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				AUTHORIZED BY		H. T. Brewbaker
			DATE		6 Dec 05	
			CLASSIFICATION UNRESTRICTED			

1.0 OBJECTIVE

This specification defines the performance, test, quality and reliability requirements of the HPC Solderless (Press Fit) Right Angle Receptacle.

2.0 SCOPE

This specification is applicable to the non-separable Connector to Board Interface of the HPC Solderless (Press Fit) Right Angle Receptacle.

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
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9.2	Inspection Conditions
9.3	Sample Quantity and Description
9.4	Acceptance
9.5	Qualification Testing
9.6	Requalification Testing
TABLE 1 QUALIFICATION TESTING MATRIX	

NOTE: HPC is a trade mark of FCI Electronics

3.1 Banned/Restricted Substances

All product where the part number ends in "LF" meet the European Union directives and other country regulations as described in GS-22-008. The part numbers that do not end in "LF" meet all regulations except for Pb in SnPb plating.

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3.2 Manufacturing Processability

All products covered by this specification will withstand exposure to 260°C peak temperature for 10-30 seconds in a convection, infra-red or vapor phase reflow oven.

4.0 APPLICABLE DOCUMENTS

4.1 Specifications

4.1.1 Engineering drawing, 50642.

4.2 Military Standards

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 (List other Standards for Materials, Gold and Tin Lead Platings, etc.).

4.3 Federal Specifications

4.3.1 QQ-N-290 for nickel plating

4.3.2 QQ-N-533 for BeCu strip

4.4 Other Standards and Specifications

4.4.1 UL94-VO

4.4.2 Bellcore, TR-NWT-001217

4.5 FCI Specifications

4.5.1 BUS-12-090 -

4.6 FCI Lab Reports - Supporting Data

4.6.1 GS-29-111

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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.

Housings: Glass and Mineral filled LCP

Terminals: Beryllium Copper

Press Blocks: Glass filled PCT Color: White

5.3 Finish

The finish for applicable components shall be as specified herein or equivalent.

5.4 Design and Construction

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

5.4.1 **See drawing 50642 for configuration of specific samples tested ie: 50642-1320E.**

6.0 ELECTRICAL CHARACTERISTICS

6.1 Contact Resistance, Low Level (LLCR) - The change in low level contact resistance shall not exceed 1.0 milliohm after environmental exposure when measured in accordance with MIL-STD-1344A, Method 3002.1. The following details shall apply:

- (a) Method of connection - Attach current and voltage leads as shown in Figure 1.
- (b) Test Voltage - 20millivolts DC max open circuit.
- (c) Test Current - Not to exceed 100 milliamps.

6.2 Current Rating - The temperature rise above ambient shall not exceed 30⁰ C at any point in the system when all contacts are powered at 1.0 amperes or one contact is powered at 3.0 amperes. The following details shall apply:

- (a) Ambient Conditions - Still air at 25⁰ C.
- (b) Reference - EIA-364-70.
- (c) Test Board P/N 301581

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6.3 Capacitance - The specification requirement shall be satisfied when evaluated in accordance with Test Specification BUS-03-114 and the following details.

a. Specification Requirements:

Row 1 =	1.0 pf
Row 2 =	1.2 pf
Row 3 =	1.3 pf
Row 4 =	1.4 pf

b. Sample Test Conditions:

Frequency	1.0 mhz
Amplitude	1.0 volt

c. Pin Out & Measurement Points

VIEW: RECEPTACLE SOLDER TAILS

Pin#	0	0	1	1	2	2	3	3	4	4
	1	5	0	5	0	5	0	5	0	5
Row 4	ooooooooMMooooooooMMooooooooMMooooooooMMoooo Long									
Row 3	ooooooooMMooooooooMMooooooooMMooooooooMMoooo									
Row 2	ooooooooMMooooooooMMooooooooMMooooooooMMoooo									
Row 1	ooooooooMMooooooooMMooooooooMMooooooooMMoooo Short									

MM = Measurement Pair
o = Unused Signal Pin

7.0 MECHANICAL CHARACTERISTICS

7.1 Individual Pin Insertion/Retention Force - The force required to insert an individual compliant pin into a plated thru hole in a printed circuit board at a rate of 0.2 inches/minute shall not exceed 6.0 pounds. The retention force in the axial direction opposite that of insertion shall not be less than 1.5 pounds.

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- 7.2 PCB Hole Deformation Radius - Cross-section parallel to board surface. Photograph and measure the hole deformation (deformation on board material) radius at a point .010" from the surface, and the center of the compliant pin section. Include 10 holes. The average (of 10 holes) hole deformation radius shall be no greater than 0.0015" when measured from the drilled hole. The absolute maximum deformation radius shall not exceed 0.002". Reference MIL-STD-2166.
- 7.3 PCB Hole Wall Damage - Cross-section perpendicular to the board surface, and thru the compliant section wear track. Photograph and measure the copper thickness remaining between the compliant section and the printed wiring board laminate. Include 10 holes. The minimum average (of 10 holes) copper thickness remaining between the compliant pin and the printed wiring board laminate shall not be less than 0.0003". In addition there shall be no copper cracks, separations between conductive interfaces, or laminate-to-copper separations. Reference MIL-STD-2166.

8.0 ENVIRONMENTAL CONDITIONS

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 requirements per paragraph 6.1 as specified in the Table 1 test sequences.

- 8.1 Thermal Shock - MIL-STD-202F, Method 107G.
- (a) Test Condition - A (100, 1-hour cycles)
 - (b) Temperature Range - Between -65 and +105 ° C.
 - (c) Time at each temperature - 30 minutes.
 - (d) Transfer time - 5 minutes, maximum.
- 8.2 Humidity/Temp Cycling - MIL-STD-202F, Method 106F.
- (a) Duration - 10 days (ten 24-hour cycles)
 - (b) Omit step 7b.
 - (c) Cyclic Temperature Variation - +25 to +65° C.
- 8.3 High Temperature Life - MIL-STD-202F, Method 108A.
- (a) Test Temperature - 105° C.
 - (b) Test Duration - 1000 hours.
- 8.4 Vibration - MIL-STD-202F, Method 204D.
- (a) Condition - B
 - (b) Vibration Amplitude - 0.06" DA or +/-15G.
 - (c) Frequency Range - 10 to 2000 to 10 hertz.

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- (d) Sweep Time and Duration - 20 minutes per sweep, 8 hours along each of three orthogonal axes (24 hours total).
- (e) Mounting - Rigidly mount assemblies and test per Figure 2.
- (f) No discontinuities greater than 10 nanoseconds.

8.5 Mechanical Shock - Mil-STD-202F, Method 213B.

- (a) Condition - I (100G, 6 millisecond sawtooth).
- (b) Shocks - 3 shocks in both directions along each of three orthogonal axes (18 total).
- (c) Mounting - Rigidly mount assemblies and test per Figure 2.
- (d) No discontinuities greater than 10 nanoseconds.

8.6 Gas-Tight-Joint-Test - EIA-364-TP36

- (a) Reference EIA-364-TP36

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 MIL-C-45662 and ISO 9000.

9.2 Inspection Conditions

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

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

9.3 Acceptance

9.3.1 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.

9.3.2 Failures attributed to equipment, test setup, or operator error shall not disqualify the product. If product failure occurs, corrective action shall be taken and samples

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resubmitted for qualification.

9.4 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.

9.5 Requalification Testing

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

- (a) 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 requirements.
- (b) A significant change is made to the manufacturing process which impacts the product form, fit or function.
- (c) A significant event occurs during production or end use requiring corrective action to be taken relative to the product design or manufacturing process.

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TABLE 1 - QUALIFICATION TESTING

TEST	PARA.	TEST GROUP					Sample Size
		1	2	3	4	5	
		TEST SEQUENCE					
EXAMINATION OF PRODUCT	5.4	1	1	1	1	1	ALL
CONTACT RESISTANCE LOW LEVEL	6.1		2 4	2 4 6	2 5	2 4	As listed below
CURRENT RATING	6.2				6		See Para. 6.2
INSERTION FORCE	7.1	2,4 6					10 Contacts
RETENTION FORCE	7.1	3,5 7					10 Contacts
PCB HOLD DEFORMATION RADIUS	7.2	8					10 Contacts
PCB HOLE WALL DAMAGE	7.3	9					10 Contacts
THERMAL SHOCK	8.1			3			120 Contacts
HUMIDITY/TEMP CYCLING	8.2			5			120 Contacts
HIGH TEMPERATURE LIFE	8.3		3				120 Contacts
VIBRATION	8.4				3*		160 Contacts
MECHANICAL SHOCK	8.5				4*		160 Contacts
GAS-TIGHT-JOINT-TEST	8.6					3	120 Contacts

*Monitor for discontinuity greater than 10 nanoseconds

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Notes:

1. Contact Test Lab for method of inserting complete connectors, and evaluating LLCR and individual retention forces after enviromental testing.
2. Individual pins may be used for Test Group 1.

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REVISION RECORD

REV	PAGE	DESCRIPTION	EC #	DATE
A	ALL	NEW RELEASE	V40397	03/17/94
B	5	7.2- CHANGE 0.10 TO .010	V40674	04/21/94
C	8	Delete Test Group 6 and IR Reflow from Table 1	V40893	06/23/94
D	8	Add Sample Size to Table 1	V41713	10/31/94
E	3	Add Press Blocks to 5.2	V60431	03/31/96
F	All	Revised format to be consistent with GS-01-001, and change BERG, Dupont, etc. references to FCI.	V01904	08/02/00
G	All	Complete Re-Write	V00233	09/13/00
H	1, 2	Add section 3.1 and 3.2.	V05-1103	12/6/05

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