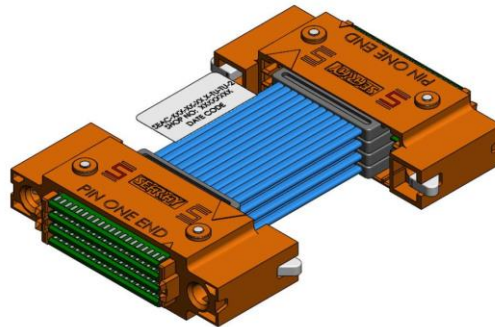
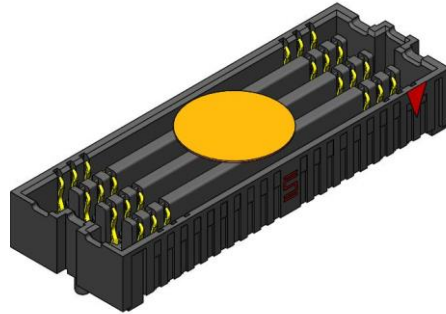




Project Number: Design Qualification Test Report	Tracking Code: 2204321_Report_Rev_1
Requested by: Dick Jones	Date: 4/7/2020
Part #: SEAFc-20-5.0-S-08-2-N-K-TR/SEAC-20-08-06.0-TU-TU-2	
Part description: SEAFc/SEAC	Tech: Dustin Pritchard
Test Start: 7/3/2018	Test Completed: 8/21/2019



DESIGN QUALIFICATION TEST REPORT

SEAFc/SEAM

SEAFc-30-5.0-S-08-2-N-K-TR/SEAM-30-02.0-S-08-2-A-K-TR

SEAFc/SEAC

SEAFc-30-5.0-S-08-2-N-K-TR/SEAC-030-08-06.0-TU-TU-2-N

SEAFc/SEAM

SEAFc-20-5.0-S-08-2-N-K-TR/SEAM-20-02.0-S-08-2-A-K-TR

SEAFc/SEAC

SEAFc-20-5.0-S-08-2-N-K-TR/SEAC-020-08-06.0-TU-TU-2-N

Tracking Code: 2204321_Report_Rev_1	Part #: SEAF-20-5.0-S-08-2-N-K-TR/SEAC-20-08-06.0-TU-TU-2
Part description: SEAF/SEAC	

REVISION HISTORY

DATA	REV.NUM.	DESCRIPTION	ENG
4/7/2020	1	Initial Issue	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

TEST SAMPLES AND PREPARATION

- 1) All materials were manufactured in accordance with the applicable product specification.
- 2) All test samples were identified and encoded to maintain traceability throughout the test sequences.
- 3) After soldering, the parts to be used for LLCR testing were cleaned according to TLWI-0001.
- 4) Either an automated cleaning procedure or an ultrasonic cleaning procedure may be used.
- 5) The automated procedure is used with aqueous compatible soldering materials.
- 6) Parts not intended for testing LLCR are visually inspected and cleaned if necessary.
- 7) Any additional preparation will be noted in the individual test sequences.
- 8) Solder Information: Lead Free
- 9) Samtec Test PCBs used: PCB-109133-TST

FLOWCHARTS

Normal Force

Group 1

SEAF-20-5.0-S-08-2-N-K-TR

SEAC-020-08-06.0-TU-TU-2-N

8 Contacts Minimum
Signal Without Thermals

Step	Description
1.	Contact Gaps
2.	Normal Force ⁽¹⁾ Deflection = 0.012 " Expected Force at Max Deflection = 90 g

Group 2

SEAF-20-5.0-S-08-2-N-K-TR

SEAC-020-08-06.0-TU-TU-2-N

8 Contacts Minimum
Signal With Thermals

Step	Description
1.	Contact Gaps
2.	Thermal Age ⁽²⁾
3.	Contact Gaps
4.	Normal Force ⁽¹⁾ Deflection = 0.012 " Expected Force at Max Deflection = 90 g

(1) Normal Force = EIA-364-04

(2) Thermal Age = EIA-364-17
Test Condition = 4 (105°C)
Time Condition = B (250 Hours)

Thermal Aging

Group 1

SEAF-30-5.0-S-08-2-N-K-TR

SEAM-30-02.0-S-08-2-A-K-TR

8 Assemblies

Step	Description
1.	Contact Gaps
2.	Mating/Unmating Force ⁽²⁾
3.	LLCR ⁽¹⁾
4.	Thermal Age ⁽³⁾
5.	LLCR ⁽¹⁾ Max Delta = 15 mOhm
6.	Mating/Unmating Force ⁽²⁾
7.	Contact Gaps

Group 2

SEAF-30-5.0-S-08-2-N-K-TR

SEAC-030-08-06.0-TU-TU-2-N

8 Assemblies

Step	Description
1.	Contact Gaps
2.	Mating/Unmating Force ⁽²⁾
3.	LLCR ⁽¹⁾
4.	Thermal Age ⁽³⁾
5.	LLCR ⁽¹⁾ Max Delta = 15 mOhm
6.	Mating/Unmating Force ⁽²⁾
7.	Contact Gaps

Group 3

SEAF-20-5.0-S-08-2-N-K-TR

SEAM-20-02.0-S-08-2-A-K-TR

8 Assemblies

Step	Description
1.	Contact Gaps
2.	Mating/Unmating Force ⁽²⁾
3.	LLCR ⁽¹⁾
4.	Thermal Age ⁽³⁾
5.	LLCR ⁽¹⁾ Max Delta = 15 mOhm
6.	Mating/Unmating Force ⁽²⁾
7.	Contact Gaps

Group 4

SEAF-20-5.0-S-08-2-N-K-TR

SEAC-020-08-06.0-TU-TU-2-N

8 Assemblies

Step	Description
1.	Contact Gaps
2.	Mating/Unmating Force ⁽²⁾
3.	LLCR ⁽¹⁾
4.	Thermal Age ⁽³⁾
5.	LLCR ⁽¹⁾ Max Delta = 15 mOhm
6.	Mating/Unmating Force ⁽²⁾
7.	Contact Gaps

(1) LLCR = EIA-364-23

Open Circuit Voltage = 20 mV Max
Test Current = 100 mA Max

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

(3) Thermal Age = EIA-364-17
Test Condition = 4 (105°C)
Time Condition = B (250 Hours)

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

SEAF-30-5.0-S-08-2-N-K-TR

SEAM-30-02.0-S-08-2-A-K-TR

8 Assemblies

Group 2

SEAF-30-5.0-S-08-2-N-K-TR

SEAC-030-08-06.0-TU-TU-2-N

8 Assemblies

Step	Description	Step	Description
1.	Contact Gaps	1.	Contact Gaps
2.	LLCR ⁽²⁾	2.	LLCR ⁽²⁾
3.	Mating/Unmating Force ⁽³⁾	3.	Mating/Unmating Force ⁽³⁾
4.	Cycles Quantity = 25 Cycles	4.	Cycles Quantity = 25 Cycles
5.	Mating/Unmating Force ⁽³⁾	5.	Mating/Unmating Force ⁽³⁾
6.	Cycles Quantity = 25 Cycles	6.	Cycles Quantity = 25 Cycles
7.	Mating/Unmating Force ⁽³⁾	7.	Mating/Unmating Force ⁽³⁾
8.	Cycles Quantity = 25 Cycles	8.	Cycles Quantity = 25 Cycles
9.	Mating/Unmating Force ⁽³⁾	9.	Mating/Unmating Force ⁽³⁾
10.	Cycles Quantity = 25 Cycles	10.	Cycles Quantity = 25 Cycles
11.	Mating/Unmating Force ⁽³⁾	11.	Mating/Unmating Force ⁽³⁾
12.	Contact Gaps	12.	Contact Gaps
13.	LLCR ⁽²⁾ Max Delta = 15 mOhm	13.	LLCR ⁽²⁾ Max Delta = 15 mOhm
14.	Thermal Shock ⁽⁴⁾	14.	Thermal Shock ⁽⁴⁾
15.	LLCR ⁽²⁾ Max Delta = 15 mOhm	15.	LLCR ⁽²⁾ Max Delta = 15 mOhm
16.	Humidity ⁽¹⁾	16.	Humidity ⁽¹⁾
17.	LLCR ⁽²⁾ Max Delta = 15 mOhm	17.	LLCR ⁽²⁾ Max Delta = 15 mOhm
18.	Mating/Unmating Force ⁽³⁾	18.	Mating/Unmating Force ⁽³⁾

(1) Humidity = EIA-364-31

Test Condition = B (240 Hours)

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

Test Exceptions: ambient pre-condition and delete steps 7a and 7b

(2) LLCR = EIA-364-23

Open Circuit Voltage = 20 mV Max

Test Current = 100 mA Max

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

(4) Thermal Shock = EIA-364-32

Exposure Time at Temperature Extremes = 1/2 Hour

Method A, Test Condition = I (-55°C to +85°C)

Test Duration = A-3 (100 Cycles)

FLOWCHARTS Continued**Mechanical Shock/Random Vibration/LLCR**

<u>Group 1</u>		<u>Group 2</u>		<u>Group 3</u>		<u>Group 4</u>	
SEAF-30-5.0-S-08-2-N-K-TR		SEAF-30-5.0-S-08-2-N-K-TR		SEAF-20-5.0-S-08-2-N-K-TR		SEAF-20-5.0-S-08-2-N-K-TR	
SEAM-30-02.0-S-08-2-A-K-TR		SEAC-030-08-06.0-TU-TU-2-N		SEAM-20-02.0-S-08-2-A-K-TR		SEAC-020-08-06.0-TU-TU-2-N	
8 Assemblies		8 Assemblies		8 Assemblies		8 Assemblies	
Step	Description	Step	Description	Step	Description	Step	Description
1.	LLCR ⁽¹⁾	1.	LLCR ⁽¹⁾	1.	LLCR ⁽¹⁾	1.	LLCR ⁽¹⁾
2.	Mechanical Shock ⁽²⁾	2.	Mechanical Shock ⁽²⁾	2.	Mechanical Shock ⁽²⁾	2.	Mechanical Shock ⁽²⁾
3.	Random Vibration ⁽³⁾	3.	Random Vibration ⁽³⁾	3.	Random Vibration ⁽³⁾	3.	Random Vibration ⁽³⁾
4.	LLCR ⁽¹⁾ Max Delta = 15 mOhm	4.	LLCR ⁽¹⁾ Max Delta = 15 mOhm	4.	LLCR ⁽¹⁾ Max Delta = 15 mOhm	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)

ATTRIBUTE DEFINITIONS

The following is a brief, simplified description of attributes.

THERMAL:

- 1) EIA-364-17, *Temperature Life with or without Electrical Load Test Procedure for Electrical Connectors*.
- 2) Test Condition 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.

THERMAL SHOCK:

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

HUMIDITY:

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

MECHANICAL SHOCK (Specified Pulse):

- 1) Reference document: EIA-364-27, *Mechanical Shock Test Procedure for Electrical Connectors*
- 2) Test Condition: C
- 3) Peak Value: 50 G and 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 G² / Hz
- 4) G 'RMS': 7.56
- 5) Frequency: 50 to 2000 Hz
- 6) Duration: 2.0 Hours per axis (3 axis total)

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

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 TC², 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 TC² software in order to acquire and record the test data.
- 10) The permanent set of each contact shall be measured within the TC² 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 printout will be stored with the Tracking Code paperwork.

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

RESULTS**Mating – Unmating Forces****Thermal Aging Group****SEAF-C-30-5.0-S-08-2-N-K-TR/SEAM-30-02.0-S-08-2-A-K-TR**

- **Initial**
 - **Mating**
 - **Min** ----- 8.31 lbs
 - **Max** ----- 9.44 lbs
 - **Unmating**
 - **Min** ----- 5.52 lbs
 - **Max** ----- 6.19 lbs
- **After Thermal**
 - **Mating**
 - **Min** ----- 4.34 lbs
 - **Max** ----- 6.74 lbs
 - **Unmating**
 - **Min** ----- 2.52 lbs
 - **Max** ----- 3.58 lbs

SEAF-C-30-5.0-S-08-2-N-K-TR/SEAC-030-08-06.0-TU-TU-2-N

- **Initial**
 - **Mating**
 - **Min** ----- 14.07 lbs
 - **Max** ----- 22.12 lbs
 - **Unmating**
 - **Min** ----- 8.98 lbs
 - **Max** ----- 9.75 lbs
- **After Thermal**
 - **Mating**
 - **Min** ----- 12.18 lbs
 - **Max** ----- 16.03 lbs
 - **Unmating**
 - **Min** ----- 7.36 lbs
 - **Max** ----- 8.28 lbs

SEAF-C-20-5.0-S-08-2-N-K-TR/SEAM-20-02.0-S-08-2-A-K-TR

- **Initial**
 - **Mating**
 - **Min** ----- 7.08 lbs
 - **Max** ----- 8.20 lbs
 - **Unmating**
 - **Min** ----- 4.54 lbs
 - **Max** ----- 5.93 lbs
- **After Thermal**
 - **Mating**
 - **Min** ----- 4.83 lbs
 - **Max** ----- 5.18 lbs
 - **Unmating**
 - **Min** ----- 2.73 lbs
 - **Max** ----- 3.34 lbs

RESULTS Continued**SEAF-C-20-5.0-S-08-2-N-K-TR/SEAC-020-08-06.0-TU-TU-2-N**

- **Initial**
 - **Mating**
 - **Min** -----14.40 lbs
 - **Max** -----17.23 lbs
 - **Unmating**
 - **Min** ----- 5.97 lbs
 - **Max** ----- 9.88 lbs
- **After Thermal**
 - **Mating**
 - **Min** -----10.53 lbs
 - **Max** -----13.28 lbs
 - **Unmating**
 - **Min** ----- 6.69 lbs
 - **Max** -----10.08 lbs

RESULTS Continued**Mating/Unmating Durability Group****SEAF-30-5.0-S-08-2-N-K-TR/SEAM-30-02.0-S-08-2-A-K-TR**

- **Initial**
 - **Mating**
 - **Min** ----- 7.58 lbs
 - **Max** ----- 9.05 lbs
 - **Unmating**
 - **Min** ----- 5.42 lbs
 - **Max** ----- 6.28 lbs
- **After 25 Cycles**
 - **Mating**
 - **Min** ----- 9.34 lbs
 - **Max** ----- 11.22 lbs
 - **Unmating**
 - **Min** ----- 6.42 lbs
 - **Max** ----- 7.00 lbs
- **After 50 Cycles**
 - **Mating**
 - **Min** ----- 9.26 lbs
 - **Max** ----- 9.94 lbs
 - **Unmating**
 - **Min** ----- 6.75 lbs
 - **Max** ----- 7.16 lbs
- **After 75 Cycles**
 - **Mating**
 - **Min** ----- 9.00 lbs
 - **Max** ----- 9.62 lbs
 - **Unmating**
 - **Min** ----- 7.04 lbs
 - **Max** ----- 7.59 lbs
- **After 100 Cycles**
 - **Mating**
 - **Min** ----- 8.82 lbs
 - **Max** ----- 9.86 lbs
 - **Unmating**
 - **Min** ----- 7.18 lbs
 - **Max** ----- 7.83 lbs
- **After Humidity**
 - **Mating**
 - **Min** ----- 6.50 lbs
 - **Max** ----- 6.99 lbs
 - **Unmating**
 - **Min** ----- 4.38 lbs
 - **Max** ----- 5.08 lbs

RESULTS Continued**SEAF-30-5.0-S-08-2-N-K-TR/SEAC-030-08-06.0-TU-TU-2-N**

- **Initial**
 - **Mating**
 - **Min** -----16.85 lbs
 - **Max** -----22.18 lbs
 - **Unmating**
 - **Min** ----- 8.60 lbs
 - **Max** ----- 9.45 lbs
- **After 25 Cycles**
 - **Mating**
 - **Min** -----15.17 lbs
 - **Max** -----16.86 lbs
 - **Unmating**
 - **Min** ----- 8.24 lbs
 - **Max** ----- 9.18 lbs
- **After 50 Cycles**
 - **Mating**
 - **Min** -----15.00 lbs
 - **Max** -----16.51 lbs
 - **Unmating**
 - **Min** ----- 9.48 lbs
 - **Max** -----11.06 lbs
- **After 75 Cycles**
 - **Mating**
 - **Min** -----12.47 lbs
 - **Max** -----16.65 lbs
 - **Unmating**
 - **Min** -----10.12 lbs
 - **Max** -----12.70 lbs
- **After 100 Cycles**
 - **Mating**
 - **Min** -----15.28 lbs
 - **Max** -----17.17 lbs
 - **Unmating**
 - **Min** -----12.19 lbs
 - **Max** -----14.14 lbs
- **After Humidity**
 - **Mating**
 - **Min** -----12.00 lbs
 - **Max** -----15.26 lbs
 - **Unmating**
 - **Min** ----- 7.94 lbs
 - **Max** ----- 9.86 lbs

Normal Force at 0.0075-inch deflection

- **Initial**
 - **Min** -----64.50 gf **Set** ---- 0.0002 inch
 - **Max** -----69.30 gf **Set** ---- 0.0002 inch
- **Thermal**
 - **Min** -----52.40 gf **Set** ---- 0.0007 inch
 - **Max** -----58.80 gf **Set** ---- 0.0013 inch

RESULTS Continued**LLCR Thermal Aging**

SEAFc-30-5.0-S-08-2-N-K-TR/SEAM-30-02.0-S-08-2-A-K-TR (192 LLCR test points)

- **Initial** -----6.74 mOhms Max
- **Thermal Aging**
 - <= +5.0 mOhms-----192 Points ----- Stable
 - +5.1 to +10.0 mOhms-----0 Points ----- Minor
 - +10.1 to +15.0 mOhms -----0 Points ----- Acceptable
 - +15.1 to +50.0 mOhms -----0 Points ----- Marginal
 - +50.1 to +1000 mOhms-----0 Points ----- Unstable
 - >+1000 mOhms-----0 Points ----- Open Failure

SEAFc-30-5.0-S-08-2-N-K-TR/SEAC-030-08-06.0-TU-TU-2 (128 signal and 64 ground LLCR test points)

Signal Pin

- **Initial** -----86.74 mOhms Max
- **Thermal Aging**
 - <= +5.0 mOhms-----126 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 +1000 mOhms-----0 Points ----- Unstable
 - >+1000 mOhms-----0 Points ----- Open Failure

Ground Pin

- **Initial** -----15.25 mOhms Max
- **Thermal Aging**
 - <= +5.0 mOhms-----64 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 Thermal Aging**

SEAF-20-5.0-S-08-2-N-K-TR/SEAM-20-02.0-S-08-2-A-K-TR (192 LLCR test points)

- **Initial** ----- 7.00 mOhms Max
- **Thermal Aging**
 - <= +5.0 mOhms ----- 192 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 0 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 0 Points ----- Acceptable
 - +15.1 to +50.0 mOhms ----- 0 Points ----- Marginal
 - +50.1 to +1000 mOhms ----- 0 Points ----- Unstable
 - >+1000 mOhms ----- 0 Points ----- Open Failure

SEAF-20-5.0-S-08-2-N-K-TR/SEAC-020-08-06.0-TU-TU-2-N (112 signal and 56 ground LLCR test points)

Signal Pin

- **Initial** ----- 197.62 mOhms Max
- **Thermal Aging**
 - <= +5.0 mOhms ----- 110 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 +1000 mOhms ----- 0 Points ----- Unstable
 - >+1000 mOhms ----- 0 Points ----- Open Failure

Ground Pin

- **Initial** ----- 16.19 mOhms Max
- **Thermal Aging**
 - <= +5.0 mOhms ----- 56 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 Durability (192 LLCR test points)**

SEAF-30-5.0-S-08-2-N-K-TR/SEAM-30-02.0-S-08-2-A-K-TR

- **Initial** -----7.93 mOhms Max
- **Durability, 100 Cycles**
 - **<= +5.0 mOhms**-----192 Points ----- Stable
 - **+5.1 to +10.0 mOhms**-----0 Points ----- Minor
 - **+10.1 to +15.0 mOhms** -----0 Points ----- Acceptable
 - **+15.1 to +50.0 mOhms** -----0 Points ----- Marginal
 - **+50.1 to +1000 mOhms**-----0 Points ----- Unstable
 - **>+1000 mOhms**-----0 Points ----- Open Failure
- **Thermal Shock**
 - **<= +5.0 mOhms**-----192 Points ----- Stable
 - **+5.1 to +10.0 mOhms**-----0 Points ----- Minor
 - **+10.1 to +15.0 mOhms** -----0 Points ----- Acceptable
 - **+15.1 to +50.0 mOhms** -----0 Points ----- Marginal
 - **+50.1 to +1000 mOhms**-----0 Points ----- Unstable
 - **>+1000 mOhms**-----0 Points ----- Open Failure
- **Humidity**
 - **<= +5.0 mOhms**-----192 Points ----- Stable
 - **+5.1 to +10.0 mOhms**-----0 Points ----- Minor
 - **+10.1 to +15.0 mOhms** -----0 Points ----- Acceptable
 - **+15.1 to +50.0 mOhms** -----0 Points ----- Marginal
 - **+50.1 to +1000 mOhms**-----0 Points ----- Unstable
 - **>+1000 mOhms**-----0 Points ----- Open Failure

RESULTS Continued**LLCR Durability (128 signal and 64 ground LLCR test points)**

SEAF-30-5.0-S-08-2-N-K-TR/SEAC-030-08-06.0-TU-TU-2-N

Signal Pin

- **Initial** ----- 86.18 mOhms Max
- **Durability, 100 Cycles**
 - <= +5.0 mOhms ----- 127 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
- **Thermal Shock**
 - <= +5.0 mOhms ----- 123 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 4 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 1 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
- **Humidity**
 - <= +5.0 mOhms ----- 125 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 3 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** ----- 12.33 mOhms Max
- **Durability, 100 Cycles**
 - <= +5.0 mOhms ----- 63 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
- **Thermal Shock**
 - <= +5.0 mOhms ----- 60 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 4 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
- **Humidity**
 - <= +5.0 mOhms ----- 62 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 +1000 mOhms ----- 0 Points ----- Unstable
 - >+1000 mOhms ----- 0 Points ----- Open Failure

RESULTS Continued**LLCR Shock & Vibration**

SEAF-30-5.0-S-08-2-N-K-TR/SEAM-30-02.0-S-08-2-A-K-TR (192 LLCR test points)

- Initial -----6.50 mOhms Max
- Shock & Vibration
 - <= +5.0 mOhms ----- 189 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 2 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 1 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

SEAF-30-5.0-S-08-2-N-K-TR/SEAC-030-08-06.0-TU-TU-2-N (112 signal and 56 ground LLCR test points)

Signal Pin

- Initial -----173.81 mOhms Max
- Shock & Vibration
 - <= +5.0 mOhms ----- 90 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 16 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 6 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 -----6.50 mOhms Max
- Shock & Vibration
 - <= +5.0 mOhms ----- 51 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 5 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**

SEAF-20-5.0-S-08-2-N-K-TR/SEAM-20-02.0-S-08-2-A-K-TR (192 LLCR test points)

- Initial ----- 16.99 mOhms Max
- Shock & Vibration
 - <= +5.0 mOhms ----- 190 Points ----- Stable
 - +5.1 to +10.0 mOhms ----- 2 Points ----- Minor
 - +10.1 to +15.0 mOhms ----- 0 Points ----- Acceptable
 - +15.1 to +50.0 mOhms ----- 0 Points ----- Marginal
 - +50.1 to +1000 mOhms ----- 0 Points ----- Unstable
 - >+1000 mOhms ----- 0 Points ----- Open Failure

SEAF-20-5.0-S-08-2-N-K-TR/SEAC-020-08-06.0-TU-TU-2-N (128 signal and 64 ground LLCR test points)

Signal Pin

- Initial ----- 356.59 mOhms Max
- Shock & Vibration
 - <= +5.0 mOhms ----- 126 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 +1000 mOhms ----- 0 Points ----- Unstable
 - >+1000 mOhms ----- 0 Points ----- Open Failure

Ground Pin

- Initial ----- 15.60 mOhms Max
- Shock & Vibration
 - <= +5.0 mOhms ----- 64 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:

Thermal Aging Group

SEAF-30-5.0-S-08-2-N-K-TR/SEAM-30-02.0-S-08-2-A-K-TR

	Initial				After Thermals			
	Mating		Unmating		Mating		Unmating	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	36.96	8.31	24.55	5.52	19.30	4.34	11.21	2.52
Maximum	41.99	9.44	27.53	6.19	29.98	6.74	15.92	3.58
Average	39.59	8.90	25.75	5.79	23.82	5.36	13.69	3.08
St Dev	1.48	0.33	1.22	0.27	3.26	0.73	1.58	0.35
Count	8	8	8	8	8	8	8	8

SEAF-30-5.0-S-08-2-N-K-TR/SEAC-030-08-06.0-TU-TU-2-N

	Initial				After Thermals			
	Mating		Unmating		Mating		Unmating	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	62.58	14.07	39.94	8.98	54.18	12.18	32.74	7.36
Maximum	98.39	22.12	43.37	9.75	71.30	16.03	36.83	8.28
Average	84.86	19.08	41.03	9.23	62.36	14.02	34.72	7.81
St Dev	10.41	2.34	1.05	0.24	5.39	1.21	1.54	0.35
Count	8	8	8	8	8	8	8	8

SEAF-20-5.0-S-08-2-N-K-TR/SEAM-20-02.0-S-08-2-A-K-TR

	Initial				After Thermals			
	Mating		Unmating		Mating		Unmating	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	31.47	7.08	20.17	4.54	21.48	4.83	12.15	2.73
Maximum	36.46	8.20	26.38	5.93	23.06	5.18	14.85	3.34
Average	34.64	7.79	23.04	5.18	22.38	5.03	13.41	3.01
St Dev	1.91	0.43	2.09	0.47	0.62	0.14	0.79	0.18
Count	8	8	8	8	8	8	8	8

SEAF-20-5.0-S-08-2-N-K-TR/SEAC-020-08-06.0-TU-TU-2-N

	Initial				After Thermals			
	Mating		Unmating		Mating		Unmating	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	64.05	14.40	26.57	5.97	46.82	10.53	29.77	6.69
Maximum	76.65	17.23	43.95	9.88	59.09	13.28	44.85	10.08
Average	70.95	15.95	37.68	8.47	52.94	11.90	38.83	8.73
St Dev	4.12	0.93	6.32	1.42	4.41	0.99	5.16	1.16
Count	7	7	7	7	7	7	7	7

DATA SUMMARIES Continued**Mating/Unmating Durability Group****SEAF-30-5.0-S-08-2-N-K-TR/SEAM-30-02.0-S-08-2-A-K-TR**

	Initial				25 Cycles			
	Mating		Unmating		Mating		Unmating	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	33.72	7.58	24.11	5.42	41.54	9.34	28.56	6.42
Maximum	40.25	9.05	27.93	6.28	49.91	11.22	31.14	7.00
Average	36.52	8.21	25.49	5.73	46.36	10.42	29.63	6.66
St Dev	2.37	0.53	1.16	0.26	2.96	0.67	0.82	0.18
Count	8	8	8	8	8	8	8	8
	50 Cycles				75 Cycles			
	Mating		Unmating		Mating		Unmating	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	41.19	9.26	30.02	6.75	40.03	9.00	31.31	7.04
Maximum	44.21	9.94	31.85	7.16	42.79	9.62	33.76	7.59
Average	43.05	9.68	30.77	6.92	41.43	9.32	32.54	7.32
St Dev	1.06	0.24	0.71	0.16	1.03	0.23	0.84	0.19
Count	8	8	8	8	8	8	8	8
	100 Cycles				After Humidity			
	Mating		Unmating		Mating		Unmating	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	39.23	8.82	31.94	7.18	28.91	6.50	19.48	4.38
Maximum	43.86	9.86	34.83	7.83	31.09	6.99	22.60	5.08
Average	41.57	9.35	33.16	7.46	30.01	6.75	21.07	4.74
St Dev	1.76	0.40	0.94	0.21	0.83	0.19	1.09	0.24
Count	8	8	8	8	8	8	8	8

DATA SUMMARIES Continued**Mating/Unmating Durability Group****SEAF-30-5.0-S-08-2-N-K-TR/SEAC-030-08-06.0-TU-TU-2-N**

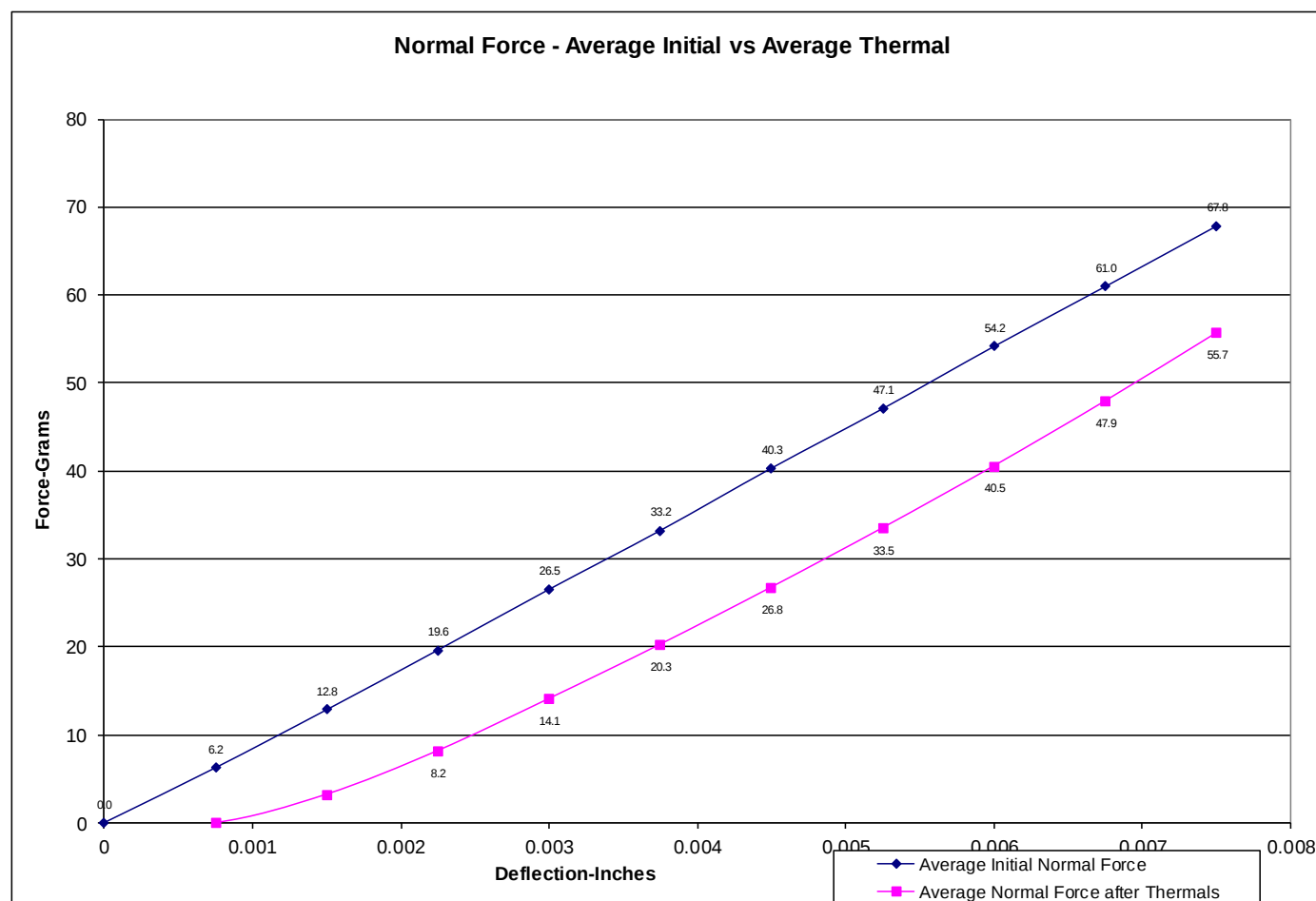
	Initial				25 Cycles			
	Mating		Unmating		Mating		Unmating	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	74.95	16.85	38.25	8.60	67.48	15.17	36.65	8.24
Maximum	98.66	22.18	42.03	9.45	74.99	16.86	40.83	9.18
Average	84.33	18.96	40.28	9.06	70.23	15.79	38.74	8.71
St Dev	8.08	1.82	1.43	0.32	2.81	0.63	1.90	0.43
Count	8	8	8	8	8	8	8	8
	50 Cycles				75 Cycles			
	Mating		Unmating		Mating		Unmating	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	66.72	15.00	42.17	9.48	55.47	12.47	45.01	10.12
Maximum	73.44	16.51	49.19	11.06	74.06	16.65	56.49	12.70
Average	69.86	15.71	45.25	10.17	68.33	15.36	51.68	11.62
St Dev	2.44	0.55	2.77	0.62	5.73	1.29	3.85	0.87
Count	8	8	8	8	8	8	8	8
	100 Cycles				After Humidity			
	Mating		Unmating		Mating		Unmating	
	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)	Newtons	Force (Lbs)
Minimum	67.97	15.28	54.22	12.19	53.38	12.00	35.32	7.94
Maximum	76.37	17.17	62.89	14.14	67.88	15.26	43.86	9.86
Average	71.64	16.11	58.04	13.05	61.34	13.79	40.23	9.04
St Dev	3.06	0.69	2.98	0.67	5.21	1.17	3.21	0.72
Count	8	8	8	8	8	8	8	8

DATA SUMMARIES Continued**NORMAL FORCE (FOR CONTACTS TESTED IN THE HOUSING):**

- 1) Calibrated force gauges are used along with computer-controlled positioning equipment.
- 2) For Normal force 8-10 measurements are taken and the averages reported.

Initial	Deflections in inches Forces in Grams										
	0.0008	0.0015	0.0023	0.0030	0.0038	0.0045	0.0053	0.0060	0.0068	0.0075	SET
Averages	6.24	12.84	19.63	26.53	33.23	40.32	47.08	54.16	60.97	67.84	0.0002
Min	5.80	12.10	18.60	24.90	31.10	37.50	43.50	50.40	56.90	64.50	0.0002
Max	6.80	13.30	20.40	27.60	34.50	41.70	48.40	55.70	62.80	69.30	0.0002
St. Dev	0.337	0.378	0.574	0.778	1.030	1.238	1.438	1.580	1.739	1.522	0.0000
Count	12	12	12	12	12	12	12	12	12	12	12

After Thermal	Deflections in inches Forces in Grams										
	0.0008	0.0015	0.0023	0.0030	0.0038	0.0045	0.0053	0.0060	0.0068	0.0075	SET
Averages	0.00	3.22	8.18	14.09	20.26	26.76	33.50	40.53	47.92	55.66	0.00
Min	0.00	2.00	6.60	12.50	18.80	24.50	31.50	38.40	44.60	52.40	0.0007
Max	0.00	4.90	9.80	16.60	23.10	29.50	36.80	43.80	50.90	58.80	0.0013
St. Dev	0.000	0.872	1.064	1.368	1.441	1.695	1.767	1.880	2.058	2.109	0.0002
Count	12	12	12	12	12	12	12	12	12	12	12



DATA SUMMARIES Continued**LLCR Durability:**

- 1) A total of 192 points were measured.
- 2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets*.
- 3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
- 4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
 - a. $\leq +5.0$ 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

SEAF-30-5.0-S-08-2-N-K-TR/SEAM-30-02.0-S-08-2-A-K-TR

LLCR Measurement Summaries by Pin Type				
Date	7/3/2018	7/25/2018	8/9/2018	8/20/2018
Room Temp (Deg C)	23	23	23	23
Rel Humidity (%)	47	42	46	46
Technician	Dustin Pritchard	Dustin Pritchard	Dustin Pritchard	Dustin Pritchard
mOhm values	Actual Initial	Delta 100 Cycles	Delta Therm Shck	Delta Humidity
Pin Type 1: Signal				
Average	5.38	0.26	0.37	0.43
St. Dev.	0.46	0.25	0.34	0.34
Min	4.56	0.00	0.01	0.01
Max	7.93	1.50	2.44	2.14
Summary Count	192	192	192	192
Total Count	192	192	192	192

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	≤ 5	$>5 \text{ \& } \leq 10$	$>10 \text{ \& } \leq 15$	$>15 \text{ \& } \leq 50$	$>50 \text{ \& } \leq 1000$	>1000
100 Cycles	192	0	0	0	0	0
Therm Shck	192	0	0	0	0	0
Humidity	192	0	0	0	0	0

DATA SUMMARIES Continued**SEAFC-30-5.0-S-08-2-N-K-TR/SEAC-030-08-06.0-TU-TU-2-N**

LLCR Measurement Summaries by Pin Type				
Date	7/11/2018	7/25/2018	8/9/2018	8/21/2018
Room Temp (Deg C)	23	23	23	23
Rel Humidity (%)	46	43	46	44
Technician	Dustin Pritchard	Dustin Pritchard	Dustin Pritchard	Dustin Pritchard
mOhm values	Actual Initial	Delta 100 Cycles	Delta Therm Shck	Delta Humidity
Pin Type 1: Signal				
Average	82.30	1.15	1.74	1.50
St. Dev.	1.47	1.17	1.67	1.39
Min	78.72	0.01	0.01	0.02
Max	86.18	8.39	10.29	6.65
Summary Count	128	128	128	128
Total Count	128	128	128	128
Pin Type 2: Ground				
Average	10.13	1.70	2.42	2.30
St. Dev.	0.78	1.28	1.44	1.45
Min	9.05	0.06	0.07	0.15
Max	12.33	5.50	5.54	5.96
Summary Count	64	64	64	64
Total Count	64	64	64	64

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	<=5	>5 & <=10	>10 & <=15	>15 & <=50	>50 & <=1000	>1000
100 Cycles	190	2	0	0	0	0
Therm Shck	183	8	1	0	0	0
Humidity	187	5	0	0	0	0

DATA SUMMARIES Continued**LLCR Thermal Aging:**

- 1) A total of 192 points were measured.
- 2) EIA-364-23, *Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets*.
- 3) A computer program, *LLCR 221.exe*, ensures repeatability for data acquisition.
- 4) The following guidelines are used to categorize the changes in LLCR as a result from stressing.
 - a. $\leq +5.0$ 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

SEAF-20-5.0-S-08-2-N-K-TR/SEAM-30-02.0-S-08-2-A-K-TR

LLCR Measurement Summaries by Pin Type				
Date	7/17/2018	7/30/2018		
Room Temp (Deg C)	23	23		
Rel Humidity (%)	44	42		
Technician	Dustin Pritchard	Dustin Pritchard		
mOhm values	Actual Initial	Delta Thermal	Delta	Delta
Pin Type 1: Signal				
Average	5.30	0.21		
St. Dev.	0.34	0.19		
Min	4.70	0.00		
Max	6.74	1.22		
Summary Count	192	192		
Total Count	192	192		

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	≤ 5	$>5 \text{ \& } \leq 10$	$>10 \text{ \& } \leq 15$	$>15 \text{ \& } \leq 50$	$>50 \text{ \& } \leq 1000$	>1000
Thermal	192	0	0	0	0	0

DATA SUMMARIES Continued**SEAF-30-5.0-S-08-2-N-K-TR/SEAC-030-08-06.0-TU-TU-2-N**

LLCR Measurement Summaries by Pin Type				
Date	7/17/2018	7/30/2018		
Room Temp (Deg C)	23	23		
Rel Humidity (%)	43	42		
Technician	Dustin Pritchard	Dustin Pritchard		
mOhm values	Actual	Delta	Delta	Delta
	Initial	Thermal		
Pin Type 1: Signal				
Average	82.37	1.15		
St. Dev.	1.76	1.14		
Min	76.36	0.01		
Max	86.74	6.28		
Summary Count	128	128		
Total Count	128	128		
Pin Type 2: Ground				
Average	10.22	1.02		
St. Dev.	1.23	0.92		
Min	8.69	0.00		
Max	15.25	4.00		
Summary Count	64	64		
Total Count	64	64		

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	<=5	>5 & <=10	>10 & <=15	>15 & <=50	>50 & <=1000	>1000
Thermal	190	2	0	0	0	0

DATA SUMMARIES Continued**SEAF-20-5.0-S-08-2-N-K-TR/SEAM-20-02.0-S-08-2-A-K-TR**

LLCR Measurement Summaries by Pin Type				
Date	2/22/2018	3/5/2018		
Room Temp (Deg C)	23	23		
Rel Humidity (%)	36	32		
Technician	Tony Wagoner	Tony Wagoner		
mOhm values	Actual	Delta	Delta	Delta
	Initial	Thermal		
Pin Type 1: Signal				
Average	5.27	0.19		
St. Dev.	0.34	0.17		
Min	4.51	0.00		
Max	7.00	1.12		
Summary Count	192	192		
Total Count	192	192		

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	<=5	>5 & <=10	>10 & <=15	>15 & <=50	>50 & <=1000	>1000
Thermal	192	0	0	0	0	0

SEAF-20-5.0-S-08-2-N-K-TR/SEAC-020-08-06.0-TU-TU-2-N

LLCR Measurement Summaries by Pin Type				
Date	2/22/2018	3/5/2018		
Room Temp (Deg C)	23	23		
Rel Humidity (%)	36	32		
Technician	Tony Wagoner	Tony Wagoner		
mOhm values	Actual	Delta	Delta	Delta
	Initial	Thermal		
Pin Type 1: Signal				
Average	187.66	0.98		
St. Dev.	3.69	0.87		
Min	179.26	0.03		
Max	197.62	7.23		
Summary Count	112	112		
Total Count	112	112		
Pin Type 2: Ground				
Average	10.28	0.50		
St. Dev.	1.06	0.58		
Min	9.15	0.00		
Max	16.19	3.25		
Summary Count	56	56		
Total Count	56	56		

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	<=5	>5 & <=10	>10 & <=15	>15 & <=50	>50 & <=1000	>1000
Thermal	166	2	0	0	0	0

DATA SUMMARIES Continued**LLCR Shock &Vibration Group:**

- 1). A total of 192 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. $\leq +5.0$ 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

SEAF-30-5.0-S-08-2-N-K-TR/SEAM-30-02.0-S-08-2-A-K-TR

LLCR Measurement Summaries by Pin Type				
Date	10/5/2018	10/24/2018		
Room Temp (Deg C)	23	22		
Rel Humidity (%)	49	36		
Technician	Dustin Pritchard	Dustin Pritchard		
mOhm values	Actual Initial	Delta Shock-Vib	Delta	Delta
Pin Type 1: Signal				
Average	5.36	0.36		
St. Dev.	0.34	0.94		
Min	4.72	0.00		
Max	6.50	10.42		
Summary Count	192	192		
Total Count	192	192		

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	≤ 5	$>5 \text{ \& } \leq 10$	$>10 \text{ \& } \leq 15$	$>15 \text{ \& } \leq 50$	$>50 \text{ \& } \leq 1000$	>1000
Shock-Vib	189	2	1	0	0	0

DATA SUMMARIES Continued**SEAF-30-5.0-S-08-2-N-K-TR/SEAC-030-08-06.0-TU-TU-2-N**

LLCR Measurement Summaries by Pin Type				
Date	10/18/2018	10/24/2018		
Room Temp (Deg C)	23	22		
Rel Humidity (%)	35	36		
Technician	Dustin Pritchard	Dustin Pritchard		
mOhm values	Actual Initial	Delta Shock-Vib	Delta	Delta
Pin Type 1: Signal				
Average	159.96	2.70		
St. Dev.	3.32	3.41		
Min	148.82	0.01		
Max	173.81	13.99		
Summary Count	112	112		
Total Count	112	112		
Pin Type 2:				
Average	13.59	1.60		
St. Dev.	0.73	1.98		
Min	12.46	0.04		
Max	15.30	8.49		
Summary Count	56	56		
Total Count	56	56		

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	<=5	>5 & <=10	>10 & <=15	>15 & <=50	>50 & <=1000	>1000
Shock-Vib	141	21	6	0	0	0

DATA SUMMARIES Continued**SEAF-20-5.0-S-08-2-N-K-TR/SEAM-20-02.0-S-08-2-A-K-TR**

LLCR Measurement Summaries by Pin Type				
Date	2/15/2018	2/19/2018		
Room Temp (Deg C)	22	22		
Rel Humidity (%)	43	40		
Technician	Tony Wagoner	Tony Wagoner		
mOhm values	Actual Initial	Delta Shock-Vib	Delta	Delta
Pin Type 1: Signal				
Average	7.35	0.74		
St. Dev.	2.17	0.92		
Min	4.63	0.00		
Max	16.99	5.79		
Summary Count	192	192		
Total Count	192	192		

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	<=5	>5 & <=10	>10 & <=15	>15 & <=50	>50 & <=1000	>1000
Shock-Vib	190	2	0	0	0	0

SEAF-20-5.0-S-08-2-N-K-TR/SEAC-020-08-06.0-TU-TU-2-N

LLCR Measurement Summaries by Pin Type				
Date	4/5/2018	4/10/2018		
Room Temp (Deg C)	22	22		
Rel Humidity (%)	30	32		
Technician	Tony Wagoner	Tony Wagoner		
mOhm values	Actual Initial	Delta Shock-Vib	Delta	Delta
Pin Type 1: Signal				
Average	342.22	2.65		
St. Dev.	6.20	0.88		
Min	328.88	0.12		
Max	356.59	7.30		
Summary Count	128	128		
Total Count	128	128		
Pin Type 2: Ground				
Average	13.50	0.59		
St. Dev.	0.58	0.50		
Min	12.58	0.09		
Max	15.60	2.66		
Summary Count	64	64		
Total Count	64	64		

LLCR Delta Count by Category						
	Stable	Minor	Acceptable	Marginal	Unstable	Open
mOhms	<=5	>5 & <=10	>10 & <=15	>15 & <=50	>50 & <=1000	>1000
Shock-Vib	190	2	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: 05/29/2018, Next Cal: 05/29/2019

Equipment #: MO-11**Description:** Switch/Multimeter**Manufacturer:** Keithley**Model:** 3706**Serial #:** 120169**Accuracy:** See Manual

... Last Cal: 09/11/2018, Next Cal: 09/11/2019

Equipment #: THC-05**Description:** Temperature/Humidity Chamber (Chamber Room)**Manufacturer:** Thermotron**Model:** SM-8-3800**Serial #:** 05 23 00 02**Accuracy:** See Manual

... Last Cal: 11/14/2018, Next Cal: 11/14/2019

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: 06/30/2018, Next Cal: 06/30/2019

Equipment #: OV-05**Description:** Forced Air Oven, 5 Cu. Ft., 120 V (Chamber Room)**Manufacturer:** Sheldon Mfg.**Model:** CE5F**Serial #:** 02008008**Accuracy:** +/- 5 deg. C

... Last Cal: 02/05/2019, Next Cal: 02/05/2020

EQUIPMENT AND CALIBRATION SCHEDULES**Equipment #:** SVC-01**Description:** Shock & Vibration Table**Manufacturer:** Data Physics**Model:** LE-DSA-10-20K**Serial #:** 10037**Accuracy:** See Manual

... Last Cal: 04/22/2018, Next Cal: 04/22/2019

Equipment #: ACLM-01**Description:** Accelerometer**Manufacturer:** PCB Piezotronics**Model:** 352C03**Serial #:** 115819**Accuracy:** See Manual

... Last Cal: 07/18/2018, Next Cal: 07/18/2019