THE CHALLENGE

Integrated circuits (ICs), sealed in ball grid array (BGA) packages, must frequently be subjected to electronic testing throughout the product life cycle, including design, development, emulation, production, programming, and, finally, deployment as part of a complete system.

However, testing ICs in BGA packages can often pose a challenge for IC manufacturers, OEMs, and end users alike. For example, suppose that the BGA package is soldered directly to either a test or production printed circuit board (PCB) and then subjected to IC testing. To remove the BGA after testing, it must first be desoldered. Then, presuming the IC is still usable, the BGA must be reballed before mounting again. This adds time and labor, while posing the risk of thermal or mechanical damage to an expensive IC or motherboard.

One way to alleviate this problem has been to use a socketing system, in which an array of socket terminals is permanently soldered to the PCB, and the BGA is soldered to an adapter designed to plug into the sockets. This arrangement facilitates the installation and removal of the BGA without risk of damage. If the same socket system is used on the test fixtures as on the production PCBs, transferring the BGA between testing and operational environments is intuitively simple, taking only seconds.

The socketed approach offers an obvious advantage when mounting BGA packages for test, production, and repair purposes. By utilizing a socket with the same footprint and size as the device package, test board layouts can easily be converted to production boards without the need for costly redesign. This eliminates the need to develop a special PCB to accommodate a unique footprint or large test socket.

Our patented True BGA Socket™ facilitates test, development, production, and field repair of BGA and LGA devices.

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THE ADVANCED® SOLUTION
As an alternative to soldering BGA packages directly to a
PCB, Advanced Interconnections’ BGA socketing
systems offer dependable, field-proven attachment
methods that facilitate device upgrade, replacement,
repair, testing and emulation. Moreover, electrical proper-
properties are excellent, having been tested at frequencies up
to 6GHz with less than a 3dB signal loss.

Unlike many other commercially available socketing
systems, the Advanced Interconnections solution is
available with footprints that match the sizes of the BGA
packages being mounted and with a choice of pitches
down to 0.75 mm. Since there is no requirement for
additional space on the PCB to accommodate the socket,
it is unnecessary to redesign the PCB when converting
the BGA test and board assembly process from direct
mounting to socket mounting.

The Advanced Interconnections True BGA Socket™
design (pictured on page 1) represents a unique evolu-
tion of the standard BGA
socketing system as it
facilitates testing while
altogether eliminating the
need to solder the BGA to
the adapter. Instead, only
the True BGA Socket is
soldered to the board. Then
the BGA package is placed
on top of the socket,
covered by a support plate,
and secured by first sliding
a clamp in place over the BGA and then tightening a coin
screw or finned heat sink (see Fig. 1). Optimal electrical
continuity is assured by the use of spring-loaded
beryllium copper contacts in pogo pin terminals, the
heads of which are compressed against the balls of
the BGA package. True BGA Socket is available in
1.27mm and 1 mm pitch, and a choice of footprints
that match the BGA packages being mounted.

For PC boards with limited space, AIC’s Flip-Top™
BGA Socket utilizes an open-top design with no
additional clearance area required for sliding the
heat sink assembly. The Flip-Top BGA Socket is
available in 1.27mm pitch with either SMT or thru-
hole terminals. Both the True BGA Socket and the
Flip-Top BGA Socket designs are also ideal solu-
tions for use with field programmable BGAs, and for
testing BGAs and LGAs (Land Grid Arrays) from
which the solder balls have been removed.

Fig. 1 – Sliding heat sink
assembly functions as
clamp to engage device to
socket connection.

The Flip-Top™ BGA Socket is designed to reduce
clearance space needed on the PC board. This socket is
only 3mm wider and 10mm longer than the BGA device
package.