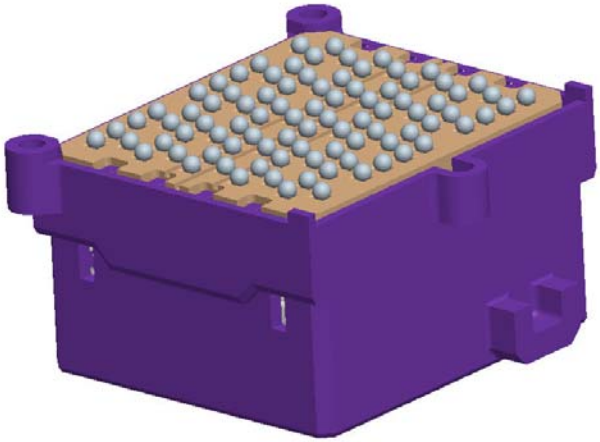
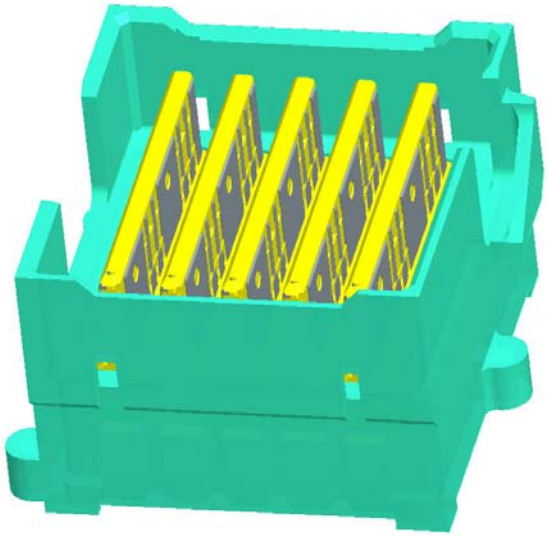
InfinX® Connector System



4 Pair, 5 Column, 9 mm Receptacle Version Shown



4 Pair, 5 Column, 6 mm Plug Version Shown

TABLE OF CONTENTS:

1.0 OBJECTIVE

This specification defines the performance, test, quality, and reliability requirements of the InfinX® Connector System with BGA termination.

2.0 SCOPE

This specification applies to the InfinX® BGA connector, which is a high density, high speed interconnect solution for mezzanine applications

3.0 APPLICABLE DOCUMENTS

3.1 FCI Specifications

- Applicable FCI product customer drawings
- FCI Application Specification GS-20-0365 (InfinX® BGA Connectors)

3.2 Other Standards and Specifications

- UL-94V-0: Test for Flammability of plastic Materials in Devices and Appliances
- EIA 364: Electrical Connector/Socket Test Procedures Including Environmental Classifications
- GR-1217-CORE: Telcordia Specification “Generic Requirements for Separable Electric Connectors”
- IPC-9701: “Performance Test Methods and Qualification Requirements for Surface Mount Solder Attachments”
- HP EL-MF862-04

4.0 REQUIREMENTS

4.1 Qualification

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

4.2 Materials

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

- Terminals: Copper alloy.
- Plating: Performance based plating, capable of meeting the requirements of this specification.
- Housing: High temperature thermoplastic, UL 94V-0 compliant.
- Vacuum cap: Stainless Steel
- Solder spheres: Lead free alloy.

4.3 Visual inspection

Visual inspections shall be performed using 10x magnification. Parts should be free from blistering, discoloration, cracks, incomplete plating, etc.

5.0 ELECTRICAL CHARACTERISTICS

5.1 Contact Resistance

5.1.1 Low Level (LLCR)

Measurements shall be performed using a four wire method per EIA 364-23. The initial low level contact resistance shall be recorded. After environmental exposure, the increase in LLCR shall not exceed 20mΩ. The following details shall apply:

- Test Voltage: 20 mV maximum open circuit
- Test Current: 100 mA maximum
- Number of readings: 160 minimum from at least 4 connector systems.
- The mechanical chock and vibration test sequence requires only 100 readings from at least 3 connector systems.

5.2 Current Rating (signal and power IMLA's to be tested separately)

5.2.2 General Criteria

- Test Specification: EIA 364-70
- Ambient Temperature: 25˚C
- Airflow: None (still-air)

5.2.3 Contacts

- Measure temperature versus applied current
- All contacts powered
- Thermocouple location: Mechanically attached to the base of a terminal located approximately in the center of the pin field.
- Copper trace weight: 1oz
- The temperature-rise above ambient shall not exceed 30˚C at 0.5A per contact.

5.3 Insulation Resistance

The insulation resistance of mated connectors shall not be less than 1000 MΩ after environmental exposure when measured in accordance with EIA 364-21. The connectors shall be unmated when insulation resistance is measured. The following details shall apply:

- Test Voltage: 500 volts DC.
- Electrification Time: 60 seconds minimum.
- Points of Measurement: between closest adjacent contacts.
- Number of measurements: 30 (10 readings per loose piece connector set)

5.4 Dielectric Withstanding Voltage (DWV)

There shall be no evidence of arc-over, insulation breakdown, or excessive current leakage (> 0.5 mA) when mated connectors are tested in accordance with EIA 364-20. The following details shall apply:

- Test Voltage: 500 VAC, 60 Hz.
- Test Duration: 60 seconds minimum.
- Voltage application rate: 500 V per second
- Points of Measurement: between closest adjacent contacts.

- Number of measurements: 30 (10 readings per loose piece connector set)

6.0 MECHANICAL CHARACTERISTICS

6.1 Mating / Un-mating Force

Perform in accordance with EIA 364-13. The force to mate two compatible connectors shall not exceed 0.40 N per contact. The un-mating force shall not be less than 0.07 N per contact. The following details shall apply:

- Cross head speed: 1 inch per minute.
- Utilize free floating fixtures
- Number of mating / un-mating cycles: 3

7.0 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 and mechanical requirements specified in the Table 1 test sequence. Unless specified otherwise, the products shall be mated during exposure.

7.1 Mechanical Shock

Perform in accordance with Telcordia GR-1217-CORE, Sections 6.3.5 and 9.1.2.1. The following details shall apply:

- Amplitude: half sine 30G
- Duration: 11 milliseconds
- Number of shocks: 3 shocks along each of three orthogonal axis (18 shocks total)
- Mounting: rigidly mounted assemblies
- After completion of test in all three axes, connector shall meet post environmental LLCR requirement
- No discontinuities greater than 1 microsecond

7.2 Vibration

Perform in accordance with Telcordia GR-1217-CORE, Sections 6.3.5 and 9.1.2.1. The following details shall apply:

- Vibration amplitude: 1.5 mm (0.06 inch) double amplitude or 10G acceleration
- Frequency range: 5 to 500 to 10 Hz sinusoidal
- Sweep time: 15 minutes per cycle
- Duration: 2 hours along each of three orthogonal axes (6 hours total)
- Mounting: rigidly mounted assemblies
- No discontinuities greater than 1 microsecond

7.3 Thermal Life

Perform in accordance with EIA-364-17. Connectors shall be mated without any electrical load. The following details shall apply:

- Test Temperature – 105 °C
- Test Duration – 500 hours

7.4 Thermal Shock

Perform in accordance with EIA-364-32. Connectors shall be mated without any electrical load. The following details shall apply:

- Number cycles: 25
- Temperature range: -55°C to +105°C
- Temperature dwell: 30 minutes
- Temperature transfer rate: >10°C per minute

7.5 Cyclic Humidity and Temperature

Mated samples are to be exposed to 1000 hours of humidity exposure at 25°C to 85°C and 80% relative humidity. The required dwell time at the maximum and minimum temperature is two hours with a maximum ramp time of two hours (maximum of eight hours of test time per cycle). The samples shall be air dried at ambient room conditions for one to two hours prior to completing the tests. LLCR shall be checked after 250, 500, 750, and 1000 hours.

7.6 Industrial Mixed Flowing Gas (class IIIA, 4 gas)

Samples shall be exposed to a gas mixture per EIA-364-65, test sequence class IIIA. Connectors will be exposed for 10 days in the mated condition. Details are as follows:

- Temperature: 30° C
- Relative humidity: 70%
- Gas composition (central office): 200 ppb NO_2, 100 ppb H_2S, 20 ppb Cl_2, 200 ppb SO_2

7.7 Durability

Perform in accordance with EIA 364-09. The following details shall apply:

- Number of cycles: 25
- Cycling rate: 12.5 cm (5 inches) per minute

7.8 Dust

Perform in accordance with Telcordia GR-1217-CORE, Sections 9.1.1.1. Samples shall be exposed for one hour to a benign dust composition as per table 9-1 of the Telcordia GR-1217-CORE specification.

- Only one half of each connector set shall be subjected to dust exposure

7.9 Steady State Temperature and Humidity

Perform in accordance with EIA TP-13. Samples will be exposed to steady state temperature and humidity for 14 days. Upon completion all samples will be visually examined under 20X magnification. There shall be no evidence of corrosion at the connector contact area. Details are as follows:

- Temperature 40°C±3°C
- Relative humidity: 93%±5%

8.0 QUALITY ASSURANCE PROVISIONS

8.1 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 ISO 9000.

8.2 Inspection Conditions

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

- Temperature: 25 ± 5° C.
- Relative Humidity: 20% to 60%
- Barometric pressure: Local ambient

8.3 Sample Quantity and Description

Samples used for qualification testing shall be samples that were manufactured using standard production equipment and procedures. The quantity of samples needed for each test sequence is shown in Table 3.

8.4 Acceptance

Electrical and mechanical requirements placed on test samples as indicated in the sections of this specification 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.

Failures attributed to equipment, test set-up or operator error shall not disqualify the product. If product failure occurs, corrective action shall be taken and samples resubmitted for qualification.

8.5 Qualification Testing

Qualification testing shall be performed per the test sequences shown in Table 2.

8.6 Re-qualification testing

If any of the following conditions occur, the responsible Product Engineer shall initiate re-qualification testing consisting of all applicable test sequences shown in Table 2.

- A significant design change is made to existing product, which impacts product form, fit or function. Examples of significant change include, but shall not be limited to, changes made to the contact plating, base material or base material composition of any component, contact interface geometry, etc.
- A significant change is made to the manufacturing process, which impacts the product form, fit or function.
- A significant event occurs during production or end use requiring corrective action to be taken relative to the product design or manufacturing process.

TABLE 1: Qualification Test Matrix

TEST GROUP ID ►		1	2	3	4	5	6	7
TEST DESCRIPTION	**SECTION**	Thermal Shock Hum.	Thermal Life	MFG	Plating	Current Rating	IR & DWV	Mech. Shock & Vibration
VISUAL EXAMINATION	4.3	1,11	1,7	1,7	1,3	1,3	1,10	1,13
ELECTRICAL:								
CONTACT RESISTANCE, LOW LEVEL	5.1.1	2,4,6,8,10	2,4,6	2,4,6				2,4,6,8, 10,12
CURRENT RATING	5.2					2		
INSULATION RESISTANCE	5.3						2,5,8	
DIELECTRIC WITHSTANDING VOLTAGE	5.4						3,6,9	
MECHANICAL:								
MATING / UNMATING FORCE	6.1	See Note 3						
ENVIRONMENTAL:								
MECHANICAL SHOCK	7.1							9
VIBRATION	7.2							7
THERMAL LIFE	7.3		5					
THERMAL SHOCK	7.4	5					4	
CYCLIC HUMIDITY AND TEMPERATURE	7.5	9					7	
MFG, MATED, 10 DAYS	7.6			5				
DURABILTY	7.7	3	3	3				3^{1}, 11^{2}
DUST	7.8	7						5
STEADY STATE TEMPERATURE	7.9				2			

NOTES:

1. Perform half of the specified number of durability cycles. (subtract out any number of cycles needed to perform measurements and other test sequences)
2. Perform second half of the specified number of durability cycles. (subtract out any number of cycles needed to perform measurements and other test sequences)
3. Record mating and un-mating forces on first three cycles of durability.
4. Report values for low level contact resistance at 250, 500, 750, and 1000 cycles.

TABLE 2: Qualification Sample Requirements

TEST GROUP ID ►	1	2	3	4	5	6	7
SAMPLE DESCRIPTION	Thermal Shock Hum.	Temp Life	MFG	Plating	Current Rating	IR & DWV	Mech. Shock & Vibration
CONNECTOR PAIRS	4	4	4	10	3	3	6 [5]
T-RISE TEST BOARD SETS	4	4	4		3		6 [5]

5. 3 connector pairs and boards for LLCR and 3 connector pairs and boards for continuity testing.

9.0 REVISION RECORD

REV	PAGE	DESCRIPTION	EC #	DATE
1	All	New	N/A	2012-03-29
3	1,5,1, and11	Updated models, 5.1.1 update for mech vibe, added temp cycling test (8)	N/A	2012-07-12
4	8 and 10	Added Disturb, Clarified TTS Qualification	N/A	2012-09-04
5	6 and 10	Removed power reference to mate unmate force. Changed forces to 1N and 0.3N. Test sequence matched to Telcordia.	N/A	2012-10-23
6	6	Corrected mating and unmating forces	N/A	2012-10-26
A	All	Release to production, align with HP spec EL-MF862-04		2013-4-15