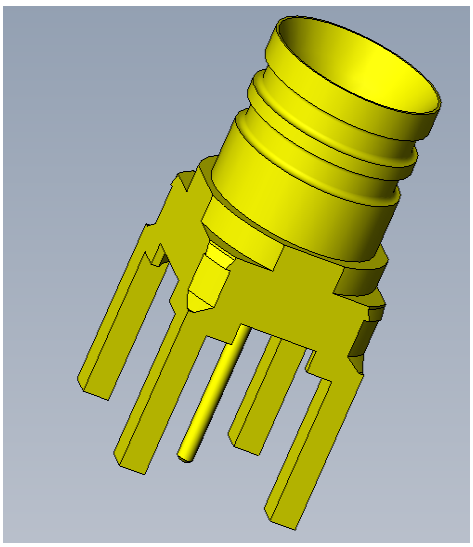
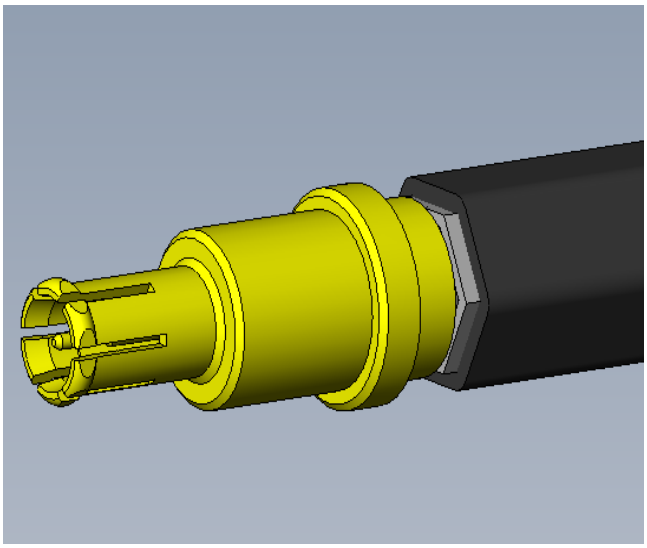
Project Number: Design Qualification Test Report	Tracking Code: 209374_Report_Rev_3		
Requested by: John Liao	Date: 3/1/2013	Product Rev: 0	
Part #: GRF7X-J-P-GF-ST-TH1/RF179-7GSP4-030303-0305 GRF7X-J-P-GF-ST-TH1/GRF7-P-C-GF-ST-CA3	Lot #: N/A	Tech: Peter Chen	Eng: Vico Zhao
Part description: GRF7X/RF179(GRF7)		Qty to test: 60	
Test Start:7/25/2012	Test Completed: 9/10/2012		





Design Qualification Test Report

GRF7X/RF179(GRF7)
GRF7X-J-P-GF-ST-TH1/RF179-7GSP4-030303-0305
GRF7X-J-P-GF-ST-TH1/GRF7-P-C-GF-ST-CA3

REVISION HISTORY

DATA	REV.NUM.	DESCRIPTION	ENG
11/28/2012	**1**	**Initial Issue**	**PC**
2/21/2013	**2**	**Grammatical Changes**	**CE**
2/27/2013	**3**	**Format Changes**	**PC**

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.

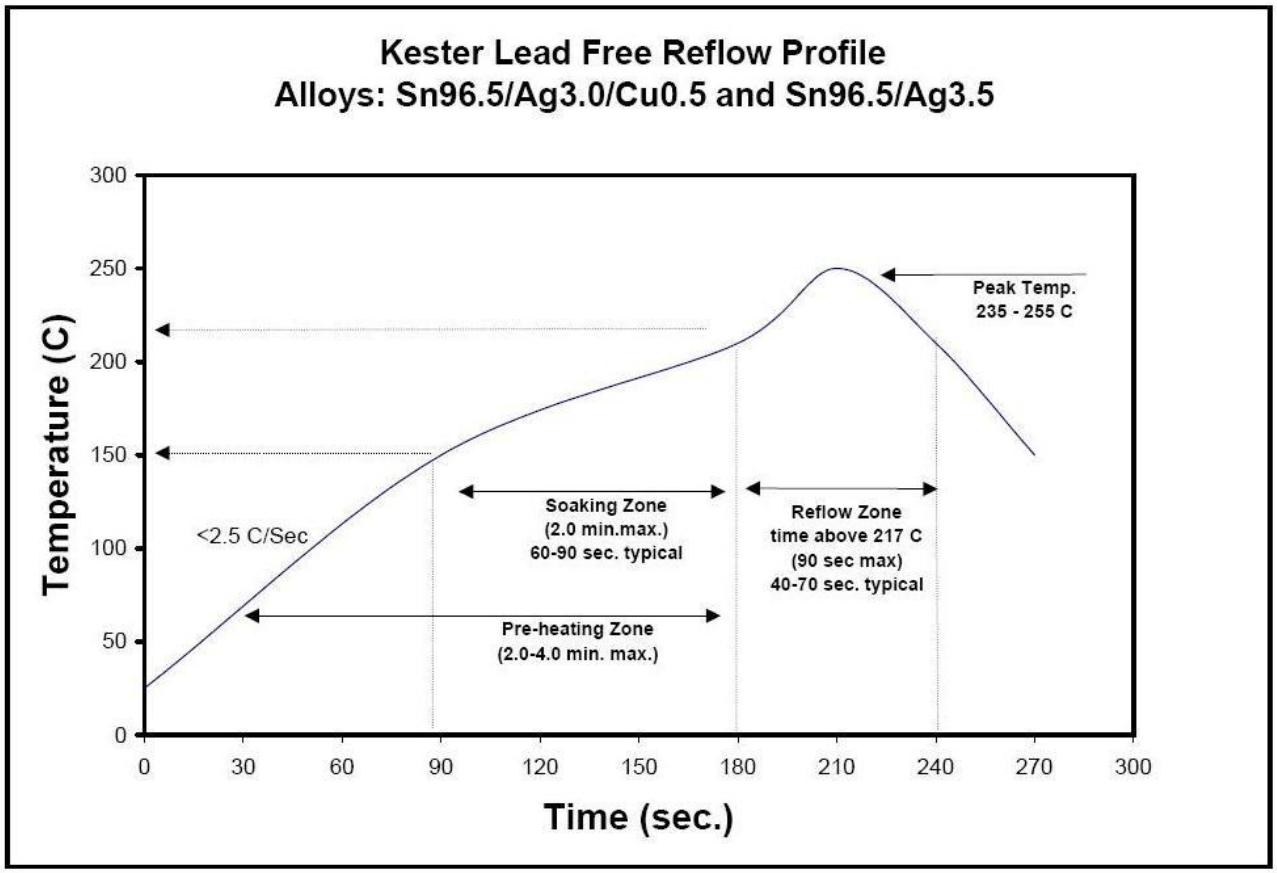
APPLICABLE DOCUMENTS

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 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
9) Re-Flow Time/Temp: See accompanying profile.
10) Samtec Test PCBs used: PCB-103913-TST-XX

TYPICAL OVEN PROFILE (Soldering Parts to Test Boards)



FLOWCHARTS

Gas Tight

TEST STEP	GROUP A1 8 Min. (GRF7-J-P-GF-ST-TH1 and RF179-7GSP4-030303-0305)
01	LLCR-1 (both center and outer)
02	Gas Tight
03	LLCR-2 (both center and outer)

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

Thermal Aging

TEST STEP	GROUP C1 8 Min (GRF7-J-P-GF-ST-TH1 + RF179-7GSP4-7GSP4-0305) Thermal Aging (Mated)	GROUP C2 8 Min (GRF7*V*-J-P-GF-ST-TH1 + RF179-7GSP4-7GSP4-0305) Thermal Aging (Mated)
01	Contact Gaps	Contact Gaps
02	Forces - Mating / Unmating	Forces - Mating / Unmating
03	LLCR-1 (both center and outer)	LLCR-1 (both center and outer)
04	Thermal Aging (Mated and Undisturbed)	Thermal Aging (Mated and Undisturbed)
05	LLCR-2 (both center and outer)	LLCR-2 (both center and outer)
06	Forces - Mating / Unmating	Forces - Mating / Unmating
07	Contact Gaps	Contact Gaps

Thermal Aging = EIA-364-17, Test Condition 4 (105°C)

Time Condition 'B' (250 Hours)

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

Durability/Mating/Unmating/Gaps

TEST STEP	GROUP D1 8 Min (GRF7*V*-J-P-HF-ST-TH1 + RF179-7GSP1-030303-0305)	GROUP D2 8 Min (GRF7*V*-J-P-GF-ST-TH1 + RF179-7GSP4-030303-0305)	GROUP D3 8 Min (GRF7-J-P-HF-ST-TH1 + RF179-7GSP1-030303-0305)
01	Contact Gaps	Contact Gaps	Contact Gaps
02	LLCR-1 (both center and outer)	LLCR-1 (both center and outer)	LLCR-1 (both center and outer)
03	Forces - Mating / Unmating	Forces - Mating / Unmating	Forces - Mating / Unmating
04	125 Cycles	25 Cycles	125 Cycles
05	Forces - Mating / Unmating	Forces - Mating / Unmating	Forces - Mating / Unmating
06	125 Cycles (250 Total)	25 Cycles (50 Total)	125 Cycles (250 Total)
07	Forces - Mating / Unmating	Forces - Mating / Unmating	Forces - Mating / Unmating
08	125 Cycles (375 Total)	25 Cycles (75 Total)	125 Cycles (375 Total)
09	Forces - Mating / Unmating	Forces - Mating / Unmating	Forces - Mating / Unmating
10	125 Cycles (500 Total)	25 Cycles (100 Total)	125 Cycles (500 Total)
11	Forces - Mating / Unmating	Forces - Mating / Unmating	Forces - Mating / Unmating
12	Clean w/Compressed Air	Clean w/Compressed Air	Clean w/Compressed Air
13	Contact Gaps	Contact Gaps	Contact Gaps
14	LLCR-2 (both center and outer)	LLCR-2 (both center and outer)	LLCR-2 (both center and outer)
15	Thermal Shock (Mated and Undisturbed)	Thermal Shock (Mated and Undisturbed)	Thermal Shock (Mated and Undisturbed)
16	LLCR-3 (both center and outer)	LLCR-3 (both center and outer)	LLCR-3 (both center and outer)
17	Cyclic Humidity (Mated and Undisturbed)	Cyclic Humidity (Mated and Undisturbed)	Cyclic Humidity (Mated and Undisturbed)
18	LLCR-4 (both center and outer)	LLCR-4 (both center and outer)	LLCR-4 (both center and outer)
19	Forces - Mating / Unmating	Forces - Mating / Unmating	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

Normal Force

TEST STEP	GROUP B1 Individual Contacts (8 Min) GRF7-J-P-G-ST-TH1-SKT	GROUP B2 Individual Contacts (8 Min) GRF7-J-P-G-ST-TH1-SKT + GRF7-P-C-G-ST-PIN	GROUP B3 Individual Contacts (8 Min) GRF7-P-C-F-ST-SHL	GROUP B4 Individual Contacts (8 Min) GRF7-P-C-F-ST-SHL + GRF7*V*-J-P-F-ST-TH1-SHL
01	Contact Gaps	Contact Gaps	Contact Gaps	Contact Gaps
02	Setup Approved	Thermal Aging (Mated and Undisturbed)	Setup Approved	Thermal Aging (Mated and Undisturbed)
03	Normal Force	Contact Gaps	Normal Force	Contact Gaps
04		Setup Approved		Setup Approved
05		Normal Force		Normal Force

Thermal Aging = EIA-364-17, Test Condition 4 (105°C)
Time Condition 'B' (250 Hours)
Normal Force = EIA-364-04
(Perpendicular) Displacement Force = 12.7 mm/min ± 6 mm/min
Spec is 50 N @ 1 mm displacement
Contact Gaps / Height - No standard method. Usually measured optically
Gaps to be taken on a minimum of 20% of each part tested

Connector Pull

TEST STEP	GROUP 3A1 5 Pieces GRF7-P-C-G-ST-PIN (Terminated with cable) & SUB-GRF7-P-C-FF-ST-CA3	GROUP 3A2 5 Pieces GRF7V-J-P-GF-ST-TH1 + RF179-7GSP4-7GSP4-0305	GROUP 3A3 5 Pieces GRF7V-J-P-GF-ST-TH1 + RF179-7VRP4-7VRP4-0305
	Center contact only to cable 0°	SIG & GND 90° Connector to Cable	SIG & GND 90° and 0° Connector to Cable
01	Pull test, Removal	Pull test, Continuity	Pull test, Continuity

TEST STEP	GROUP 3B1 5 Pieces GRF7-J-C-G-ST-SKT (Terminated with cable) & SUB-GRF7V-J-C-FF-ST-CA3	GROUP 3B2 5 Pieces GRF7-P-P-GF-ST-TH1 + RF179-7VSJ4-7VSJ4-0305
	Center contact only to cable 0°	SIG & GND 90° Connector to Cable
01	Pull test, Removal	Pull test, Continuity

FLOWCHARTS Continued

IR & DWV

TEST STEP	GROUP E11 2 Mated Sets (GRF7V-J-P-GF-ST-TH1 + RF179-7GSP4-030303-0305) Break Down Pin-to-Grond	GROUP E12 2 Unmated of Part # Being Tested(GRF7V-J-P-GF-ST-TH1) Break Down Pin-to-Grond	GROUP E13 2 Unmated of Mating Part #(RF179-7GSP4-030303-0305) Break Down Pin-to-Grond	GROUP E14 2 Mated Sets (GRF7V-J-P-GF-ST-TH1 + RF179-7GSP4-030303-0305) Break Down Pin-to-Grond
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)

TEST STEP	GROUP E21 2 Mated Sets (GRF7V-J-P-GF-RA-TH1 + RF179-7GSP4-030303-0305) Break Down Pin-to-Grond	GROUP E22 2 Unmated of Part # Being Tested(GRF7V-J-P-GF-RA-TH1) Break Down Pin-to-Grond	GROUP E23 2 Unmated of Mating Part #(RF179-7GSP4-030303-0305) Break Down Pin-to-Grond((Use same data as Group E13))	GROUP E24 2 Mated Sets (GRF7V-J-P-GF-RA-TH1 + RF179-7GSP4-030303-0305) Break Down Pin-to-Grond
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)

FLOWCHARTS Continued

TEST STEP	GROUP E31 2 Mated Sets (GRF7-P-P-GF-ST-TH1 + RF179-7VSJ4-7VSJ4-0305) Break Down Pin-to-Grond	GROUP E32 2 Unmated of Part # Being Tested(GRF7-P-P-GF-ST-TH1) Break Down Pin-to-Grond	GROUP E33 2 Unmated of Mating Part #(RF179-7VSJ4-7VSJ4-0305) Break Down Pin-to-Grond	GROUP E34 2 Mated Sets (GRF7-P-P-GF-ST-TH1 + RF179-7VSJ4-7VSJ4-0305) Break Down Pin-to-Grond
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)

TEST STEP	GROUP E41 2 Mated Sets (GRF7V-J-P-GF-ST-TH1 + RF179-7VRP4-7VRP4-0305) Break Down Pin-to-Grond	GROUP E42 2 Unmated of Part # Being Tested(GRF7V-J-P-GF-ST-TH1) Break Down Pin-to-Grond	GROUP E43 2 Unmated of Mating Part #(RF179-7VRP4-7VRP4-0305) Break Down Pin-to-Grond	GROUP E44 2 Mated Sets (GRF7V-J-P-GF-ST-TH1 + RF179-7VRP4-7VRP4-0305) Break Down Pin-to-Grond
01	DWV/Break Down Voltage	DWV/Break Down Voltage(Use same data as Group E12)	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

Mechanical Shock / Vibration / LLCR

TEST STEP	GROUP G1 8 Min (GRF7V-J-P-GF-ST-TH1 + RF179-7GSP4-030303-0305)
01	LLCR-1 (both center and outer)
02	Shock
03	Vibration
04	LLCR-2 (both center and outer)

Mechanical Shock = EIA 364-27 Half Sine,

100 g's, 6 milliSeconds (Condition "C") each axis

Vibration(first round)= MIL-PRF-28800 F, Tale 3 class 2, Random Vibration,

Vibration(second round)= MIL-PRF-28800 F, table 4, class2, sinus oidal Vibration, --- using the same parts

LLCR = EIA-364-23, LLCR

20 mV Max, 100 mA Max

Use Keithley 580 or 3706 in 4 wire dry circuit mode

Shock / Vibration / nanoSecond Event Detection

TEST STEP	GROUP H1 8 Min (GRF7V-J-P-GF-ST-TH1 + RF179-7GSP4-030303-0305)
01	Event Detection, Shock (*both center and outer)
02	Event Detection, Vibration (*both center and outer)

Mechanical Shock = EIA 364-27 Half Sine,

100 g's, 6 milliSeconds (Condition "C") each axis

Vibration(first round) = MIL-PRF-28800 F, Table 3 class 2,Table 4, class2, Random Vibration

Event detection requirement during Shock / Vibration is 10 nanoseconds minimum

Note: Strain relief cable 8" from mated interface

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.

THERMAL:

1) EIA-364-17, *Temperature Life with or without Electrical Load Test Procedure for Electrical Connectors.*
2) Test Condition 4 at 105° C.
3) Test Time Condition B for 250 hours.
4) All test samples are pre-conditioned at ambient.
5) 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 Pullse):

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)

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 10 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

The following is a brief, simplified description of attributes.

VIBRATION (Random Vibration):

1) Reference document: Mil-PRF-28800F, *PERFORMANCE SPECIFICATION TEST EQUIPMENT FOR USE WITH ELECTRICAL AND ELECTRONIC EQUIPMENT, GENERAL SPECIFICATION FOR*
2) Test Condition: Table 3 ,class 2
3) Power Spectral Density: 0.03 G^2 / Hz
4) G 'RMS': 3.83
5) Frequency: 10 to 500 Hz
6) Duration: 0.5 Hours per axis (3 axis total)

VIBRATION (Swept sinusoidal vibration):

1) Reference document: Mil-PRF-28800F, *PERFORMANCE SPECIFICATION TEST EQUIPMENT FOR USE WITH ELECTRICAL AND ELECTRONIC EQUIPMENT, GENERAL SPECIFICATION FOR*
2) Test Condition: Table 4 ,class 2
3) Displacement Peak-to-Peak: 5 to 15Hz ,1.5mm; 16 to 25Hz ,1.0mm; 26 to 55Hz,0.5mm
4) G 'RMS':
5) Frequency: 5 to 55 Hz
6) Duration: 5 minutes resonance search, 10 minutes resonance dwell time per axis ,15 minutes cycling time per axis, (3 axis total)

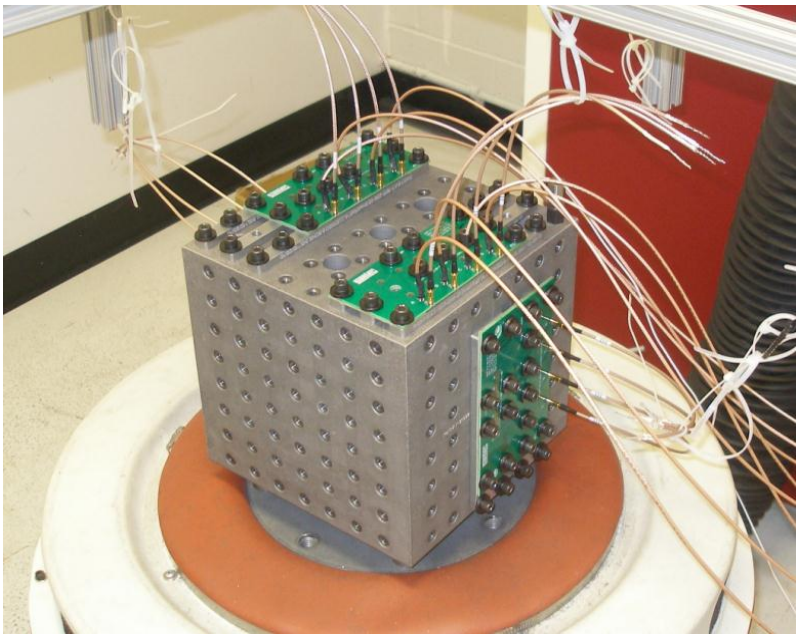


Fig. 1
Vibration test setup picture

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes

NORMAL FORCE (FOR CONTACTS TESTED IN THE HOUSING):

1) Reference document: EIA-364-04, *Normal Force Test Procedure for Electrical Connectors*.
2) The contacts shall be tested in the connector housing.
3) If necessary, a "window" shall be made in the connector body to allow a probe to engage and deflect the contact at the same attitude and distance (plus 0.05 mm [0.002"]) as would occur in actual use.
4) The connector housing shall be placed in a holding fixture that does not interfere with or otherwise influence the contact force or deflection.
5) Said holding fixture shall be mounted on a floating, adjustable, X-Y table on the base of the Dillon TC^2, computer controlled test stand with a deflection measurement system accuracy of 5.0 µm (0.0002").
6) The nominal deflection rate shall be 5 mm (0.2")/minute.
7) Unless otherwise noted a minimum of five contacts shall be tested.
8) The force/deflection characteristic to load and unload each contact shall be repeated five times.
9) The system shall utilize the TC^2 software in order to acquire and record the test data.
10) The permanent set of each contact shall be measured within the TC^2 software.
11) The acquired data shall be graphed with the deflection data on the X-axis and the force data on the Y-axis and a print out will be stored with the Tracking Code paperwork.

ENGAGEMENT/SEPARATION (FOR CONTACTS TESTED OUT OF THE HOUSING):

1) Reference document: EIA-364-37, *Contact Engagement and Separation Force Test Procedure for Electrical Connectors*.
2) Unless otherwise noted a minimum of twenty-five contacts shall be tested.
3) The insertion/withdrawal forces for each contact shall be repeated five times.
4) The contacts shall be tested in the loose state, *not* inserted in connector housing.
5) The contacts shall be prepared to allow access to the spring member at the same attitude and deflection level as would occur in actual use.
6) Said holding fixture shall be mounted on a floating, adjustable, X-Y table on the base of the Dillon TC^2, computer controlled test stand with a deflection measurement system resolution of 5.0 µm (0.0002").
7) The probe shall be attached to a load cell providing a typical accuracy of ± 0.2%.
8) The deflection rate shall be 5 mm (0.2")/minute nominal (not to exceed 2"/min).
9) The system shall utilize the TC^2 software in order to acquire and record the test data.
10) The acquired data shall be graphed with the deflection data on the X-axis and the force data on the Y-axis.

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 5000 megohms.

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

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. Rate of Application 500 V/Sec
        iii. 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)..

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

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

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

The following is a brief, simplified description of attributes.

CONNECTOR PULL:

4) Secure cable near center and Pull on connector
    a. At 90°, right angle to cable
    b. At 0°, in-line with cable

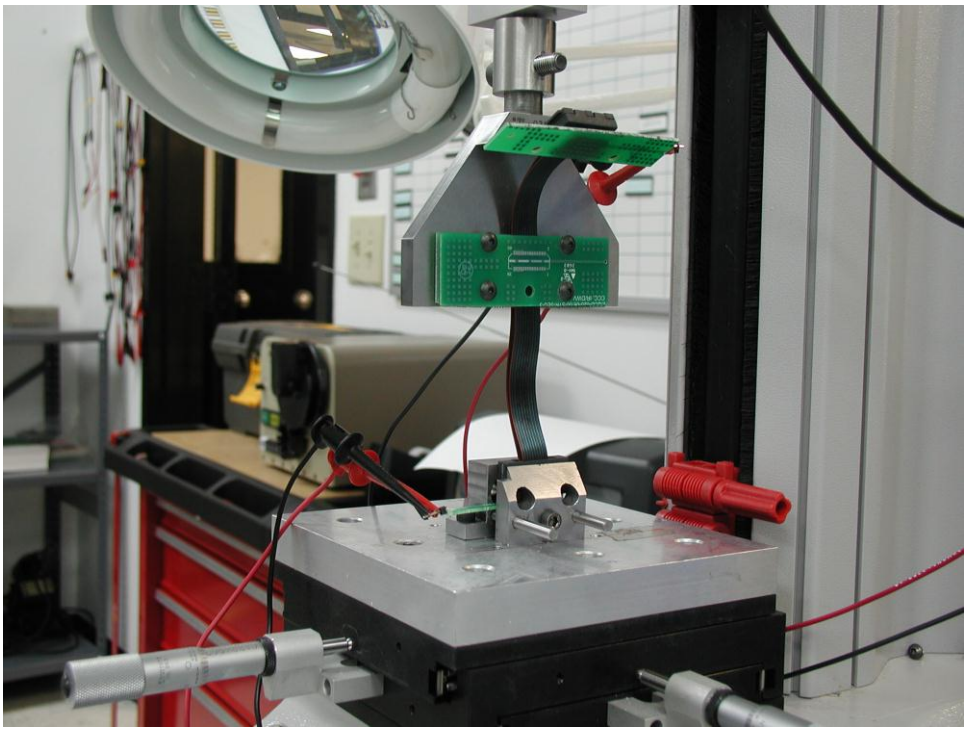


Fig. 2
(Typical set-up. Actual part not depicted.)
0° Connector Pull, notice the electrical continuity hook-up wires.

RESULTS

Mating & Unmating force
Mating&Unmating durability:
GRF7V-J-P-HF-ST-TH1 + RF179-7GSP1-030303-0305

- **Initial**
  - **Mating**
    - **Min ---------- 1.20 Lbs**
    - **Max---------- 1.53 Lbs**
  - **Unmating**
    - **Min ---------- 2.85 Lbs**
    - **Max---------- 3.58 Lbs**
- **After 125 Cycles**
  - **Mating**
    - **Min ---------- 1.15 Lbs**
    - **Max---------- 1.42 Lbs**
  - **Unmating**
    - **Min ---------- 2.26 Lbs**
    - **Max---------- 3.10 Lbs**
- **After 250 Cycles**
  - **Mating**
    - **Min ---------- 1.03 Lbs**
    - **Max---------- 1.35 Lbs**
  - **Unmating**
    - **Min ---------- 2.15 Lbs**
    - **Max---------- 2.81 Lbs**
- **After 375 Cycles**
  - **Mating**
    - **Min ---------- 0.91 Lbs**
    - **Max---------- 1.30 Lbs**
  - **Unmating**
    - **Min ---------- 2.16 Lbs**
    - **Max---------- 2.78 Lbs**
- **After 500 Cycles**
  - **Mating**
    - **Min ---------- 0.93 Lbs**
    - **Max---------- 1.20 Lbs**
  - **Unmating**
    - **Min ---------- 2.04 Lbs**
    - **Max---------- 2.60 Lb**
- **After Humidity**
  - **Mating**
    - **Min ---------- 1.70 Lbs**
    - **Max---------- 2.06 Lbs**
  - **Unmating**
    - **Min ---------- 2.30 Lbs**
    - **Max---------- 3.03 Lbs**

RESULTS Continued

GRF7V-J-P-GF-ST-TH1 + RF179-7GSP4-030303-0305:

- **Initial**
  - **Mating**
    - **Min ---------- 1.21 Lbs**
    - **Max---------- 1.47 Lbs**
  - **Unmating**
    - **Min ---------- 2.89 Lbs**
    - **Max---------- 4.20 Lbs**
- **After 25 Cycles**
  - **Mating**
    - **Min ---------- 1.15 Lbs**
    - **Max---------- 1.45 Lbs**
  - **Unmating**
    - **Min ---------- 2.78 Lbs**
    - **Max---------- 3.59 Lbs**
- **After 50 Cycles**
  - **Mating**
    - **Min ---------- 1.14 Lbs**
    - **Max---------- 1.35 Lbs**
  - **Unmating**
    - **Min ---------- 2.66 Lbs**
    - **Max---------- 3.46 Lbs**
- **After 75 Cycles**
  - **Mating**
    - **Min ---------- 1.10 Lbs**
    - **Max---------- 1.43 Lbs**
  - **Unmating**
    - **Min ---------- 2.54 Lbs**
    - **Max---------- 3.37 Lbs**
- **After 100 Cycles**
  - **Mating**
    - **Min ---------- 1.02 Lbs**
    - **Max---------- 1.51 Lbs**
  - **Unmating**
    - **Min ---------- 2.37 Lbs**
    - **Max---------- 3.37 Lbs**
- **After Humidity**
  - **Mating**
    - **Min ---------- 1.70 Lbs**
    - **Max---------- 2.01 Lbs**
  - **Unmating**
    - **Min ---------- 2.76 Lbs**
    - **Max---------- 3.03 Lbs**

RESULTS Continued

GRF7-J-P-HF-ST-TH1 + RF179-7GSP1-030303-0305:

- **Initial**
  - **Mating**
    - **Min ---------- 0.65 Lbs**
    - **Max---------- 0.88 Lbs**
  - **Unmating**
    - **Min ---------- 0.56 Lbs**
    - **Max---------- 0.70 Lbs**
- **After 125 Cycles**
  - **Mating**
    - **Min ---------- 0.65 Lbs**
    - **Max---------- 0.86 Lbs**
  - **Unmating**
    - **Min ---------- 0.61 Lbs**
    - **Max---------- 0.71 Lbs**
- **After 250 Cycles**
  - **Mating**
    - **Min ---------- 0.65 Lbs**
    - **Max---------- 0.75 Lbs**
  - **Unmating**
    - **Min ---------- 0.63 Lbs**
    - **Max---------- 0.73 Lbs**
- **After 375 Cycles**
  - **Mating**
    - **Min ---------- 0.65 Lbs**
    - **Max---------- 0.76 Lbs**
  - **Unmating**
    - **Min ---------- 0.65 Lbs**
    - **Max---------- 0.75 Lbs**
- **After 500 Cycles**
  - **Mating**
    - **Min ---------- 0.66 Lbs**
    - **Max---------- 0.76 Lbs**
  - **Unmating**
    - **Min ---------- 0.64 Lbs**
    - **Max---------- 0.69 Lbs**
- **After Humidity**
  - **Mating**
    - **Min ---------- 0.41 Lbs**
    - **Max---------- 0.57 Lbs**
  - **Unmating**
    - **Min ---------- 0.36 Lbs**
    - **Max---------- 0.45 Lbs**

RESULTS Continued

Thermal aging

GRF7-J-P-GF-ST-TH1 + RF179-7GSP4-7GSP4-0305

- **Initial**
  - **Mating**
    - **Min ---------- 1.25 Lbs**
    - **Max---------- 1.52 Lbs**
  - **Unmating**
    - **Min ---------- 2.98 Lbs**
    - **Max---------- 3.84 Lbs**
- **After thermal aging**
  - **Mating**
    - **Min ---------- 1.28 Lbs**
    - **Max---------- 2.15 Lbs**
  - **Unmating**
    - **Min ---------- 2.21 Lbs**
    - **Max---------- 3.54 Lbs**

GRF7V-J-P-GF-ST-TH1 + RF179-7GSP4-7GSP4-0305

- **Initial**
  - **Mating**
    - **Min ---------- 0.54 Lbs**
    - **Max---------- 0.87 Lbs**
  - **Unmating**
    - **Min ---------- 0.55 Lbs**
    - **Max---------- 0.78 Lbs**
- **After thermal aging**
  - **Mating**
    - **Min ---------- 0.43 Lbs**
    - **Max---------- 0.65 Lbs**
  - **Unmating**
    - **Min ---------- 0.45 Lbs**
    - **Max---------- 0.60 Lbs**

Normal force:

GRF7-J-P-G-ST-TH1-SKT

Signal pin at 0.0026 inch deflection

- **Initial**
  - **Min----------57.40 gf Set ----- 0.0000 Inch**
  - **Max ---------- 73.60 gf Set ----- 0.0008 Inch**
- **Thermal**
  - **Min----------63.20 gf Set----- 0.0003 Inch**
  - **Max ----------72.60 gf Set----- 0.0006 Inch**

GRF7-P-C-F-ST-SHL

Ground pin at 0.0031 inch deflection

- **Initial**
  - **Min---------- 245.20 gf Set ----- 0.0000 Inch**
  - **Max ---------- 327.90 gf Set ----- 0.0003 Inch**
- **Thermal**
  - **Min---------- 196.40 gf Set----- 0.0000 Inch**
  - **Max ---------- 307.60 gf Set----- 0.0007 Inch**

RESULTS Continued

Connector Pull force
GRF7-P-C-G-ST-PIN&SUB-GRF7-P-C-FF-ST-CA3
0° Pull-only center contact

- **Min ---------- 0.32 Lbs**
- **Max---------- 0.48 Lbs**

GRF7V-J-P-GF-ST-TH1& RF179-7GSP4-7GSP4-0305
90° Pull

- **Min ---------- 2.64 Lbs**
- **Max---------- 2.83 Lbs**

GRF7V-J-P-GF-ST-TH1& RF179-7VRP4-7VRP4-0305
0° Pull

- **Min ---------- 2.22 Lbs**
- **Max---------- 3.36 Lbs**

90° Pull

- **Min ----------14.57 Lbs**
- **Max----------17.49 Lbs**

GRF7-P-C-G-ST-SKT & SUB-GRF7V-J-C-FF-ST-CA3
0° Pull-only center contact

- **Min ---------- 0.20 Lbs**
- **Max---------- 0.30 Lbs**

GRF7-P-P-GF-ST-TH1 & RF179-7VSJ4-7VSJ4-0305
90° Pull

- **Min ---------- 1.85 Lbs**
- **Max---------- 2.64 Lbs**

RESULTS Continued

LLCR Durability (8 signal pin and 8 ground pin LLCR test points)

GRF7V-J-P-HF-ST-TH1 + RF179-7GSP1-030303-0305

Signal pin:

- **Initial ---------- 51.50 mOhms Max**

Ground pin:

- **Initial ---------- 3.80 mOhms Max**
- **After 100 Cycles**
  - **<= +5.0 mOhms ---------- 16 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**
- **After thermal shock**
  - **<= +5.0 mOhms ---------- 16 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**
- **After humidity**
  - **<= +5.0 mOhms ---------- 16 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**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**

GRF7V-J-P-GF-ST-TH1 + RF179-7GSP4-030303-0305

Signal pin:

- **Initial ---------- 49.30 mOhms Max**

Ground pin:

- **Initial ---------- 3.70 mOhms Max**
- **After 100 Cycles**
  - **<= +5.0 mOhms ---------- 16 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**
- **After thermal shock**
  - **<= +5.0 mOhms ---------- 16 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**
- **After humidity**
  - **<= +5.0 mOhms ---------- 16 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**
  - **>+2000 mOhms ---------- 0 Points ---------- Open Failure**

RESULTS Continued

GRF7-J-P-HF-ST-TH1 + RF179-7GSP1-030303-0305

Signal pin:

- **Initial ---------- 51.50 mOhms Max**

Ground pin:

- **Initial ----------3.30 mOhms Max**
- **After 100 Cycles**
  - **<= +5.0 mOhms ----------16 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**
- **After thermal shock**
  - **<= +5.0 mOhms ----------16 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**
- **After humidity**
  - **<= +5.0 mOhms ----------16 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**
  - **>+2000 mOhms----------0 Points ---------- Open Failure**

LLCR Thermal Aging (8 signal pin and 8 ground pin LLCR test points)

GRF7-J-P-GF-ST-TH1 + RF179-7GSP4-7GSP4-0305

Signal Pin:

- **Initial ---------- 50.60 mOhms Max**

Ground Pin:

- **Initial ----------4.00 mOhms Max**
- **Thermal Aging**
  - **<= +5.0 mOhms ----------16 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**

GRF7V-J-P-GF-ST-TH1 + RF179-7GSP4-7GSP4-0305

Signal Pin:

- **Initial ---------- 48.3 mOhms Max**

Ground Pin:

- **Initial ----------2.70 mOhms Max**
- **Thermal Aging**
  - **<= +5.0 mOhms ----------16 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 Gas Tight (8 signal pin and 8 ground pin LLCR test points)
GRF7-J-P-GF-ST-TH1 and RF179-7GSP4-030303-0305

Signal Pin:

- **Initial ---------- 42.98 mOhms Max**

Ground Pin:

- **Initial ---------- 2.58 mOhms Max**
- **Gas-Tight**
  - **<= +5.0 mOhms ---------- 16 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**

LLCR Shock & Vibration (8 signal pin and 8 ground pin LLCR test points)
GRF7V-J-P-GF-ST-TH1 + RF179-7GSP4-030303-0305

Signal Pin:

- **Initial ---------- 216.77 mOhms Max**

Ground Pin:

- **Initial ---------- 9.67 mOhms Max**
- **Shock & Vibration**
  - **<= +5.0 mOhms ---------- 14 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**

Mechanical Shock & Vibration:
GRF7V-J-P-GF-ST-TH1 + RF179-7GSP4-030303-0305

- **Shock**
  - **No Damage ---------- ---------- Passed**
  - **10 Nanoseconds ---------- ---------- Passed**
- **Vibration**
  - **No Damage ---------- ---------- Passed**
  - **10 Nanoseconds ---------- ---------- Passed**

RESULTS Continued

Insulation Resistance Minimum, IR

Pin-Ground

GRF7V-J-P-GF-ST-TH1 + RF179-7GSP4-030303-0305

- **Initial**
  - **Mated ---------- 10000Meg Ω ---------- Pass**
  - **Unmated ---------- 10000Meg Ω ---------- Pass**
- **Thermal**
  - **Mated ---------- 10000Meg Ω ---------- Pass**
  - **Unmated ---------- 10000Meg Ω ---------- Pass**
- **Humidity**
  - **Mated ---------- 10000Meg Ω ---------- Pass**
  - **Unmated ---------- 10000Meg Ω ---------- Pass**

GRF7V-J-P-GF-RA-TH1 + RF179-7GSP4-030303-0305

- **Initial**
  - **Mated ---------- 10000Meg Ω ---------- Pass**
  - **Unmated ---------- 10000Meg Ω ---------- Pass**
- **Thermal**
  - **Mated ---------- 10000Meg Ω ---------- Pass**
  - **Unmated ---------- 10000Meg Ω ---------- Pass**
- **Humidity**
  - **Mated ---------- 10000Meg Ω ---------- Pass**
  - **Unmated ---------- 10000Meg Ω ---------- Pass**

GRF7-P-P-GF-ST-TH1 + RF179-7VSJ4-7VSJ4-0305

- **Initial**
  - **Mated ---------- 10000Meg Ω ---------- Pass**
  - **Unmated ---------- 10000Meg Ω ---------- Pass**
- **Thermal**
  - **Mated ---------- 10000Meg Ω ---------- Pass**
  - **Unmated ---------- 10000Meg Ω ---------- Pass**
- **Humidity**
  - **Mated ---------- 10000Meg Ω ---------- Pass**
  - **Unmated ---------- 10000Meg Ω ---------- Pass**

GRF7V-J-P-GF-ST-TH1 + RF179-7VRP4-7VRP4-0305

- **Initial**
  - **Mated ---------- 10000Meg Ω ---------- Pass**
  - **Unmated ---------- 10000Meg Ω ---------- Pass**
- **Thermal**
  - **Mated ---------- 10000Meg Ω ---------- Pass**
  - **Unmated ---------- 10000Meg Ω ---------- Pass**
- **Humidity**
  - **Mated ---------- 10000Meg Ω ---------- Pass**
  - **Unmated ---------- 10000Meg Ω ---------- Pass**

RESULTS Continued

Dielectric Withstanding Voltage Minimum, DWV

GRF7V-J-P-GF-ST-TH1 + RF179-7GSP4-030303-0305

- **Minimum**
  - **Breakdown Voltage ---------- 1250VAC**
  - **Test Voltage ----------938VAC**
  - **Working Voltage ----------313VAC**

Pin - Ground

- **Initial DWV ----------Passed**
- **Thermal DWV----------Passed**
- **Humidity DWV----------Passed**

GRF7V-J-P-GF-RA-TH1 + RF179-7GSP4-030303-0305

- **Minimum**
  - **Breakdown Voltage ---------- 1250VAC**
  - **Test Voltage ----------938VAC**
  - **Working Voltage ----------313VAC**

Pin - Ground

- **Initial DWV ----------Passed**
- **Thermal DWV----------Passed**
- **Humidity DWV----------Passed**

GRF7-P-P-GF-ST-TH1 + RF179-7VSJ4-7VSJ4-0305

- **Minimum**
  - **Breakdown Voltage ---------- 1125VAC**
  - **Test Voltage ----------844VAC**
  - **Working Voltage ----------281VAC**

Pin - Ground

- **Initial DWV ----------Passed**
- **Thermal DWV----------Passed**
- **Humidity DWV----------Passed**

GRF7V-J-P-GF-ST-TH1 + RF179-7VRP4-7VRP4-0305

- **Minimum**
  - **Breakdown Voltage ---------- 1150VAC**
  - **Test Voltage ----------863VAC**
  - **Working Voltage ----------288VAC**

Pin - Ground

- **Initial DWV ----------Passed**
- **Thermal DWV----------Passed**
- **Humidity DWV----------Passed**

DATA SUMMARIES

MATING/UNMATING FORCE:

Mating/Unmating durability:

GRF7V-J-P-HF-ST-TH1 + RF179-7GSP1-030303-030

	Initial				After 125 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	5.34	1.20	12.68	2.85	5.12	1.15	10.05	2.26
Maximum	6.81	1.53	15.92	3.58	6.32	1.42	13.79	3.10
Average	6.03	**1.36**	14.47	**3.25**	5.72	**1.29**	12.70	**2.86**
St Dev	0.54	0.12	1.22	0.28	0.39	0.09	1.24	0.28
Count	8	8	8	8	8	8	8	8

	After 250 Cycles				After 375 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	4.58	1.03	9.56	2.15	4.05	0.91	9.61	2.16
Maximum	6.00	1.35	12.50	2.81	5.78	1.30	12.37	2.78
Average	5.30	**1.19**	11.53	**2.59**	5.07	**1.14**	11.14	**2.51**
St Dev	0.49	0.11	1.13	0.25	0.60	0.13	1.14	0.26
Count	8	8	8	8	8	8	8	8

	After 500 Cycles				After Humidity			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	4.14	0.93	9.07	2.04	7.56	1.70	10.23	2.30
Maximum	5.34	1.20	11.56	2.60	9.16	2.06	13.48	3.03
Average	4.79	**1.08**	10.55	**2.37**	8.18	**1.84**	12.65	**2.84**
St Dev	0.46	0.10	0.94	0.21	0.52	0.12	1.08	0.24
Count	8	8	8	8	8	8	8	8

DATA SUMMARIES Continued

GRF7V-J-P-GF-ST-TH1 + RF179-7GSP4-030303-0305:

	Initial				After 25 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	5.38	1.21	12.85	2.89	5.12	1.15	12.37	2.78
Maximum	6.54	1.47	18.68	4.20	6.45	1.45	15.97	3.59
Average	5.90	**1.33**	16.68	**3.75**	5.62	**1.26**	14.72	**3.31**
St Dev	0.44	0.10	1.98	0.45	0.47	0.11	1.36	0.31
Count	8	8	8	8	8	8	8	8

	After 50 Cycles				After 75 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	5.07	1.14	11.83	2.66	4.89	1.10	11.30	2.54
Maximum	6.00	1.35	15.39	3.46	6.36	1.43	14.99	3.37
Average	5.59	**1.26**	13.98	**3.14**	5.42	**1.22**	13.75	**3.09**
St Dev	0.35	0.08	1.28	0.29	0.47	0.11	1.24	0.28
Count	8	8	8	8	8	8	8	8

	After 100 Cycles				After Humidity			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	4.54	1.02	10.54	2.37	7.56	1.70	12.28	2.76
Maximum	6.72	1.51	14.99	3.37	8.94	2.01	13.48	3.03
Average	5.42	**1.22**	13.38	**3.01**	8.02	**1.80**	12.85	**2.89**
St Dev	0.72	0.16	1.38	0.31	0.41	0.09	0.34	0.08
Count	8	8	8	8	8	8	8	8

DATA SUMMARIES Continued

GRF7-J-P-HF-ST-TH1 + RF179-7GSP1-030303-0305:

	Initial				After 125 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	2.89	0.65	2.49	0.56	2.89	0.65	2.71	0.61
Maximum	3.91	0.88	3.11	0.70	3.83	0.86	3.16	0.71
Average	3.22	**0.72**	2.82	**0.64**	3.23	**0.73**	2.98	**0.67**
St Dev	0.39	0.09	0.25	0.06	0.28	0.06	0.16	0.04
Count	8	8	8	8	8	8	8	8

	After 250 Cycles				After 375 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	2.89	0.65	2.80	0.63	2.89	0.65	2.89	0.65
Maximum	3.34	0.75	3.25	0.73	3.38	0.76	3.34	0.75
Average	3.18	**0.72**	2.99	**0.67**	3.16	**0.71**	3.01	**0.68**
St Dev	0.18	0.04	0.15	0.03	0.15	0.03	0.14	0.03
Count	8	8	8	8	8	8	8	8

	After 500 Cycles				After Humidity			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	2.94	0.66	2.85	0.64	1.82	0.41	1.60	0.36
Maximum	3.38	0.76	3.07	0.69	2.54	0.57	2.00	0.45
Average	3.13	**0.70**	2.95	**0.66**	2.07	**0.47**	1.83	**0.41**
St Dev	0.14	0.03	0.08	0.02	0.24	0.05	0.13	0.03
Count	8	8	8	8	8	8	8	8

Thermal aging:

GRF7-J-P-GF-ST-TH1 + RF179-7GSP4-7GSP4-0305

	Initial				After Thermals			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	5.56	1.25	13.26	2.98	5.69	1.28	9.83	2.21
Maximum	6.76	1.52	17.08	3.84	9.56	2.15	15.75	3.54
Average	6.03	**1.36**	15.31	**3.44**	6.79	**1.53**	14.13	**3.18**
St Dev	0.37	0.08	1.23	0.28	1.29	0.29	1.82	0.41
Count	8	8	8	8	8	8	8	8

GRF7V-J-P-GF-ST-TH1 + RF179-7GSP4-7GSP4-0305

	Initial				After Thermals			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	2.40	0.54	2.45	0.55	1.91	0.43	2.00	0.45
Maximum	3.87	0.87	3.49	0.78	2.89	0.65	2.67	0.60
Average	2.92	**0.66**	2.91	**0.65**	2.43	**0.55**	2.26	**0.51**
St Dev	0.43	0.10	0.32	0.07	0.30	0.07	0.24	0.05
Count	8	8	8	8	8	8	8	8

DATA SUMMARIES Continued

Normal force:

GRF7-J-P-G-ST-TH1-SKT

Initial	Deflections in inches Forces in Grams										
	0.0003	**0.0005**	**0.0008**	**0.0010**	**0.0013**	**0.0016**	**0.0018**	**0.0021**	**0.0023**	**0.0026**	***SET***
Averages	4.55	12.83	17.24	24.50	32.29	36.96	44.30	49.53	56.61	63.79	0.0001
Min	2.40	10.00	14.70	20.60	27.90	31.90	37.90	43.40	50.80	57.40	0.0000
Max	7.90	18.10	22.00	30.30	38.00	43.80	52.00	57.00	65.60	73.60	0.0008
St. Dev	1.555	2.256	2.474	3.272	3.446	3.994	4.919	4.620	4.521	5.497	0.0002
Count	12	12	12	12	12	12	12	12	12	12	12

After Thermals	Deflections in inches Forces in Grams										
	0.0003	**0.0005**	**0.0008**	**0.0010**	**0.0013**	**0.0016**	**0.0018**	**0.0021**	**0.0023**	**0.0026**	***SET***
Averages	5.03	12.46	16.63	25.03	32.84	38.51	46.19	52.88	60.50	67.82	0.0004
Min	1.60	6.90	11.30	20.30	28.80	34.10	40.70	46.00	54.60	63.20	0.0003
Max	10.30	17.10	21.20	29.40	36.70	42.50	50.90	57.50	63.90	72.60	0.0006
St. Dev	2.377	2.642	2.669	3.027	2.669	3.066	3.479	4.027	3.270	3.051	0.0001
Count	12	12	12	12	12	12	12	12	12	12	12

GRF7-P-C-F-ST-SHL

Initial	Deflections in inches Forces in Grams										
	0.0003	**0.0006**	**0.0009**	**0.0012**	**0.0016**	**0.0019**	**0.0022**	**0.0025**	**0.0028**	**0.0031**	***SET***
Averages	31.83	58.43	86.09	113.06	137.58	163.18	188.14	214.18	237.68	271.73	0.0001
Min	18.40	39.90	73.10	95.30	122.00	141.60	163.90	192.70	215.70	245.20	0.0000
Max	73.10	97.50	122.50	157.50	176.80	206.80	238.80	264.70	284.50	327.90	0.0003
St. Dev	14.726	15.925	14.176	18.687	15.886	18.201	21.096	20.833	20.078	23.017	0.0001
Count	12	12	12	12	12	12	12	12	12	12	12

After Thermals	Deflections in inches Forces in Grams										
	0.0003	**0.0006**	**0.0009**	**0.0012**	**0.0016**	**0.0019**	**0.0022**	**0.0025**	**0.0028**	**0.0031**	***SET***
Averages	12.18	30.93	58.18	82.67	106.54	132.06	158.36	185.27	208.32	242.29	0.0002
Min	-0.20	0.40	29.30	54.00	72.60	97.00	119.40	149.90	161.80	196.40	0.0000
Max	35.80	61.60	89.20	117.60	142.80	173.10	205.80	237.10	273.20	307.00	0.0007
St. Dev	12.305	21.542	21.000	20.531	21.091	22.311	22.668	23.489	28.546	27.448	0.0002
Count	12	12	12	12	12	12	12	12	12	12	12

Connector Pull force:

GRF7-P-C-G-ST-PIN&SUB-GRF7-P-C-FF-ST-CA3

0° Pull

	Force (lbs)
Minimum	**0.32**
Maximum	0.48
Average	0.40

DATA SUMMARIES Continued

GRF7V-J-P-GF-ST-TH1& RF179-7GSP4-7GSP4-0305
90° Pull-only center contact

	Force (lbs)
Minimum	**2.64**
Maximum	2.83
Average	2.77

GRF7V-J-P-GF-ST-TH1& RF179-7VRP4-7VRP4-0305
0° Pull

	Force (lbs)
Minimum	**2.22**
Maximum	3.36
Average	2.80

90° Pull

	Force (lbs)
Minimum	**14.57**
Maximum	17.49
Average	16.17

GRF7-P-C-G-ST-SKT & SUB-GRF7V-J-C-FF-ST-CA3
0° Pull-only center contact

	Force (lbs)
Minimum	**0.20**
Maximum	0.30
Average	0.25

GRF7-P-P-GF-ST-TH1 & RF179-7VSJ4-7VSJ4-0305
90° Pull

	Force (lbs)
Minimum	**1.85**
Maximum	2.64
Average	2.19

DATA SUMMARIES Continued

INSULATION RESISTANCE (IR):

GRF7V-J-P-GF-ST-TH1 + RF179-7GSP4-030303-0305

	Pin to Ground		
	Mated	Unmated	Unmated
Minimum	GRF7V-ST/RF179-7GSP4	GRF7V-ST	RF179-7GSP4
Initial	10000	10000	10000
Thermal	10000	10000	10000
Humidity	10000	10000	10000

GRF7V-J-P-GF-RA-TH1 + RF179-7GSP4-030303-0305

	Pin to Ground		
	Mated	Unmated	Unmated
Minimum	GRF7V-RA/RF179-7GSP4	GRF7V-RA	RF179-7GSP4
Initial	10000	10000	10000
Thermal	10000	10000	10000
Humidity	10000	10000	10000

GRF7-P-P-GF-ST-TH1 + RF179-7VSJ4-7VSJ4-0305

	Pin to Ground		
	Mated	Unmated	Unmated
Minimum	GRF7-ST/RF179-7VSJ4	GRF7-ST	RF179-7VSJ4
Initial	10000	10000	10000
Thermal	10000	10000	10000
Humidity	10000	10000	10000

GRF7V-J-P-GF-ST-TH1 + RF179-7VRP4-7VRP4-0305

	Pin to Ground		
	Mated	Unmated	Unmated
Minimum	GRF7V-ST/RF179-7VRP4	GRF7V-ST	RF179-7VRP4
Initial	10000	10000	10000
Thermal	10000	10000	10000
Humidity	10000	10000	10000

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

GRF7V-J-P-GF-ST-TH1 + RF179-7GSP4-030303-0305

Voltage Rating Summary	
Minimum	GRF7V-ST/RF179-7GSP4
Break Down Voltage	1250
Test Voltage	938
Working Voltage	313

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

DATA SUMMARIES Continued

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

GRF7V-J-P-GF-RA-TH1 + RF179-7GSP4-030303-0305

Voltage Rating Summary	
Minimum	**GRF7V-RA/RF179-7GSP4**
Break Down Voltage	1250
Test Voltage	938
Working Voltage	313

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

GRF7-P-P-GF-ST-TH1 + RF179-7VSJ4-7VSJ4-0305

Voltage Rating Summary	
Minimum	**GRF7-ST/RF179-7VSJ4**
Break Down Voltage	1125
Test Voltage	844
Working Voltage	281

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

GRF7V-J-P-GF-ST-TH1 + RF179-7VRP4-7VRP4-0305

Voltage Rating Summary	
Minimum	**GRF7V-ST/RF179-7VRP4**
Break Down Voltage	1150
Test Voltage	863
Working Voltage	288

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

DATA SUMMARIES Continued

LLCR Durabiltiy:

1) A total of 16 points (8 signal pin and 8 ground pin) 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

GRF7V-J-P-HF-ST-TH1 + RF179-7GSP1-030303-0305

Ground Pin

Date	7/31/2012	8/8/2012	8/14/2012	8/28/2012
Room Temp C	24	23	24	23
RH	56%	56%	59%	59%
Name	Peter Chen	Peter Chen	Peter Chen	Peter Chen
mOhm values	**Actual Initial**	**Delta 500 Cycles**	**Delta Thermal**	**Delta Humidity**
Average	3.1	1.0	2.3	0.6
St. Dev.	0.4	1.0	1.3	0.8
Min	2.5	-0.4	-0.4	-0.4
Max	3.8	2.2	3.8	1.8
Count	8	8	8	8

How many samples are being tested?	8
How many contacts are on each board?	1

	Stable	Minor	Acceptable	Marginal	Unstable	Open
500 Cycles	8	0	0	0	0	0
Thermal	8	0	0	0	0	0
Humidity	8	0	0	0	0	0

DATA SUMMARIES Continued

Signal Pin

Date	7/31/2012	8/8/2012	8/14/2012	8/28/0212
Room Temp C	24	23	24	23
RH	56%	56%	59%	59%
Name	Peter Chen	Peter Chen	Peter Chen	Peter Chen
mOhm values	**Actual Initial**	**Delta 500 Cycles**	**Delta Thermal**	**Delta Humidity**
Average	48.8	-2.2	0.5	-2.0
St. Dev.	2.0	0.9	1.8	1.3
Min	46.2	-3.6	-2.2	-3.4
Max	51.5	-0.7	3.0	0.8
Count	8	8	8	8

How many samples are being tested?	8
How many contacts are on each board?	1

	Stable	Minor	Acceptable	Marginal	Unstable	Open
500 Cycles	8	0	0	0	0	0
Thermal	8	0	0	0	0	0
Humidity	8	0	0	0	0	0

DATA SUMMARIES Continued

GRF7V-J-P-GF-ST-TH1 + RF179-7GSP4-030303-0305

Ground Pin

Date	7/31/2012	8/8/2012	8/14/2012	8/28/2012
Room Temp C	24	23	24	23
RH	56%	56%	59%	58%
Name	Peter Chen	Peter Chen	Peter Chen	Peter Chen
mOhm values	**Actual Initial**	**Delta 100 Cycles**	**Delta Thermal**	**Delta Humidity**
Average	3.3	0.4	2.0	0.1
St. Dev.	0.3	0.6	0.9	0.7
Min	2.5	-0.6	0.7	-0.8
Max	3.7	1.4	3.2	1.2
Count	9	8	8	8

How many samples are being tested?	8
How many contacts are on each board?	1

	Stable	Minor	Acceptable	Marginal	Unstable	Open
100 Cycles	8	0	0	0	0	0
Thermal	8	0	0	0	0	0
Humidity	8	0	0	0	0	0

Signal Pin

Date	7/31/2012	8/8/2012	8/14/2012	8/28/2012
Room Temp C	24	23	24	23
RH	56%	56%	59%	59%
Name	Peter Chen	Peter Chen	Peter Chen	Peter Chen
mOhm values	**Actual Initial**	**Delta 100 Cycles**	**Delta Thermal**	**Delta Humidity**
Average	47.6	-1.6	1.3	-2.6
St. Dev.	1.2	1.0	1.3	0.5
Min	46.2	-3.1	-0.8	-3.6
Max	49.3	-0.3	3.9	-2.0
Count	8	8	8	8

How many samples are being tested?	8
How many contacts are on each board?	1

	Stable	Minor	Acceptable	Marginal	Unstable	Open
100 Cycles	8	0	0	0	0	0
Thermal	8	0	0	0	0	0
Humidity	8	0	0	0	0	0

DATA SUMMARIES Continued

GRF7-J-P-HF-ST-TH1 + RF179-7GSP1-030303-0305

Ground Pin

Date	7/31/2012	8/8/2012	8/14/2012	8/28/201
Room Temp C	24	23	24	23
RH	56%	56%	59%	59%
Name	Peter Chen	Peter Chen	Peter Chen	Peter Chen
mOhm values	**Actual Initial**	**Delta 500 Cycles**	**Delta Thermal**	**Delta Humidity**
Average	3.0	-0.1	0.1	0.0
St. Dev.	0.2	0.2	0.5	0.4
Min	2.7	-0.3	-0.7	-0.6
Max	3.3	0.3	0.8	0.5
Count	8	8	8	8

How many samples are being tested?	8
How many contacts are on each board?	1

	Stable	Minor	Acceptable	Marginal	Unstable	Open
500 Cycles	8	0	0	0	0	0
Thermal	8	0	0	0	0	0
Humidity	8	0	0	0	0	0

Signal Pin

Date	7/31/2012	8/8/2012	8/14/2012	8/28/2012
Room Temp C	24	23	24	23
RH	56%	56%	59%	59%
Name	Peter Chen	Peter Chen	Peter Chen	Peter Chen
mOhm values	**Actual Initial**	**Delta 500 Cycles**	**Delta Thermal**	**Delta Humidity**
Average	48.8	-1.3	1.8	-2.4
St. Dev.	2.0	2.4	2.2	2.5
Min	46.2	-4.7	-2.3	-4.9
Max	51.5	1.3	4.7	2.2
Count	8	8	8	8

How many samples are being tested?	8
How many contacts are on each board?	1

	Stable	Minor	Acceptable	Marginal	Unstable	Open
500 Cycles	8	0	0	0	0	0
Thermal	8	0	0	0	0	0
Humidity	8	0	0	0	0	0

DATA SUMMARIES Continued

LLCR thermal aging

1) A total of 16 points (8 signal pin and 8 ground pin) 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

GRF7-J-P-GF-ST-TH1 + RF179-7GSP4-7GSP4-0305

	Ground Pin	
Date	8/7/2012	8/21/2012
Room Temp C	23	23
RH	58%	56%
Name	Peter Chen	Peter Chen
mOhm values	**Actual Initial**	**Delta After Thermal**
Average	3.2	-0.3
St. Dev.	0.5	0.6
Min	2.6	-1.3
Max	4.0	0.4
Count	8	8

How many samples are being tested?	8
How many contacts are on each board?	1

	Stable	Minor	Acceptable	Marginal	Unstable	Open
After Thermal	8	0	0	0	0	0

DATA SUMMARIES Continued

	Signal Pin	
Date	8/7/2012	8/21/2012
Room Temp C	23	23
RH	53%	57%
Name	Peter Chen	Peter Chen
mOhm values	**Actual Initial**	**Delta After Thermal**
Average	47.0	3.0
St. Dev.	1.7	1.0
Min	45.4	1.5
Max	50.6	4.8
Count	8	8

How many samples are being tested?	8
How many contacts are on each board?	1

	Stable	Minor	Acceptable	Marginal	Unstable	Open
After Thermal	8	0	0	0	0	0

DATA SUMMARIES Continued

GRF7V-J-P-GF-ST-TH1 + RF179-7GSP4-7GSP4-0305

Ground Pin

Date	8/7/2012	8/21/2012
Room Temp C	23	23
RH	53%	58%
Name	Peter Chen	Peter Chen
mOhm values	**Actual Initial**	**Delta After Thermal**
Average	2.5	0.0
St. Dev.	0.1	0.3
Min	2.3	-0.2
Max	2.7	0.5
Count	8	8

How many samples are being tested?	8
How many contacts are on each board?	1

	Stable	Minor	Acceptable	Marginal	Unstable	Open
After Thermal	8	0	0	0	0	0

Signal Pin

Date	8/7/2012	8/21/2012
Room Temp C	23	23
RH	53%	58%
Name	Peter Chen	Peter Chen
mOhm values	**Actual Initial**	**Delta After Thermal**
Average	45.7	2.2
St. Dev.	1.2	1.9
Min	44.3	-0.5
Max	48.3	4.5
Count	8	8

How many samples are being tested?	8
How many contacts are on each board?	1

	Stable	Minor	Acceptable	Marginal	Unstable	Open
After Thermal	8	0	0	0	0	0

DATA SUMMARIES Continued

LLCR GAS TIGHT:

1) A total of 16 points (8 signal pin and 8 ground pin) 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

GRF7-J-P-GF-ST-TH1 and RF179-7GSP4-030303-0305

	Ground Pin	
Date	7/25/2012	7/31/2012
Room Temp C	23	24
RH	56	58
Name	Peter Chen	Peter Chen
mOhm values	**Actual Initial**	**Delta Acid Vapor**
Average	2.45	0.21
St. Dev.	0.09	0.25
Min	2.28	-0.16
Max	2.58	0.62
Count	8	8

How many samples are being tested?	8
How many contacts are on each board?	1

	Stable	Minor	Acceptable	Marginal	Unstable	Open
Acid Vapor	8	0	0	0	0	0

DATA SUMMARIES Continued

	Signal Pin	
Date	7/25/2012	7/31/2012
Room Temp C	23	24
RH	56	58
Name	Peter Chen	Peter Chen
mOhm values	**Actual Initial**	**Delta Acid Vapor**
Average	41.61	1.16
St. Dev.	1.16	1.47
Min	39.66	-0.54
Max	42.98	3.21
Count	8	8

How many samples are being tested?	8
How many contacts are on each board?	1

	Stable	Minor	Acceptable	Marginal	Unstable	Open
Acid Vapor	8	0	0	0	0	0

DATA SUMMARIES Continued

LLCR Shock & Vibration:

1) A total of 16 points (8 signal pin and 8 ground pin) 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

GRF7V-J-P-GF-ST-TH1 + RF179-7GSP4-030303-0305

	LLCR Measurement Summaries by Pin Type	
Date	8/23/2012	10/1/2012
Room Temp (Deg C)	23	22
Rel Humidity (%)	36	36
Technician	Aaron McKim	Aaron McKim
mOhm values	**Actual Initial**	**Delta Shock-Vib**
	Pin Type 1: Signal	
Average	214.14	2.17
St. Dev.	1.37	2.19
Min	212.31	0.29
Max	216.77	6.50
Summary Count	8	8
Total Count	8	8
	Pin Type 2: Ground	
Average	9.35	0.36
St. Dev.	0.14	0.21
Min	9.22	0.03
Max	9.67	0.84
Summary Count	8	8
Total Count	8	8

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
Shock-Vib	**14**	**2**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

Shock & Vibration Event Detection:
GRF7V-J-P-GF-ST-TH1 + RF179-7GSP4-030303-0305

Shock and Vibration Event Detection Summary	
Contacts tested	8
Test Condition	C, 100g's, 6ms, Half-Sine
Shock Events	0
Test Condition	Table 3, Class 2, 3.8 grms
Vibration Events	0
Test Condition	Table 4, Class 2, Resonance Search and Dwell
Vibration Events	0
Total Events	0

EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: HZ-MO-05
Description: Micro-ohmmeter
Manufacturer: Keithley
Model: 3706
Serial #: 297288
Accuracy: Last Cal: 2012-8-6, Next Cal: 2013-8-5

Equipment #: HZ-HPM-01
Description: IR/DWV Tester
Manufacturer: AN9636H
Model: AN9636H
Serial #: 089601091
Accuracy: Last Cal: 2012-7-6, Next Cal: 2013-7-5

Equipment #: HZ-TCT-01
Description: Normal force analyzer
Manufacturer: Mecmesin Multitester
Model: Mecmesin Multitester 2.5-i
Serial #: 08-1049-04
Accuracy: Last Cal: 2012-4-28, Next Cal: 2013-4-27

Equipment #: HZ-OV-01
Description: Oven
Manufacturer: Huida
Model: CS101-1E
Serial #: CS101-1E-B
Accuracy: Last Cal: 2011-12-14, Next Cal: 2012-12-13

Equipment #: HZ-THC-01
Description: Humidity transmitter
Manufacturer: Thermtron
Model: HMM30C
Serial #: D0240037
Accuracy: Last Cal: 2012-3-3, Next Cal: 2013-3-2

Equipment #: MO-02
Description: Multimeter /Data Acquisition System
Manufacturer: Keithley
Model: 2700
Serial #: 0780546
Accuracy: Last Cal: 2012-6-16, Next Cal: 2013-6-16

EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: PS-01
Description: Power Supply
Manufacturer: Hewlett Packard
Model: 6033A
Serial #: 3329A-07330
Accuracy: Last Cal: 2012-6-12, Next Cal: 2013-6-12

Equipment #: HZ-TSC-01
Description: Thermal Shock transmitter
Manufacturer: CSZ
Model: 10-VT14994
Serial #: VTS-3-6-6-SC/AC
Accuracy: Last Cal: 2012-11-1, Next Cal: 2013-11-1

Equipment #: SVC-01
Description: Shock & Vibration Table
Manufacturer: Data Physics
Model: LE-DSA-10-20K
Serial #: 10037
Accuracy: See Manual
… Last Cal: 2011-11-31, Next Cal: 2012-11-31

Equipment #: ACLM-01
Description: Accelerometer
Manufacturer: PCB Piezotronics
Model: 352C03
Serial #: 115819
Accuracy: See Manual
… Last Cal: 2012-07-9, Next Cal: 2013-7-9

Equipment #: ED-03
Description: Event Detector
Manufacturer: Analysis Tech
Model: 32EHD
Serial #: 1100604
Accuracy: See Manual
… Last Cal: 2012-06-4, Next Cal: 2013-06-4