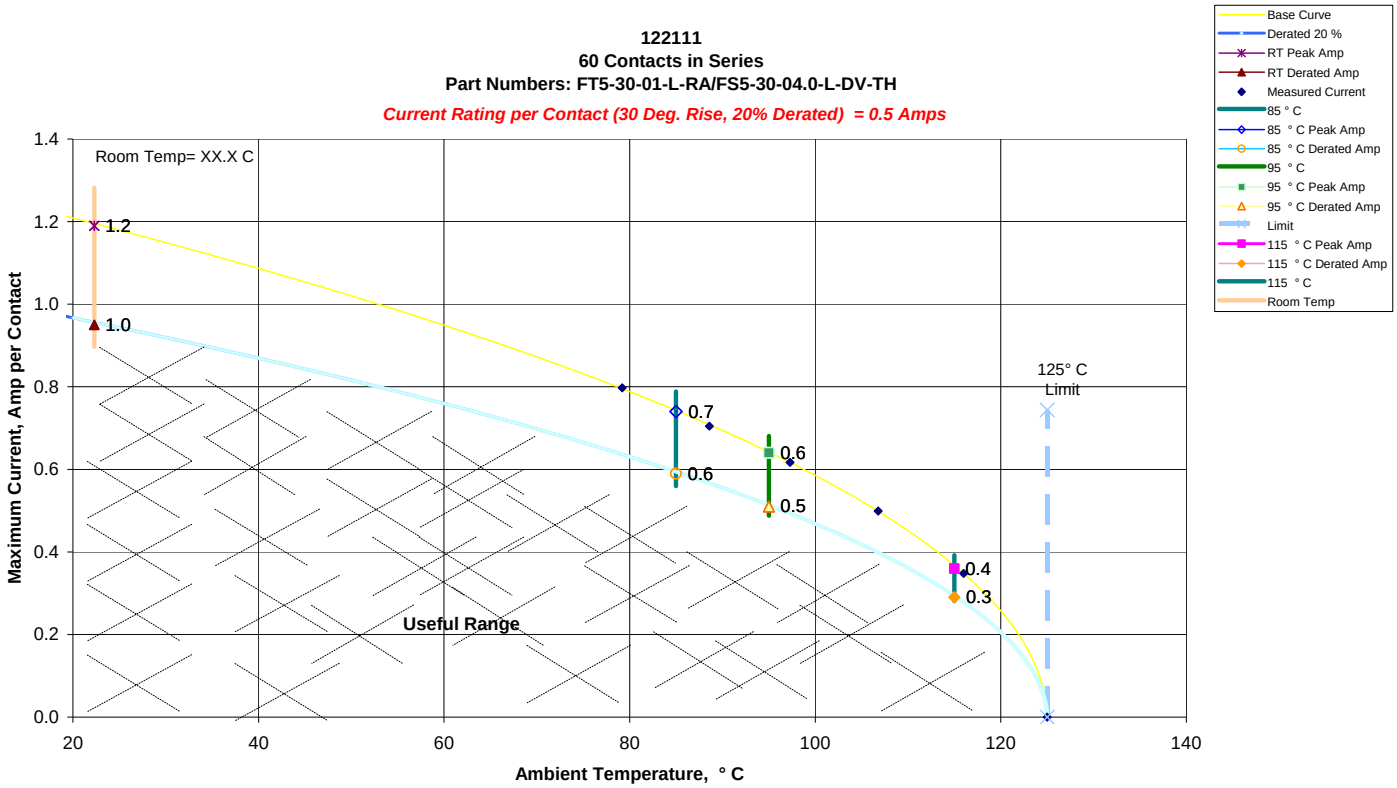
DATA SUMMARIES Continued

d. Linear configuration with 8 adjacent conductors/contacts powered



DATA SUMMARIES Continued

e. Linear configuration with all adjacent conductors/contacts powered



DATA SUMMARIES Continued

Mating\Unmating Force

FT5-30-01-L-RA\ FS5-30-04.0-L-DV-TH

	Initial				25 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	14.55	3.27	12.30	2.77	14.67	3.30	13.52	3.04
Maximum	19.05	4.28	18.12	4.07	20.49	4.61	19.22	4.32
Average	16.88	**3.80**	15.65	**3.52**	17.55	**3.95**	16.76	**3.77**
St Dev	1.41	0.32	1.76	0.40	2.00	0.45	1.60	0.36
Count	8	8	8	8	8	8	8	8

	50 Cycles				75 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	15.27	3.43	15.63	3.51	16.49	3.71	16.83	3.78
Maximum	23.73	5.33	20.12	4.52	24.84	5.59	21.46	4.83
Average	19.05	**4.28**	18.52	**4.16**	20.02	**4.50**	19.52	**4.39**
St Dev	2.78	0.62	1.40	0.31	3.13	0.70	1.50	0.34
Count	8	8	8	8	8	8	8	8

	100 Cycles				After Humidity			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	17.42	3.92	17.70	3.98	11.79	2.65	5.12	1.15
Maximum	26.71	6.01	22.21	4.99	13.39	3.01	6.72	1.51
Average	21.48	**4.83**	20.43	**4.59**	12.62	**2.84**	5.67	**1.28**
St Dev	3.44	0.77	1.60	0.36	0.67	0.15	0.54	0.12
Count	8	8	8	8	8	8	8	8

DATA SUMMARIES Continued

Mating\Unmating Force

FT5-15-01-L-RA\ FS5-15-04.0-L-DV-TH

	Initial				25 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	10.59	2.38	11.70	2.63	10.63	2.39	11.28	2.54
Maximum	14.46	3.25	14.81	3.33	15.08	3.39	15.12	3.40
Average	12.48	**2.81**	13.27	**2.98**	12.78	**2.87**	13.52	**3.04**
St Dev	1.45	0.32	1.17	0.26	1.61	0.36	1.34	0.30
Count	8	8	8	8	8	8	8	8

	50 Cycles				75 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	10.56	2.37	11.85	2.66	10.84	2.44	12.01	2.70
Maximum	14.27	3.21	15.75	3.54	15.03	3.38	16.64	3.74
Average	12.65	**2.84**	13.99	**3.15**	13.18	**2.96**	14.61	**3.28**
St Dev	1.47	0.33	1.31	0.30	1.66	0.37	1.42	0.32
Count	8	8	8	8	8	8	8	8

	100 Cycles			
	Mating		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	11.12	2.50	12.57	2.83
Maximum	15.66	3.52	16.59	3.73
Average	13.74	**3.09**	14.95	**3.36**
St Dev	1.74	0.39	1.38	0.31
Count	8	8	8	8

DATA SUMMARIES Continued

INSULATION RESISTANCE (IR):

	Pin to Pin		
	Mated	Unmated	Unmated
Minimum	FT5/FS5	FT5	FS5
Initial	100000	100000	100000
Thermal	100000	100000	100000
Humidity	100000	100000	100000

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

Voltage Rating Summary	
Minimum	FT5/FS5
Break Down Voltage	860
Test Voltage	645
Working Voltage	215

Pin to Pin	
Initial Test Voltage	Passed
After Thermal Test Voltage	Passed
After Humidity Test Voltage	Passed

DATA SUMMARIES Continued

LLCR Durability:

1) A total of 192 points were measured.
2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
   a. <= +5.0 mOhms:---------- Stable
   b. +5.1 to +10.0 mOhms: ---------- Minor
   c. +10.1 to +15.0 mOhms: ---------- Acceptable
   d. +15.1 to +50.0 mOhms: ---------- Marginal
   e. +50.1 to +2000 mOhms---------- Unstable
   f. >+2000 mOhms:---------- Open Failure

Date	2/1/2011	2/2/2011	2/14/2011	2/25/2011
Room Temp C	23	23	23	23
RH	27%	27%	27%	27%
Name	Tony Wagoner	Tony Wagoner	Tony Wagoner	Aaron McKim
mOhm values	**Actual Initial**	**Delta 100 Cycles**	**Delta Thermal**	**Delta Humidity**
Average	21.5	0.0	0.6	0.4
St. Dev.	1.2	0.9	1.3	1.3
Min	19.6	-4.0	-4.6	-5.4
Max	27.0	4.1	6.0	7.9
Count	192	192	192	192

How many samples are being tested?	8
How many contacts are on each board?	24

	Stable	Minor	Acceptable	Marginal	Unstable	Open
100 Cycles	192	0	0	0	0	0
Thermal	190	2	0	0	0	0
Humidity	190	2	0	0	0	0

DATA SUMMARIES Continued

LLCR Gas Tight:

1) A total of 192 points were measured.
2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
   a. <= +5.0 mOhms: ---------- Stable
   b. +5.1 to +10.0 mOhms:---------- Minor
   c. +10.1 to +15.0 mOhms: ---------- Acceptable
   d. +15.1 to +50.0 mOhms: ---------- Marginal
   e. +50.1 to +2000 mOhms: ---------- Unstable
   f. >+2000 mOhms:---------- Open Failure

Date	1/25/2011	1/25/2011
Room Temp C	23	23
RH	26%	27%
Name	Tony Wagoner	Tony Wagoner
mOhm values	**Actual Initial**	**Delta Gas Tight**
Average	20.5	0.3
St. Dev.	0.7	0.4
Min	19.1	-1.8
Max	23.6	1.8
Count	192	192

How many samples are being tested?	8
How many contacts are on each board?	24

	Stable	Minor	Acceptable	Marginal	Unstable	Open
Gas Tight	192	0	0	0	0	192

DATA SUMMARIES Continued

LLCR Shock &Vibration:

1). A total of 191 points were measured.
2). EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.*
3). The following guidelines are used to categorize the changes in LLCR as a result from stressing.
   a. <= +5.0 mOhms: ---------- Stable
   b. +5.1 to +10.0 mOhms: ---------- Minor
   c. +10.1 to +15.0 mOhms: ---------- Acceptable
   d. +15.1 to +50.0 mOhms: ---------- Marginal
   e. +50.1 to +2000 mOhms ---------- Unstable
   f. >+2000 mOhms: ---------- Open Failure

Date	2/19/2011	2/25/2011
Room Temp C	23	23
RH	29%	27%
Name	Tony Wagoner	Tony Wagoner
mOhm values	**Actual Initial**	**Delta Shock / Vibe**
Average	20.6	0.0
St. Dev.	0.7	0.7
Min	19.2	-2.2
Max	23.7	3.2
Count	191	191

How many samples are being tested?	8
How many contacts are on each board?	24

	Stable	Minor	Acceptable	Marginal	Unstable	Open
Shock / Vibe	191	0	0	0	0	0

Nanosecond Event Detection:

Shock and Vibration Event Detection Summary	
Contacts tested	8
Test Condition	C, 100g's, 6ms, Half-Sine
Shock Events	0
Test Condition	V-B, 7.56 rms g
Vibration Events	0
Total Events	0

EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: MO-04
Description: Multimeter /Data Acquisition System
Manufacturer: Keithley
Model: 2700
Serial #: 0798688
Accuracy: See Manual
… Last Cal: 04/30/2010, Next Cal: 04/30/2011

Equipment #: TCT-04
Description: Dillon Quantrol TC2 Test Stand
Manufacturer: Dillon Quantrol
Model: TC2
Serial #: 04-1041-04
Accuracy: Speed Accuracy: +/- 5% of indicated speed; Displacement: +/- 5 micrometers.
… Last Cal: 05/21/2010, Next Cal: 05/21/2011

Equipment #: THC-02
Description: Temperature/Humidity Chamber
Manufacturer: Thermotron
Model: SE-1000-6-6
Serial #: 31808
Accuracy: See Manual
… Last Cal: 02/16/2011, Next Cal: 02/16/2012

Equipment #: TSC-01
Description: Vertical Thermal Shock Chamber
Manufacturer: Cincinnatti Sub Zero
Model: VTS-3-6-6-SC/AC
Serial #: 10-VT14993
Accuracy: See Manual
… Last Cal: 05/18/2010, Next Cal: 05/18/2011

Equipment #: HPM-01
Description: Hipot Megommeter
Manufacturer: Hipotronics
Model: H306B-A
Serial #: M9905004
Accuracy: 2 % Full Scale Accuracy
… Last Cal: 11/30/2010, Next Cal: 11/30/2011

Equipment #: SVC-01
Description: Shock & Vibration Table
Manufacturer: Data Physics
Model: LE-DSA-10-20K
Serial #: 10037
Accuracy: See Manual
… Last Cal: 11/31/2010, Next Cal: 11/31/2011

EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: ACLM-01
Description: Accelerometer
Manufacturer: PCB Piezotronics
Model: 352C03
Serial #: 115819
Accuracy: See Manual
… Last Cal: 07/09/2010, Next Cal: 07/09/2011

Equipment #: ED-03
Description: Event Detector
Manufacturer: Analysis Tech
Model: 32EHD
Serial #: 1100604
Accuracy: See Manual
… Last Cal: 06/04/2010, Next Cal: 06/04/2011