

3.9mm STRADA Whisper* Connector System

DESIGN OBJECTIVES

The product described in this document has not been fully tested to ensure conformance to the requirements outlined below. Therefore, TE Connectivity (TE) makes no representation or warranty, express or implied, that the product will comply with these requirements. Further, TE may change these requirements based on the results of additional testing and evaluation. Contact TE Engineering for further details.

1. SCOPE

1.1. Content

This specification defines performance, tests and quality requirements for the 3.9mm STRADA Whisper Connector System, that uses a modular concept to interconnect two printed circuit boards. Both receptacle and pin connectors are connected to the printed circuit board with plated thru-hole compliant press-fit leads.

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.

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

- 114-32029: Application Specification (3.9mm STRADA Whisper Connector System)
- 501-TBD: Qualification Test Report (3.9mm STRADA Whisper Connector System)

2.2. Industry Standard

EIA-364: Electrical Connector/Socket Test Procedures Including Environmental Classifications

2.3. Reference Document

109-197: Test Specification (TE Test Specifications vs. EIA and IEC Test Methods)

3. REQUIREMENTS

3.1. Design and Construction

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

3.2. Materials

Materials used in the construction of this product shall be as specified on the applicable product drawing.

3.3. Ratings

- Voltage: 80 volts AC maximum peak ($\frac{1}{3}$ of minimum [withstanding](#) voltage)
- Current: 0.5 ampere per signal contact (fully loaded)
- Temperature: -65 to 105°C

3.4. Performance and Test Description

Product is designed to meet the electrical, mechanical and environmental performance requirements specified in Figure 1. Unless otherwise specified, all tests shall be performed at ambient environmental conditions.

3.5. Test Requirements and Procedures Summary

Test Description	Requirement	Procedure
Initial examination of product.	Meets requirements of product drawing and Application Specification 114-32029.	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).	See Figure 2 for initial resistance. ΔR 10 milliohms maximum individual signal reading and ΔR 20 milliohms maximum individual ground reading final. .	EIA-364-23. Subject specimens to 100 milliamperes maximum and 20 millivolts maximum open circuit voltage. See Figure 4.
Low Level Compliant Pin Resistance (LLCPR).	1 milliohm maximum initial. ΔR 1 milliohm maximum change from initial.	EIA-364-23. Subject specimens to 100 milliamperes maximum and 20 millivolts maximum open circuit voltage. Measurements shall be taken between PCB hole and pin tip.
Insulation resistance.	1000 megohms minimum.	EIA-364-21. 100 volts DC, 2 minute hold. Test between adjacent contacts of mated specimens.
Withstanding voltage.	One minute hold with no breakdown or flashover.	EIA-364-20, Condition I. <u>250</u> volts AC at sea level. Test between adjacent contacts of mated specimens.
Temperature rise vs current.	30°C maximum temperature rise at the current ratings shown in Figure 2.	EIA-364-70, Method 1. Stabilize at a single current level until 3 readings at 5 minute intervals are within 1°C.

Figure 1 (Cont'd)

Test Description	Requirement	Procedure
MECHANICAL		
Random vibration.	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-28, Test Condition VII, Condition D. Subject mated specimens to 3.10 G's rms between 20 to 500 Hz. Fifteen minutes in each of 3 mutually perpendicular planes. See Figure 5.
Mechanical shock.	No discontinuities of 1 microsecond or longer duration. See Note.	EIA-364-27, Method A. Subject mated specimens to 490m/s ² (50 G's) half-sine shock pulses of 11 milliseconds duration. Three shocks in each direction applied along 3 mutually perpendicular planes, 18 total shocks. See Figure 5.
Durability.	See Note.	EIA-364-9. Mate and unmate specimens for 200 cycles at a maximum rate of 600 cycles per hour.
Mating force.	See Figure 2 for maximum average per differential pair including ground.	EIA-364-13. Measure force necessary to mate specimens at a maximum rate of 12.7 mm [.5 in] per minute.
Unmating force.	See Figure 2 for minimum average per differential pair including ground.	EIA-364-13. Measure force necessary to unmate specimens at a maximum rate of 12.7 mm [.5 in] per minute.
Compliant pin insertion force.	17.8 N [4.0 lbf] maximum average per pin. The insertion force of a connector can be calculated by multiplying the force per pin by the total number of pins.	EIA-364-5. Measure force necessary to seat pins into a printed circuit board with tin-lead plating at a maximum rate of 12.7 mm [.5 in] per minute.
Compliant pin retention force.	1.8 N [.40 lbf] minimum average per pin. The retention force of a connector can be calculated by multiplying the force per pin by the total number of pins.	EIA-364-5. Measure force necessary to unseat pins from a printed circuit board with tin-lead plating at a maximum rate of 12.7 mm [.5 in] per minute.
Minute disturbance.	See Note.	Unmate and mate each connector pair a distance of approximately 0.1 mm [.004 in].

Figure 1 (Cont'd)

Test Description	Requirement	Procedure
Thermal shock.	See Note.	EIA-364-32, Test Condition II. Subject unmated specimens to 5 cycles between -55 and 85°C with 30 minute dwells at temperature extremes and 1 minute transition between temperatures.
Humidity/temperature cycling.	See Note.	EIA-364-31, Method III. Subject mated specimens to 50 cycles (800 hours) between 5 and 85°C at 80 to 100% RH.
Temperature life.	See Note.	EIA-364-17, Method A, Test Time Condition C. Subject mated specimens to 105°C for 1000 hours.
Mixed flowing gas.	See Note.	EIA-364-65, Class IIA (4 gas). Subject specimens to environmental Class IIA for 20 days total (10 days unmated followed by 10 days mated).
Dust contamination.	See Note.	EIA-364-91. Subject unmated specimens to dust contamination #1 for 1 hour. Air flow shall be 360 cfm.

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 2 and Figure 3.

Figure 1 (end)

Configuration			Pair Size	LLCR Max Initial (mOhm)	Mating Force (N, lbf)	Unmating Force (N, lbf)	Current Rating (Amps)		
							Single (Longest) Pair	Single Column	Fully Energized
PiR RA Rec	Mates To	Vertical Header (BP/MP)	4-6	75	1.7, 0.38	0.31, 0.07	1.45	0.8	0.5
			7-12				1.4	0.55	0.25
PiC RA Rec	Mates To	Vertical Header (BP/MP)	6-8	100	1.7, 0.38	0.31, 0.07			
			8-12	100					

PIC: Pair-In-Column (Orthogonal Connector)

PIR: Pair-In-Row (Standard Connector)

BP: Backplane

MP: Midplane

Figure 2

Product Qualification and Requalification Test Sequence

Test or Examination	Test Group (a)					
	1	2	3	4	5	6
	Test Sequence (b)					
Initial examination of product	1	1	1	1	1	1
LLCR	3,6,8,10,12	3,5,7,9,11		4(c),6	2,4,6,8,10,12,14,16	
LLCPR		2,12		3,7		
Insulation resistance			6			
Withstanding voltage			7			
Vibration	9					
Mechanical shock	11					
Durability	5	4	2		3(d),15(d)	
Mating force	2,14					
Unmating force	4,13					
Compliant pin insertion force				2		
Compliant pin retention force				8		
Minute disturbance					13	
Thermal shock		8	4			
Humidity/temperature cycling		10	5			
Temperature life				5		
Mixed flowing gas (mated)					9(e),11(e)	
Mixed flowing gas (unmated)					5(e),7(e)	
Dust contamination	7	6	3			
Temperature Rise vs Current						2
Final examination of product	15	13	8	9	17	3

NOTE

- (a) See paragraph 4.1.A.
(b) Numbers indicate sequence in which tests are performed.
(c) Perform 10 durability cycles prior to initial measurement.
(d) Perform 100 durability cycles before, and 100 durability cycles after mixed flowing gas testing.
(e) Exposure interval of 5 days.

Figure 3

4. QUALITY ASSURANCE PROVISIONS

4.1. Qualification Testing

A. Specimen Selection

Specimens shall be prepared in accordance with applicable instruction sheets and shall be selected at random from current production. Each test group shall consist of a minimum of 3 specimens.

B. Test Sequence

Qualification inspection shall be verified by testing specimens as specified in Figure 3.

4.2. Requalification Testing

If changes significantly affecting form, fit or function are made to the product or manufacturing process, product assurance shall coordinate requalification testing, consisting of all or part of the original testing sequence as determined by development/product, quality and reliability engineering.

4.3. Acceptance

Acceptance is based on verification that the product meets the requirements of Figure 2. Failures attributed to equipment, test setup or operator deficiencies shall not disqualify the product. If product failure occurs, corrective action shall be taken and specimens resubmitted for qualification. Testing to confirm corrective action is required before resubmittal.

4.4. Quality Conformance Inspection

The applicable quality inspection plan shall specify the sampling acceptable quality level to be used. Dimensional and functional requirements shall be in accordance with the applicable product drawing and this specification.

TBD

Figure 4
LLCR Measurement Points

TBD

Figure 5
Vibration and Mechanical Shock Mounting Fixture