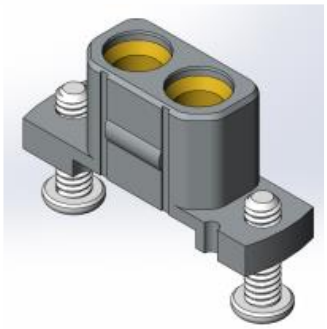
Project Number: Design Qualification Test Report	Tracking Code: CR-845701_Report_Rev_2
Requested by: Brian Luallen	Date: 2/16/2023
Part #: GPPC-PF-1-2-EP-ST-CMM\GC47-1-02-505050-0152	
Part description: GPPC\GC47	Tech: Tony Wagoner
Test Start: 11/1/2022	Test Completed: 11/29/2022



DESIGN QUALIFICATION TEST REPORT

GPPC/GC47
GPPC-PF-1-2-EP-ST-CMM/GC47-1-02-505050-0152

REVISION HISTORY

DATA	REV.NUM.	DESCRIPTION	ENG
1/6/2023	**1**	**Initial Issue**	**KH**
2/16/2023	**2**	**Add the Mating-Unmating Basic test data**	**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, MIL-PRF-39012.

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 CO-SC-WI-3029.
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) Samtec Test PCBs used: PCB-112347-TST/PCB-112348-TST

FLOWCHARTS

Mating/Unmating/Durability

Group 1
GPPC-PF-1-2-EP-ST-CMM
GC47-1-02-505050-0152
5 Assemblies
2 POS. FD. WITH 1X2 CABLE ASSEMBLY

Step	Description
1.	Interface Gaging *Note: Measure and record center contact shoulder recess from interface reference plane.*
2.	LLCR (1) - Non Standard *Note: Signal and ground.*
3.	Mating/Unmating Force (3) - Non Standard
4.	Cycles Quantity = 50 Cycles
5.	Mating/Unmating Force (3) - Non Standard
6.	Cycles Quantity = 50 Cycles
7.	Mating/Unmating Force (3) - Non Standard
8.	LLCR (1) - Non Standard Max Delta = 15 mOhm *Note: Signal and ground.*
9.	Interface Gaging *Note: Measure and record center contact shoulder recess from interface reference plane.*

Group 2
GPPC-PS-1-2-EP-ST-CMM
GC47-1-02-505050-0152
5 Assemblies
2 POS. FD. WITH 1X2 CABLE ASSEMBLY

Step	Description
1.	Interface Gaging *Note: Measure and record center contact shoulder recess from interface reference plane.*
2.	Mating/Unmating Force (4) - Non Standard
3.	Cycles Quantity = 50 Cycles
4.	Mating/Unmating Force (4) - Non Standard
5.	Cycles Quantity = 50 Cycles
6.	Mating/Unmating Force (4) - Non Standard
7.	Interface Gaging *Note: Measure and record center contact shoulder recess from interface reference plane.*

Group 3
GPPC-PF-1-2-EP-ST-CMM
PRFIA-SMPM-J-J-S-3
5 Assemblies

Step	Description
1.	Mating/Unmating Force (2) - Non Standard
2.	Cycles Quantity = 50 Cycles
3.	Mating/Unmating Force (2) - Non Standard
4.	Cycles Quantity = 50 Cycles
5.	Mating/Unmating Force (2) - Non Standard

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(1) LLCR = EIA-364-23
Open Circuit Voltage = 20 mV Max
Test Current = 100 mA Max

(2) Mating/Unmating Force = Other
DSCC 10019, PER MIL-STD-348A, FULL DETENT

(3) Mating/Unmating Force = Other
DSCC 10019, PER MIL-STD-348A, FULL DETENT
Measurement will include 2 interface prts and Latching Cable assemblies.

(4) Mating/Unmating Force = Other
DSCC 10019, PER MIL-STD-348A, SMOOTH BORE
Measurement will include 2 interface prts and Latching Cable assemblies.

FLOWCHARTS Continued

IR/DWV

Pin-to-Ground

Group 1

GPPC-PF-1-2-EP-ST-CMM

GC47-1-02-505050-0152

5 Assemblies

2 POS.

Note: Test after mounting to board.

Step	Description
1.	IR (3) - Non Standard
2.	DWV at Test Voltage (1) - Non Standard Test Voltage = 325 VAC
3.	LLCR (4) - Non Standard *Note: Signal and ground.*
4.	Thermal Shock (5) - Non Standard
5.	IR (3) - Non Standard
6.	DWV at Test Voltage (1) - Non Standard Test Voltage = 325 VAC
7.	LLCR (4) - Non Standard Max Delta = 15 mOhm *Note: Signal and ground.*

Group 2

GPPC-PX-1-2-EP-ST-CMM

GC47-1-02-505050-0152

2 Assemblies

Note: Test after mounting to board

Step	Description
1.	DWV Breakdown (2) - Non Standard

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(1) DWV at Test Voltage = Other
Test Condition = 1 (Sea Level) Test voltage applied for 60 seconds
MIL-PRF-39012, Paragraph. 4.6.14 per MIL-STD-202-301

(2) DWV Breakdown = Other
Record breakdown voltage. (Data only)

(3) IR = Other
Test Condition = 325V DC, 2 Minutes Max
DSCC-10019 / MIL-PRF-39012, Paragraph 4.6.8 per MIL-STD-202-302

(4) LLCR = EIA-364-23
Open Circuit Voltage = 20 mV Max
Test Current = 100 mA Max

(5) Thermal Shock = Other
DSCC-10019 / MIL-STD-202-107
TEST COND. B PER DSCC-10019. EXCEPTION: HIGH TEMP. TO BE +165C°.

FLOWCHARTS Continued

Mechanical Shock/Random Vibration/LLCR

Group 1
GPPC-PF-1-2-EP-ST-CMM
GC47-1-02-505050-0305
2 Assemblies
2 POS.

Step	Description
1.	LLCR (1)
2.	Mechanical Shock (2) - Non Standard
3.	Random Vibration (3) - Non Standard
4.	LLCR (1) Max Delta = 15 mOhm

(1) LLCR = EIA-364-23
Open Circuit Voltage = 20 mV Max
Test Current = 100 mA Max

(2) Mechanical Shock = EIA-364-27
Test Condition = C (100 G Peak, 6 milliseconds, Half Sine)
Number of Shocks = 3 Per Direction, Per Axis, 18 Total

(3) Random Vibration = EIA-364-28
Condition = VB (7.56 gRMS Average, 2 Hours/Axis)

Mechanical Shock/Random Vibration/Event Detection

Group 1
GPPC-PF-1-2-EP-ST-CMM
GC47-1-02-505050-0305
2 Assemblies
2 POS

Step	Description
1.	Nanosecond Event Detection (Mechanical Shock) (1) - Non Standard
2.	Nanosecond Event Detection (Random Vibration) (2)

(1) Nanosecond Event Detection (Mechanical Shock) = Other
Use EIA-364-87 for Nanosecond Event Detection:
Test Condition = F (50 nanoseconds at 10 ohms)
Use EIA-364-27 for Mechanical Shock:
Test Condition = C (100 G Peak, 6 milliseconds, Half Sine)
Number of Shocks = 3 Per Direction, Per Axis, 18 Total

(2) Nanosecond Event Detection (Random Vibration)
Use EIA-364-87 for Nanosecond Event Detection:
Test Condition = F (50 nanoseconds at 10 ohms)
Use EIA-364-28 for Random Vibration:
Condition = VB (7.56 gRMS Average, 2 Hours/Axis)

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

THERMAL SHOCK:

1) MIL-STD-202-107, *Thermal Shock (Temperature Cycling) Test Procedure for Electrical Connectors.*
2) Test Condition B per DSCC 10019. Exception – high temperature to be +165° C. Visual inspection for damage.
3) All test samples are pre-conditioned at ambient.
4) 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 +1000 mOhms: ----------Unstable
    f. >+1000 mOhms:----------Open Failure

INSULATION RESISTANCE (IR):

To determine the resistance of insulation materials to leakage of current through or on the surface of these materials when 325V DC potential is applied.
Per DSCC 10019 and MIL-STD-202-302. MIL-PRF-39012, Para 4.6.8.

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) Breakdown:
    Record breakdown voltage. (Data only). MIL-PRF-39012, para 4.6.14
2) Test Voltage
    a. 325 V rms min. at sea level per DSCC 10019.
    b. Test voltage applied for 60 seconds. Per DSCC-10019 and MIL-PRF-39012, PARA 4.6.14.

RESULTS

Mating-Unmating Force

Group 1 (GPPC-PF-1-2-EP-ST-CMM\GC47-1-02-505050-0152)

- **Initial**
  - **Mating**
    - **Min ---------- 1.63 lbs**
    - **Max---------- 1.93 lbs**
  - **Unmating**
    - **Min ---------- 2.06 lbs**
    - **Max---------- 3.69 lbs**
- **50 Cycles**
  - **Mating**
    - **Min ---------- 3.43 lbs**
    - **Max---------- 4.55 lbs**
  - **Unmating**
    - **Min ---------- 3.29 lbs**
    - **Max---------- 4.84 lbs**
- **100 Cycles**
  - **Mating**
    - **Min ---------- 3.82 lbs**
    - **Max---------- 4.67 lbs**
  - **Unmating**
    - **Min ---------- 3.43 lbs**
    - **Max---------- 5.29 lbs**

Group 2 (GPPC-PS-1-2-EP-ST-CMM\GC47-1-02-505050-0152)

- **Initial**
  - **Mating**
    - **Min ---------- 0.89 lbs**
    - **Max---------- 1.10 lbs**
  - **Unmating**
    - **Min ---------- 0.64 lbs**
    - **Max---------- 0.95 lbs**
- **50 Cycles**
  - **Mating**
    - **Min ---------- 2.03 lbs**
    - **Max---------- 2.54 lbs**
  - **Unmating**
    - **Min ---------- 2.02 lbs**
    - **Max---------- 2.46 lbs**
- **100 Cycles**
  - **Mating**
    - **Min ---------- 2.38 lbs**
    - **Max---------- 2.82 lbs**
  - **Unmating**
    - **Min ---------- 2.21 lbs**
    - **Max---------- 2.64 lbs**

RESULTS Continued

Mating-Unmating Force

Group 3 (GPPC-PF-1-2-EP-ST-CMM\PRFIA-SMPM-J-J-S-3)

- **Initial**
  - **Mating**
    - **Min ---------- 2.60 lbs**
    - **Max---------- 3.14 lbs**
  - **Unmating**
    - **Min ---------- 3.27 lbs**
    - **Max---------- 4.15 lbs**
- **50 Cycles**
  - **Mating**
    - **Min ---------- 3.96 lbs**
    - **Max---------- 5.06 lbs**
  - **Unmating**
    - **Min ---------- 3.12 lbs**
    - **Max---------- 4.67 lbs**
- **100 Cycles**
  - **Mating**
    - **Min ---------- 4.84 lbs**
    - **Max---------- 5.40 lbs**
  - **Unmating**
    - **Min ---------- 3.40 lbs**
    - **Max---------- 4.88 lbs**

Interface Gaging

Group 1 (GPPC-PF-1-2-EP-ST-CMM\GC47-1-02-505050-0152)

Initial

- **Min---------- 0.0000 inch**
- **Max ---------- 0.0018 inch**

After 100 cycles

- **Min---------- 0.0000 inch**
- **Max ---------- 0.0017 inch**

Group 2 (GPPC-PS-1-2-EP-ST-CMM\GC47-1-02-505050-0152)

Initial

- **Min---------- 0.0000 inch**
- **Max ---------- 0.0005 inch**

After 100 cycles

- **Min---------- 0.0000 inch**
- **Max ---------- 0.0005 inch**

RESULTS Continued

Insulation Resistance minimums, IR

Pin to Ground

- **Initial**
  - **Mated ---------- 45000 Meg Ω ---------- Passed**
  - **Unmated ---------- 45000 Meg Ω ---------- Passed**
- **Thermal Shock**
  - **Mated ---------- 45000 Meg Ω ---------- Passed**
  - **Unmated ---------- 45000 Meg Ω ---------- Passed**

Dielectric Withstanding Voltage minimums, DWV

Group 1

- **Test Voltage ---------- 325 VAC**

Pin to Ground

- **Initial DWV ---------- Passed**
- **Thermal Shock DWV ---------- Passed**

Group 2

Pin to Ground

- **Breakdown Voltage ---------- 680 VAC**

RESULTS Continued

LLCR IR\DWV (10 signal and 5 ground LLCR test points)

Signal pin

- **Initial ---------- 55.24 mOhms Max**
- **Thermal Shock**
  - **<= +5.0 mOhms----------9 Points ---------- Stable**
  - **+5.1 to +10.0 mOhms----------1 Points ---------- Minor**
  - **+10.1 to +15.0 mOhms ----------0 Points ---------- Acceptable**
  - **+15.1 to +50.0 mOhms ----------0 Points ---------- Marginal**
  - **+50.1 to +1000 mOhms----------0 Points ---------- Unstable**
  - **>+1000 mOhms----------0 Points ---------- Open Failure**

Ground pin

- **Initial ---------- 15.33 mOhms Max**
- **Thermal Shock**
  - **<= +5.0 mOhms----------5 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 +1000 mOhms----------0 Points ---------- Unstable**
  - **>+1000 mOhms----------0 Points ---------- Open Failure**

LLCR Mating-Unmating Durability (10 signal and 5 ground LLCR test points)

Signal Pin

- **Initial ---------- 55.89 mOhms Max**
- **Durability 100 cycles**
  - **<= +5.0 mOhms---------- 10 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 +1000 mOhms----------0 Points ---------- Unstable**
  - **>+1000 mOhms----------0 Points ---------- Open Failure**

Ground Pin

- **Initial ---------- 12.25 mOhms Max**
- **Durability 100 cycles**
  - **<= +5.0 mOhms----------5 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 +1000 mOhms----------0 Points ---------- Unstable**
  - **>+1000 mOhms----------0 Points ---------- Open Failure**

RESULTS Continued

LLCR Shock & Vibration (4 signal and 2 ground LLCR test points)

Signal Pin

- **Initial ---------- 95.22 mOhms Max**
- **Shock &Vibration**
  - **<= +5.0 mOhms----------4 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 +1000 mOhms----------0 Points ---------- Unstable**
  - **>+1000 mOhms----------0 Points ---------- Open Failure**

Ground Pin

- **Initial ---------- 19.05 mOhms Max**
- **Shock &Vibration**
  - **<= +5.0 mOhms----------2 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 +1000 mOhms----------0 Points ---------- Unstable**
  - **>+1000 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

Mating-Unmating Force

Group 1

	Initial				50 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	7.25	1.63	9.16	2.06	15.26	3.43	14.63	3.29
Maximum	8.58	1.93	16.41	3.69	20.24	4.55	21.53	4.84
Average	7.74	**1.74**	11.59	**2.61**	17.69	**3.98**	17.23	**3.87**
St Dev	0.54	0.12	2.92	0.66	2.36	0.53	2.76	0.62
Count	5	5	5	5	5	5	5	5

	100 Cycles			
	Mating		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	16.99	3.82	15.26	3.43
Maximum	20.77	4.67	23.53	5.29
Average	18.75	**4.22**	18.18	**4.09**
St Dev	1.42	0.32	3.23	0.73
Count	5	5	5	5

Group 2

	Initial				50 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	3.96	0.89	2.85	0.64	9.03	2.03	8.98	2.02
Maximum	4.89	1.10	4.23	0.95	11.30	2.54	10.94	2.46
Average	4.42	**0.99**	3.25	**0.73**	10.02	**2.25**	9.61	**2.16**
St Dev	0.38	0.09	0.58	0.13	0.83	0.19	0.81	0.18
Count	5	5	5	5	5	5	5	5

	100 Cycles			
	Mating		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	10.59	2.38	9.83	2.21
Maximum	12.54	2.82	11.74	2.64
Average	11.46	**2.58**	10.31	**2.32**
St Dev	0.78	0.17	0.82	0.18
Count	5	5	5	5

DATA SUMMARIES

Mating-Unmating Force

Group 3

	Initial				50 Cycles			
	Mating		**Unmating**		**Mating**		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	11.56	2.60	14.54	3.27	17.61	3.96	13.88	3.12
Maximum	13.97	3.14	18.46	4.15	22.51	5.06	20.77	4.67
Average	13.07	**2.94**	16.72	**3.76**	19.33	**4.35**	17.48	**3.93**
St Dev	0.98	0.22	1.60	0.36	1.98	0.44	3.33	0.75
Count	5	5	5	5	5	5	5	5

	100 Cycles			
	Mating		**Unmating**	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	21.53	4.84	15.12	3.40
Maximum	24.02	5.40	21.69	4.88
Average	22.60	**5.08**	18.40	**4.14**
St Dev	0.98	0.22	3.11	0.70
Count	5	5	5	5

DATA SUMMARIES Continued

Interface Gaging

Group 1

Initial		After Cycles	
Pin Type 1		***Pin Type 1***	
Signal		**Signal**	
Nominal	0.000	***Nominal***	0.000
Hi Limit	0.003	***Hi Limit***	0.003
Lo Limit	0.000	***Lo Limit***	0.000
Min	**0.0000**	***Min***	**0.0000**
Max	**0.0018**	***Max***	**0.0017**
Avg	**0.0003**	***Avg***	**0.0003**
St. Dev.	**0.0005**	***St. Dev.***	**0.0005**
Count	**10**	***Count***	**10**
% High	**0%**	***% High***	**0%**
% Low	**0%**	***% Low***	**0%**

Group 2

Initial		After Cycles	
Pin Type 1		***Pin Type 1***	
Signal		**Signal**	
Nominal	0.000	***Nominal***	0.000
Hi Limit	0.003	***Hi Limit***	0.003
Lo Limit	0.000	***Lo Limit***	0.000
Min	**0.0000**	***Min***	**0.0000**
Max	**0.0005**	***Max***	**0.0005**
Avg	**0.0002**	***Avg***	**0.0002**
St. Dev.	**0.0002**	***St. Dev.***	**0.0001**
Count	**10**	***Count***	**10**
% High	**0%**	***% High***	**0%**
% Low	**0%**	***% Low***	**0%**

DATA SUMMARIES Continued

IR\DWV:

Initial

	Pin to Ground	
	Mated	
	GPPC / RF047A	
	IR	DWV
Minimum	45000	325
Maximum	45000	325
Average	45000	325

Thermal Shock

	Pin to Ground	
	Mated	
	GPPC / RF047A	
	IR	DWV
Minimum	45000	325
Maximum	45000	325
Average	45000	325

BREAKDOWN:

Pin to Ground	
Mated	
GPPC / RF047A	
Sample#	Breakdown
CR-845701-016	719
CR-845701-017	680

DATA SUMMARIES Continued

LLCR IR\DWV:

1) A total of 10 signal and 5 ground 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 +1000 mOhms: ----------Unstable
   f. >+1000 mOhms:----------Open Failure

	LLCR Measurement Summaries by Pin Type			
Date	2022/11/4	2022/11/8		
Room Temp (Deg C)	22	22		
Rel Humidity (%)	42	35		
Technician	Tony Wagoner	Tony Wagoner		
mOhm values	Actual	**Delta**		
	Initial	**Thermal Shock**		
	Pin Type: Signal 1			
Average	54.82	1.14		
St. Dev.	0.27	1.6		
Min	54.33	0.25		
Max	55.24	5.47		
Summary Count	10	10		
Total Count	10	10		
	Pin Type: GND 1			
Average	12.62	2		
St. Dev.	1.66	1.74		
Min	11.23	0.17		
Max	15.33	4.79		
Summary Count	5	5		
Total Count	5	5		

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
Thermal Shock	**14**	**1**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

LLCR Mating-Unmating Durability:

1) A total of 10 signal and 5 ground 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 +1000 mOhms: ----------Unstable
   f. >+1000 mOhms:----------Open Failure

LLCR Measurement Summaries by Pin Type				
Date	2022/11/28	2022/11/29		
Room Temp (Deg C)	23	22		
Rel Humidity (%)	39	42		
Technician	Tony Wagoner	Tony Wagoner		
mOhm values	Actual	**Delta**		
	Initial	**100 Cycles**		
Pin Type: Signal 1				
Average	55	0.39		
St. Dev.	0.52	0.32		
Min	54.08	0.04		
Max	55.89	0.99		
Summary Count	10	10		
Total Count	10	10		
Pin Type: GND 1				
Average	11.5	0.22		
St. Dev.	0.61	0.25		
Min	11	0.04		
Max	12.25	0.65		
Summary Count	5	5		
Total Count	5	5		

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
100 Cycles	**15**	**0**	**0**	**0**	**0**	**0**

DATA SUMMARIES Continued

LLCR Shock &Vibration:

1). A total of 4 signal and 2 ground 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 +1000 mOhms ----------Unstable
   f. >+1000 mOhms: ----------Open Failure

LLCR Measurement Summaries by Pin Type				
Date	2022/11/1	2022/11/4		
Room Temp (Deg C)	22	22		
Rel Humidity (%)	48	43		
Technician	Tony Wagoner	Tony Wagoner		
mOhm values	Actual **Initial**	**Delta Shock-Vib**		
Pin Type: Signal 1				
Average	94.28	0.59		
St. Dev.	0.69	0.16		
Min	93.55	0.43		
Max	95.22	0.76		
Summary Count	4	4		
Total Count	4	4		
Pin Type: GND 1				
Average	18.3	0.77		
St. Dev.	1.07	0.44		
Min	17.54	0.46		
Max	19.05	1.08		
Summary Count	2	2		
Total Count	2	2		

LLCR Delta Count by Category						
	Stable	**Minor**	**Acceptable**	**Marginal**	**Unstable**	**Open**
mOhms	**<=5**	**>5 & <=10**	**>10 & <=15**	**>15 & <=50**	**>50 & <=1000**	**>1000**
Shock-Vib	**6**	**0**	**0**	**0**	**0**	**0**

Nanosecond Event Detection:

Shock and Vibration Event Detection Summary	
Contacts tested	4
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 #: TCT-04
Description: Dillon Quantrol TC21 25-1000 mm/min series test stand
Manufacturer: Dillon Quantrol
Model: TC2 I series test stand
Serial #: 04-1041-04
Accuracy: Speed Accuracy: +/- 5% of indicated speed; Speed Accuracy: +/- 5% of indicated speed;
… Last Cal: 05/29/2022, Next Cal: 05/29/2023

Equipment #: MO-11
Description: Switch/Multimeter
Manufacturer: Keithley
Model: 3706
Serial #: 120169
Accuracy: See Manual
… Last Cal: 09/11/2022, Next Cal: 09/11/2023

Equipment #: TSC-01
Description: Vertical Thermal Shock Chamber
Manufacturer: Cincinnati Sub Zero
Model: VTS-3-6-6-SC/AC
Serial #: 10-VT14993
Accuracy: See Manual
… Last Cal: 06/30/2022, Next Cal: 06/30/2023

Equipment #: HPT-01
Description: Hipot Safety Tester
Manufacturer: Vitrek
Model: V73
Serial #: 019808
Accuracy:
… Last Cal: 05/15/2022, Next Cal: 05/15/2023

Equipment #: SVC-01
Description: Shock & Vibration Table
Manufacturer: Data Physics
Model: LE-DSA-10-20K
Serial #: 10037
Accuracy: See Manual
… Last Cal: 04/22/2022, Next Cal: 04/22/2023

Equipment #: ACLM-01
Description: Accelerometer
Manufacturer: PCB Piezotronics
Model: 352C03
Serial #: 115819
Accuracy: See Manual
… Last Cal: 07/18/2022, Next Cal: 07/18/2023

EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: ED-03
Description: Event Detector
Manufacturer: Analysis Tech
Model: 32EHD
Serial #: 1100604
Accuracy: See Manual
… Last Cal: 10/31/2022, Next Cal: 10/31/2023