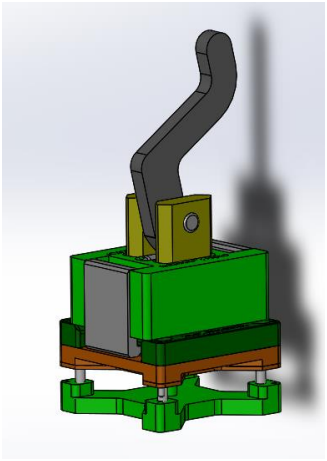
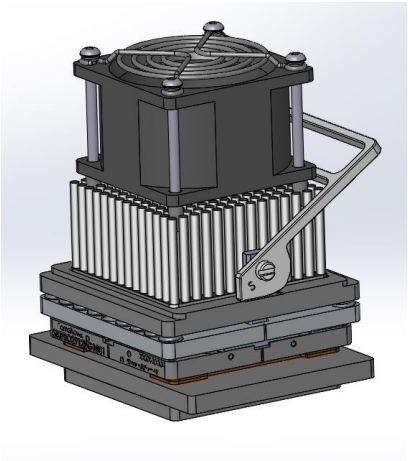
APPLICATION NOTE

AE-AN-SK-011 - SK SERIES - IMPLEMENTATION GUIDE

Purpose:

This application note provides detailed instructions on how to successfully install and care for an Ardent Concepts High Performance BGA/LGA Socket using either our RC Spring Probe™ or our RC-Connect-R™ contact series.





Introduction:

Ardent Concepts utilizes our industry leading compression mount, solderless high performance contact technology to provide the ideal solution to whatever our customers' needs and specific requirements may be. We have a long history of making socket solutions that fit the various performance and pitch requirements of our customers, while bringing to the table the best signal integrity on the market.

Socket Components:
Ardent's BGA and LGA sockets consist of the following components:

- Mounting Hardware
- Metal Guide Plate
- Plastic Interposer Subassembly
- Shipping Cover
- Stiffener Assembly
- Lid Assembly

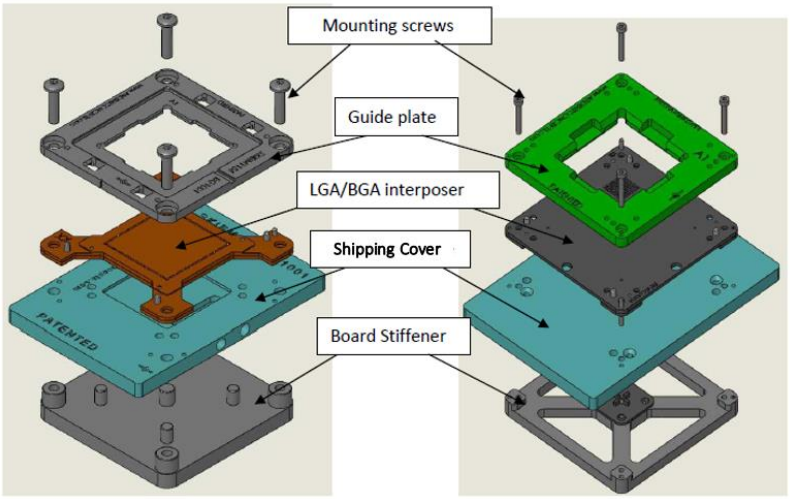


***Figure 1*: Exploded View of Socket Assembly**

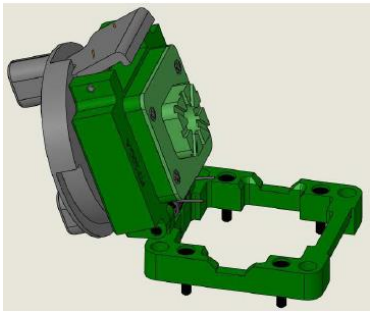


***Figure 2*: Family 20GA Lid**

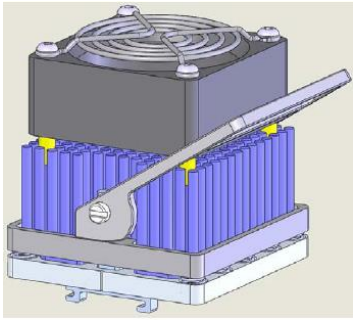


***Figure 3*: Air cooled lever lid**

All components of the socket assembly are customized to the needs of our customers. Guide plates and board stiffeners are either nickel plated, stainless steel, or green anodized aluminum. Depending on customer pitch and speed requirements, the interposer sub assembly may incorporate either Ardent's patent RC Connect-R™ or RC Springprobe ™ contact solutions. Ardent has a wide range of Lid Assemblies that can accommodate height requirements, cooling requirements, and even DUT thermal monitoring.

To protect the socket assembly and the contacts within, a Lexan Shipping Cover is included with all orders. In the full assembly, it is placed between the socket and the stiffener assembly. The Shipping Cover is vital to guarantee a long life of the socket and should be installed whenever transporting, shipping, or storing of the socket. The Shipping Cover is the most critical component of the Ardent socket system. Care should be taken to not subject the bottom side of the socket to contaminants of any kind. The socket should never be placed on a bench or exposed to any surface other than the PCB pads or the socket Shipping Cover. When not in use, the Shipping Cover should be used to store the socket.

The Stiffener Assembly can be comprised of a single metal plate with support posts or the metal plate and a detachable plastic stiffener pad. The stiffener is an important component of the whole assembly, as it provides the rigidity to the PCB needed for our dual compression contact technology to work properly. Once the socket is properly mounted on the PCB, the contact pins are securely preloaded and the system is much more stable.

Socket Installation:

Ensure the following items have been shipped to you. Contact the factory if anything is missing or damaged.

- Socket Lid/Actuator
- Socket (shipping cover and Board Stiffener assembly attached)
- Mounting hardware

NOTE: Please consult Ardent's Applications Engineering department if the socket is to be used on boards with pads **other than hard gold,** or if the socket is to be installed on a board that has had a BGA device soldered on it before.

Clean the bench top surfaces where you will be handling the socket to remove any dust, debris, or residue

Board Preparation:

1. Check the condition of the pads on your PCB under at least 7X magnification with a stereoscope at an angle with plenty of light.
    a. They should be clean and free of solder and solder paste resin.
    b. The entire socket footprint and pad array should be flat and planar.
2. Clean the footprint and contact pads;
    a. Use 99% isopropyl alcohol or equivalent and a short-haired acid brush (McMaster-Carr p/n 7431T92, or equivalent) and brush away any debris and or contaminants in the footprint area.

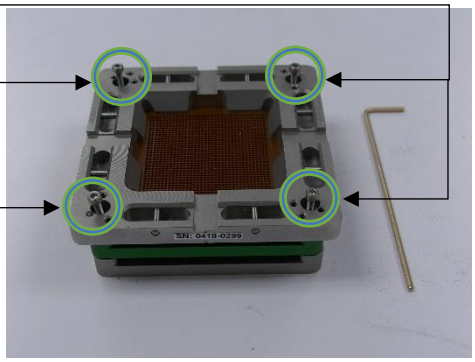
Note: If any solder rework needs to be done to the PCB in the area around the socket on the primary or secondary side of the board, complete that work before the socket is installed. After work is complete, inspect the contact pads on the primary side of the board thoroughly for solder or flux residue. Repeat step 2 if needed.

***Figure 4*: Examining the board under a stereomicroscope.**

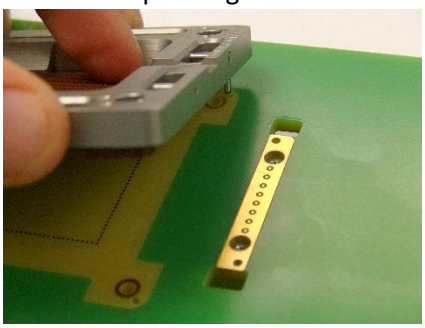
***Figure 5*: Cleaning the board pads with alcohol and brush.**

Mounting:

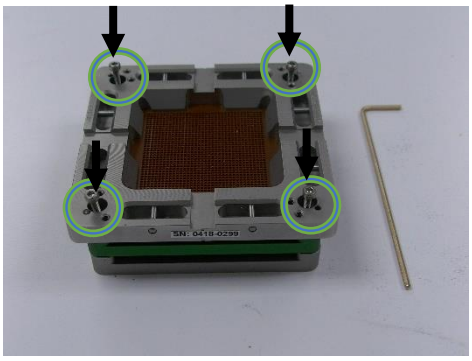
1. Remove the mounting screws that fasten the socket to the board stiffener and shipping cover using the appropriate hex wrench.



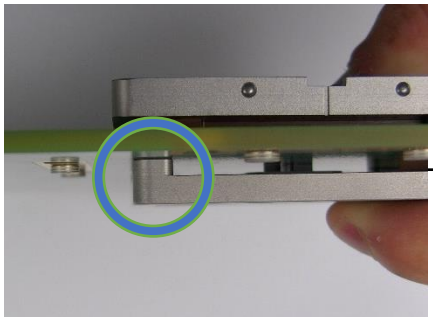
2. Lift the socket off its shipping cover, position it over the board in the correct A1 orientation, and lower it slowly until the alignment dowels go into their corresponding slotted holes on the board.

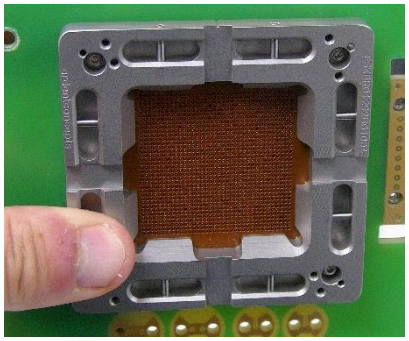


3. Drop the four mounting screws into the counter-bored holes on the guide plate corners.



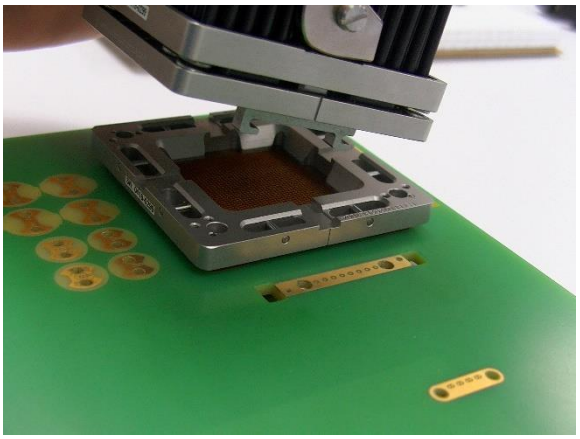
4. While holding the socket firmly against the PCB, position the board stiffener on the backside of the board so that the screws align with the tapped holes on the stiffener. While holding the board, refrain from touching the grid area of the socket as it could damage the contacts. Instead, touch the frame. Make sure the raised portions of the Stiffener is the side mating to the board.

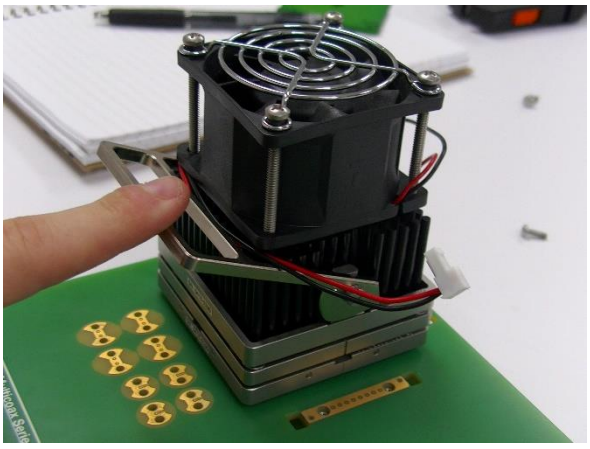




5. Turn the mounting screws on all four corners until they are hand tight.

6. Lastly, install the lid in its open position. It can be stored with the assembly until your package is ready for testing.





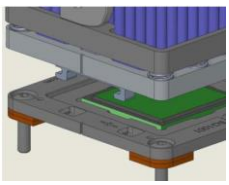
If you experience any difficulties or need for further assistance, please contact an Application Engineer at support@ardentconcepts.com

Socket Use:

NOTE: It is critical that the device be properly seated in the socket before the lid is actuated. To ensure proper seating, push down on the center of the device with your index and middle fingers and wiggle the device side to side or in a circular motion while pressing down. This check will tell you if the balls on the device are properly engaged in their contact holes.

If using a Family lid, close the lid and turn the handle to its stopping point and begin testing. If the resulting lid pressure is too much or not enough, lid adjustment will be necessary. See AE-AN-SK-005 - FAMILY GA - LID ADJUSTMENT PROCEDURE for more information.

If using an Air or Water Cooled Lever lid, plug the fan connector, if supplied, into its plug on the board. Plug in the thermocouple and/or Peltier module leads to the board. Attach the water hoses to the water cooler lid fittings with appropriate hose clamps. Slide the lid onto the socket so that its anchor hooks engage with the slots on the guide plate and until all the vertical faces of the lid base align with the vertical faces on the guide plate. At that point, the vertical grooves on the socket base will align with the grooves on the guide plate. Push the lever to its down position and begin testing.



Who Is Amphenol Ardent Concepts?

Amphenol Ardent Concepts is a leading designer and manufacturer of high performance multicoax and coaxial assemblies, connectors, and sockets used in the development of next generation semiconductors and electronics systems. Our core technology is the smallest, fastest, most electrically efficient compression mount connector technology worldwide. As data rate requirements increase and devices and systems shrink, Ardent's products deliver superior signal integrity in a dense footprint that can be reusable across programs to maximize cost savings.