	TYPE	NUMBER	
	PRODUCT SPECIFICATION	GS-12-095	
TITLE	USB PRODUCT SPECIFICATION	PAGE	REV.
		1 OF 17	K
		AUTHORIZED BY	DATE
		JOHN HAN	09/11/2014

## 1.0 OBJECTIVE

THIS SPECIFICATION DEFINES THE PERFORMANCE, TEST, QUALITY AND RELIABILITY REQUIREMENTS OF THE USB (UNIVERSAL SERIAL BUS) INCLUDING THE FOLLOWING:

- SERIES "A" RIGHT ANGLE SINGLE DECK
- SERIES "A" RIGHT ANGLE SINGLE DECK WITH SENSOR PIN
- SERIES "A" RIGHT ANGLE DOUBLE DECK
- SERIES "A" SMT SINGLE DECK
- SERIES "A" PLUG


## 2.0 SCOPE

THIS SPECIFICATION IS APPLICABLE TO THE TERMINATION CHARACTERISTICS OF THE USB FAMILY OF PRODUCTS WHICH PROVIDES INTERCONNECTION OF COMPUTER PERIPHERALS

## 3.0 GENERAL: THIS DOCUMENT IS COMPOSED OF THE FOLLOWING SECTIONS:

<u>PARAGRAPH</u>	<u>TITLE</u>
1.	OBJECTIVE
2.	SCOPE
3.	GENERAL
4.	APPLICABLE DOCUMENTS
5.	REQUIREMENTS
5.1	QUALIFICATION
5.2	PRODUCT EXAMINATION
5.3	MATERIAL
5.4	FINISH
5.5	DESIGN AND CONSTRUCTION
6.	ELECTRICAL CHARACTERISTICS
7.	MECHANICAL CHARACTERISTICS
8.	ENVIRONMENTAL CHARACTERISTICS
9.	QUALITY ASSURANCE PROVISIONS
9.1	EQUIPMENT CALIBRATION

NOTE: THIS DOCUMENT IS THE PROPERTY OF AND EMBODIES PROPRIETARY INFORMATION OF THE FCI ELECTRONICS COMPANY. NO PART OF THE INFORMATION SHOWN ON THIS DOCUMENT MAY BE USED IN ANY WAY WITHOUT THE WRITTEN CONSENT OF FCI ELECTRONICS.

	TYPE	NUMBER	
	PRODUCT SPECIFICATION	GS-12-095	
TITLE	USB PRODUCT SPECIFICATION	PAGE	REV.
		2 OF 17	K
		AUTHORIZED BY	DATE
		JOHN HAN	09/11/2014

9.2	INSPECTION CONDITIONS
9.3	SAMPLES QUANTITY AND DESCRIPTION
9.4	ACCEPTANCE
9.5	QUALIFICATION TESTING
9.6	RE-QUALIFICATION TESTING
FIGURE 1	CONTACT RESISTANCE MEASUREMENT POINTS TYPICAL
FIGURE 2	VIBRATIONS AND PHYSICAL SHOCK MOUNTING FIXTURE
TABLE 1	QUALIFICATION TESTING AND SEQUENCE MATRIX


#### 4.0 APPLICABLE DOCUMENTS

##### 4.1 SPECIFICATIONS:

###### 4.1.1 ENGINEERING DRAWINGS

<b><u>SERIES "A"</u></b>	<b>SINGLE DECK RECEPTACLES:</b>
87520	THROUGH HOLE
87583	SURFACE MOUNT W/THROUGH HOLE CLAWS
72313	SENSOR PIN THROUGH HOLE
72367	SENSOR PIN SURFACE MOUNT W/THROUGH HOLE CLAWS
72507	SENSOR PIN SURFACE MOUNT W/SURFACE MOUNT TABS
73725	SIDE MOUNT
74612/56434/52369	SMT SPECIAL SHIELD
74552	THROUGH HOLE REVERSED
74626	SURFACE MOUNT REVERSED
74510	SMT WITH TOP SCREW MOUNT
61819	STAND SOLDED TAIL THROUGH HOLE WITH TOP SCREW MOUNT
74056	SHORT SOLDED TAIL THROUGH HOLE WITH TOP SCREW MOUNT
52469	SIDE MOUNT SHORT BODY
52319/57422/57423,	
54006/54026	SIDE MOUNT SHORT BODY
<b><u>SERIES "A"</u></b>	<b>DOUBLE DECK RECEPTACLES:</b>
72309	THROUGH HOLE
<b><u>SERIES "A" PLUG</u></b>	
74033	FULLY RATED
74032	SUB-CHANNEL

NOTE: THIS DOCUMENT IS THE PROPERTY OF AND EMBODIES PROPRIETARY INFORMATION OF THE FCI ELECTRONICS COMPANY. NO PART OF THE INFORMATION SHOWN ON THIS DOCUMENT MAY BE USED IN ANY WAY WITHOUT THE WRITTEN CONSENT OF FCI ELECTRONICS.

	TYPE	NUMBER	
	PRODUCT SPECIFICATION	GS-12-095	
TITLE	USB PRODUCT SPECIFICATION	PAGE	REV.
		3 OF 17	K
		AUTHORIZED BY	DATE
		JOHN HAN	09/11/2014

4.2 MILITARY STANDARDS

- 4.2.1. MIL-STD-202F: TEST METHODS FOR ELECTRONIC COMPONENT PARTS
- 4.2.2. MIL-STD-1344A: TEST METHODS FOR ELECTRICAL CONNECTORS
- 4.2.3. MIL-C-45662: EQUIPMENT CALIBRATION

4.3 FEDERAL SPECIFICATIONS

- 4.3.1. QQ-N-290: NICKEL PLATING (ELECTRODEPOSITED)
- 4.3.2. QQ-B-750: PHOSPHOR BRONZE ALLOY STRIP
- 4.3.3. QQ-S-571: SOLDER


4.4 OTHER STANDARDS AND SPECIFICATIONS

- 4.4.1 UL94: FLAMMABILITY
- 4.4.2 ASTM B-103: PHOSPHOR BRONZE
- 4.4.3 ISO 9000:
- 4.4.4 EIA 364: ELECTRICAL CONNECTOR/SOCKET TEST PROCEDURES INCLUDING ENVIRONMENTAL CLASSIFICATIONS
- 4.4.5 ASTM-D-4565: PHYSICAL AND ENVIRONMENTAL PERFORMANCE PROPERTIES OF INSULATION AND JACKET FOR TELECOMMUNICATIONS WIRE AND CABLE, TEST STANDARD METHOD
- 4.4.6 ASTM-D-4566: ELECTRICAL PERFORMANCE PROPERTIES OF ISULATION AND JECKET FOR TELECOMMUNICATION WIRE AND CABLE TEST STANDARD METHOD
- 4.4.7 USB UNIVERSAL SERIAL BUS SPECIFICATION

4.5 FCI SPECIFICATIONS

- 4.5.1 BUS-03-114: CAPACITANCE MEASUREMENT
- 4.5.2 BUS-03-404: NORMAL FORCE MEASUREMENT
- 4.5.3 BUS-03-405: INSERTION/WITHDRAWAL FORCE MEASUREMENT
- 4.5.4 BUS-03-601: CURRENT RATING/30 DEGREES TEMPERATURE RISE
- 4.5.5 BUS-16-016: PHOSPHOR BRONZE STRIP
- 4.5.6 BUS-16-074: PCT, 30% GLASS
- 4.5.7 BUS-19-002: SOLDERABILITY
- 4.5.8 BUS-19-020: POROSITY

NOTE: THIS DOCUMENT IS THE PROPERTY OF AND EMBODIES PROPRIETARY INFORMATION OF THE FCI ELECTRONICS COMPANY. NO PART OF THE INFORMATION SHOWN ON THIS DOCUMENT MAY BE USED IN ANY WAY WITHOUT THE WRITTEN CONSENT OF FCI ELECTRONICS.

	TYPE	NUMBER	
	PRODUCT SPECIFICATION	GS-12-095	
TITLE	USB PRODUCT SPECIFICATION	PAGE	REV.
		4 OF 17	K
		AUTHORIZED BY	DATE
		JOHN HAN	09/11/2014

- 4.5.9 BUS-19-040: PLATING ADHESION
- 4.6.0 BUS-19-002: SURFACE MOUNT SOLDER JOINT RELIABILITY
- 4.6.1 BUS-19-122: SOLDER JOINT RELIABILITY TEST PROCEDURE FOR SURFACE MOUNT CONNECTORS

## 5.0 REQUIREMENTS

### 5.1 QUALIFICATION

CONNECTORS FURNISHED UNDER THIS SPECIFICATION SHALL BE CAPABLE OF MEETING THE QUALIFICATION TEST REQUIREMENTS SPECIFIED HEREIN.

### 5.2 PRODUCT EXAMINATION

PRODUCT WILL BE EXAMINED PER EIA-364-18 VERIFYING VISUALLY PARAGRAPHS 5.3, 5.4 AND 5.5. DIMENSIONAL EXAMINATION IS NOT REQUIRED.

### 5.3 MATERIAL

MATERIAL FOR EACH PART SHALL BE SPECIFIED HEREIN, OR EQUIVALENT, SUBSTITUTE MATERIAL SHALL MEET THE PERFORMANCE REQUIREMENTS OF THIS SPECIFICATION.


5.3.1 RECEPTACLE TERMINAL; THE BASE MATERIAL SHALL BE PHOSPHOR-BRONZE STRIP

5.3.2 RECEPTACLE INSULATOR HOUSINGS; CONNECTORS SHALL BE MOLDED OF PLASTIC THAT IS RATED UL94-V-0 OR BETTER IN ACCORDANCE WITH UL-94.

5.3.3 RECEPTACLE SHELL; THE BASE MATERIAL SHALL BE PHOSPHOR-BRONZE STRIP.

5.3.4 INSULATOR HOUSINGS AND COVERS OF LEAD FREE PART - THE INSULATOR HOUSINGS AND COVERS OF LEAD FREE PART WILL WITHSTAND EXPOSURE TO 260°C PEAK TEMPERATURE FOR 40 SECONDS IN A CONVECTION, INFRA-RED OR VAPOUR PHASE REFLOW OVEN.

NOTE: THIS DOCUMENT IS THE PROPERTY OF AND EMBODIES PROPRIETARY INFORMATION OF THE FCI ELECTRONICS COMPANY. NO PART OF THE INFORMATION SHOWN ON THIS DOCUMENT MAY BE USED IN ANY WAY WITHOUT THE WRITTEN CONSENT OF FCI ELECTRONICS.

	TYPE	NUMBER	
	PRODUCT SPECIFICATION	GS-12-095	
TITLE	USB PRODUCT SPECIFICATION	PAGE	REV.
		5 OF 17	K
		AUTHORIZED BY	DATE
		JOHN HAN	09/11/2014

5.3.5 LEAD FREE PART - ALL LEAD FREE PARTS ARE COMPATIBLE WITH ROHS.

#### 5.4 FINISH

5.4.1 RECEPTACLE TERMINAL SHALL BE PLATED IN THE CONTACT AREA

WITH 0.76um (30u"INCHES) PALLADIUM NICKEL WITH GOLD FLASH MINIMUM OR 0.76um (30u"INCHES) GOLD OVER 1,27um (50u" INCHES) MINIMUM NICKEL. THE RECEPTACLE TERMINAL SOLDER TAIL SECTIONS SHALL BE PLATED WITH 2,54um (100u"INCHES) 90/10 TIN-LEAD MINIMUM OR 2,54um (100u" INCHES) MINIMUM MATTED TIN FOR LEAD FREE PART OVER 1,27um (50u"INCHES) MINIMUM NICKEL. THE TERMINAL AREAS OUTSIDE OF THE CONTACT AREAS AND THE SOLDER TAIL AREAS SHALL BE PLATED WITH 1,27um (50u"INCHES) NICKEL MINIMUM.


5.4.2 OUTSIDE SEHLL OF THE RECEPTACLE SHALL BE PLATED WITH 2.54um (100u"INCHES) 90/10 TIN-LEAD MINIMUM OR 2.54um (100u"INCHES) MINIMUM PURE TIN OVER 1,27um (50u"INCHES) MINIMUM NICKEL UNDERPLATE.

5.4.3 Lead free plating - ALL PLATING BATH FOR COMPONENTS OF LEAD FREE PART ARE QUALIFIED BY FCI. FCI QUALIFICATION INCLUDES SOLDERABILITY, WHISKERING, SOLDER JOINT RELIABILITY AND TARNISHING EFFECTS.

#### 5.5 DESIGN AND CONSTRUCTION

5.5.1. SINGLE DECK: THE RECEPTACLE CONNECTOR SHALL BE A MULTIPLE PIECE ASSEMBLY HAVING A SINGLE ROWS OF CONTACTS. SPACE ON DISSIMILAR CENTER LINE (THE TWO INNER CONTACTS ARE SPACED 2.0mm APART AND THE TERMINALS ADJACENT TO THESE TERMINALS ARE SPECED 2.5mm AWAY) IN THE INTERFACE AREA. EACH TERMINAL TRANSITION WILL BE A 90 DEGREES BEND TO ALLOW FOR TERMINATION TO THE PC BOARD BY EITHER A THROUGH HOLE LEG OR A SMT LEG. THE OUTSIDE SHELL HAS FOUR RESILIENT CONTACT ARMS (TWO ON TOP AND TOW ON THE BOTTOM) THAT ACT AS ESD GROUNDING AS WELL AS CABLE PLUG RETENTION FEATURES. TWO ADDITIONAL ARMS ON THE SIDE OF THE SHELL ASSURE THAT THERE IS CONSTANT CONTACT BETWEEN THE SHELL AND THE SHELL OF THE CABLE ASSEMBLY PLUG WHILE THE CONNECTORS

NOTE: THIS DOCUMENT IS THE PROPERTY OF AND EMBODIES PROPRIETARY INFORMATION OF THE FCI ELECTRONICS COMPANY. NO PART OF THE INFORMATION SHOWN ON THIS DOCUMENT MAY BE USED IN ANY WAY WITHOUT THE WRITTEN CONSENT OF FCI ELECTRONICS.

	TYPE	NUMBER	
	PRODUCT SPECIFICATION	GS-12-095	
TITLE	USB PRODUCT SPECIFICATION	PAGE	REV.
		6 OF 17	K
		AUTHORIZED BY	DATE
		JOHN HAN	09/11/2014

ARE MATED. THE ENTIRE RECEPTACLE ASSEMBLY IS ATTACHED TO THE PRINTED CIRCUIT BOARD VIA RETENTION CLAWS ON THE OUTSIDE SHELL.REFER TO THE CUSTOMER DRAWING FOR RECOMMENDED P.C. BOARD THICKNESS.

5.5.2. DOUBLEDECK (STACKED); THE RECEPTACLE CONNECTOR SHALL BE A MULTIPLE PIECE ASSEMBLY HAVING DOUBLE ROW A OF CONTACTS SPACED ON DISSIMILAR CENTERLINES (THE TWO INNER CONTACTS ARE SPACED 2.0 mm APART AND THE TERMINALS ADJACENT TO THESE TERMINALS ARE SPACED 2.5mm AWAY) IN THE INTERFACE AREA. EACH TERMINAL TRANSITION WILL BE A 90 DEGREE BEND TO ALLOW FOR TERMINATION TO THE PC BOARD BY MEANS OF A THROUGH HOLE LEG. THE SHELL HAS EIGHT RESILIENT CONTACT ARMS (TWO ON TOP, TWO ON THE BOTTOM, AND FOUR INTERNAL) THAT ACT AS ESP GROUNDING AS WELL AS CABLE PLUG RETENTION FEATURES. FOUR ADDITIONAL ARMS ON THE SIDE OF THE SHELL ASSURE THAT THERE IS CONSTANT CONTACT BETWEEN THE RECEPTACLE SHELL AND THE SHELL OF THE MATING CABLE ASSEMBLY PLUG WHILE THE CONNECTORS ARE MATED. THE ENTIRE RECEPTACLE ASSEMBLY IS ATTACHED TO THE PRINTED CIRCUIT BOARD VIA RETENTION CLAWS ON THE OUTSIDE SHELL.REFER TO THE CUSTOMER DRAWING FOR RECOMMENDED P.C. BOARD THICKNESS.

THE RECOMMENDED P.C. BOARD THICKNESS IS 1.57mm (0.062")


5.3.3 MATING; THE CONNECTORS SHALL BE CAPABLE OF MATING AND UNMATING MANUALLY WITHOUT THE USE OF SPECIAL TOOLS.

5.5.4 WORKMANSHIP; CONNECTORS SHALL BE UNIFORM IN QUALITY AND SHALL BE FREE FROM BURRS, SCRATCHES, CRACKS, VOIDS, CHIPS, BLISTERS, PIN HOLES, SHARP EDGES, OTHER DEFECTS, DEBRIS AND ANY INGRESS OF FOREIGN MATERIAL THAT WILL ADVERSELY AFFECT LIFE OR SERVICEABILITY.

5.5.5 TEMPERATURE RATING; THE RECEPTACLE CONNECTOR SHALL BE CAPABLE OF WITHSTANDING A STORAGE TEMPERATURE RANGE OF -55°C TO 85°C AND OPERATING TEMPERATURE RANGE OF -55°C TO 85°C

## 6.0 ELECTRICAL CHARACTERISTICS

NOTE: THIS DOCUMENT IS THE PROPERTY OF AND EMBODIES PROPRIETARY INFORMATION OF THE FCI ELECTRONICS COMPANY. NO PART OF THE INFORMATION SHOWN ON THIS DOCUMENT MAY BE USED IN ANY WAY WITHOUT THE WRITTEN CONSENT OF FCI ELECTRONICS.

	TYPE	NUMBER	
	PRODUCT SPECIFICATION	GS-12-095	
TITLE	USB PRODUCT SPECIFICATION	PAGE	REV.
		7 OF 17	K
		AUTHORIZED BY	DATE
		JOHN HAN	09/11/2014

6.1 LOW LEVEL CONTACT RESISTANCE (LLCR):

6.6.1 TEST STANDARD: EIA 364-23  
6.6.2 ACCEPTANCE CRITERIA: 30m OHM max.  
6.6.3 CONNECTION METHOD: ATTACH CURRENT AND VOLTAGE LEADS AS SHOWN  
IN FIGURE 1

6.2 INSULATION RESISTANCE;

6.2.1 TEST STANDARD: EIA 364-21  
6.2.2 ACCEPTANCE CRITERIA: >1000 MEGOHMS, MATED AND UNMATED  
6.2.3 TEST VOLTAGE: 500 VOLTS DC  
6.2.4 ELECTRIFICATION TIME: 2 MINUTES  
6.2.5 MEASUREMENT POINTS: BETWEEN ADJACENT CONTACT AND BETWEEN  
CONTACTS SHELL

6.3 DIELECTRIC WITHSTANDING VOLTAGE;

6.3.1 TEST STANDARD: EIA 364-20, METHOD A  
6.3.2 ACCEPTANCE CRITERIA: NO EVIDENCE OF ARC-OVER, INSULATION  
BREAKDOWN, OR EXCESSIVE CURRENT  
LEAKAGE (> 1mA) MATED AND UNMATED  
CONNECTORS  
6.3.3 TEST VOLTAGE: 750 VOLTS AC, 60  
6.3.4 TEST BAROMETRIC PRESSURE: 760mm Hg, SEA LEVEL


6.4 CURRENT RATING:

6.4.1 TEST STANDARD: BUS-03-601  
6.4.2 ACCEPTANCE CRITERIA: 30 °C MAX. DELTA T ANY POINT.  
6.4.3 TEST METHODS: FOR 87520/87583/74552/74626 SERIES:  
PER CONTACT & ALL CONTACT IN  
SERIES AT 3 A; FOR 73725 SERIES:  
PER CONTACT & ALL CONTACT IN  
SERIES AT 2.5A;  
FOR OTHER USB SERIES: PER CONTACT  
AT 1.5A; ALL CONTACTS IN SERIES  
AT 1.0A.  
6.4.4 AMBIENT CONDITIONS: STILL AIR AT 25 °C.

6.5 CAPACITANCE:

6.5.1 TEST STANDARD: EIA 364-30

NOTE: THIS DOCUMENT IS THE PROPERTY OF AND EMBODIES PROPRIETARY INFORMATION OF THE FCI ELECTRONICS COMPANY. NO PART OF THE INFORMATION SHOWN ON THIS DOCUMENT MAY BE USED IN ANY WAY WITHOUT THE WRITTEN CONSENT OF FCI ELECTRONICS.

	TYPE	NUMBER	
	PRODUCT SPECIFICATION	GS-12-095	
TITLE	USB PRODUCT SPECIFICATION	PAGE	REV.
		8 OF 17	K
		AUTHORIZED BY	DATE
		JOHN HAN	09/11/2014

6.5.2 ACCEPTANCE CRITERIA: 2 PF MAX.

6.5.3 AMBIENT CONDITIONS: STILL AIR AT 25 °C.

6.5.4 FREQUENCY: 1 KHZ (DEFAULT 1 MHZ)

6.5.5 POINTS OF MEASUREMENT BETWEEN ADJACENT CONTACTS IN AN UNMATED CONNECTOR

## 7.0 MECHANICAL CHARACTERISTICS

### 7.1 MATING/UNMATING FORCE

7.1.1 TEST STANDARD: EIA 364-13

7.1.2 ACCEPTANCE CRITERIA:

7.1.2.1 MATING: <35.0 N (7.87 Lb) PER PLUG

7.1.2.2 UNMATING: >10.0 N (2.25 Lb) PER PLUG

7.1.3 CROSS HEAD SPEED: 1 INCH PER MINUTE

7.1.4 MOUNTING: FREE FLOATING FIXTURES

### 7.2 CONTACT RETENTION:

7.2.1 TEST STANDARD: EIA 364-29

7.2.2 ACCEPTANCE CRITERIA: AXIAL LOAD > 0.5 POUNDS WITHOUT DISLODGING

7.2.3 APPLICATION RATE: 0.2 INCHES/MINUTE

## 8.0 ENVIRONMENTAL CONDITIONS

ACCEPTANCE CRITERIA: 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 ELECTRICAL AND MECHANICAL REQUIREMENTS PER PARAGRAPHS 6.0 AND 7.0 AS SPECIFIED IN THE TABLE 1. UNLESS SPECIFIED OTHERWISE, ASSEMBLIES SHALL BE MATED DURING EXPOSURE.

### 8.1 THERMAL SHOCK:

8.1.1 TEST STANDARD: EIA 364-32, TEST CONDITION 1


8.1.2 NUMBER OF CYCLES: 10

8.1.3 TIME AT EACH TEMPERATURE: 30 MINUTES

8.1.4 TRANSFER TIME: 5 MINUTES MAXIMUM

NOTE: THIS DOCUMENT IS THE PROPERTY OF AND EMBODIES PROPRIETARY INFORMATION OF THE FCI ELECTRONICS COMPANY. NO PART OF THE INFORMATION SHOWN ON THIS DOCUMENT MAY BE USED IN ANY WAY WITHOUT THE WRITTEN CONSENT OF FCI ELECTRONICS.



	TYPE	NUMBER	
	PRODUCT SPECIFICATION	GS-12-095	
TITLE	USB PRODUCT SPECIFICATION	PAGE	REV.
		9 OF 17	K
		AUTHORIZED BY	DATE
		JOHN HAN	09/11/2014

8.2 HUMIDITY, STEADY STATE:

8.2.1 TEST STANDARD: EIA 364-31, METHOD 3 CONDITION A  
8.2.2 TEST HUMIDITY: 90% TO 98%.  
8.2.3 TEST DURATION: 96 HOURS.

8.3 HIGH TEMPERATURE LIFE:

8.3.1 TEST STANDARD: EIA 364-17, TEST CONDITION 3, METHOD A  
8.3.2 TEST TEMPERATURE: 85 °C  
8.3.3 TEST DURATION: 250 HOURS

8.4 INDUSTRIAL MIXED FLOWING GAS (IMFG):

8.4.1 TEST STANDARD: EIA 364-65, CLASS:III  
8.4.2 DURATION: 20 DAYS  
8.4.3 CONDITION: MATED CONNECTORS

8.5 VIBRATION RANDOM:

8.5.1 TEST STANDARD: EIA 364-28, TEST CONDITION: V, TEST LETTER A  
8.5.2 ACCEPTANCE CRITERIA: NO DISCONTINUITIES GREATER THAN 1 MICROSECOND  
8.5.3 DURATION: 15 MINUTES ALONG EACH OF THREE ORTHOGONAL AXES  
8.5.4 MOUNTING: SEE FIGURE 2


8.6 MECHANICAL SHOCK:

8.6.1 TEST STANDARD: EIA 364-27, CONDITION: H  
8.6.2 DURATION: 18 SHOCK IMPULSES.  
8.6.3 ACCEPTANCE CRITERIA: NO DISCONTINUITIES GREATER THAN 1 MICROSECONDS  
8.6.4 MOUNTING: SEE FIGURE 2

8.7 DURABILITY:

8.7.1 TEST STANDARD: STANDARD LABORATORY PROCEDURE AS APPLICABLE TO THE SPECIFIC PRODUCT  
8.7.2 NUMBER OF CYCLES: 1500 CYCLES  
12,000 CYCLES FOR 73725-XX3XXLF; 73725-XXSXXLF;  
74552-SXXXXXXLF; 74626-XXSXXLF; 87520-  
XSXXXXXXLF; 87583-SXXXXXXLF; 72309-SXXXXXXLF;  
10,000 CYCLES FOR 87583-3010XXLF

NOTE: THIS DOCUMENT IS THE PROPERTY OF AND EMBODIES PROPRIETARY INFORMATION OF THE FCI ELECTRONICS COMPANY. NO PART OF THE INFORMATION SHOWN ON THIS DOCUMENT MAY BE USED IN ANY WAY WITHOUT THE WRITTEN CONSENT OF FCI ELECTRONICS.

	TYPE	NUMBER	
	PRODUCT SPECIFICATION	GS-12-095	
TITLE	USB PRODUCT SPECIFICATION	PAGE	REV.
		10 OF 17	K
		AUTHORIZED BY	DATE
		JOHN HAN	09/11/2014

8.7.3 CYCLING RATE: EIA 364-09

8.8 SOLDERABILITY:

8.8.1 TEST STANDARD: ANSI-J-002, TEST CONDITION A

8.8.2 ACCEPTANCE CRITERIA: MEETS ANSI-J-002 REQUIREMENTS

8.8.3 STEAM AGING: 1 HOURS

8.9 RESISTANCE TO SOLDER HEAT:

8.9.1 TEST STANDARD:

8.9.1.1 THRU HOLE EIA 364-56, PROCEDURE 3, CONDITION E

8.9.1.2 SURFACE MOUNT EIA 364-56, PROCEDURE 5, LEVEL 3

8.9.2 ACCEPTANCE CRITERIA: THERE SHALL BE NO EVIDENCE OF PHYSICAL OR MECHANICAL DAMAGE

8.10 RESISTANCE TO SOLVENTS:

8.10.1 TEST STANDARD: EIA 364-11, CLASS IV

8.10.2 ACCEPTANCE CRITERIA: NO EVIDENCE OF PHYSICAL OR MECHANICAL DAMAGE

8.10.3 SOLVENT TEMPERATURE: 25 °C

8.10.4 IMMERSION TIME: 3 MINUTES

~~8.11 SURFACE MOUNT CONNECTOR SOLDER JOINT RELIABILITY:~~

~~8.11.1 TEST STANDARD: BERG BUS 19 122~~

~~8.11.2 TEST CONDITION: 900 THERMAL CYCLES, CONTINUITY MONITOR ONLY.~~

**9.0 QUALITY ASSURANCE PROVISIONS**

9.1 EQUIPMENT CALIBRATION:

ALL TEST EQUIPMENT AND INSPECITON FACILITIES USED IN THE PERFORMANCE OF ANY TEST SHALL BE MAINTAINCED IN A CALIBRATION SYSTEM IN ACCORDANCE WITH MIL-C-45662 AND ISO 9000


9.2 INSPECTION CONDITIONS:

UNLESS OTHERWISE SPECIFIED HEREIN, ALL INSPECTIONS SHALL BE PERFORMED UNDER THE FOLLOWING AMBIENT CONDITIONS:

9.2.1 TEMPERATURE: 25 +/-5 °C

9.2.2 RELATIVE HUMIDITY: 30% TO 60 %

NOTE: THIS DOCUMENT IS THE PROPERTY OF AND EMBODIES PROPRIETARY INFORMATION OF THE FCI ELECTRONICS COMPANY. NO PART OF THE INFORMATION SHOWN ON THIS DOCUMENT MAY BE USED IN ANY WAY WITHOUT THE WRITTEN CONSENT OF FCI ELECTRONICS.

	TYPE	NUMBER	
	PRODUCT SPECIFICATION	GS-12-095	
TITLE	USB PRODUCT SPECIFICATION	PAGE	REV.
		11 OF 17	K
		AUTHORIZED BY	DATE
		JOHN HAN	09/11/2014

9.2.3 BAROMETRIC PRESSURE: LOCAL AMBIENT

9.3 SAMPLE QUANTITY AND DESCRIPTION

9.3.1 GROUPS 1,2,8: 8 SAMPLES IN EACH GROUP

9.3.2 GROUPS 3,5,6,7: 5 SAMPLES IN EACH GROUP

9.3.3 GROUP 4: 9 SAMPLES IN GROUP

9.4 ACCEPTANCE

9.4.1 ELECTRICAL AND MECHANICAL REQUIREMENTS PLACED ON TEST SAMPLES AS INDICATED IN PARAGRAPHS 6.0 AND 7.0 SHALL BE ESTABLISHED FROM TEST DATA USING APPROPRIATE STATISTICAL TECHNIQUES OR SHALL OTHERWISE BE CUSTOMER SPECIFIED, AND ALL SAMPLES TESTED IN ACCORDANCE WITH THIS PRODUCT SPECIFICATION SHALL MEET THE STATED REQUIREMENTS.

9.4.2 FAILURES ATTRIBUTED TO EQUIPMENT, TEST SET-UP, OR OPERATOR ERROR SHALL NOT DISQUALIFY THE PRODUCT. IF PRODUCT FAILURE OCCURES, CORRECTIVE ACTION SHALL BE TAKEN AND SAMPLES RESUBMITTED FOR QUALIFICATION.


9.5 QUALIFICATION TESTING: QUALIFICATION TESTING SHALL BE PERFORMED ON SAMPLE UNITS PRODUCED WITH EQUIPMENT AND PROCEDURES NORMALLY USED IN PRODUCTION. THE TEST SEQUENCE SHALL BE AS SHOWN IN TABLE 1

9.6 RE-QUALIFICATION TESTING: IF ANY OF THE FOLLOWING CONDITION OCCUR, THE RESPONSIBLE PRODUCT ENGINEER SHALL INITIATE RE-QUALIFICATION TESTING CONSISTING OF ALL APPLICABLE PARTS OF THE QUALIFICATION TEST MATRIX ( TABLE 1 ):

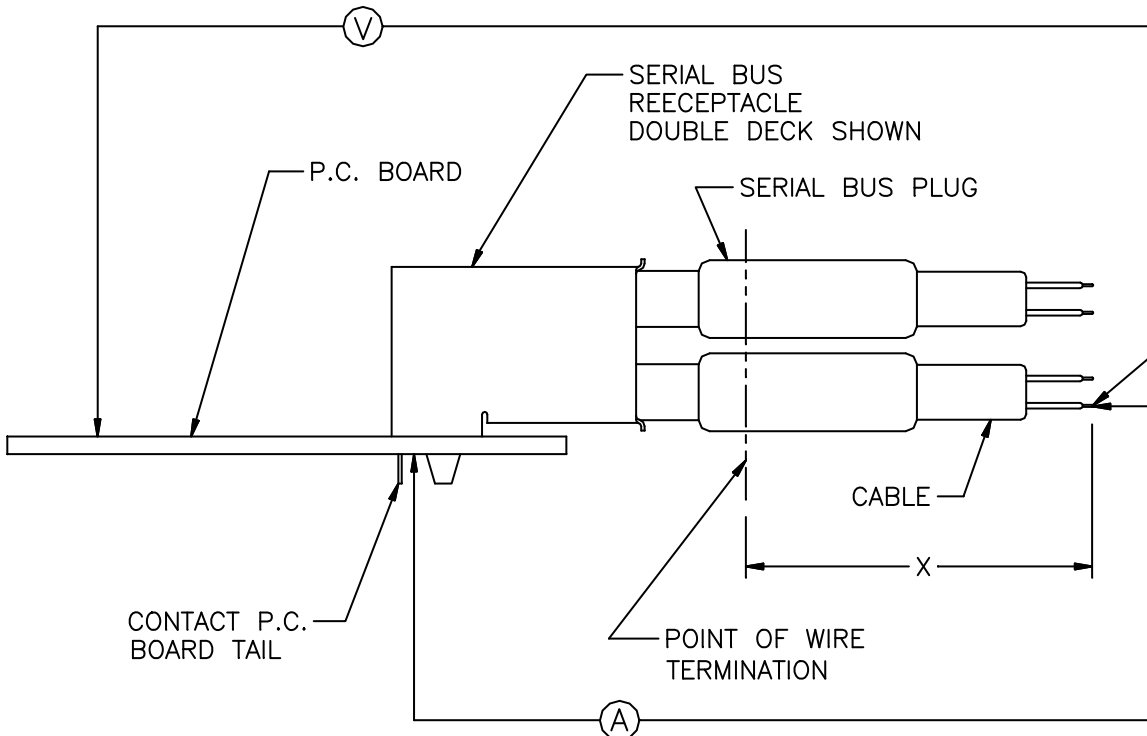
9.6.1 A SIGNIFICANT DESIGN CHANGE IS MADE TO THE EXISTING PRODUCT WHICH IMPACTS THE PRODUCT FORM, FIT OR FUNCTION. EXAMPLES OF SIGNIFICANT CHANGES SHALL INCLUDE, BUT NOT BE LIMITED TO, CHANGES IN THE PLATING MATERIAL COMPOSITION OR THICKNESS , CONTACT FORCE, CONTACT SURFACE GEOMETRY, INSULATOR DESIGN, CONTACT BASE MATERIAL, OR CONTACT LUBRICATION RQUIREMENTS.

9.6.2 A SIGNIFICANT CHANGE IS MADE TO THE MANUFACTURING PROCESS WHICH IMPACTS THE PRODUCT FORM, FIT OR FUNCTION.

NOTE: THIS DOCUMENT IS THE PROPERTY OF AND EMBODIES PROPRIETARY INFORMATION OF THE FCI ELECTRONICS COMPANY. NO PART OF THE INFORMATION SHOWN ON THIS DOCUMENT MAY BE USED IN ANY WAY WITHOUT THE WRITTEN CONSENT OF FCI ELECTRONICS.

	TYPE PRODUCT SPECIFICATION	NUMBER GS-12-095		
	TITLE USB PRODUCT SPECIFICATION	PAGE 12 OF 17	REV. K	
		AUTHORIZED BY JOHN HAN	DATE 09/11/2014	

9.6.3 A SIGNIFICANT EVENT OCCURS DURING PRODUCTION OR END USE REQUIRING CORRECTIVE ACTION TO BE TAKEN RELATIVE TO THE PRODUCT DESIGN OR MANUFACTURING PROCESS.




1. RESISTANCE DUE TO X INCHES OF IS TO BE REMOVED FROM ALL READINGS

FIGURE 1

CONTACT RESISTANCE MEASUREMENT POINTS TYPICAL

NOTE: THIS DOCUMENT IS THE PROPERTY OF AND EMBODIES PROPRIETARY INFORMATION OF THE FCI ELECTRONICS COMPANY. NO PART OF THE INFORMATION SHOWN ON THIS DOCUMENT MAY BE USED IN ANY WAY WITHOUT THE WRITTEN CONSENT OF FCI ELECTRONICS.

	TYPE PRODUCT SPECIFICATION	NUMBER GS-12-095		
	TITLE USB PRODUCT SPECIFICATION	PAGE 13 OF 17	REV. K	
		AUTHORIZED BY JOHN HAN	DATE 09/11/2014	

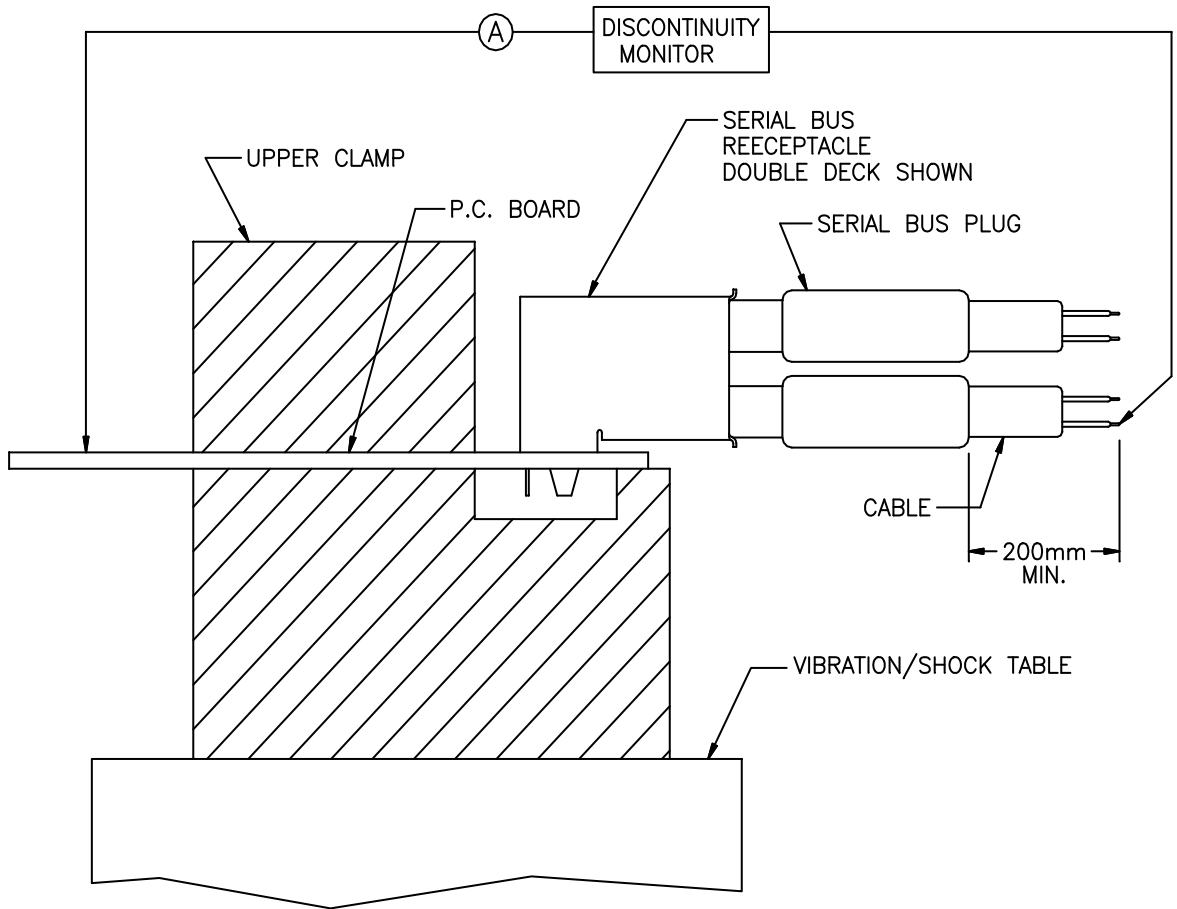



FIGURE 2  
 VIBRATION AND PHYSICAL SHOCK MOUNTING FIXTURE

NOTE: THIS DOCUMENT IS THE PROPERTY OF AND EMBODIES PROPRIETARY INFORMATION OF THE FCI ELECTRONICS COMPANY. NO PART OF THE INFORMATION SHOWN ON THIS DOCUMENT MAY BE USED IN ANY WAY WITHOUT THE WRITTEN CONSENT OF FCI ELECTRONICS.

	TYPE	NUMBER	
	PRODUCT SPECIFICATION	GS-12-095	
TITLE	USB PRODUCT SPECIFICATION	PAGE	REV.
		14 OF 17	K
		AUTHORIZED BY	DATE
		JOHN HAN	09/11/2014

Test Groups And Sequence									
Test Procedure	Para	1	2	3	4	5	6	7	8
Product Examination	5.2	1,11	1,7	1,5,14	1,3	1,3	1,4	1,3	1,5
Contact Resistance	6.1	3,5,8,1	2,4,6	6,8,10					2,3
Insulation Resistance	6.2			3,13 (C)					
Dielectric Withstanding Voltage	6.3			4,12 (C)					
Current Rating	6.4				2				
Capacitance	6.5			2,11 (C)					
Mating/Unmating Forces	7.1	2,9							
Contact Retention	7.2		8(B)						
Thermal Shock	8.1			7					
Humidity, Steady State	8.2			9					
High Temperature Life	8.3		5						
Ind. Mixed Flowing Gas	8.4								4
Vibration	8.5	6							
Mechanical Shock	8.6	7							
Durability	8.7	4	3(A)						
Solderability	8.8					2			
Resistance to Soldering Heat	8.9						2		
Resistance to Solvents	8.10						3		
<del>Surface Mount Solder Joint Reliability</del>	<del>8.11</del>							2	
(A)Condition samples with 10 cycles of durability									
(B)Testing to be done on loose piece (unterminated) connector that has been exposed to high temperature life testing.									
(C)A single loose piece may be used for this testing									

Table 1  
Qualification Testing and Sequence Matrix

NOTE: THIS DOCUMENT IS THE PROPERTY OF AND EMBODIES PROPRIETARY INFORMATION OF THE FCI ELECTRONICS COMPANY. NO PART OF THE INFORMATION SHOWN ON THIS DOCUMENT MAY BE USED IN ANY WAY WITHOUT THE WRITTEN CONSENT OF FCI ELECTRONICS.



TYPE  
PRODUCT SPECIFICATION

NUMBER  
GS-12-095

TITLE  
USB PRODUCT SPECIFICATION

PAGE  
15 OF 17


REV.  
K

AUTHORIZED BY  
JOHN HAN

DATE  
09/11/2014

<u>REV</u>	<u>PAGE</u>	<u>DESCRIPTION</u>	<u>EC#</u>	<u>DATE</u>
A	ALL	RELEASED	T70149	4/18/'97
B	ALL	Add P/N 73725	T70375	8/28/'97
C	ALL	Add P/N 74612	J80259	6/08/'98
D	ALL	Add P/N 52319,52469	J80259	6/08/'98
E	ALL	Add P/N 7422, 57423, 56434,54006,54026,52369.	T10178	6/29/'01
F	5	5.4.1 Add "or 2,54um (100 µinches) minimum matted tin for lead free part"	N04-0084	11/08/04
	5	5.4.2 Add "or 2,54um (100 µinches) minimum matted tin for lead free part"	N04-0084	11/08/04
	5	Add 5.3.4 Insulator housings and covers of lead free part	N04-0084	11/08/04
	5	Add 5.4.3 lead free plating	N04-0084	11/08/04
	5	Add 5.3.5 lead free part material	N04-0084	11/08/04
G	7	5.5.5 Modify operation temperature to the range of -40~85 degree	N06-0260	10/12/06
H	7	5.5.5 Modify storage temperature to the range of -40~85 degree	N06-0284	11/13/06
	9	8.1 Modify thermal shock cycles to 10 times to meet USB 2.0 SPEC	N06-0284	11/13/06
	9	8.2 Modify humidity test standard to EIA 364-31, METHOD III CONDITION A to meet USB 2.0 SPEC	N06-0284	11/13/06
J	8,9	Add new part numbers that can meet 12,000 and 10,000mating cycles. Increase 2.1A at the amp section	N09-0203	09/20/2013
J1	6, 7, 10	1.Modify storing and operating temperature range from -40°C ~ 85°C to -55°C ~ 85°C; 2.modify 87520/87583/74552/74626 series current rating from 1.0 to 3A; AND 73725 series; current rating from 1.0 to 2.5A 3.modify steam aging from 4H to	/	9/11/2014

NOTE: THIS DOCUMENT IS THE PROPERTY OF AND EMBODIES PROPRIETARY INFORMATION OF THE FCI ELECTRONICS COMPANY. NO PART OF THE INFORMATION SHOWN ON THIS DOCUMENT MAY BE USED IN ANY WAY WITHOUT THE WRITTEN CONSENT OF FCI ELECTRONICS.

	TYPE PRODUCT SPECIFICATION	NUMBER GS-12-095	
TITLE USB PRODUCT SPECIFICATION		PAGE 16 OF 17	REV. K
		AUTHORIZED BY JOHN HAN	DATE 09/11/2014

		1H in solderability; 4. Delete "8.11 SURFACE MOUNT CONNECTOR SOLDER JOINT RELIABILITY" this section.		
--	--	---	--	--

NOTE: THIS DOCUMENT IS THE PROPERTY OF AND EMBODIES PROPRIETARY INFORMATION OF THE FCI ELECTRONICS COMPANY. NO PART OF THE INFORMATION SHOWN ON THIS DOCUMENT MAY BE USED IN ANY WAY WITHOUT THE WRITTEN CONSENT OF FCI ELECTRONICS.