1.0 Scope

The following is an application and use specification for all standard and custom InterCon Systems LGA socket products, as typically described in InterCon catalog number 99130, titled, 'Land Grid Array Socket System'.

This document is superseded by any individual product drawing.

Refer to the individual product drawing for circuit board interface layout and construction details.

2.0 Product Description

The InterCon Systems cLGA™ socket system is a low profile, z directional system used to interconnect an LGA module to a circuit board, or to stack two circuit boards in parallel. Contacts in the socket are manufactured from heat-treated beryllium copper, which is plated after forming with 20 microinches of hard gold over 10 microinches of soft gold over 30 to 70 microinches of sulfamate nickel. The contacts are assembled into contact housings molded from liquid crystal polymer, and typically module to board sockets incorporate molded frames of glass filled polyetherimide. The product requires that its contacts be compressed under a load which varies from 60 to 120 grams per contact, depending on heat sink mass, card plating, and other system variables.

3.0 Standard Products

The following is a list of standard socket products which are controlled by this specification. Numerous custom products are also controlled by this specification, but are not listed here.

InterCon P/N	I/O Count	Contact Centerline	Module size
7729-001	1089	.050	42.5 x 42.5 mm
7729-002	544	.050	42.5 x 42.5 mm
7730-001	1681	1 mm	42.5 x 42.5 mm
7730-002	1657	1 mm	42.5 x 42.5 mm
7731-001	961	1 mm	33 x 33 mm
7731-002	937	1 mm	33 x 33 mm

4.0 Storage

For long term storage (greater than one week), sockets should be stored in conditions between 40 and 80 degrees F, and between 30 and 60 per cent relative humidity.

5.0 Handling

5.1 Sockets should always be handled by the outer frame only. See Figures 1 & 2.
5.2 Contacts should not be touched with fingers, tools, wipes, or any other devices.
5.3 Sockets should be left in the manufacturer's original shipping trays, with tray covers intact, until assembly. Sockets should be returned to their original trays if removed for incoming inspection purposes.
5.4 The socket should not be exposed to liquids or dry chemicals.
5.5 Acceptable contact interfaces are limited to:
- 5.5.1 Manufacturer's shipping trays
- 5.5.2 Mating board and device pad arrays

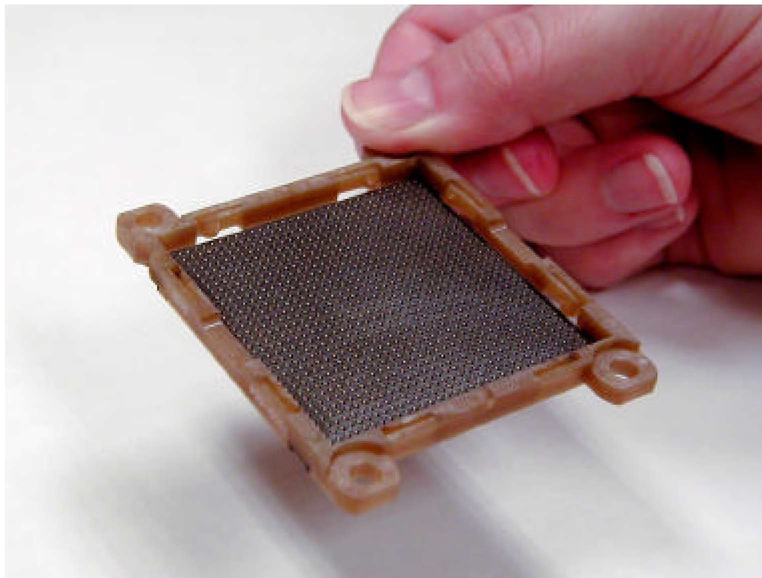

Fig. 1 - Acceptable handling by outer frame.

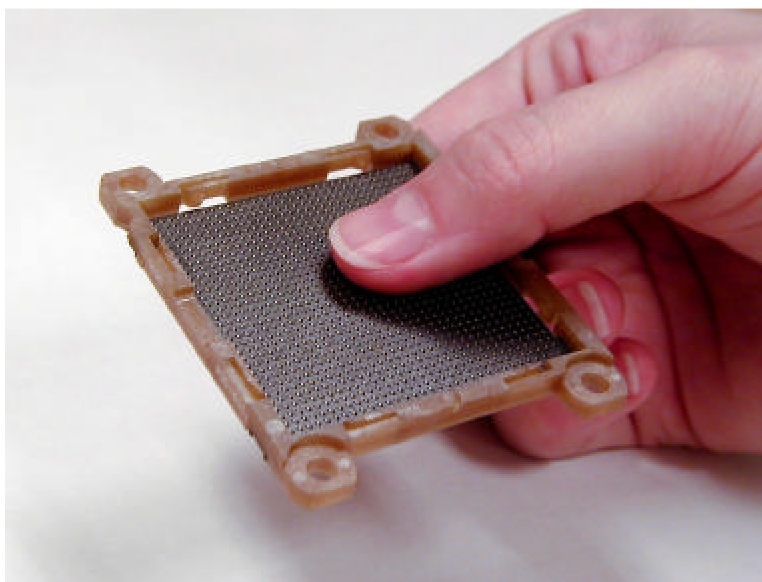

Fig. 2 - Bad handling. Fingers touching c-spring contacts.

6.0 Socket placement to board

6.1 During storage and handling of circuit boards, care should be taken to protect the mating pad array surfaces. Stacked boards should be protected using non-dyed, sulfur free paper sheets between boards in packaging and in assembly staging. For long-term storage (greater than one week), boards should be stored in conditions between 40 and 80 degrees F, and between 30 and 60 per cent relative humidity.
6.2 Board pad array areas should not be touched with fingers, tools, or any other devices.
6.2 If soldering operations are required for other board areas, the socket footprint area must be sealed and protected from flux and solder contamination. Materials used to protect the LGA site must not leave residue or contamination.
6.3 If board pad array cleaning is required, the array should be cleaned using electronic/reagent grade isopropyl alcohol and a lint free clean room cloth (no chemical residue, polyester/polypropylene/polyolefin type). Subsequent drying of the pad array per section 6.4 must be done following cleaning.
6.4 Immediately following cleaning per section 6.3, or immediately prior to placement of socket to circuit board, the board pad array and socket contact array should be blown off with clean, oil free dry air or nitrogen to remove loose debris. The blowing process should be started by aiming away from the array areas, then sweeping across the pad and contact arrays in a repeated motion to remove loose debris.
6.5 The socket should be placed onto the board pad array, using the molded frame locator pins to board registration holes for alignment, if present. Care should be taken to prevent incidental contact with other surfaces or edges in the socket contact array area prior to board placement.
6.6 While installing the ceramic module (or second circuit board) and mounting hardware, care should be taken to not unnecessarily move the socket relative to the board surface.

7.0 Ceramic module placement to socket

This section specifically applies to product applications involving module to board interconnection. Board to board stacking applications should follow similar procedures in principle to those shown below.

7.1 During storage and handling of ceramic modules, care should be taken to protect the mating pad array surfaces. Modules should be left in the manufacturer's original shipping trays, with tray covers intact, until assembly. Modules should be returned to their original trays if removed for incoming inspection purposes. For long-term storage (greater than one week), modules should be stored in conditions between 40 and 80 degrees F, and between 30 and 60 per cent relative humidity.
7.2 Module pad array areas should not be touched with fingers, tools, or any other devices.
7.3 If module pad array cleaning is required, the array should be cleaned using electronic/reagent grade isopropyl alcohol and a lint free clean room cloth (no chemical residue, polyester/polypropylene/polyolefin type). Subsequent drying of the pad array per section 7.4 must be done following cleaning.

7.4 Immediately following cleaning per section 7.3, or immediately prior to placement of module into socket, the module pad array and socket contact array should be blown off with clean, oil free dry air or nitrogen to remove loose debris. The blowing process should be started by aiming away from the array areas, then sweeping across the pad and contact arrays in a repeated motion to remove loose debris.

7.5 The module should be laid carefully into the frame of the socket, allowing the lead in chamfers of the frame to center it prior to insertion.

7.6 Once the module has been laid into place on the frame, it should be pressed into the socket downward or z-axis force (perpendicular to the mating surface of the contact housing) using uniform, gentle finger pressure applied to the top of the module. See Figures 3 & 4. The module should NOT be inserted into the socket by first engaging one corner or edge of the module into the contact array and wiping the module corner or edge across the array. See Figure 5.

7.7 If the module is subsequently removed from the socket for any reason, handling, cleaning, and assembly procedures per sections 7.1 to 7.6 above should be followed for reassembly.

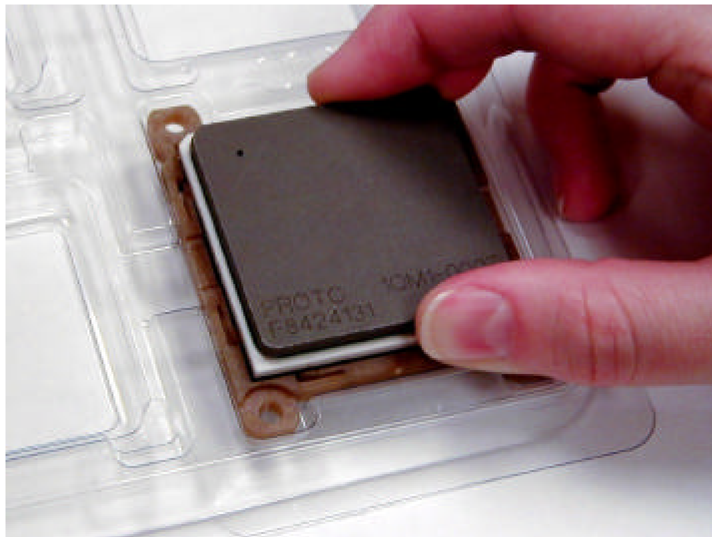

Figure 3 - Acceptable placement of module. Vertical installation motion only.

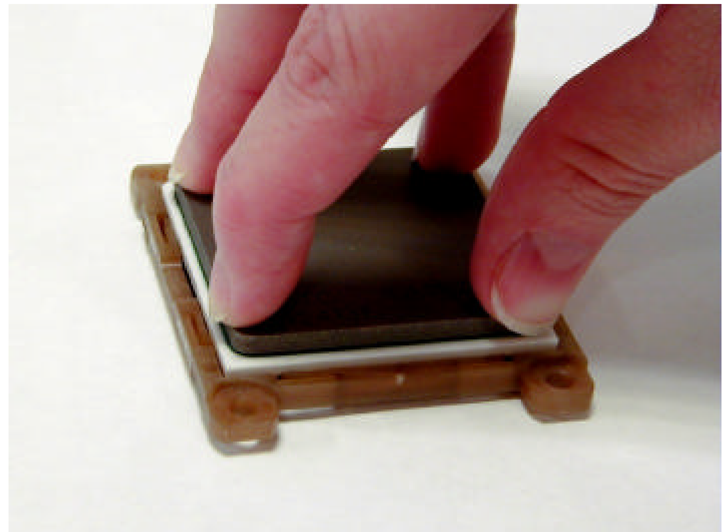

Figure 4 – Inserting the module.

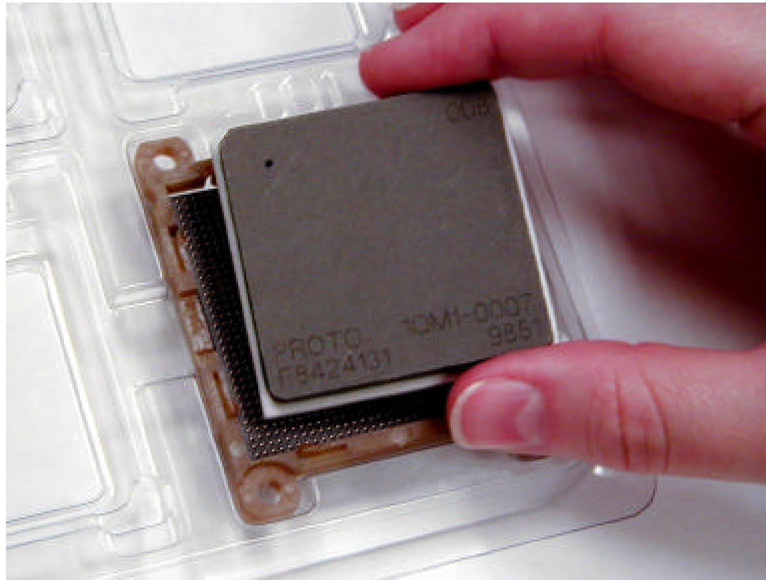

Figure 5 - Bad module assembly.
Dragging sharp corner or edge across c-spring contacts.

8.0 Hardware attachment

8.1 Lower bolster plates, heat sinks, and attachment screws should be assembled roughly as shown in Figure 6. For board to board stacking applications, upper and lower bolster plates should be used, depending on contact count, board thickness, and application specifics. Flatness tolerance requirements for bolster plates and pad coplanarity tolerance requirements for mating ceramic modules and circuit boards will vary depending on product application, but production tolerances for both can typically be used (.003 inch maximum flatness tolerance for bolster plates and .002 inch maximum pad coplanarity tolerance for ceramic module and circuit board pads). Contact InterCon Systems for specific application recommendations. During hardware assembly, care should be taken to not unnecessarily disrupt the socket to board and module to socket interfaces.

8.2 For module to board applications, it is recommended that a four corner screw system be used, preferably with coil springs at each corner screw, as shown in Figure 6. This type of hardware system, if implemented properly, will allow for uniform load distribution of clamping force, which will allow maximum system stability. Contact InterCon Systems for specific application recommendations.

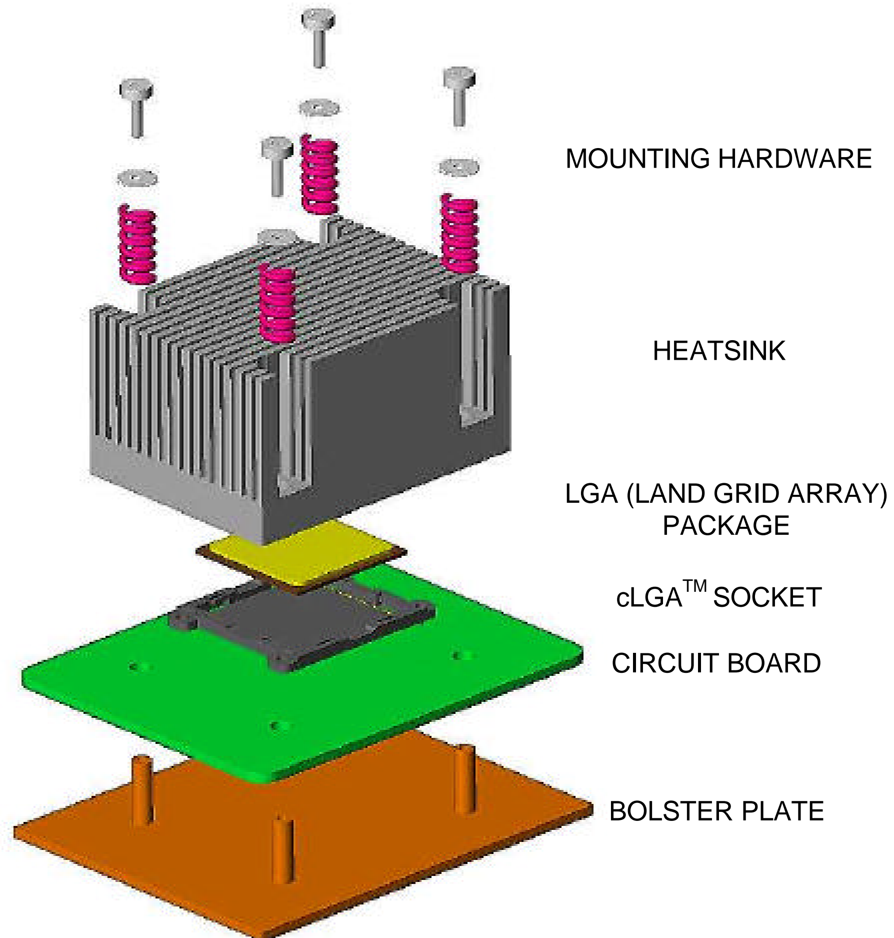

Figure 6 –
cLGA™ Typical Application Stackup

9.0 Revision Record

Rev.	Page(s)	Description of Change	ECR#	Date
A	1 to 4	New Specification	EC-5545	5/17/01
B	1 to 4	Section 8.1 Added bolster plate flatness requirement; module and board pad coplanarity requirement	EC 5871	9/7/01
C	1 to 6	Add more detail to 7.6, add Figures 1 to 5	EC-5921	10/3/01
D	1 to 6	Correct Figure #'s in7.6, 8.1 & 8.2	EC-5934	10/10/01
E	1	Updated part numbers	EC-6002	12/10/01