SEVERE ENVIRONMENT TEST REPORT

UMPS / UMPT
UMPS-05-05.5-G-VT-SM-WT-K / UMPT-05-06.5-G-VT-SM-WT-K
<table>
<thead>
<tr>
<th>DATA</th>
<th>REV.NUM.</th>
<th>DESCRIPTION</th>
<th>ENG</th>
</tr>
</thead>
<tbody>
<tr>
<td>5/13/2020</td>
<td>1</td>
<td>Initial Issue</td>
<td>KH</td>
</tr>
</tbody>
</table>
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: Severe Environment Test. Please see test plan.

APPLICABLE DOCUMENTS

Standards: EIA Publication 364; VITA 47.1.

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) Samtec Test PCBs used: PCB-110510-TST.
### Mating/Unmating/Durability

*Note: With Humidity (Up to 100% RH, 240 hours, 25°C to 65°C)*
*Note: From MIL-STD-810G: For chamber control purposes, 100% RH implies as close to 100% RH as possible, but not less than 95%.*

<table>
<thead>
<tr>
<th>Group 1</th>
<th>Group 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>UMPS-05-05.5-G-VT-SM-WT-K</td>
<td>UMPS-02-05.5-G-VT-SM-WT-K</td>
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<tr>
<td>UMPT-05-06.5-G-VT-SM-WT-K</td>
<td>UMPT-02-06.5-G-VT-SM-WT-K</td>
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<tr>
<td>8 Assemblies</td>
<td>8 Assemblies</td>
</tr>
<tr>
<td>5 Positions</td>
<td>2 Positions</td>
</tr>
</tbody>
</table>

#### Step Description

1. LLCR (1)
2. Mating/Unmating Force (2)
3. Cycles
   - Quantity = 250 Cycles
4. LLCR (2)
   - Max Delta = 15 mOhm
5. Thermal Shock (4)
6. LLCR (2)
   - Max Delta = 15 mOhm
7. Humidity (1) - Non Standard
8. LLCR (2)
   - Max Delta = 15 mOhm
9. Mating/Unmating Force (2)

---

(1) Humidity = Other
- 240 Hours
  - +25°C to +65°C @ 95% RH up to 100% RH

(2) LLCR = EIA-364-23
- Open Circuit Voltage = 20 mV Max
- Test Current = 200 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 = 1 (-55°C to +85°C)
- Test Duration = A-3 (100 Cycles)
FLOWCHARTS Continued

Mechanical Shock/Random Vibration/LLCR

Group 1
UMPS-05-05.5-G-VT-SM-WT-K
UMPT-05-06.5-G-VT-SM-WT-K
8 Assemblies
VITA 47.1 (V To V)

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
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<tbody>
<tr>
<td>1.</td>
<td>LLCR (a)</td>
</tr>
<tr>
<td>2.</td>
<td>Mechanical Shock (b) - Non Standard</td>
</tr>
<tr>
<td>3.</td>
<td>Random Vibration (c) - Non Standard</td>
</tr>
<tr>
<td></td>
<td>Note: Conditions:</td>
</tr>
<tr>
<td></td>
<td>1) 5 Hz to 100 Hz, PSD increasing at 3dB/octave</td>
</tr>
<tr>
<td></td>
<td>2) 100 Hz to 1000 Hz, 0.10 g^2/Hz</td>
</tr>
<tr>
<td></td>
<td>3) 1000 Hz to 2000 Hz, PSD decreasing at 3dB/octave</td>
</tr>
<tr>
<td>4.</td>
<td>LLCR (a)</td>
</tr>
<tr>
<td></td>
<td>Max Delta = 15 mOhm</td>
</tr>
</tbody>
</table>

(1) LLCR = EIA-364-23
Open Circuit Voltage = 20 mV Max
Test Current = 100 mA Max
(2) Mechanical Shock = Other
40G, 11 milliseconds, Half Sine
Number of Shocks = 3 Per Direction, Per Axis, 18 Total
Operating Shock Class OS2
(3) Random Vibration = Other
12 G ‘RMS’, 5Hz to 2000Hz, 1 Hours/Axis
Vibration Class V3 VITA 47.1

Mechanical Shock/Random Vibration/Event Detection

Group 1
UMPS-05-05.5-G-VT-SM-WT-K
UMPT-05-06.5-G-VT-SM-WT-K
8 Assemblies
VITA 47.1 (V To V)

<table>
<thead>
<tr>
<th>Step</th>
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<tbody>
<tr>
<td>1.</td>
<td>Nanosecond Event Detection</td>
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<tr>
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<td>(Mechanical Shock) (1) - Non Standard</td>
</tr>
<tr>
<td>2.</td>
<td>Nanosecond Event Detection</td>
</tr>
<tr>
<td></td>
<td>(Random Vibration) (a) - Non Standard</td>
</tr>
<tr>
<td></td>
<td>Note: Conditions:</td>
</tr>
<tr>
<td></td>
<td>1) 5 Hz to 100 Hz, PSD increasing at 3dB/octave</td>
</tr>
<tr>
<td></td>
<td>2) 100 Hz to 1000 Hz, 0.10 g^2/Hz</td>
</tr>
<tr>
<td></td>
<td>3) 1000 Hz to 2000 Hz, PSD decreasing at 3dB/octave</td>
</tr>
</tbody>
</table>

(1) Nanosecond Event Detection (Mechanical Shock) = Other
Use EIA-364-87 for Nanosecond Event Detection:
Test Condition = F (50 nanoseconds at 10 ohms)
40G, 11 milliseconds, Half Sine

(2) Nanosecond Event Detection (Random Vibration) = Other
Use EIA-364-87 for Nanosecond Event Detection:
Test Condition = F (50 nanoseconds at 10 ohms)
Random Vibration: 12 G ‘RMS’, 5Hz to 2000Hz, 1 Hours/Axis, Vibration Class V3 VITA 47.1
FLOWCHARTS Continued

Temperature Cycling

**Group 1**
UMPS-05-05.5-G-VT-SM-WT-K
UMPT-05-06.5-G-VT-SM-WT-K
8 Assemblies
500 Thermal Cycles

*Note: Reference MIL-STD-202G, Method 107, Thermal Shock*

**Step** | **Description**
--- | ---
1. | Continuity (Initial)
2. | Temperature Cycle(1) - Non Standard Cycles = 500 Cycles Continuity = Monitor for 1 MicroSecond Interruptions Throughout
3. | Continuity (Following Last Cycle)

(1) Temperature Cycles = Other
Max Temperature = 125°C
Min Temperature = 65°C
Dwell Time = 30 minutes at each extreme
Ramp Rate = 10°C/min
VITA 47.1

Non-Operating Class Temperature

**VITA 47.1**

**Group 1**
UMPS-05-05.5-G-VT-SM-WT-K
UMPT-05-06.5-G-VT-SM-WT-K
8 Assemblies

Non-Operating Class Temperature

**Step** | **Description**
--- | ---
1. | LLR(t) Max Delta = 15 mOhm
2. | Temperature Cycle Cycles = 100 Temperature Cycle = -55°C to 105°C
3. | LLR(t) Max Delta = 15 mOhm
4. | Temperature Cycle Cycles = 100 Temperature Cycles = -65°C to 125°C
5. | LLR(t) Max Delta = 15 mOhm

(1) LLR = MIL-964-23
Open Circuit Voltage = 20 mV Max
Test Current = 100 mA Max
FLOWCHARTS Continued

**DWV @ Altitude**

*Pin to Pin*

<table>
<thead>
<tr>
<th>Group 1</th>
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<tbody>
<tr>
<td>UMPS-05-05.5-G-VT-SM-WT-K</td>
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<tr>
<td>UMPT-05-06.5-G-VT-SM-WT-K</td>
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<tr>
<td>3 Assemblies</td>
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<tr>
<td>Custom Group</td>
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<table>
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<tbody>
<tr>
<td>1.</td>
<td>DWV at Test Voltage - Non Standard</td>
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<td>Note: Test Voltage to be 300 VAC</td>
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*Pin to Weld Tab*

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<td>UMPT-05-06.5-G-VT-SM-WT-K</td>
</tr>
<tr>
<td>3 Assemblies</td>
</tr>
<tr>
<td>Custom Group</td>
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<table>
<thead>
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<th>Step</th>
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<tbody>
<tr>
<td>1.</td>
<td>DWV at Test Voltage - Non Standard</td>
</tr>
<tr>
<td></td>
<td>Note: Test Voltage to be 300 VAC</td>
</tr>
</tbody>
</table>

---

(1) DWV at Test Voltage = Other
Test Condition I've 70,000 ft
DWV test voltage is equal to 75% of the lowest breakdown voltage
Test voltage applied for 60 seconds

(2) DWV at Test Voltage = Other
Test Condition I've 70,000 ft
DWV test voltage is equal to 75% of the lowest breakdown voltage
Test voltage applied for 60 seconds

**Electrostatic Discharge (ESD)**

<table>
<thead>
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<th>Group 1</th>
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</thead>
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<td>UMPS-05-05.5-G-VT-SM-WT-K</td>
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<tr>
<td>UMPT-05-06.5-G-VT-SM-WT-K</td>
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<tr>
<td>8 Assemblies</td>
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<tr>
<td>EN61000-4-2</td>
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</table>

<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Exposure To 5kV, 10kV, 15kV, Repeat 10 Times</td>
</tr>
<tr>
<td></td>
<td>Note: The connector shall not be susceptible to damage by ESD</td>
</tr>
<tr>
<td></td>
<td>events from 0 to 15kV as discharged from a 150 pf capacitor</td>
</tr>
<tr>
<td></td>
<td>through a 330 ohm resistor</td>
</tr>
</tbody>
</table>

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ATTRIBUTE DEFINITIONS
The following is a brief, simplified description of attributes.

TEMPERATURE CYCLES:
1) OTHER, Thermal Shock (Temperature Cycling) Test Procedure for Electrical Connectors.
2) Test Condition: -65°C to +125°C
3) Test Time: ½ hour dwell at each temperature extreme
4) Test Duration: 500 Cycles
5) All test samples are pre-conditioned at ambient.
6) All test samples are exposed to environmental stressing in the mated condition.

TEMPERATURE CYCLES:
7) OTHER, Thermal Shock (Temperature Cycling) Test Procedure for Electrical Connectors.
8) Test Condition: -55°C to +105°C and -65°C to +125°C
9) Test Time: ½ hour dwell at each temperature extreme
10) Test Duration: 100 Cycles
11) All test samples are pre-conditioned at ambient.
12) 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 I: -55°C to +85°C
3) Test Time: ½ hour dwell at each temperature extreme
4) Test Duration: A-3 100 Cycles
5) All test samples are pre-conditioned at ambient.
6) All test samples are exposed to environmental stressing in the mated condition.

HUMIDITY:
2) Test Condition B, 240 Hours.
3) Method III, +25° C to + 65° C, 95% to 100% Relative Humidity.
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) Other method, Mechanical Shock Test Procedure for Electrical Connectors
2) Peak Value: 40 G
3) Duration: 11 Milliseconds
4) Wave Form: Half Sine
5) Velocity: Operating Shock Class OS2
6) Number of Shocks: 3 Shocks / Direction, 3 Axis (18 Total)

VIBRATION:
1) Reference document: other, Vibration Test Procedure for Electrical Connectors
2) Test Condition: V3 vita 47.1
3) Power Spectral Density: 0.1 G² / Hz
4) G ‘RMS’: 12
5) Frequency: 5 to 2000 Hz
6) Duration: 1 Hours per axis (3 axis total)
ATTRIBUTES DEFINITIONS Continued

The following is a brief, simplified description of attributes.

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:
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) 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. \( \leq +5.0 \text{ mOhms} \): -------------------------------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. \( >+1000 \text{ mOhms} \):-----------------------------Open Failure

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 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:
   b. Test Conditions IV=70000 ft
   c. Test voltage applied for 60 seconds.

ELECTROSTATIC DISCHARGE:
1) Reference Document: EN61000-4-2, VITA 47
2) Connector shall not be susceptible to damage by electrostatic discharge (ESD) events from 0 to 15kV as discharged from a 150-pf capacitor through a 330-ohm resistor
3) Any damage shall be noted

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RESULTS

Mating – Unmating Forces
Mating-Unmating Durability Group (UMPS-05-05.5-G-VT-SM-WT-K / UMPT-05-06.5-G-VT-SM-WT-K)
- Initial
  - Mating
    - Min ----------------------------- 6.03 Lbs
    - Max------------------------------- 7.05 Lbs
  - Unmating
    - Min ----------------------------- 3.53 Lbs
    - Max------------------------------- 4.47 Lbs
- After 250 Cycles
  - Mating
    - Min ----------------------------- 7.04 Lbs
    - Max------------------------------- 8.53 Lbs
  - Unmating
    - Min ----------------------------- 5.10 Lbs
    - Max------------------------------- 7.04 Lbs
- Humidity
  - Mating
    - Min ----------------------------- 3.00 Lbs
    - Max------------------------------- 3.57 Lbs
  - Unmating
    - Min ----------------------------- 2.37 Lbs
    - Max------------------------------- 2.82 Lbs

Mating-Unmating Basic (UMPS-02-05.5-G-VT-SM-WT-K / UMPT-02-06.5-G-VT-SM-WT-K)
- Initial
  - Mating
    - Min ----------------------------- 1.74 Lbs
    - Max------------------------------- 2.39 Lbs
  - Unmating
    - Min ----------------------------- 0.85 Lbs
    - Max------------------------------- 1.18 Lbs
- After 250 Cycles
  - Mating
    - Min ----------------------------- 2.09 Lbs
    - Max------------------------------- 3.18 Lbs
  - Unmating
    - Min ----------------------------- 1.69 Lbs
    - Max------------------------------- 2.13 Lbs
RESULTS Continued

Temperature Cycling

Continuity Initial
• No Interruptions --------------------------------Passed

Continuity Following 500 Cycles
• No Interruptions --------------------------------Passed

DWV @ Altitude
• Minimums
  o Test Voltage --------------------------------300 VAC
  o Altitude Tested -----------------------------70000 ft

  Mated
  Pin to Pin
  • DWV-----------------------------------------Passed

  Pin to Weld Tab
  • DWV-----------------------------------------Passed

  Unmated
  Pin to Pin
  • DWV-----------------------------------------Passed

  Pin to Weld Tab
  • DWV-----------------------------------------Passed

Electrostatic Discharge

5kV
• No Damage -----------------------------------Passed

10kV
• No Damage -----------------------------------Passed

15kV
• No Damage -----------------------------------Passed
RESULTS Continued

LLCR Mating/Unmating Durability Group (40 LLCR test points)

- Initial ------------------------------------1.60 mOhms Max
- Durability, 250 Cycles
  - <= +5.0 mOhms---------------------------------- 40 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---------------------------------- 40 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---------------------------------- 40 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 Non-Operating Class Temperature Group (40 LLCR test points)

- Initial ------------------------------------1.81 mOhms Max
- Temperature Cycle1 (-55°C to +105°C)
  - <= +5.0 mOhms---------------------------------- 40 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
- Temperature Cycle2 (-65°C to +125°C)
  - <= +5.0 mOhms---------------------------------- 40 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 Group (40 LLCR test points)

- Initial ------------------------------- 1.71 mOhms Max
- Shock & Vibration
  - <= +5.0 mOhms------------------------ 40 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:

### Mating-Unmating Durability Group (UMPS-05-05.5-G-VT-SM-WT-K / UMPT-05-06.5-G-VT-SM-WT-K)

<table>
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<tr>
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<th>Unmating</th>
<th>Mating</th>
<th>Unmating</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Newtons Force (Lbs)</td>
<td>Newtons Force (Lbs)</td>
<td>Newtons Force (Lbs)</td>
<td>Newtons Force (Lbs)</td>
</tr>
<tr>
<td>Minimum</td>
<td>26.82</td>
<td>6.03</td>
<td>15.70</td>
<td>3.53</td>
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<tr>
<td>Maximum</td>
<td>31.36</td>
<td>7.05</td>
<td>19.88</td>
<td>4.47</td>
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<tr>
<td>Average</td>
<td>28.77</td>
<td>6.47</td>
<td>18.07</td>
<td>4.06</td>
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<td>St Dev</td>
<td>1.78</td>
<td>0.40</td>
<td>1.67</td>
<td>0.37</td>
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<tr>
<td>Count</td>
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### After Humidity

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<tr>
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<td>Newtons Force (Lbs)</td>
<td>Newtons Force (Lbs)</td>
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<tr>
<td>Minimum</td>
<td>13.34</td>
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<tr>
<td>Maximum</td>
<td>15.88</td>
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<td>Average</td>
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<td>0.24</td>
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### Matting-Unmating Basic (UMPS-02-05.5-G-VT-SM-WT-K / UMPT-02-06.5-G-VT-SM-WT-K)

<table>
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<tr>
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<th>Mating</th>
<th>Unmating</th>
<th>Mating</th>
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<td>Newtons Force (Lbs)</td>
<td>Newtons Force (Lbs)</td>
<td>Newtons Force (Lbs)</td>
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<tr>
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<tr>
<td>Maximum</td>
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<td>2.39</td>
<td>5.25</td>
<td>1.18</td>
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<tr>
<td>Average</td>
<td>9.05</td>
<td>2.04</td>
<td>4.31</td>
<td>0.97</td>
</tr>
<tr>
<td>St Dev</td>
<td>0.98</td>
<td>0.22</td>
<td>0.52</td>
<td>0.12</td>
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<tr>
<td>Count</td>
<td>8</td>
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Mating/Unmating Data for 02 and 05 Position UMPS/UMPT

<table>
<thead>
<tr>
<th>Force (lbs)</th>
<th>Number of Terminals per Row</th>
<th>Mating (Initial)</th>
<th>Unmating (Initial)</th>
<th>Mating (250 Cycles)</th>
<th>Unmating (250 Cycles)</th>
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<td>0.00</td>
<td>02</td>
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</tr>
<tr>
<td>1.00</td>
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<td>2.00</td>
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<tr>
<td>3.00</td>
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<tr>
<td>4.00</td>
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</tr>
<tr>
<td>5.00</td>
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<td>6.00</td>
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<tr>
<td>7.00</td>
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<tr>
<td>8.00</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.00</td>
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</tbody>
</table>

Number of Terminals per Row

02 05

Force (lbs)
DATA SUMMARIES Continued

Temperature Cycling

<table>
<thead>
<tr>
<th>Temperature Cycling Event Detection Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Contacts tested</td>
</tr>
<tr>
<td>Test Conditions</td>
</tr>
<tr>
<td>Temperature</td>
</tr>
<tr>
<td>Dwell Time</td>
</tr>
<tr>
<td>Ramp Rate</td>
</tr>
<tr>
<td>Total Events</td>
</tr>
</tbody>
</table>

DWV @ Altitude

<table>
<thead>
<tr>
<th>Altitude Tested = 70,000 feet</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Voltage= 300</td>
</tr>
</tbody>
</table>

Mated

UMPS / UMPT

<table>
<thead>
<tr>
<th>Pin to Pin</th>
<th>Pin to Weld Tab</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passed</td>
<td>Passed</td>
</tr>
<tr>
<td>Passed</td>
<td>Passed</td>
</tr>
<tr>
<td>Passed</td>
<td>Passed</td>
</tr>
</tbody>
</table>

Unmated

UMPS

<table>
<thead>
<tr>
<th>Pin to Pin</th>
<th>Pin to Weld Tab</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passed</td>
<td>Passed</td>
</tr>
<tr>
<td>Passed</td>
<td>Passed</td>
</tr>
<tr>
<td>Passed</td>
<td>Passed</td>
</tr>
</tbody>
</table>

UMPT

<table>
<thead>
<tr>
<th>Pin to Pin</th>
<th>Pin to Weld Tab</th>
</tr>
</thead>
<tbody>
<tr>
<td>Passed</td>
<td>Passed</td>
</tr>
<tr>
<td>Passed</td>
<td>Passed</td>
</tr>
<tr>
<td>Passed</td>
<td>Passed</td>
</tr>
</tbody>
</table>
DATA SUMMARIES Continued

Electrostatic Discharge:

<table>
<thead>
<tr>
<th>Electrostatic Discharge (ESD) Summary</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Assemblies tested</strong></td>
</tr>
<tr>
<td><strong>Test Conditions</strong></td>
</tr>
<tr>
<td>5kV</td>
</tr>
<tr>
<td>10kV</td>
</tr>
<tr>
<td>15kV</td>
</tr>
<tr>
<td><strong>Pass/Fail</strong></td>
</tr>
</tbody>
</table>
DATA SUMMARIES Continued

LLCR Non-Operating Class Temperature Group:
1) A total of 40 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

<table>
<thead>
<tr>
<th>Date</th>
<th>1/21/2020</th>
<th>3/9/2020</th>
<th>3/13/2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Room Temp (Deg C)</td>
<td>23</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>Rel Humidity (%)</td>
<td>34</td>
<td>34</td>
<td>33</td>
</tr>
<tr>
<td>Technician</td>
<td>Troy Cook</td>
<td>Troy Cook</td>
<td>Troy Cook</td>
</tr>
</tbody>
</table>

LLCR Measurement Summaries by Pin Type

<table>
<thead>
<tr>
<th>Pin Type: Signal 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Actual</td>
</tr>
<tr>
<td>Average</td>
</tr>
<tr>
<td>St. Dev.</td>
</tr>
<tr>
<td>Min</td>
</tr>
<tr>
<td>Max</td>
</tr>
<tr>
<td>Summary Count</td>
</tr>
<tr>
<td>Total Count</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>mOhms</th>
<th>Stable</th>
<th>Minor</th>
<th>Acceptable</th>
<th>Marginal</th>
<th>Unstable</th>
<th>Open</th>
</tr>
</thead>
<tbody>
<tr>
<td>After Temp Cycle-1</td>
<td>40</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>After Temp Cycle-2</td>
<td>40</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

LLCR Delta Count by Category - Signal
DATA SUMMARIES Continued

LLCR Mating/Unmating Durability Group
1. A total of 40 points were measured.
2. EIA-364-23, Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets.
3. A computer program, LLCR.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

<table>
<thead>
<tr>
<th>Date</th>
<th>1/21/2020</th>
<th>1/27/2020</th>
<th>2/10/2020</th>
<th>3/3/2020</th>
</tr>
</thead>
<tbody>
<tr>
<td>Room Temp (Deg C)</td>
<td>23</td>
<td>23</td>
<td>22</td>
<td>22</td>
</tr>
<tr>
<td>Rel Humidity (%)</td>
<td>37</td>
<td>35</td>
<td>38</td>
<td>43</td>
</tr>
<tr>
<td>Technician</td>
<td>Troy Cook</td>
<td>Troy Cook</td>
<td>Troy Cook</td>
<td>Aaron McKim</td>
</tr>
<tr>
<td>mOhm values</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Actual Initial</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delta 250 Cycles</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delta Therm Shck</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Delta Humidity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pin Type 1: Signal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>1.40</td>
<td>0.13</td>
<td>0.07</td>
<td>0.06</td>
</tr>
<tr>
<td>St. Dev.</td>
<td>0.12</td>
<td>0.12</td>
<td>0.07</td>
<td>0.07</td>
</tr>
<tr>
<td>Min</td>
<td>1.07</td>
<td>0.01</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>Max</td>
<td>1.60</td>
<td>0.53</td>
<td>0.29</td>
<td>0.30</td>
</tr>
<tr>
<td>Summary Count</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>Total Count</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td>40</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LLCR Delta Count by Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>mOhms</td>
</tr>
<tr>
<td>250 Cycles</td>
</tr>
<tr>
<td>Therm Shck</td>
</tr>
<tr>
<td>Humidity</td>
</tr>
</tbody>
</table>
DATA SUMMARIES Continued

LLCR Shock & Vibration Group

1) A total of 40 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. \( \leq +5.0 \text{ mOhms} \): 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

<table>
<thead>
<tr>
<th>Date</th>
<th>Actual</th>
<th>Delta</th>
<th>Delta</th>
</tr>
</thead>
<tbody>
<tr>
<td>1/22/2020</td>
<td>1.46</td>
<td>0.12</td>
<td></td>
</tr>
<tr>
<td>1/27/2020</td>
<td>0.12</td>
<td>0.00</td>
<td></td>
</tr>
</tbody>
</table>

**LLCR Measurement Summaries by Pin Type**

<table>
<thead>
<tr>
<th>Room Temp (Deg C)</th>
<th>Technician</th>
<th>Actual</th>
<th>Delta</th>
<th>Delta</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>Troy Cook</td>
<td>1.46</td>
<td>0.12</td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>Troy Cook</td>
<td>0.12</td>
<td>0.00</td>
<td></td>
</tr>
</tbody>
</table>

**LLCR Delta Count by Category**

<table>
<thead>
<tr>
<th>mOhms</th>
<th>Stable</th>
<th>Minor</th>
<th>Acceptable</th>
<th>Marginal</th>
<th>Unstable</th>
<th>Unstable</th>
<th>Unstable</th>
<th>Open</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shock-Vib</td>
<td>40</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

**Nanosecond Event Detection:**

**Shock and Vibration Event Detection Summary**

<table>
<thead>
<tr>
<th>Contacts tested</th>
<th>32</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test Condition</td>
<td>C, 40g's, 11ms, Half-Sine</td>
</tr>
<tr>
<td>Shock Events</td>
<td>0</td>
</tr>
<tr>
<td>Test Condition</td>
<td>V-B, 12.0 rms g, 1 Hr./Axis</td>
</tr>
<tr>
<td>Vibration Events</td>
<td>0</td>
</tr>
<tr>
<td>Total Events</td>
<td>0</td>
</tr>
</tbody>
</table>
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: 05/29/2019, Next Cal: 05/29/2020

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

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: 11/14/2019, Next Cal: 05/31/2020

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: 06/30/2019, Next Cal: 06/30/2020

Equipment #: HPT-01
Description: Hipot Safety Tester
Manufacturer: Vitrek
Model: V73
Serial #: 019808
Accuracy:
… Last Cal: 05/15/2019, Next Cal: 05/15/2020

Equipment #: SVC-01
Description: Shock & Vibration Table
Manufacturer: Data Physics
Model: LE-DSA-10-20K
Serial #: 10037
Accuracy: See Manual
… Last Cal: 04/22/2019, Next Cal: 04/22/2020
EQUIPMENT AND CALIBRATION SCHEDULES

Equipment #: ACLM-01
Description: Accelerometer
Manufacturer: PCB Piezotronics
Model: 352C03
Serial #: 115819
Accuracy: See Manual
… Last Cal: 07/18/2019, Next Cal: 07/18/2020

Equipment #: ED-03
Description: Event Detector
Manufacturer: Analysis Tech
Model: 32EHD
Serial #: 1100604
Accuracy: See Manual
… Last Cal: 10/31/2019, Next Cal: 10/31/2020