STRADA Mesa* High Speed Mezzanine Press-Fit Differential Connector System

1. SCOPE

1.1. Content

This specification covers performance, tests and quality requirements for the STRADA Mesa* High Speed Mezzanine Press-Fit Differential Connector System which provides for interconnection of parallel printed wiring boards. These connectors are available with contact configurations for high-speed differential pairs, high-density, single-ended signals, or power applications.

1.2. Qualification

When tests are performed on the subject product line, procedures specified in Figure 1 shall be used. All inspections shall be performed using the applicable inspection plan and product drawing.

1.3 Qualification Test Results

Successful qualification testing on the subject product line was completed on 07Aug2012.
The Qualification Test Report number for this testing is 501-134006

2. APPLICABLE DOCUMENTS

The following documents form a part of this specification to the extent specified herein. Unless otherwise specified, the latest edition of the document applies. In the event of conflict between the requirements of this specification and the product drawing, the product drawing shall take precedence. In the event of conflict between the requirements of this specification and the referenced documents, this specification shall take precedence.

2.1. TE Connectivity (TE) Documents

- 114-13249: Application Specification (STRADA Mesa* Mezzanine Printed Circuit (PC) Board Connectors)
- 501-134006: Qualification Test Report (STRADA Mesa* High Speed Mezzanine Press-Fit Differential Connector System)

2.2. Industry Documents

- EIA-364: Electrical Connector/Socket Test Procedures Including Environmental Classifications
- Telcordia GR-1217 (Central Office) Generic Requirements for Separable Electrical Connectors Used in Telecommunications Hardware (Issue 2 - December 2008)

2.3. Reference Documents

- 108-2385: Design Objectives (EON Compliant Pin For 0.34 mm Diameter Finished Plated Thru Holes)
- 109-197: Test Specification (TE Test Specifications vs EIA and IEC Test Methods)

3. REQUIREMENTS

3.1. Product shall be of the design, construction, materials and physical dimensions specified on the applicable product drawing

3.2. Ratings

- Voltage: 250 volts AC maximum peak (⅓ of minimum withstanding voltage)
- Temperature: -55 to 85°C
- Current: 1.5 amperes for signal contacts, see Figure 1 for power contacts, see Figure 5 for contact energizing patterns

Number of Contacts Energized	Single Contact	2 Adjacent Contacts	3 Adjacent Contacts	4 Adjacent Contacts	5 Adjacent Contacts	6 Adjacent Contacts
Current (amperes)	24	22	20	19	19	18

Figure 1

Power Contact Current Rating Within Single Column of 6 Power Contacts

NOTE
3x4 array (12 power contacts) current rating equals 11 amperes fully energized. See Figure 5

3.3. Test Requirements and Procedures Summary
Unless otherwise specified, all tests shall be performed at ambient environmental conditions.

Test Description	Requirement	Procedure
Initial examination of product.	Meets requirements of product drawing and Application Specification 114-13249.	EIA-364-18. Visual and dimensional (C of C) inspection per product drawing.
Final examination of product.	Meets visual requirements.	EIA-364-18. Visual inspection.
ELECTRICAL		
Low Level Contact Resistance (LLCR).	Signal contacts: 18 milliohms maximum initial for 8 to 13 mm stack heights; 21 milliohms maximum initial for 14 to 28 mm stack heights; 26 milliohms maximum initial for 29 to 42 mm stack heights; ΔR 10 milliohms maximum. Power contacts: 1.5 milliohms maximum initial for 8 to 13 mm stack heights; 2.0 milliohms maximum initial for 14 to 28 mm stack heights; 3.5 milliohms maximum initial for 29 to 42 mm stack heights; ΔR 4 milliohms maximum.	EIA-364-23. Subject specimens to 100 milliamperes maximum and 20 millivolts maximum open circuit voltage. For test groups 1,2,4,5, and 7, measure a minimum of 100 contacts on each of 3 specimens for a total of 300 readings. For test group 8, measure a minimum of 100 contacts on each of 10 specimens for a total of 1000 readings. See Figure 4.

Figure 2 (continued)

Contact resistance at rated current.	Power Contacts: Stack Height (mm) — Maximum Resistance End of Life (mΩ) 8 to 13 — 2.0 14 to 28 — 3.0 29 to 42 — 4.0 Signal Contact: Stack Height (mm) — Maximum Resistance End of Life (mΩ) 8 to 13 — 18.0 14 to 28 — 21.0 29 to 42 — 26.0	EIA-364-6. At rated DC test current.
Insulation resistance.	1000 megohms minimum.	EIA-364-21. 500 volts DC, 1 minute hold. Test mated and unmounted specimens between 10 signal-signal differential pairs and between 10 signal-signal adjacent single-ended positions.
Withstanding voltage.	One minute hold with no breakdown, flashover, or excessive leakage current > 5 milliamperes.	EIA-364-20, Condition I. 750 volts AC at sea level. Test mated and unmounted specimens between 10 signal-signal differential pairs and between 10 signal-signal adjacent single-ended positions.

Figure 2 (continued)

Current rating.	30°C maximum temperature rise above ambient (25 ± 5°C) at specified current.	Signal contacts: Measure temperature rise on all contacts in 1 full column of ground and differential pair signal contacts of mated and mounted specimens. Measure temperature rise on all signal contacts in 2 adjacent columns of high density signal contacts of mated and mounted specimens. Measure temperature rise at multiple current levels, including rated current level, to generate temperature rise curves showing 30°C temperature rise. See Figure 5.
		Power contacts: Measure temperature rise on power contacts for the following energized configurations: single contact, 2 adjacent, 3 adjacent, 4 adjacent, 5 adjacent, and entire column of 6 adjacent contacts. Measure temperature rise at multiple current levels, including rated current level, to generate temperature rise curves showing 30°C temperature rise. See Figure 5.
MECHANICAL		
Vibration, sinusoidal.	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-28, Test Condition II. Subject mated specimens to 10 to 500 to10 Hz traversed in 15 minutes with 1.5 mm maximum total excursion. Two hours in each of 3 mutually perpendicular planes. Monitor a minimum of 15 contacts on a minimum of 3 specimens.
Mechanical shock.	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-27, Method H. Subject mated specimens to 30 G's half-sine shock pulses of 11 milliseconds duration. Three shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks. Monitor a minimum of 15 contacts on a minimum of 3 specimens.

Figure 2 (continued)

Durability, 25 cycles.	See Note.	EIA-364-9. Mate and unmate specimens for 25 cycles at a maximum rate of 500 cycles per hour. The first 13 cycles shall be performed prior to specific environmental test in the sequence. The remaining 12 cycles shall be performed after environmental test. The test shall be performed with header and receptacle installed (press-fit) on test boards.
Durability, 20 cycles.	See Note.	EIA-364-9. Mate and unmate specimens for 20 cycles at a maximum rate of 500 cycles per hour.
Durability, 250 cycles.	See Note.	EIA-364-9. Mate and unmate specimens for 250 cycles at a maximum rate of 500 cycles per hour.
Mating force.	45 grams-force maximum for signal contacts. 1200 grams-force maximum for power contacts.	EIA-364-13. Measure force necessary to mate specimens at a rate of 12.7 to 25.4 mm per minute.
Unmating force	5 grams-force minimum for signal contacts. 120 grams-force minimum for power contacts.	EIA-364-13. Measure force necessary to unmate specimens at a rate of 12.7 to 25.4 mm per minute.
Disturbed interface.	See Note.	Interface shall be disturbed so that contact surfaces move about 0.10 mm or less.
Reseating.	See Note.	Unmate and remate specimens 3 times.
ENVIRONMENTAL		
Humidity/temperature cycling.	See Note.	Telcordia GR-1217 (Central Office). Subject mated specimens to 50 cycles (500 hours) between 25 and 65°C at 90 to 98% RH. Temperature ramp shall be 2 hours per transition with 4 hours dwell at 65°C and 2 hours dwell at 25°C (10 hours total per cycle).
High temperature life, 105°C.	See Note.	EIA-364-17, Method A, Test Condition 4. Subject mated specimens to 105°C for 120 hours.
High temperature life, 105°C.	See Note.	EIA-364-17, Method A, Test Condition 4, Test Time Condition C. Subject mated specimens to 105°C for 500 hours.

Figure 2 (continued)

Thermal shock.	See Note.	EIA-364-32, Test Condition VII. Subject mated specimens to 5 cycles between -55 and 105°C. Temperature transfer rate shall be < 1 minute with 30 minute dwell at each temperature extreme.
Thermal disturbance.	See Note.	Subject mated specimens to 10 cycles between 15 and 85°C. Temperature ramp shall be a minimum of 2°C per minute with 5 minutes minimum dwell at temperature extremes.
Mixed flowing gas, 14 days.	See Note.	EIA-364-65, Class IIA (4 gas). Subject mounted specimens to environmental Class IIA for 14 days. Ten days unmated, 4 days mated.
Mixed flowing gas, 20 days.	See Note.	EIA-364-65, Class IIA (4 gas). Subject mounted specimens to environmental Class IIA for 20 days. Ten days unmated, 10 days mated.
Dust.	See Note.	EIA-364-91. Subject unmated receptacle specimens to dust exposure for 1 hour at a flow rate of 300 cfm. Dust composition shall be #1 Benign. Use 9 grams of dust for each cubic foot of chamber space. Dry dust for 1 hour at 50°C prior to application to connector. After exposure, let specimens sit for 1 hour in chamber.

Figure 2 (end)

NOTE

Shall meet visual requirements, show no physical damage, and meet requirements of additional tests as specified in the Product Qualification and Requalification Test Sequence shown in Figure 3.

3.6. Product Qualification and Requalification Test Sequence

Test or Examination	Test Group (a)							
	1	2	3	4	5	6	7	8
	Test Sequence (b)							
Initial examination of product	1	1	1	1	1	1	1	1
LLCR	2,4,6,8,10,12,14,16	2,4,6,8,10,12		2,4,6,8,10,12	3,5	2,5,7,9,11,13	2,4	2,4,6,8,10,12,14
Contact resistance, rated current						15		
Insulation resistance			2,6					
Withstanding voltage			3,7					
Current rating						3,14		
Vibration, sinusoidal				7				
Mechanical shock				9				
Durability, 25 cycles	3(c),15(d)	5(c),11(d)		3(c),11(d)				
Durability, 20 cycles						4		3
Durability, 250 cycles							3	
Mating/unmating force					2,6			
Disturbed interface	13							
Reseating								13
Humidity/temperature cycling		9	5					
High temperature life, 105°C, 120 hours						6		5
High temperature life, 105°C, 500 hours					4			
Thermal shock		3	4					
Thermal disturbance						12		11
Mixed flowing gas, 14 days						8(e),10(f)		7(e),9(f)
Mixed flowing gas, 20 days	5(g),7(g),9(h),11(h)							
Dust		7		5				
Final examination of product	17	13	8	13	7	16	5	15

Figure 3

NOTE

a) Specimens shall be selected at random from current production. Test groups 1 and 2 each require 5 connector pairs terminated to 1.57 mm minimum thick LLCR PCB with copper/OSP plated thru holes. Test group 3 requires 2 loose piece connector pairs. Test Group 4 requires 5 connector pairs terminated to LLCR/Continuity PCB. Mated connectors shall be held together with standoffs and fasteners. Test group 5 requires 5 connector pairs terminated to LLCR PCB. Test group 6 requires 4 connector pairs terminated to special serial current test PCB. Test group 7 requires 5 connector pairs terminated to LLCR PCB. Test group 8 requires 10 connector pairs terminated to LLCR PCB. Numbers indicate sequence in which tests are performed.

b) *First half of the total number of specified cycles.*
c) *Second half of the total number of specified cycles.*
d) *Ten days unmated.*
e) *Four days mated.*
f) *Five days unmated.*
g) *Five days mated.*

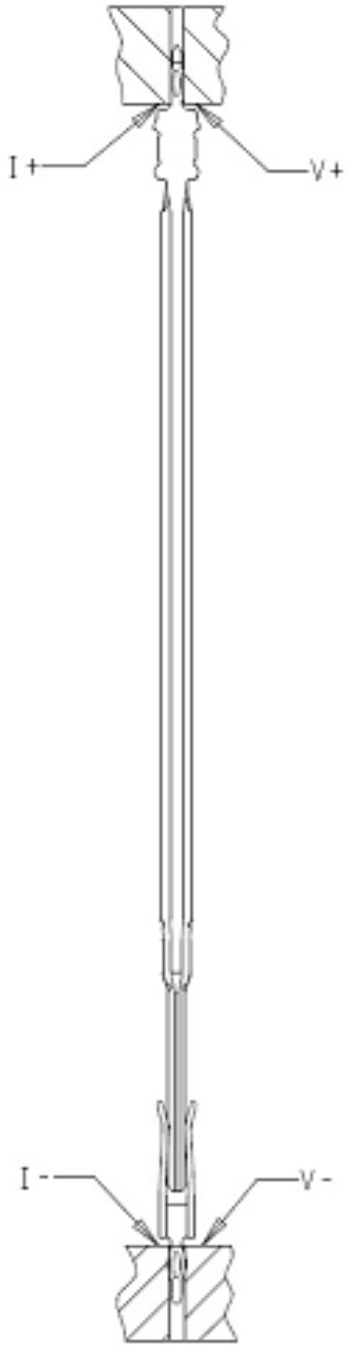
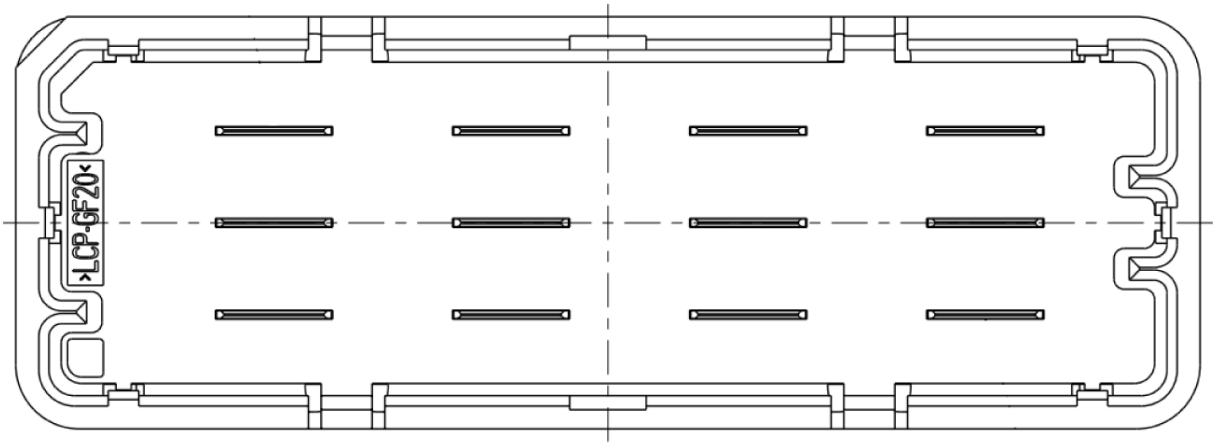


Figure 4
LLCR Measurement Points



3x4 array (12 power contacts) energized

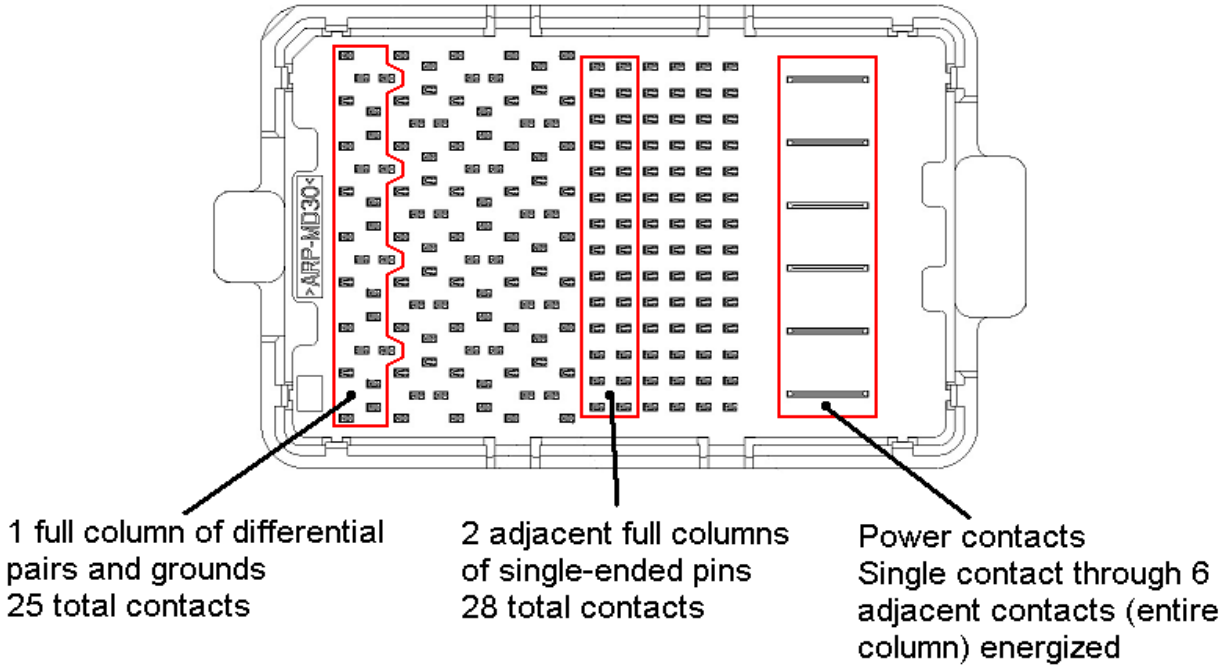


Figure 5
Energized Contact Patterns for Signal and Power Contact Temperature Rise Testing

T-Rise Test Board Description – The test board used for the T-Rise testing has a nominal thickness of 1.57 mm. The power contact area of the board has 2-ounce copper layers on the top and bottom surfaces with 6.8 mm wide traces connected to the power contacts. In addition, 2 internal 2-ounce copper planes are added, evenly spaced through the thickness of the board. The internal planes are not connected to the contacts. The boards are designed to allow 1, 2, 3, 4, 5 or 6 adjacent power contacts to be energized. The signal contact area of the test board has a single 2-ounce copper layer on the bottom surface with 0.6 mm wide traces to the contacts to energize the desired contact chains for the temperature rise measurements as shown in Figure 5. The chains used for the signal contact measurements consist of 1 full column of ground pins and signal pins in the differential pair section of the connector and 2 full columns of signal pins in the single-ended section of the connector.

NOTE

Test board construction has a significant impact on T-Rise results. It is important that the test board design be understood and taken into account when interpreting the T-Rise data and current ratings.