

## Product/Process Change Notifications



# PCN - 14 040-R.1

Release Date: July 01 2014

<b>Product Name:</b>	USB		
	USB PRODUCT SPECIFICATION ( GS-12-095)		
<b>Product Manager:</b>	Otto.Yang		
<b>Subject:</b>	Notification of Change with Immediate Effectivity		
<b>Distribution:</b>	General		
<b>Type of Change:</b>	Documentation Change		
<b>Change Description:</b>	1. Standardize steam aging specification from 4 hour to 1 hour in solderability test 2. Remove "8.11 SURFACE MOUNT CONNECTOR SOLDER JOINT RELIABILITY" section from product specification.		
<b>Reason for Change:</b>	1. Steam aging need only to be 1 hour by USB Serial Bus standard. 2. About "8.11" section. we never do this test as it is not compulsory in USB Serial Bus standard.  <i><b>By R.1</b> - Effective date has been made immediate as per PM request since there is only a documentation change happening. No other change in the PCN.</i>		
<b>Affected Parts:</b>	Attached list		
<b>Effective Date of Change:</b>	July 15, 2014		
<b>Last Time Buy Date:</b>	NA		
<b>Last Disty Return Date:</b>	NA		
<b>Last Time Shipment Date</b>	NA		
<b>Datasheet Attached?</b>	Yes		
<b>Qual/Test Data Attached?</b>	Yes		
<b>Samples Availability Date:</b>	June	2	2014
<b>Available Alternatives?</b>	N/A		
<b>Questions?</b>	<i>Contact your local FCI Representative, or Product Manager</i>		
	<i>Otto Yang / Product Specialist</i>		
	<i>+86 51380167367 / Otto.Yang@fci.com</i>		

**Note:**

Customer shall intimate the product Manager any Concern regarding the PCN within 3 weeks of the release date.  
 PCN is considered approved by the customer if no communication is received within 3 weeks

PCN	Item Number	Change	Effective Date	Last Time Buy Date	Last Disty return date	Replacement Part	Alternate Part	Comments
PCN14040 R.1	72309-2013BLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-2014BLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-2023BLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-2023RLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-2034BLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-2034RLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-2044BLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-3013BPLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-3013RPLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-3015RPLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-3023BLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-3023BPLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-3024BLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-3024BPLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-3043BLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-3045RPLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-5013RLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-5034BLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-5043BLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-5044BLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-5044BSLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-7013BLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-7013BPLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-7013RPLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-7014BLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-7014BPLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-7014RLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-7024BLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-7024RLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-7033RPLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-7034BLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-7043BLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-7043RLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-7043RPLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-7044BLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-7044BPLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-7044RLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-7044RPSLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-8014BLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-8014RLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-8023BLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-8023RLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-8024BLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-8024RLF	DOCUMENTATION CHANGE	15-Jul-14					
PCN14040 R.1	72309-8033BLF	DOCUMENTATION CHANGE	15-Jul-14					

PCN14040 R.1	72309-8034BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	72309-8034RLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	72309-8043BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	72309-8044BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	72309-9013RPLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	72309-9043BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	72309-S033BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	72309-S034RPLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	73725-0110BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	73725-0110RLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	73725-0120BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	73725-0130BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	73725-0140BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	73725-0150BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	73725-0160BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	73725-0170BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	73725-0180BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	73725-0180RLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	73725-01A0BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	73725-1010BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	73725-1020BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	73725-1030BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	73725-1060BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	73725-10S0BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	73725-1110BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	73725-1120BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	73725-1130BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	73725-1170BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	73725-1180BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	73725-1191BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	73725-1191RLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	73725-11A0BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	73725-11S0BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	74552-1111BPLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	74552-3111BPLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	74552-4110BPSLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	74626-11S0BPLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	74626-11S0RPLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	74626-2110BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-0010ALF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-0010BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-0012BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-0110ALF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-0110APLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-0110BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-0112ALF	DOCUMENTATION CHANGE	15-Jul-14

PCN14040 R.1	87520-0112BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-0210BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-1010ALF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-1010BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-1010BPLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-1012APLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-1012BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-1012BPLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-1110ALF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-1110BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-1112APLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-1112BPLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-2010ALF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-2010BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-2110APLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-2112ALF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-2112BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-3010ALF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-3010APBLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-3010APLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-3012APLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-3012BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-3012BPBLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-3110ABLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-3112ALF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-3112APLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-3S10APBLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-3S10APCLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-3S10APLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-3S10BPLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-3S12XPBLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-4010ALF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-4010BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-4010BPLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-5010ALF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-5010BPLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-5010BPSLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-6010ALF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-6010BPLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-7010BPLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87520-7010BPSLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87583-0010BHLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87583-0010RHLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87583-1010RPALF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87583-2010BALF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87583-2010BLF	DOCUMENTATION CHANGE	15-Jul-14

PCN14040 R.1	87583-2010BPLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87583-2010RLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87583-2010RPLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87583-3010BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87583-3010BPLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87583-3010RLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87583-3010RPALF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87583-3010RPLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87583-S010BLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87583-S010BPLF	DOCUMENTATION CHANGE	15-Jul-14
PCN14040 R.1	87583-S010RPLF	DOCUMENTATION CHANGE	15-Jul-14

**Report DL-2010-04-014A-CR**  
USB Connector Qualification Testing  
02 Feb, 2012

**PURPOSE**

Qualification testing was conducted on USB Receptacle Connector to assess conformance to FCI product specification GS-12-095(Rev: J1)

**CONCLUSIONS**

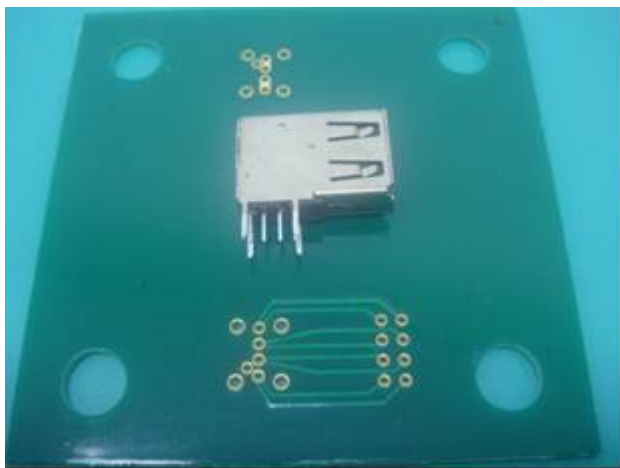
The test results showed that USB Receptacle Connector met the product specification requirement.

**SAMPLE DESCRIPTION**

The samples were examined at low magnification and judged to be acceptable for testing. The details of the submitted samples are given in Table 1 and illustrated in Figure 1.

**Table 1 Identity of Submitted Test Samples**

Item	Description	Part #	Lot #	Contact Plating
1	USB Receptacle	73725-1191BLF	NA	GXT 0.76um min
2	USB Plug	NA	NA	NA



**Figure1 Photo of receptacle and PCB & Plug**

**REFERENCE DOCUMENT**

The requirements for product qualification are established by the product specifications with reference to a variety of test methods. FCI qualification and other pertinent documents are listed in Table 2.

**Table 2 Reference Documents**

Document ID	Title	Rev. Level (Date)
EIA-364-23	Low Level Contact Resistance Test Procedure for Electrical Connectors and Sockets	C (2006 Jun)
EIA-364-09	Durability Test Procedure for Electrical Connectors and Sockets	C (1999 Jun)
EIA-364-17	Temperature Life With or without Electrical Load Test Procedure for Electrical Connectors and Sockets	B (1999 Jun)
EIA-364-20	Dielectric Withstanding Voltage Test Procedure for Electrical Connector	D (2008 Mar)
EIA -364-21	Insulation Resistance Test Procedure for Electrical Connectors, Sockets, and Coaxial Contacts	D (2008 Mar)
EIA-364-27	Mechanical Shock (Specified Pulse) Test Procedure for Electrical Connectors and Sockets	C (2011 Jun)
EIA-364-28	Vibration Test Procedure for Electrical Connectors and Sockets	F (2011 Jan)
EIA-364-31	Humidity Test Procedure for Electrical Connectors and Sockets	C (2008 Nov)
EIA-364-32	Thermal shock (Temperature Cycling) Test Procedure for Electrical Connectors and Sockets	E (2008 May)
EIA -364-13	Mating and Un-mating Forces Test Procedure for Electrical Connectors	D (2007 Jul)
EIA -364-29	Contact Retention Test Procedure for Electrical Connectors	C( 2006 Aug)
EIA-364-65	Mixed Flowing Test Procedure for Electrical Connectors and Sockets	B (2009 Dec)
EIA-364-70	Temperature Rise Versus Current Test Procedure for Electrical Connectors and Sockets	B (2007 Jun)
J-STD-002C*	Solderability tests for component leads, terminations, lugs, terminals and wires	C(2007 Dec)
EIA-364-56	Resistance to Soldering Heat Test Procedure for Electrical Connectors and Sockets	D (2008 Feb)

\* J-STD-002C was used instead of ANSI-J-002.

**TEST DESCRIPTIONS**

Qualification testing was conducted in accordance with FCI product specification GS-12-095 with some amendments to test groups.

**Table 3 Test Sequence Matrix**

Test Items	Test method	Test groups and sequence						
		GROUP 1	GROUP 2	GROUP 3	GROUP 4	GROUP 5	GROUP 6	GROUP 8
Examination of product	5.2	1,11	1,7	1,4,12	1,3	1,3	1,4	1,5
Contact Resistance	6.1	3,5,8,10	2,4,6	5,7,9				2,4
Insulation resistance	6.2			2,11(C)				
Dielectric withstanding voltage	6.3			3,10(C)				
Current rating	6.4				2			
Mating un-mating force	7.1	2,9						
Contact retention	7.2		8(B)					
Thermal shock	8.1			6				
Humidity, steady state	8.2			8				
High temperature life	8.3		5					
Ind. Mixed flowing gas	8.4							3
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	8.1						3	
(A) Condition samples with 10 cycles of durability								
(B) Testing to be done on loose piece(un-terminated) connector that has been exposed to high temperature life testing								
(C) A single loose piece may be used for this testing								



**TEST METHODS/REQUIREMENTS****Table 4 Test Requirements**

<b>Test Items</b>	<b>Test method</b>	<b>Condition</b>	<b>Requirement</b>
LLCR	EIA-364-23C	20mV,100mA	30mΩ max
Durability	EIA-364-09C	500cycles/hour,12000cycles	No physical damage
Temperature life	EIA-364-17B	Method A, condition 3. 85 °C, 250hours	No physical damage
Thermal shock	EIA-364-32E	Method A, Condition I, -55~85 °C,10cycles	No physical damage
Cyclic Temp & Humidity	EIA-364-31C	Method III, Condition B, omitting 7b vibration test	No physical damage
Mechanical Shock	EIA-364-27C	Condition H	No damage and no discontinuities > 1us
Vibration	EIA-364-28F	Condition V, Letter A. 15min/axes	No damage and no discontinuities > 1us
MFG	EIA-364-65B	Class IIIA mated 20days.	No physical damage
DW V	EIA-364-20D	750V AC,1 Minute	No evidence of arc-over and insulation breakdown
IR	EIA-364-21D	500V DC,2 Minute	>1000MΩ
Solderability	J-STD-002C	4hours steam aging 260°C max	≥95% Solder coverage
Resistance to soldering heat	EIA-364-56D	Procedure 3, Condition E for THRU HOLE Procedure 5, Level 3 for SURFACE MOUNT	No evidence of physical or mechanical damage.

## TEST RESULTS

### Summary of Test Result, Group 1

Step	Test	Requirement	Step Description	Results	Comment
1	Examination product	No evidence of physical damage or functional fail.	No physical damage	No physical damage	Pass
2	Mating un-mating force	Mating: <35.0 N un-mating: >10.0 N	Mating un-mating force	Mating: <19.0 N un-mating: >14.3 N	Pass
3	Contact Resistance	30 mΩ max.	After Mating un-mating force	Min:11.2mΩ Max:18.2mΩ Average:14.7mΩ	Pass
4	Durability	Number of cycles: 12000cycles	Durability	No physical damage	Pass
5	Contact Resistance	30 mΩ max.	After Durability	Min:11.6mΩ Max:20.1mΩ Average:15.6mΩ	Pass
6	Vibration	No physical damage and no discontinuities > 1us	Vibration	No damage and no discontinuities > 1us	Pass
7	Mechanical Shock	No physical damage and no discontinuities > 1us	Mechanical Shock	No damage and no discontinuities > 1us	Pass
8	Contact Resistance	30 mΩ max.	After Mechanical Shock	Min:11.6mΩ Max:20.1mΩ Average:15.6mΩ	Pass
9	Mating un-mating force	Mating: <35.0 N un-mating: >10.0 N	Mating un-mating force	Mating: <18.3 N un-mating: >13.3 N	Pass
10	Contact Resistance	30 mΩ max.	Final CR (After Mating un-mating force)	Min:11.5mΩ Max:19.8mΩ Average:15.4mΩ	Pass
11	Examination product	No evidence of physical damage or functional fail.	Final Exam.	No physical damage	Pass

**Summary of Test Result, Group 2**

<b>Step</b>	<b>Test</b>	<b>Requirement</b>	<b>Step Description</b>	<b>Results</b>	<b>Comment</b>
1	Examination product	No evidence of physical damage or functional fail.	No physical damage	No physical damage	Pass
2	Contact Resistance	30 mΩ max.	Initial CR	Min:10.5mΩ Max:17.9mΩ Average:14.1mΩ	Pass
3	Durability	10cycles	Durability	No physical damage	Pass
4	Contact Resistance	30 mΩ max.	After Durability	Min:10.4mΩ Max:18.7mΩ Average:14.3mΩ	Pass
5	High temperature life	No physical damage	High temperature life	No physical damage	Pass
6	Contact Resistance	30 mΩ max.	After High temperature life	Min:10.5mΩ Max:18.7mΩ Average:14.2mΩ	Pass
7	Examination product	No evidence of physical damage or functional fail.	Final Exam.	No physical damage	Pass
8	Contact retention	Axial load >0.5pounds without dislodging 0.2inches/minute	Contact retention	Min:5.020pounds Max:9.221 pounds Average:7.351pounds	Pass

**Summary of Test Result, Group 3**

Step	Test	Requirement	Step Description	Results	Comment
1	Examination product	No evidence of physical damage or functional fail.	No physical damage	No physical damage	Pass
2	IR	>1000megohm	IR	17100megohm min	Pass
3	DWV	No evidence of arc-over and insulation breakdown	DWV	No evidence of arc-over and insulation breakdown	Pass
4	Examination product	No evidence of physical damage or functional fail.	Examination product	No physical damage	Pass
5	Contact Resistance	30 mΩ max.	Contact Resistance	Min:10.7mΩ Max:18.0mΩ Average:14.5mΩ	Pass
6	Thermal shock	No physical damage	Thermal shock	No physical damage	Pass
7	Contact Resistance	30 mΩ max.	After Thermal shock	Min:10.6mΩ Max:18.2mΩ Average:14.7mΩ	Pass
8	Humidity	No physical damage	Humidity	No physical damage	Pass
9	Contact Resistance	30 mΩ max.	After Humidity	Min:10.9mΩ Max:18.7mΩ Average:14.8mΩ	Pass
10	DWV	No evidence of arc-over and insulation breakdown	DWV	No evidence of arc-over and insulation breakdown	Pass
11	IR	>1000megohm	IR	11667megohm min	Pass
12	Examination product	No evidence of physical damage or functional fail.	Final Exam	No physical damage	Pass

**Summary of Test Result, Group 4**

Step	Test	Requirement	Step Description	Results	Comment
1	Examination product	No evidence of physical damage or functional fail.	No physical damage	No physical damage	Pass
2	Current rating	30°C in series at 1.00A Delta T any point	Current rating	Max:3.89°C @ 1Amp Detail see <b>Appendix A</b>	Pass
3	Examination product	No evidence of physical damage or functional fail.	Final Exam.	No physical damage	Pass


**Summary of Test Result, Group 5**

Step	Test	Requirement	Step Description	Results	Comment
1	Examination product	No evidence of physical damage or functional fail.	Initial Exam	No physical damage	Pass
2	Solderability	≥95% Solder coverage	Solderability	>95% Solder coverage	Pass
3	Examination product	No evidence of physical damage or functional fail.	Final Exam.	No physical damage	Pass

**Summary of Test Result, Group 6**

Step	Test	Requirement	Step Description	Results	Comment
1	Examination product	No evidence of physical damage or functional fail.	Initial Exam	No physical damage	Pass
2	Resistance to soldering heat	No physical damage	Resistance to soldering heat	No physical damage	Pass
3	Examination product	No evidence of physical damage or functional fail.	Final Exam.	No physical damage	Pass

**Summary of Test Result, Group 8**

Step	Test	Requirement	Step Description	Results	Comment
1	Examination product	No evidence of physical damage or functional fail.	Initial Exam	No physical damage	Pass
2	Contact Resistance	30 mΩ max.	Initial CR	Min:10.6mΩ Max:18.7mΩ Average:14.4mΩ	Pass
3	Ind. Mixed flowing gas	Class IIIA 20days mated	MFG	After 20 days exposure, the outside surface of shell exhibited severe corrosion, but it didn't affect the performance of the connector. 	Pass
4	Contact Resistance	30 mΩ max.	Final CR (After MFG)	Min:10.6mΩ Max:18.7mΩ Average:14.4mΩ	Pass
5	Examination product	No evidence of physical damage or functional fail.	Final Exam.	No physical damage	Pass

**EQUIPMENT**

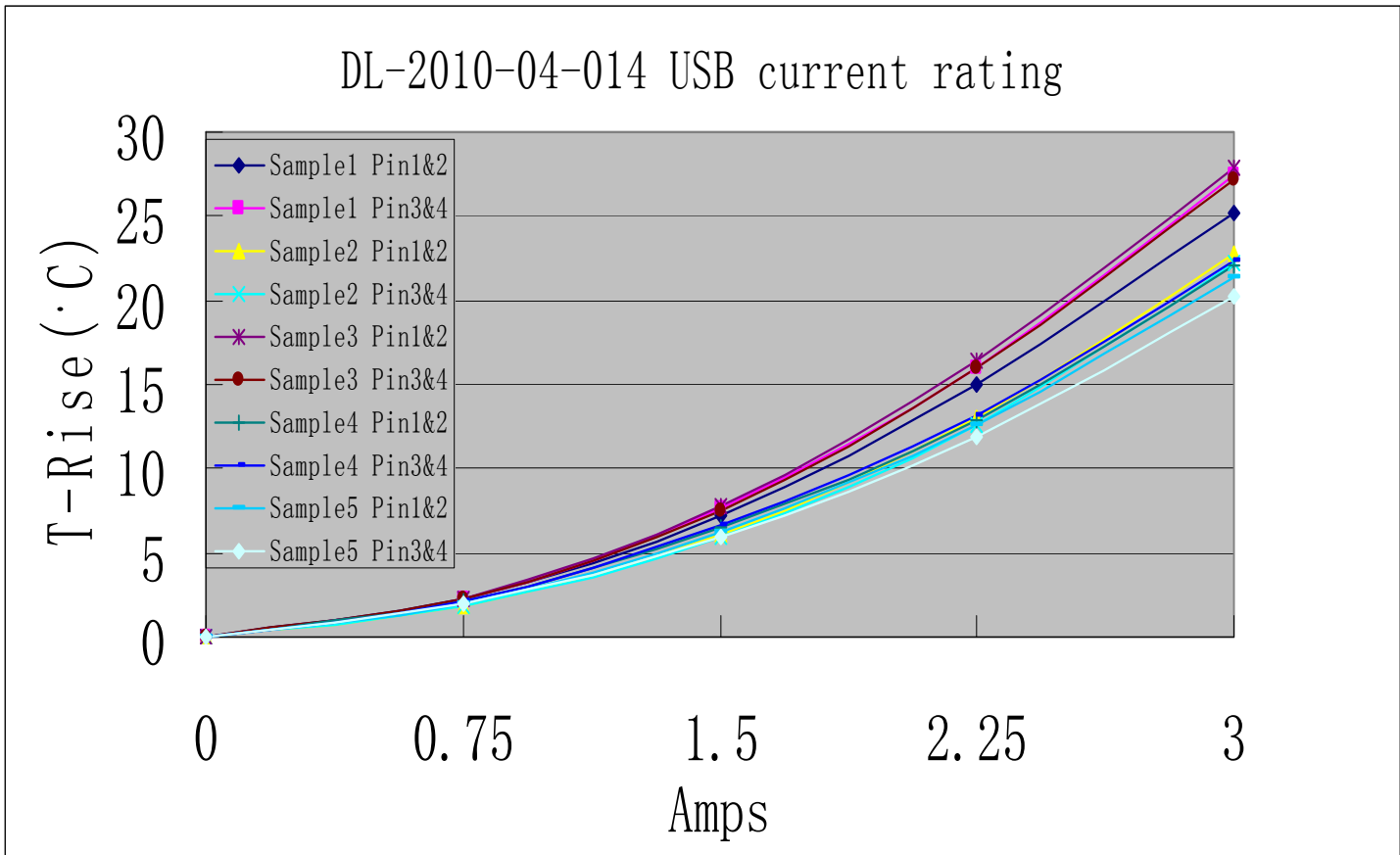
Equipment	Model	Series No.	Calibration date	Next Calibration date
Microscope	Nikon 50X max	1019652	Not Calibrated	Not applicable
Miliohmmeter	4338B	DG-Q-0268	Jan-23-2010	Jan-22-2011
Automatic Load Tester	1220HS	DG-Q-0246	Oct-22-2009	Oct-21-2010
Insulation resistance tester	4339B	DG-Q-0029	Jan-23-2010	Jan-22-2011
Dielectric withstanding voltage tester	GPT-715	DG-Q-0218	Jan-23-2010	Jan-22-2011
Thermal shock chamber	TS-42C	DG-Q-0030	Jan-23-2010	Jan-22-2011
Humidity chamber	TH-121EH-R	DG-Q-0031	Jan-23-2010	Jan-22-2011
MFG test chamber	Tested in FCI Valley Green LAB			
Power supply	Agilent 6031A	DG-Q-0025	Jan-23-2010	Jan-22-2011
Hydra data logger	Fluke 2625	DG-Q-0087	Jan-23-2010	Jan-22-2011
Temperature chamber	RHD-45	DG-Q-0235	Jan-23-2010	Jan-22-2011
Lead-free Solder pot	CM-141	DG-Q-0036	Jan-23-2010	Jan-22-2011

**REVISION RECORD:**


<b>Revision Level</b>	<b>Affected Pages</b>	<b>Description</b>	<b>Revision Date</b>
A	All	Original Release	02/Feb/2012

**Appendix A Current Rating test data and chart**

Amps	0	0.75	1.50	2.25	3.00
Sample1 Pin1&2	0	2.23	7.26	15.01	25.22
Sample1 Pin3&4	0	2.33	7.58	16.00	27.46
Sample2 Pin1&2	0	1.83	6.10	12.95	22.79
Sample2 Pin3&4	0	1.79	5.92	12.63	22.17
Sample3 Pin1&2	0	2.33	7.75	16.42	27.83
Sample3 Pin3&4	0	2.27	7.54	15.97	27.14
Sample4 Pin1&2	0	2.09	6.44	12.83	22.03
Sample4 Pin3&4	0	2.17	6.64	13.16	22.33
Sample5 Pin1&2	0	1.96	6.21	12.54	21.37
Sample5 Pin3&4	0	1.94	5.88	11.83	20.27





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## 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

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- 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 VIBRATION AND PHYSICAL SHOCK MOUNTING FIXTURE
- TABLE 1 QUALIFICATION TESTING AND SEQUENCE MATRIX

#### 4.0 APPLICABLE DOCUMENTS

##### 4.1 SPECIFICATIONS:

###### 4.1.1 ENGINEERING DRAWINGS

###### SERIES "A"

###### **SINGLE DECK RECEPTACLES:**

- 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

###### SERIES "A"


###### **DOUBLE DECK RECEPTACLES:**

- 72309 THROUGH HOLE

###### SERIES "A" PLUG

- 74033 FULLY RATED

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74032 SUB-CHANNEL

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

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- 4.5.6 BUS-16-074: PCT, 30% GLASS
- 4.5.7 BUS-19-002: SOLDERABILITY
- 4.5.8 BUS-19-020: POROSITY
- 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.

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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.

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 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 (100 μinches) 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 SEHELL OF THE RECEPTACLE SHALL BE PLATED WITH


2.54u(100u"INCHES) 90/10 tin-lead minimum or 2.54u(100u"INCHES) minimum bright 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 include 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

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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 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

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OF WITHSTANDING A STORAGE TEMPERATURE RANGE OF -40 DEGREES C TO 85 DEGREES C AND OPERATING TEMPERATURE RANGE OF -40 DEGREES C TO 85 DEGREES C.

## 6.0 ELECTRICAL CHARACTERISTICS

### 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 DEGREES C MAX. DELTA T ANY POINT.
- 6.4.3 TEST METHODS: 1 CONTACT AT 1.50A ALL CONTACTS IN SERIES AT 1.00A
- 6.4.4 AMBIENT CONDITIONS: STILL AIR AT 25 DEGREES C.

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6.5 CAPACITANCE:

- 6.5.1 TEST STANDARD: EIA 364-30
- 6.5.2 ACCEPTANCE CRITERIA: 2 PF MAX.
- 6.5.3 AMBIENT CONDITIONS: STILL AIR AT 25 DEGREES 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

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8.1.4 TRANSFER TIME: 5 MINUTES MAXIMUM

8.2 HUMIDITY, STEADY STATE:

8.2.1 TEST STANDARD: EIA 364-31, METHOD III CONDITION A

8.3 HIGH TEMPERATURE LIFE:

8.3.1 TEST STANDARD: EIA 364-17, TEST CONDITION 3, METHOD A

8.3.2 TEST TEMPERATURE: 85 DEGREES 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 ACCEPTANCE CRITERIA: NO DISCONTINUITIES GREATER THAN 1 MICROSECONDS

8.6.3 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 87583-3010XXXXLF

8.7.3 CYCLING RATE: EIA 364-09

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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: 4 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 DEGREES C
- 8.10.4 IMMERSION TIME: 3 MINUTES

8.11 SURFACE MOUNT CONNECTIR 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 MAINTAINED 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 DEGREES C
- 9.2.2 RELATIVE HUMIDITY: 30% TO 60 %
- 9.2.3 BAROMETRIC PRESSURE: LOCAL AMBIENT

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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 ):

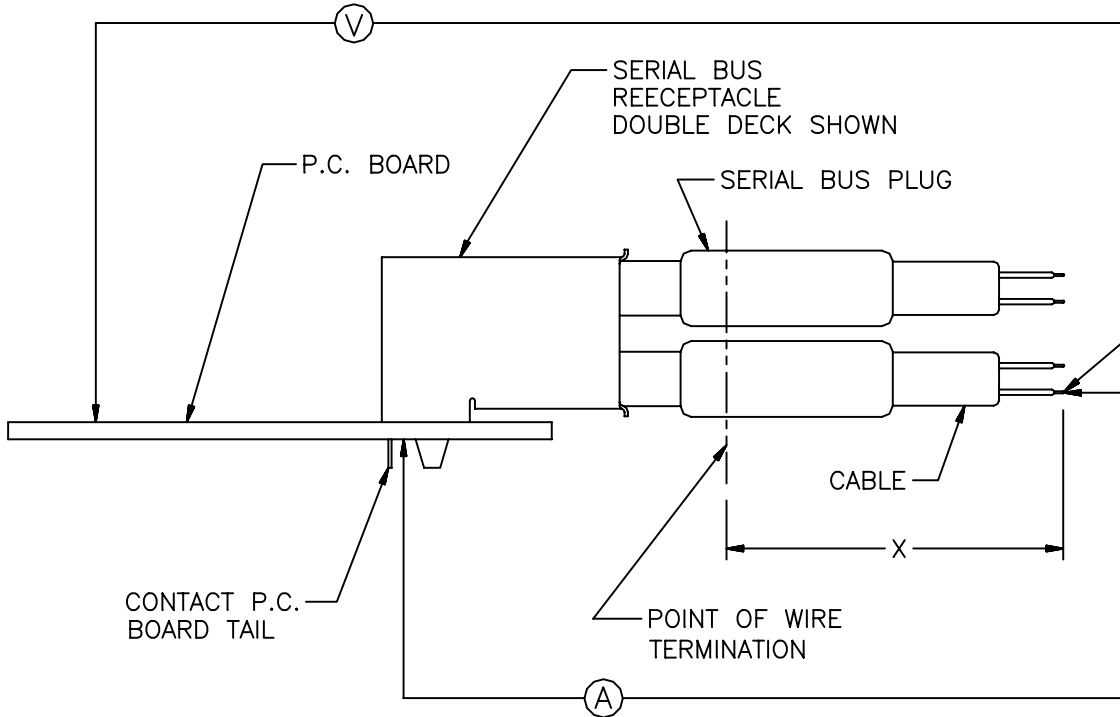
9.6.1 A SIGNIFICANT DESIGN CHANGE IS MADE TO THE EXISTING PRODUCT WHICH IMPACTS THE PRODUCT FORM, FIT OR FUNCTION. EXAMPLES OF SIGNIFICANT CHANGES SHALL INCLUDE, BUT NOT BE LIMITED TO, CHANGES IN THE PLATING MATERIAL COMPOSITION OR THICKNESS , CONTACT FORCE, CONTACT SURFACE GEOMETRY, INSULATOR DESIGN,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

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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

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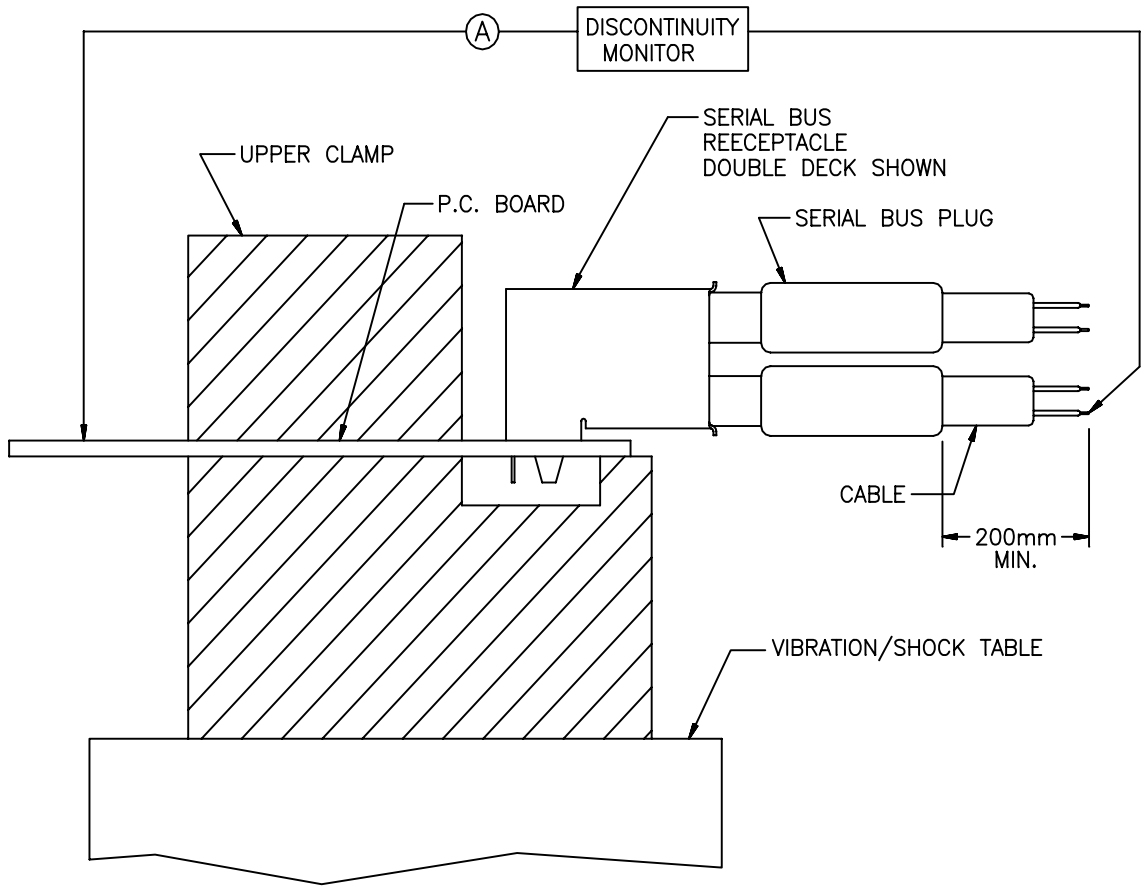



FIGURE 2  
 VIBRATION AND PHYSICAL SHOCK MOUNTING FIXTURE


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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		
Surface Mount Solder Joint Reliability	8.11							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

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<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	9	Add new part numbers that can meet 12,000 and 10,000 mating cycles.	N09-0203	07/06/2009

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## 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

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- 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

##### SERIES "A"

##### **SINGLE DECK RECEPTACLES:**

- 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

##### SERIES "A"


##### **DOUBLE DECK RECEPTACLES:**

- 72309 THROUGH HOLE

##### SERIES "A" PLUG

- 74033 FULLY RATED
- 74032 SUB-CHANNEL

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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

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- 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.

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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 SHELL 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

5.5.1.1 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 SPACED 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 TWO 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

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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

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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 AND 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
- 6.5.2 ACCEPTANCE CRITERIA: 2 PF MAX.

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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

### 8.2 HUMIDITY, STEADY STATE:

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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 87583-3010XXXXLF  
8.7.3 CYCLING RATE: EIA 364-09

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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 MAINTAINED 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 %
- 9.2.3 BAROMETRIC PRESSURE: LOCAL AMBIENT

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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 ):

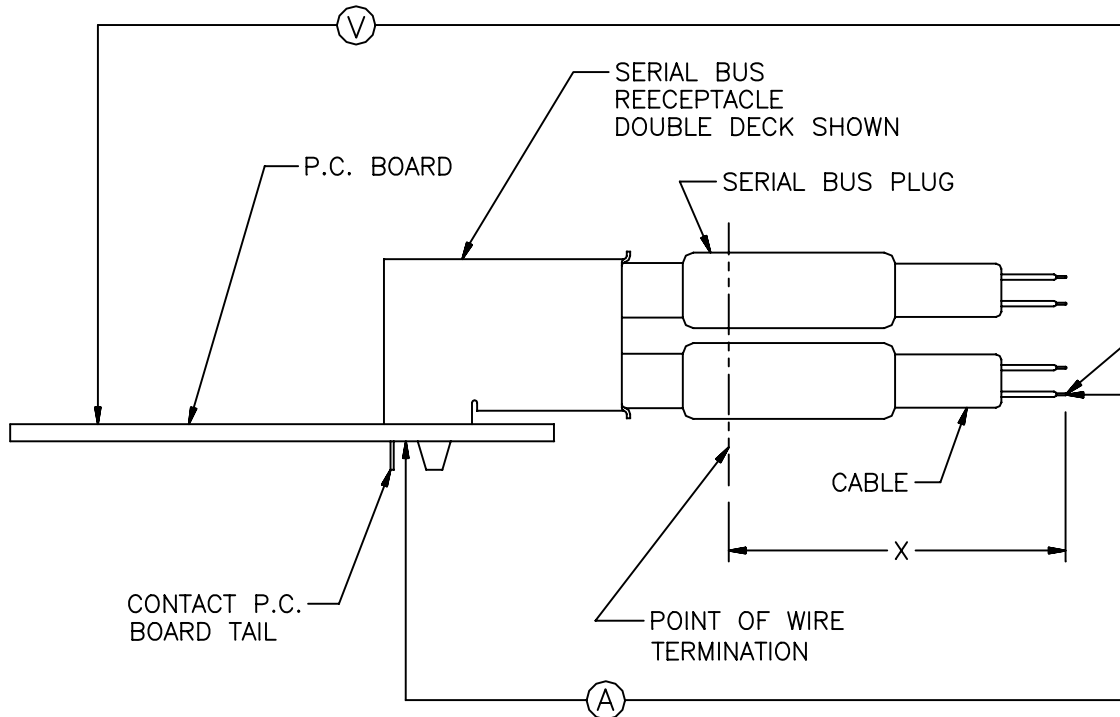
9.6.1 A SIGNIFICANT DESIGN CHANGE IS MADE TO THE EXISTING PRODUCT WHICH IMPACTS THE PRODUCT FORM, FIT OR FUNCTION. EXAMPLES OF SIGNIFICANT CHANGES SHALL INCLUDE, BUT NOT BE LIMITED TO, CHANGES IN THE PLATING MATERIAL COMPOSITION OR THICKNESS , CONTACT FORCE, CONTACT SURFACE GEOMETRY, INSULATOR DESIGN,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

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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

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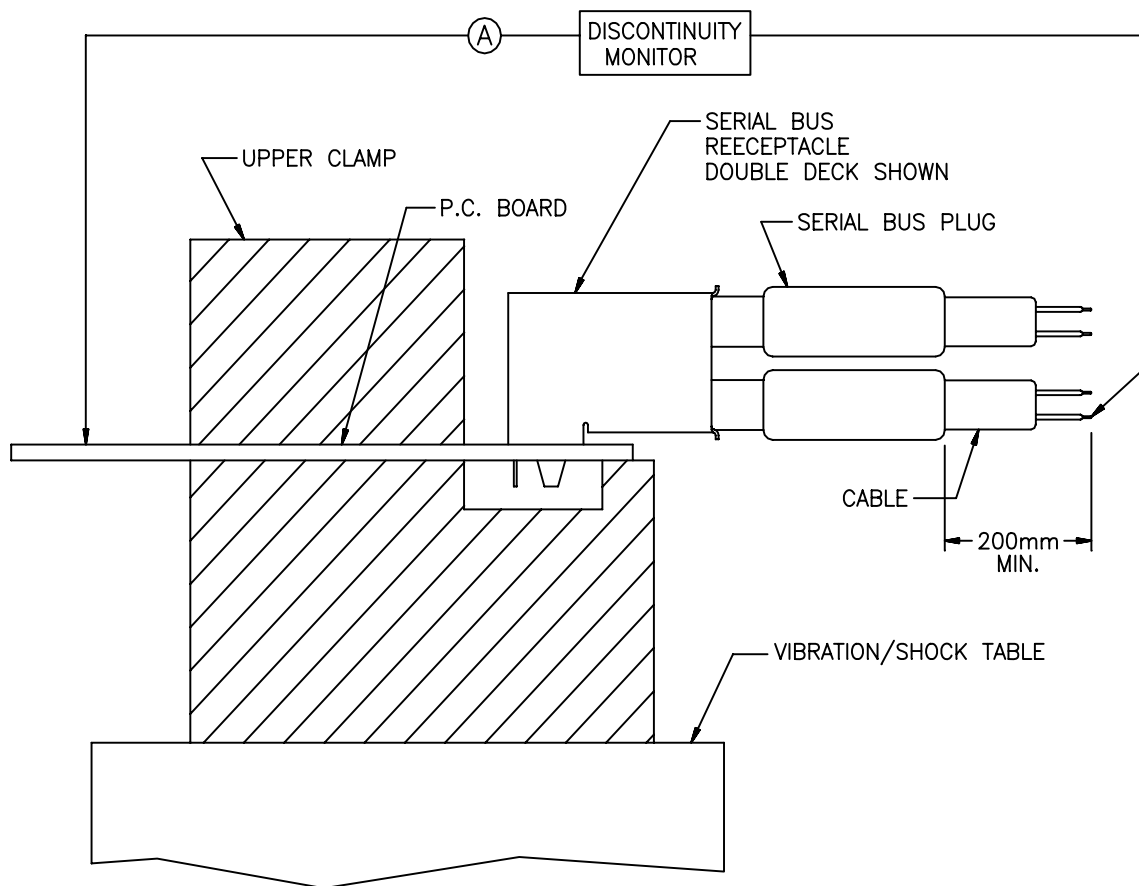



FIGURE 2  
 VIBRATION AND PHYSICAL SHOCK MOUNTING FIXTURE

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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	<del>4,3</del>	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>							<del>2</del>	
(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


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<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 microns) minimum matted tin for lead free part"	N04-0084	11/08/04
	5	5.4.2 Add "or 2,54um (100 microns) 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	9	Add new part numbers that can meet 12,000 and 10,000 mating cycles.	N09-0203	07/06/2009
J1	8	Increase 2.1A at the amp section	--	09/20/2013
K	6, 7, 10	1.Modify storing and operating temperature range from -40°C ~ 85°C to -55°C ~ 85°C; 2.Modify 87520/87583 AND 73725 current rating from 2.1 to 2.5A; 3.Modify steam aging from 4H to 1H in solderability;	ECN- 16515	4/25/2014

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		4. Delete "8.11 SURFACE MOUNT CONNECTOR SOLDER JOINT RELIABILITY" this section.		
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