



Project Number: Design Qualification Test Report	Tracking Code: 2493950_Report_Rev_3
Requested by: Ross Pritchett	Date: 12/22/2020
Part #: RF047-A-MORJ-MORJ-0152/RF047-A-MOSP-MOSP-0152	
Part description: RF047/RF047	Tech: Scott Rollefstad
Test Start: 9/3/2020	Test Completed: 9/9/2020



DESIGN QUALIFICATION TEST REPORT
RF047/RF047
RF047-A-MORJ-MORJ-0152/RF047-A-MOSP-MOSP-0152

REVISION HISTORY

DATA	REV.NUM.	DESCRIPTION	ENG
9/24/2020	1	Initial Issue	KH
11/11/2020	2	Update the Length Mass Gaging test data(MUD)	KH
12/22/2020	3	Add the Mating-Unmating force data	KH

CERTIFICATION

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

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SCOPE

To perform the following tests: 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) Parts not intended for testing LLCR and DWV/IR are visually inspected and cleaned if necessary.
- 4) Any additional preparation will be noted in the individual test sequences.

FLOWCHARTS**Mating/Unmating/Durability**Group 1

RF047-A-MORJ-505050-0152

RF047-A-MOSP-505050-0152

4 Assemblies

Step	Description
1.	Length & Mass
2.	Interface Gaging
3.	DWV at Test Voltage ⁽¹⁾ - Non Standard DWV = 500 VAC
4.	LLCR ⁽²⁾ - Non Standard <i>Note: Signal and ground.</i>
5.	Mating/Unmating Force ⁽³⁾
6.	Cycles Quantity = 500 Cycles
7.	LLCR ⁽²⁾ - Non Standard Max Delta = 15 mOhm <i>Note: Signal and ground.</i>
8.	Interface Gaging

(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) LLCR = Other

Open Circuit Voltage = 20 mV Max
Test Current = 100 mA Max
MIL-PRF-39012, Paragraph 4.6.13 except current to be 100mA nominal and voltage to be 20 mV maximum.

(3) Mating/Unmating Force = EIA-364-13

Mating/Unmating/DurabilityGroup 2

PRFM0-J-C-EE-047A-RD

450035

10 Assemblies

RIGHT ANGLE MUD

*Note: MATING PART 450035 IS A GAGE
PROVIDED BY ENGINEERING.*

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

(1) Mating/Unmating Force = EIA-364-13

FLOWCHARTS Continued**IR/DWV****Pin-to-Ground**Group 1

RF047-A-MORJ-505050-1000

RF047-A-MOSP-505050-0152

4 Assemblies

Note: For Step 6, please put the following cable assemblies in the thermal shock chamber (as ride along parts.):

RF047-A-MORJ-MORJ-1000 (4 PCS)

Step	Description
1.	Length & Mass
2.	Interface Gaging
3.	IR (2) - Non Standard
4.	DWV at Test Voltage (1) - Non Standard Test Voltage = 500VAC
5.	LLCR (3) - Non Standard <i>Note: Signal and ground.</i>
6.	Thermal Shock (4) - Non Standard
7.	IR (2) - Non Standard
8.	DWV at Test Voltage (1) - Non Standard Test Voltage = 500VAC
9.	LLCR (3) - Non Standard Max Delta = 15 mOhm <i>Note: Signal and ground.</i>
10.	Interface Gaging

(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) IR = Other

Test Condition = 500V DC, 2 Minutes Max
MIL-PRF-39012, Paragraph 4.6.8 per MIL-STD-202-302

(3) LLCR = Other

Open Circuit Voltage = 20 mV Max
Test Current = 100 mA Max
MIL-PRF-39012, Paragraph 4.6.13 except current to be 100mA nominal and voltage to be 20 mV maximum.

(4) Thermal Shock = Other

Exposure Time at Temperature Extremes = 1/2 Hour
Test Condition = I (-65°C to +125°C)
Test Duration = test condition B except 10 cycles instead of 5.
MIL-PRF-39012, Paragraph. 4.6.17 per MIL-STD-202-107

FLOWCHARTS Continued**Cable Pull**Group 1

RF047-A-MORJ-505050-0152

2 Assemblies

0 Degrees

Group 2

RF047-A-MORJ-505050-0152

RF047-A-MOSP-505050-0152

4 Assemblies

0 Degrees

Step Description

1. Cable Retention (2) - Non Standard
Note: Pull-to-destruct. Record data.

Step Description

1. Length & Mass
2. Interface Gaging
3. LLCR (3) - Non Standard
Note: Signal and ground.
4. Cable Retention (1) - Non Standard
Note: Apply 5 pounds (2.3 kg) for Cable Retention test.
5. LLCR (3) - Non Standard
Note: Signal and ground.
6. Interface Gaging

(1) Cable Retention = Other

Apply 10 pounds (4.6 kg) for Cable Retention test.
MIL-PRF-30192, Paragraph 4.6.21

(2) Cable Retention = Other

Pull-to-destruct.
MIL-PRF-30192, Paragraph 4.6.21

(3) LLCR = Other

Open Circuit Voltage = 20 mV Max
Test Current = 100 mA Max
MIL-PRF-39012, Paragraph 4.6.13 except current to be 100mA nominal and voltage to be 20 mV maximum.

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

THERMAL SHOCK:

- 1) MIL-PRF-39012, paragraph. 4.6.17 per MIL-STD-202-107.
- 2) Test Condition I: -65°C to +125°C
- 3) Test Time: ½ hour dwell at each temperature extreme
- 4) Test Duration: test condition B except 10 cycles instead of 5.
- 5) All test samples are pre-conditioned at ambient.
- 6) All test samples are exposed to environmental stressing in the mated condition.

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.

LLCR:

- 1) MIL-PRF-39012, Paragraph 4.6.13 except current to be 100 mA nominal and voltage to be 20 mV maximum.
- 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. $\leq +5.0$ 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

CABLE RETENTION:

- 1) Apply 10 pounds (4.6 kg) for cable retention test.
- 2) Pull to destruct.
- 3) MIL-PRF-30192, paragraph. 4.6.21.

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: MIL-PRF-39012, paragraph. 4.6.8 per MIL-STD-202-302.
 - 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: MIL-PRF-39012, paragraph. 4.6.14 per MIL-STD-202-301.
 - b. Test Conditions:
 - i. Between Adjacent Contacts or Signal-to-Ground
 - ii. Barometric Test Condition 1(Sea Level) Test voltage applied for 60 seconds.
 - 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).

RESULTS**Mating – Unmating Forces****RF047-A-MORJ-MORJ-0152/RF047-A-MOSP-MOSP-0152**

- **Initial**
 - **Mating**
 - **Min** ----- 4.94 lbs
 - **Max** ----- 8.35 lbs
 - **Unmating**
 - **Min** ----- 3.65 lbs
 - **Max** ----- 5.07 lbs
- **After 250 Cycles**
 - **Mating**
 - **Min** ----- 6.44 lbs
 - **Max** ----- 9.40 lbs
 - **Unmating**
 - **Min** ----- 6.30 lbs
 - **Max** ----- 8.57 lbs
- **After 500 Cycles**
 - **Mating**
 - **Min** ----- 6.05 lbs
 - **Max** ----- 7.43 lbs
 - **Unmating**
 - **Min** ----- 5.67 lbs
 - **Max** ----- 7.54 lbs

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- **Initial**
 - **Mating**
 - **Min** ----- 2.77 lbs
 - **Max** ----- 3.96 lbs
 - **Unmating**
 - **Min** ----- 4.93 lbs
 - **Max** ----- 7.08 lbs
- **After 50 Cycles**
 - **Mating**
 - **Min** ----- 3.34 lbs
 - **Max** ----- 5.28 lbs
 - **Unmating**
 - **Min** ----- 4.78 lbs
 - **Max** ----- 6.80 lbs
- **After 100 Cycles**
 - **Mating**
 - **Min** ----- 4.62 lbs
 - **Max** ----- 6.13 lbs
 - **Unmating**
 - **Min** ----- 5.69 lbs
 - **Max** ----- 6.92 lbs

RESULTS Continued**Cable Pull force**

- 0° Pull
 - Min -----16.00 lbs
 - Max -----16.27 lbs

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

- Minimums
 - Test Voltage -----500 VAC

Pin to Ground

- Initial DWV -----Passed
- Thermal DWV -----Passed

Mating/Unmating Durability Group**Pin to Ground**

- Initial DWV -----Passed

RESULTS Continued**Length & Mass****Mating/Unmating Durability Group****Length****MORJ**

- Min ----- 154.781 mm
- Max ----- 155.575 mm

MOSP

- Min ----- 153.194 mm
- Max ----- 154.781 mm

Mass**MORJ**

- Min ----- 1.312 g
- Max ----- 1.319 g

MOSP

- Min ----- 1.126 g
- Max ----- 1.132 g

IR/DWV Group**Length****MORJ**

- Min ----- 1004.09 mm
- Max ----- 1007.27 mm

MOSP

- Min ----- 153.987 mm
- Max ----- 154.781 mm

Mass**MORJ**

- Min ----- 6.056 g
- Max ----- 6.095 g

MOSP

- Min ----- 1.131 g
- Max ----- 1.135 g

Cable Pull Group**Length****MORJ**

- Min ----- 154.8 mm
- Max ----- 155.6 mm

MOSP

- Min ----- 154.0 mm
- Max ----- 154.8 mm

Mass**MORJ**

- Min ----- 1.307 g
- Max ----- 1.327 g

MOSP

- Min ----- 1.126 g
- Max ----- 1.135 g

RESULTS Continued**Interface Gaging****Mating/Unmating Durability Group****MORJ****Initial**

- **Min** ----- **0.0329 inch**
- **Max** ----- **0.0754 inch**

After 500 cycles

- **Min** ----- **0.0286 inch**
- **Max** ----- **0.0963 inch**

MOSP**Initial**

- **Min** ----- **0.0550 inch**
- **Max** ----- **0.0614 inch**

After 500 cycles

- **Min** ----- **0.0527 inch**
- **Max** ----- **0.0671 inch**

IR/DWV Group**MORJ****Initial**

- **Min** ----- **0.0364 inch**
- **Max** ----- **0.0897 inch**

After Thermal Shock

- **Min** ----- **0.0598 inch**
- **Max** ----- **0.1206 inch**

MOSP**Initial**

- **Min** ----- **0.0598 inch**
- **Max** ----- **0.0677 inch**

After Thermal Shock

- **Min** ----- **0.0555 inch**
- **Max** ----- **0.0653 inch**

Cable Pull Group**MORJ****Initial**

- **Min** ----- **0.0579 inch**
- **Max** ----- **0.0926 inch**

After Retention

- **Min** ----- **0.0734 inch**
- **Max** ----- **0.0954 inch**

MOSP**Initial**

- **Min** ----- **0.0600 inch**
- **Max** ----- **0.0678 inch**

After Retention

- **Min** ----- **0.0490 inch**
- **Max** ----- **0.0597 inch**

RESULTS Continued**LLCR Mating/Unmating Durability (4 ground and 4 signal LLCR test points)****Ground pin**

- **Initial** ----- 32.00 mOhms Max
- **After 500 cycles**
 - <= +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

Signal pin

- **Initial** ----- 87.3 mOhms Max
- **After 500 cycles**
 - <= +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

LLCR IR/DWV (4 ground and 4 signal LLCR test points)**Ground pin**

- **Initial** ----- 128.15 mOhms Max
- **Thermal Shock**
 - <= +5.0 mOhms ----- 0 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 ----- 4 Points ----- Marginal
 - +50.1 to +1000 mOhms ----- 0 Points ----- Unstable
 - >+1000 mOhms ----- 0 Points ----- Open Failure

Signal pin

- **Initial** ----- 328.11 mOhms Max
- **Thermal Shock**
 - <= +5.0 mOhms ----- 2 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 ----- 1 Points ----- Marginal
 - +50.1 to +1000 mOhms ----- 0 Points ----- Unstable
 - >+1000 mOhms ----- 0 Points ----- Open Failure

RESULTS Continued**LLCR Cable Pull (4 ground and 4 signal LLCR test points)****Ground pin**

- **Initial** ----- 32.0 mOhms Max
- **After 5lb Retention**
 - **<= +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

Signal pin

- **Initial** ----- 87.3 mOhms Max
- **After 5lb Retention**
 - **<= +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

DATA SUMMARIES**MATING/UNMATING:****Mating/Unmating Durability Group****RF047-A-MORJ-MORJ-0152/RF047-A-MOSP-MOSP-0152**

	Initial				After 250 Cycles			
	Mating		Unmating		Mating		Unmating	
	Newton's	Force (Lbs)	Newton's	Force (Lbs)	Newton's	Force (Lbs)	Newton's	Force (Lbs)
Minimum	21.97	4.94	16.24	3.65	28.65	6.44	28.02	6.30
Maximum	37.14	8.35	22.55	5.07	41.81	9.40	38.12	8.57
Average	28.53	6.42	18.94	4.26	33.54	7.54	31.71	7.13
St Dev	6.85	1.54	3.17	0.71	5.79	1.30	4.41	0.99
Count	4	4	4	4	4	4	4	4
	After 500 Cycles							
	Mating		Unmating					
	Newton's	Force (Lbs)	Newton's	Force (Lbs)				
Minimum	26.91	6.05	25.22	5.67				
Maximum	33.05	7.43	33.54	7.54				
Average	30.94	6.96	29.27	6.58				
St Dev	2.74	0.62	3.57	0.80				
Count	4	4	4	4				

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	Initial				After 50 Cycles			
	Mating		Unmating		Mating		Unmating	
	Newton's	Force (Lbs)	Newton's	Force (Lbs)	Newton's	Force (Lbs)	Newton's	Force (Lbs)
Minimum	12.32	2.77	21.93	4.93	14.86	3.34	21.26	4.78
Maximum	17.61	3.96	31.49	7.08	23.49	5.28	30.25	6.80
Average	14.81	3.33	26.87	6.04	20.40	4.59	26.04	5.85
St Dev	1.60	0.36	3.15	0.71	2.61	0.59	2.72	0.61
Count	10	10	10	10	10	10	10	10
	After 100 Cycles							
	Mating		Unmating					
	Newton's	Force (Lbs)	Newton's	Force (Lbs)				
Minimum	20.55	4.62	25.31	5.69				
Maximum	27.27	6.13	30.78	6.92				
Average	23.81	5.35	27.60	6.20				
St Dev	2.18	0.49	1.96	0.44				
Count	10	10	10	10				

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

Pin to Ground	
	Mated
Minimum	RF047A/RF047A
Initial	45000
Thermal Shock	45000

DIELECTRIC WITHSTANDING VOLTAGE (DWV):

Voltage Rating Summary	
Minimum	RF047A/RF047A
Test Voltage	500

Pin to Ground	
Initial Test Voltage	Pass
After Thermal Shock Test Voltage	Pass

Mating/Unmating Durability Group

Pin to Ground	
Initial Test Voltage	Pass

**Cable Pull Force:
0° Pull**

	Force (lbs)
Minimum	16.00
Maximum	16.27
Average	16.14

DATA SUMMARIES Continued**LENGTH & MASS****Mating/Unmating Durability Group**

MORJ	Length (mm)	Mass (g)
1	155.575	1.317
2	155.575	1.319
3	155.575	1.318
4	154.781	1.312

MOSP	Length (mm)	Mass (g)
1	153.987	1.131
2	153.194	1.127
3	153.987	1.126
4	154.781	1.132

IR/DWV Group

MORJ	Length (mm)	Mass (g)
1	1007.27	6.074
2	1006.48	6.095
3	1004.09	6.056
4	1004.09	6.089

MOSP	Length (mm)	Mass (g)
1	154.781	1.135
2	154.781	1.135
3	153.987	1.131
4	154.781	1.134

Cable Pull Group

Group 2		
MORJ	Length (mm)	Mass (g)
1	154.8	1.307
2	155.6	1.318
3	155.6	1.321
4	155.6	1.327

Group 2		
MOSP	Length (mm)	Mass (g)
1	154.0	1.132
2	154.0	1.135
3	154.8	1.126
4	154.8	1.133

DATA SUMMARIES Continued**INTERFACE GAGING****Mating/Unmating Durability Group**

Gaging (.003 / .000)(in)			
MORJ	Initial	Post 500 Cycles	Delta
1	0.0590	0.02860	0.03040
2	0.0709	0.09630	0.02540
3	0.0754	0.06950	0.00590
4	0.0329	0.04400	0.01110

Gaging (.002 (+.001/-.002)(in)			
MOSP	Initial	Post 500 Cycles	Delta
1	0.0550	0.0552	0.0002
2	0.0562	0.0671	0.0109
3	0.0613	0.0581	0.0032
4	0.0614	0.0527	0.0087

IR/DWV Group

Gaging (.003 / .000)(in)			
MORJ	Initial	Therm Shock	Delta
1	0.0667	0.1044	0.0377
2	0.0364	0.1074	0.071
3	0.0812	0.1206	0.0394
4	0.0897	0.0598	0.0299

Gaging (.002 (+.001/-.002)(in)			
MOSP	Initial	Therm Shock	Delta
1	0.0677	0.06080	0.00690
2	0.0598	0.06530	0.00550
3	0.0601	0.06110	0.00100
4	0.0651	0.05550	0.00960

Cable Pull Group

Gaging (.003 / .000)(in)			
MORJ	Initial	Post Retention	Delta
1	0.0675	0.0734	0.0059
2	0.0926	0.0884	0.0042
3	0.0878	0.0897	0.0019
4	0.0579	0.0954	0.0375

Gaging (.002 (+.001/-.002)(in)			
MOSP	Initial	Post Retention	Delta
1	0.0633	0.0595	0.0038
2	0.0600	0.0490	0.0110
3	0.0623	0.0509	0.0114
4	0.0678	0.0597	0.0081

DATA SUMMARIES Continued

LLCR Durability:

- 1) A total of 4 signal and 4 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. $\leq +5.0$ 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	9/9/2020	9/10/2020		
Room Temp (Deg C)	23	23		
Rel Humidity (%)	48	48		
Technician	Scott Rollefstad	Scott Rollefstad		
mOhm values	Actual	Delta		
	Initial	500 Cycles		
Pin Type: Signal 1				
Average	83.7	1.15		
St. Dev.	2.41	1.92		
Min	82.2	0		
Max	87.3	4		
Summary Count	4	4		
Total Count	4	4		
Pin Type: GND 1				
Average	30.375	0.975		
St. Dev.	1.75	0.61		
Min	27.9	0.1		
Max	32	1.4		
Summary Count	4	4		
Total Count	4	4		

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	≤ 5	$>5 \ \& \ \leq 10$	$>10 \ \& \ \leq 15$	$>15 \ \& \ \leq 50$	$>50 \ \& \ \leq 1000$	>1000
After 500 Cycles	8	0	0	0	0	0

DATA SUMMARIES Continued**LLCR IR/DWV:**

- 1) A total of 4 signal and 4 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. $\leq +5.0$ 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	9/3/2020	9/4/2020		
Room Temp (Deg C)	23	23		
Rel Humidity (%)	53	45		
Technician	Scott Rollefstad	Scott Rollefstad		
mOhm values	Actual	Delta		
	Initial	Thermal Shock		
Pin Type: Signal 1				
Average	317.5475	7.6975		
St. Dev.	7.2045	6.9716		
Min	312.18	2.28		
Max	328.11	17.81		
Summary Count	4	4		
Total Count	4	4		
Pin Type: GND 1				
Average	123.9405	31.4905		
St. Dev.	4.0095	2.4375		
Min	118.52	28.22		
Max	128.15	33.502		
Summary Count	4	4		
Total Count	4	4		

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	≤ 5	>5 & ≤ 10	>10 & ≤ 15	>15 & ≤ 50	>50 & ≤ 1000	>1000
After Thermal Shock	2	1	0	5	0	0

DATA SUMMARIES Continued

LLCR Cable Pull:

- 1) A total of 4 signal and 4 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. $\leq +5.0$ 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	9/9/2020	9/9/2020	
	Room Temp (Deg C)	23	23	
	Rel Humidity (%)	48	48	
	Technician	Scott Rollefstad	Scott Rollefstad	
	mOhm values	Actual	Delta	
		Initial	5lb Retention	
Pin Type: Signal 1				
	Average	83.7	0.67	
	St. Dev.	2.41	0.54	
	Min	82.2	0.1	
	Max	87.3	1.4	
	Summary Count	4	4	
	Total Count	4	4	
Pin Type: GND 1				
	Average	30.38	1.325	
	St. Dev.	1.75	0.74	
	Min	27.9	0.5	
	Max	32	2.2	
	Summary Count	4	4	
	Total Count	4	4	

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	≤ 5	$>5 \ \& \ \leq 10$	$>10 \ \& \ \leq 15$	$>15 \ \& \ \leq 50$	$>50 \ \& \ \leq 1000$	>1000
After 5lb Retention	8	0	0	0	0	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: 05/29/2020, Next Cal: 05/29/2021**Equipment #:** MO-11**Description:** Switch/Multimeter**Manufacturer:** Keithley**Model:** 3706**Serial #:** 120169**Accuracy:** See Manual

... Last Cal: 09/11/2020, Next Cal: 09/11/2021

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: 06/30/2020, Next Cal: 06/30/2021

Equipment #: HPT-01**Description:** Hipot Safety Tester**Manufacturer:** Vitrek**Model:** V73**Serial #:** 019808**Accuracy:**

... Last Cal: 05/15/2020, Next Cal: 05/15/2021