


NUMBER GS-12-557	TYPE PRODUCT SPECIFICATION		
TITLE Right Angle Type, Edge Card Connector		PAGE 1 of 9	REVISION D
		AUTHORIZED BY De-Feng Qin	DATE 2012-07-23
		CLASSIFICATION UNRESTRICTED	

1.0 OBJECTIVE

This specification defines the performance, test, quality and reliability requirements for Small Form-factor Pluggable (SFP) 20, and (XFP) 30 and (X2, XPAK and XENPAK) 70 position Connectors.

2.0 SCOPE

This specification is applicable to the termination characteristics of separable Transceiver PCB when mated to Pluggable connectors.


3.0 GENERAL

This document is composed of the following sections:

<u>Paragraph</u>	<u>Title</u>
1.0	OBJECTIVE
2.0	SCOPE
3.0	GENERAL
4.0	APPLICABLE DOCUMENTS
5.0	REQUIREMENTS
5.1	Qualification
5.2	Material
5.3	Finish
5.4	Design and construction
5.5	Workmanship
6.0	ELECTRICAL CHARACTERISTICS
7.0	MECHANICAL CHARACTERISTICS
8.0	ENVIRONMENTAL CONDITIONS
9.0	QUALITY ASSURANCE PROVISIONS
9.1	Equipment Calibration
9.2	Inspection Conditions
9.3	Acceptance
9.4	Qualification Testing
9.5	Re-qualification Testing
10.0	Reference Documents
Table 1	Qualification Testing Matrix

4.0 APPLICABLE DOCUMENTS

- 4.1 Specifications
 - 4.1.1 Engineering Drawing 10084423, 10120578
- 4.2 Federal Specifications
 - 4.2.1 MIL-STD-202F: Test Methods for Electronic and Electrical Component Parts.
 - 4.2.2 MIL-STD-1344A: Test Methods for Electrical Connectors
 - 4.2.3 MIL-STD-2166: Connectors, Electrical, Compliant Pin

NUMBER GS-12-557	TYPE PRODUCT SPECIFICATION		
TITLE Right Angle Type, Edge Card Connector		PAGE 2 of 9	REVISION D
		AUTHORIZED BY De-Feng Qin	DATE 2012-07-23
		CLASSIFICATION UNRESTRICTED	

4.3 Other Standards and Specifications

- 4.3.1 UL 94 V-0: Flammability
- 4.3.2 EIA 364: Test Procedures for Electrical Connectors, Sockets and Coaxial Contact
- 4.3.3 INF-8074i: SFP Small Form-Factor Pluggable Transceiver Rev 1.0
- 4.3.4 INF-8077i: 10 Gigabit Small Form Factor Pluggable Module
- 4.3.5 XENPAK: 10 Gigabit Ethernet MSA
- 4.3.6 X2_MSA: a Small Versatile 10 Gigabit Transceiver

4.4 FCI Specifications:

- 4.4.1 BUS-03-404: Normal Force Measurement
- 4.4.2 BUS-19-002: Solderability test
- 4.4.3 GS-22-011 : Pb-free solder Heat Resistance procedure-Convection oven reflow

5.0 **REQUIREMENTS**

5.1 Qualification

Connectors furnished under this specification shall be capable of meeting the qualification test requirements specified herein.

5.2 Material

The material for each component shall be as specified herein or equivalent.

Signal Contacts – Nickel Copper alloy

Receptacle Housing – Class filled, High temperature LCP

5.3 Finish

Contact area: Au or GXT (Au-Palladium-Nickel) over Nickel under-plating

Or other selected plating (Please refer to drawing)


Solder tails area: Matt pure Tin over Nickel under-plating

5.4 Design and Construction

Connectors shall be of the design, construction and physical dimensions specified on the applicable product drawings.

5.4.1 See drawing number 10084423,10120578 for test connector configurations

5.5 Workmanship includes freedom from blistering, cracks, discoloration, etc.


NUMBER GS-12-557	TYPE PRODUCT SPECIFICATION		
TITLE Right Angle Type, Edge Card Connector		PAGE 3 of 9	REVISION D
		AUTHORIZED BY De-Feng Qin	DATE 2012-07-23
		CLASSIFICATION UNRESTRICTED	

6.0 ELECTRICAL CHARACTERISTICS

- 6.1 Low Level Contact Resistance (LLCR) - The low level contact resistance shall not exceed 30 milliohms initially and shall not exceed a change of 10 milliohms after environmental exposure when measured in accordance with EIA 364 -TP23. The following details shall apply:
- Test Voltage – 20 millivolts DC Max. open circuit.
 - Test Current - Not to exceed 100 milliamps.
- 6.2 Insulation Resistance - the insulation resistance of mated connectors shall not be less than 500 Megohms for signal initially and after environmental exposure, When measured in accordance with EIA 364 TP21
- Test Voltage 500 volts DC
 - Electrification time - 2 minutes
 - Points of Measurement - Between adjacent Contacts
- 6.3 Dielectric Withstanding Voltage - There shall be no evidence of arc-over, insulation breakdown, or excessive leakage current (>1 Milliampere) when mated connectors are tested in accordance with EIA 364 TP 20. The following details apply:
- Test Voltage – 300 Volts Minimun, AC.
 - Test Duration – 60 seconds.
 - Test Condition – (760 Torr – sea level).
 - Points of measurement – between adjacent contacts
- 6.4 Current Rating
The following details shall apply:
- Voltage: 120 Volts AC
 - Current: 0.5 Ampere Max. per individual contact.
 - Temperature : -55 to 85 ° C.
 - Inductance: 4.0 nH, maximum.
 - Capacitance: 1.2 pF maximum.
 - Differential Impedance: 100 ohms.

7.0 MECHANICAL CHARACTERISTICS

- 7.1 Insertion/Withdrawal Force - The insertion force to mate Transceiver PCB shall not exceed 0.56 N per contact pair, The withdrawal force shall not be less than 0.15 N per contact pair.
The following details shall apply:
- Cross Head Speed - 1 inch per minute
 - Lubrication - None
 - Utilize free floating fixtures
 - Reference EIA 364-13
 - Test PCB thickness is 1.00+/-0.10mm.

NUMBER GS-12-557	TYPE PRODUCT SPECIFICATION		
TITLE Right Angle Type, Edge Card Connector		PAGE 4 of 9	REVISION D
		AUTHORIZED BY De-Feng Qin	DATE 2012-07-23
		CLASSIFICATION UNRESTRICTED	

7.2 Reseating

The connector pair needs to undergo 3 manual plug/unplug cycles.

- a. Sample Size – Dependent upon current test group, refer to specific sample sizes.
- b. Failure Criteria - No evidence of physical damage.
- c. No lubrication to be used during cycling.

7.3 Vibration - EIA 364 TP 28

- a. Test procedure: Test Condition – V, Letter C (50-2000Hz, 9g rms)
- b. Mounting – To eliminate relative motion between the contacts, both mating halves should be rigidly fixed.
- c. Duration – 120 minutes in each of three mutually perpendicular directions.
- d. Failure criteria - No evidence of physical damage. No interruptions > 1.0 microsecond.

7.4 Mechanical Shock - EIA 364-27

- a. Condition A (50g, 11 millisecond half sine wave)
- b. Shocks - 3 shocks in both directions along each of three orthogonal axes (18 total)
- c. Mounting - rigidly mount assemblies
- d. No discontinuities of greater than 1.0 microsecond

7.5 Durability - Standard laboratory procedure as applicable to the specific product EIA-364-09

- a. Number of Cycles – 250.
- b. Cycling rate – 25.4mm per minute.

7.6 Durability (preconditioning) EIA-364-09

The intent of this test is encompassed in latest version of EIA-364-09.

- a. Number of Cycles - 50
- b. Sample Size – Dependent upon current test group, refer to specific sample sizes.
- c. Failure Criteria – No evidence of physical damage.
- d. No lubrication to be used during cycling.
- e. Cycling to be performed manually unless otherwise specified.
- f. Cycling rate - 500 cycles per hour

7.7 Normal Force - The contact normal force shall be greater than 25 grams per contact in floating condition. when tested in accordance with FCI Test Specification BUS-03-404.

7.8 Contact Retention - Individual upper and lower contacts shall withstand an axial retention load of 90 Grams minimum to seat further into housing.


- a. Rate of 0.5 inches/minute without dislodging from the housing cavity.
- b. Test 35 contacts per each contacts of 70 positions, Test 10 contacts per each contacts of 20 and test 15 contacts per each contacts of 30 positions.
- c. As per MIL-STD-1344A, Method 2007.1.

8.0 ENVIRONMENTAL CONDITIONS

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NUMBER GS-12-557	TYPE PRODUCT SPECIFICATION		
TITLE Right Angle Type, Edge Card Connector		PAGE 5 of 9	REVISION D
		AUTHORIZED BY De-Feng Qin	DATE 2012-07-23
		CLASSIFICATION UNRESTRICTED	

After exposure to the following environmental conditions in accordance with the specified test procedure and / or details, the product shall show no physical damage and shall meet the applicable electrical and mechanical requirements of paragraphs 6.0 and 7.0 as detailed in Table 1 test sequences. Unless otherwise specified, assemblies shall be mated during exposure.

8.1 Thermal Shock - EIA 364 TP 32

- a. Test condition - I , 10 cycles
- b. Temperature Range - -55 to +80⁰ C
- c. Time at each Temperature - 30 minutes minimum
- d. Transfer Time - 5 minutes, maximum

8.2 Cycling Temperature and Humidity - EIA 364 TP 31, Method II

- a. Test condition A
- b. Relative Humidity and temperature – between 25±3°C at 80±3% RH and 65±3°C at 50±3% RH.
- c. Test Duration – 96 hours

8.3 Temperature Life, EIA 364 TP 17, Method A.

- a. Test time - 432 Hours
- b. Temperature 115⁰ C
- c. Pre-condition - Perform number of durability cycles specified for product

8.4 Thermal disturbance


- a, The test specimens shall be mated during the test.
- b, Temperature Range – 15°C +/- 3°C to 85°C+/- 3°C.
- c, Thermal Ramp – minimum of 1°C per minute.
- d, Dwell times should insure that the contacts reach the extremes, no less than 5 minutes.
- e, Number of cycles – 10.
- f, Humidity does not need to be controlled during this portion of the test.

8.5 Mixed Flowing Gas (MFG) – EIA 364-65

- a. Class – IIA
- b. Duration – 14 days (Un-mate 1/2 days, mated 1/2 days)
- c. Test per EIA 364-1000.01 Table 4, Note –For 1 piece connector.

8.6 Solderability – BUS-19-002/B and GS-22-011/A.(SMT Reflow soldering)

- a. Steam aging - 4 hours
- b. PCB termination area was evaluated and meets the requirements of BUS-19-002.
- c. Reflow soldering profile(SMT) refer to 5.4.3 Peak Reflow -260 ° C of GS-22-011.

NUMBER GS-12-557	TYPE PRODUCT SPECIFICATION		
TITLE Right Angle Type, Edge Card Connector		PAGE 6 of 9	REVISION D
		AUTHORIZED BY De-Feng Qin	DATE 2012-07-23
CLASSIFICATION UNRESTRICTED			

8.7 Temperature Life (preconditioning) EIA 364 TP 17, Method A.
(Refer to EIA TS-1000 Table 9 for durations and temperatures)

- a. Test temperature - 115⁰ C
- b. Test duration - 192 Hours

9.0 QUALITY ASSURANCE PROVISIONS

9.1 Equipment Calibration

All test equipment and inspection facilities used in the performance of any test shall be maintained in a calibration system in accordance with QS 9000

9.2 Inspection conditions

Unless otherwise specified, all inspections shall be performed under the following conditions:

- a. Temperature: 25 +/- 5⁰ C
- b. Relative humidity: 30 to 60%
- c. Barometric Pressure: Local ambient

9.3 Acceptance

9.4.1 Electrical and Mechanical requirements shall be as indicated in Paragraphs 6.0 and 7.0 using test data and appropriate statistical techniques.

9.4.2 Failures attributed to equipment, test setup or operator error shall not disqualify the product.


9.4 Qualification Testing

Qualification testing shall be performed on sample units predicted with equipment and procedures normally used in production. Test sequence is as shown in Table 1.

9.5 Re-qualification Testing

If any of the following conditions occur, the responsible product engineer shall initiate re-qualification testing consisting of the applicable parts of the test matrix, Table 1.

- a. A significant design change is made to the existing product that impacts the product form, fit or function. Examples of significant changes shall include, but not be limited to, changes in the plating material composition or thickness, contact force or contact surface geometry, insulator design, contact base material or contact lubrication requirements.
- b. A significant event occurs during production or end use requiring corrective action to be taken relative to the product design or manufacturing process.

NUMBER GS-12-557	TYPE PRODUCT SPECIFICATION		
TITLE Right Angle Type, Edge Card Connector		PAGE 7 of 9	REVISION D
		AUTHORIZED BY De-Feng Qin	DATE 2012-07-23
CLASSIFICATION UNRESTRICTED			

- c. A significant change is made to the manufacturing process that impacts the product form, fit or function.


Test Sequence Table 1

Test Items	Para.	Test Group						
		1	2	3	4	5	6	7
		Test Sequence						
Examination of Product	5.5	1 8	1 10	1 9	1 12	1 9	1 3	1 4
Contact Resistance Low Level	6.1	2 5 7	2 7 9	2 5 8	2 9 5 11 7	3 6		
Insulation Resistance	6.2		6					
Dielectric Withstanding Voltage	6.3					4 7		
Insertion/Withdrawal Force	7.1					2 8		
Reseating	7.2	6	8		10			
Vibration	7.3			6				
Mechanical Shock	7.4			7				
Durability	7.5					5		
Durability (Preconditioning)	7.6	3	3	3	3			
Normal force	7.7							2
Contact retention	7.8							3
Thermal Shock	8.1		4					
Cycling Temperature and Humidity	8.2		5					
Temperature Life	8.3	4						
Thermal disturbance	8.4				8			
Mixed Flowing Gas	8.5				6			
Solderability	8.6						2	
Temperature Life (Preconditioning)	8.7			4	4			


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NUMBER GS-12-557	TYPE PRODUCT SPECIFICATION		
TITLE Right Angle Type, Edge Card Connector		PAGE 8 of 9	REVISION D
		AUTHORIZED BY De-Feng Qin	DATE 2012-07-23
		CLASSIFICATION UNRESTRICTED	

Samples quantity		5	5	5	5	5	3	3
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NUMBER GS-12-557	TYPE PRODUCT SPECIFICATION		
TITLE Right Angle Type, Edge Card Connector		PAGE 9 of 9	REVISION D
		AUTHORIZED BY De-Feng Qin	DATE 2012-07-23
CLASSIFICATION UNRESTRICTED			

REVISION RECORD

REV	PAGE	DESCRIPTION	EC#	DATE
C	ALL	Change document classification to unrestricted.	DG10-0365	2010-10-18
D	ALL	Add new P/N and industrial spec	DG-012298	2012-07-23