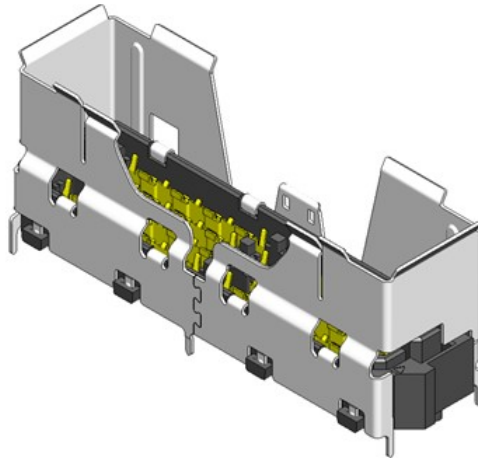
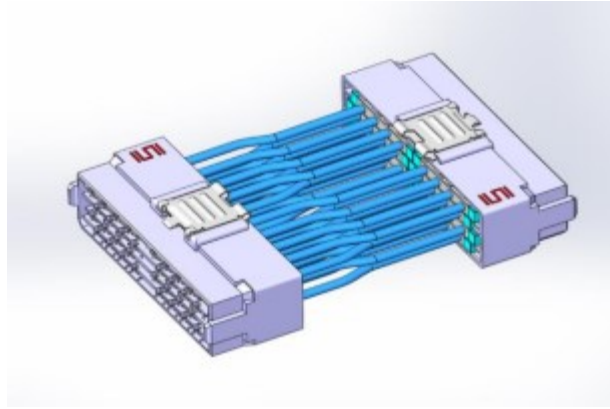




Project Number: Design Qualification Test Report	Tracking Code: CR-1006102_Report_Rev_1
Requested by: Tyler Lang	Date: 12/7/2023
Part #: NVAC-DP-5-04-2-12.0-01-1-L/NVAM-DP-04-2-02.0-S-2-CT	
Part description: NVAC / NVAM	Tech: Richard Ison
Test Start: 10/25/2023	Test Completed: 11/3/2023



DESIGN QUALIFICATION TEST REPORT
NVAC / NVAM
NVAC-DP-5-04-2-12.0-01-1-L/NVAM-DP-04-2-02.0-S-2-CT

REVISION HISTORY

DATA	REV.NUM.	DESCRIPTION	ENG
12/7/2023	1	Initial test	PC

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 DWV/IR testing was cleaned according to CO-SC-WI-3029.
- 4) Either an automated cleaning procedure or an ultrasonic cleaning procedure may be used.
- 5) The automated procedure is used with aqueous compatible soldering materials.
- 6) Parts not intended for testing DWV/IR is 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-110684-TST.

FLOWCHARTS

Cable Pull

Group 1

NVAC-DP-5-04-2-12.0-01-1-L
NVAM-DP-04-2-02.0-S-2-CT
5 Assemblies
0 Degrees

Note: PCB-110695-TST-XXX

Step	Description
1.	Cable Pull (1)

Group 2

NVAC-DP-5-04-2-12.0-01-1-L
NVAM-DP-04-2-02.0-S-2-CT
5 Assemblies
90 Degrees Vertical

Note: PCB-110695-TST-XXX

Step	Description
1.	Cable Pull (1)

Group 3

NVAC-DP-5-04-2-12.0-01-1-L
NVAM-DP-04-2-02.0-S-2-CT
5 Assemblies
90 Degrees Lateral

Note: PCB-110695-TST-XXX

Step	Description
1.	Cable Pull (1)

(1) Cable Pull = EIA-364-38

Measure and Record Force Required to Failure

Failure = Discontinuity >1 microsecond at 10 ohms

Cable Flex

Group 1

NVAC-DP-5-04-2-12.0-01-1-L
NVAM-DP-04-2-02.0-S-2-CT
8 Assemblies
Flat Cable

*Note: PCB-110695-TST-XX & PCB-110684
-TST-XX (IR/DWV)*

Step	Description
1.	IR (3)
2.	DWV at Test Voltage(2) Test Voltage = 500 V
3.	Cable Flex (1)
4.	Visual Inspection
5.	IR (3)
6.	DWV at Test Voltage(2) Test Voltage = 500 V

(1) Cable Flex = EIA-364-41

Circular Jacket Cable - to be tested 90° each direction (180° total)

Flat Cable - to be tested 70° each direction (140° total)

Monitor continuity during flex testing

Failure = Discontinuity >1 microsecond at 10 ohms

(2) DWV at Test Voltage = EIA-364-20

Test Condition = 1 (Sea Level)

DWV test voltage is equal to 75% of the lowest breakdown voltage

Test voltage applied for 60 seconds

(3) IR = EIA-364-21

Test Condition = 500 Vdc, 2 Minutes Max

ATTRIBUTE DEFINITIONS

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: EIA-364-21, *Insulation Resistance Test Procedure for Electrical Connectors*.
 - b. Test Conditions:
 - i. Between Adjacent Contacts or Signal-to-Ground
 - ii. Electrification Time 2.0 minutes
 - iii. Test Voltage (500 VDC) corresponds to calibration settings for measuring resistances.
- 2) MEASUREMENTS:
- 3) When the specified test voltage is applied (VDC), the insulation resistance shall not be less than 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: EIA-364-20, *Withstanding Voltage Test Procedure for Electrical Connectors*.
 - b. Test Conditions:
 - i. Between Adjacent Contacts or Signal-to-Ground
 - ii. Barometric Test Condition 1
 - 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).

ATTRIBUTE DEFINITIONS Continued

The following is a brief, simplified description of attributes

CABLE PULL:

- 1) Secure cable near center and pull on connector
 - a. At 0° , in-line with cable
 - b. At 90° , in-line with cable



Fig. 1
 0° Connector pull



Fig. 2
 90° Connector pull-Vertical



Fig. 3
 90° Connector pull-Lateral

ATTRIBUTE DEFINITIONS Continued

The following is a brief, simplified description of attributes

CABLE Flex:

- 1) Oscillate and monitor electrical continuity for open circuit indication.
 - a. $\pm 70^\circ$ Flex Mode, bend up to 500 cycles. load on 10.24 oz.



Fig. 4
(Setup picture)

RESULTS

Cable Pull force

- 0° Pull
 - Min -----12.70 lbs
 - Max -----16.00 lbs
- 90° Pull (Vertical)
 - Min ----- 8.62 lbs
 - Max -----15.95 lbs
- 90° Pull (Lateral)
 - Min -----14.63 lbs
 - Max -----21.24 lbs
 -

Cable Flex:

Insulation Resistance minimums, IR

Pin to Pin

- Initial
 - Mated-----45000 Meg Ω ----- Passed
- After 500 flex cycles
 - Mated-----45000 Meg Ω ----- Passed

Row to Row

- Initial
 - Mated-----45000 Meg Ω ----- Passed
- After 500 flex cycles
 - Mated-----45000 Meg Ω ----- Passed

Dielectric Withstanding Voltage minimums, DWV

- Test Voltage -----500 VAC

Pin to Pin

- Initial DWV -----Passed
- After 500 Flex cycles DWV -----Passed

Row to Row

- Initial DWV -----Passed
- After 500 Flex cycles DWV -----Passed

DATA SUMMARIES

**Cable Pull Force:
0° Pull**

	Force (lbs)
Minimum	12.70
Maximum	16.00
Average	14.86

90° Pull (Vertical)

	Force (lbs)
Minimum	8.62
Maximum	15.95
Average	14.11

90° Pull (Lateral)

	Force (lbs)
Minimum	14.63
Maximum	21.24
Average	19.64

Cable Flex:

Insulation Resistance minimums, IR

Pin to Pin	
Mated	
Minimum	
Initial	45000
After 500 Flex Cycles	45000
Row to Row	
Mated	
Minimum	
Initial	45000
After 500 Flex Cycles	45000

Dielectric Withstanding Voltage minimums, DWV

Voltage Rating Summary	
Minimum	B1SDT/P1M
Test Voltage	500
Pin to Pin	
Initial Test Voltage	Passed
After 500 Flex Cycles Test Voltage	Passed
Row to Row	
Initial Test Voltage	Passed
After 500 Flex Cycles Test Voltage	Passed

EQUIPMENT AND CALIBRATION SCHEDULES**Equipment #:** TCT-08**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: 05/29/2023, Next Cal: 05/29/2024**Equipment #:** HPT-01**Description:** Hipot Safety Tester**Manufacturer:** Vitrek**Model:** V73**Serial #:** 019808**Accuracy:**

... Last Cal: 05/15/2023, Next Cal: 05/15/2024