

Solder-Bearing “Claw” Design Edge Clips: Getting a Grip for 100% Solderability

This is the second in a series of Tech Bulletins focusing on Solder Bearing Lead (SBL) Technology, offering information on a wide range of usage cases, configurations and practical applications.

The first Tech Bulletin in this series provided background on Solder Bearing Lead Technology and an overview of the key considerations to keep in mind when implementing SBL applications.

This SBL Tech Bulletin focuses on the specific details of one leading SBL approach, which is the “Claw” edge clip design that incorporates solder and flux on the interior faces of the interconnect in order to enhance solderability as well as simplify the assembly process.

The following sections address four key areas that are important for understanding and making optimal usage of claw edge card technology:

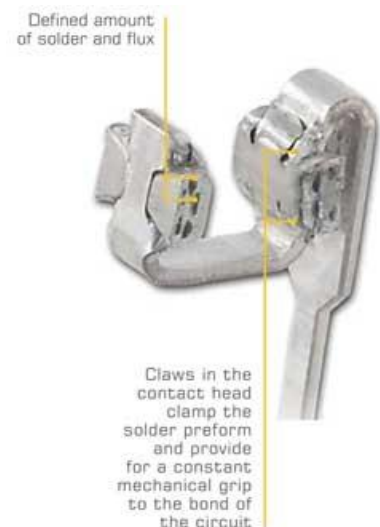
- Design overview
- Assembly steps and process simplification
- Claw edge clip configurations and application scenarios
- Solderability results and yield advantages

Overview of the Claw Edge Clip Design

With conventional soldering processes, the two metal components to be joined are first brought into position and mechanically held in place. Then flux and solder are applied to the conjoined parts, typically by a dipping process. The biggest issue is the inability of the solder dipping process to consistently assure precise and complete coverage of the desired areas on the pad and contact, which can result in variances of solder joint quality and reliability. In addition, this multi-step soldering process adds cost, time and complexity to the production environment.

In contrast, the claw edge clip design eliminates these issues by including a precise amount of preformed solder and flux on the contact surfaces. The claws within each contact head clamp the solder in place to assure correct positioning before and during the reflow soldering process. This unique grip approach provides direct contact between the solder and conductor pads, thus enhancing correct mechanical positioning and holding that position during reflow to achieve better quality joints with 100 percent solderability.

The next section provides a step-by-step look at how solder bearing claw edge clips can simultaneously simplify the production flow, improve solder joint formation and reduce costs.



Assembly Steps and Process Simplification

From an overall process flow standpoint, the use of solder bearing claw edge clip connectors simplifies assembly by eliminating the secondary solder and flux application steps. All interconnects can then be processed in a single reflow step along with other components, thereby reducing production cost, minimizing rework and eliminating variability.

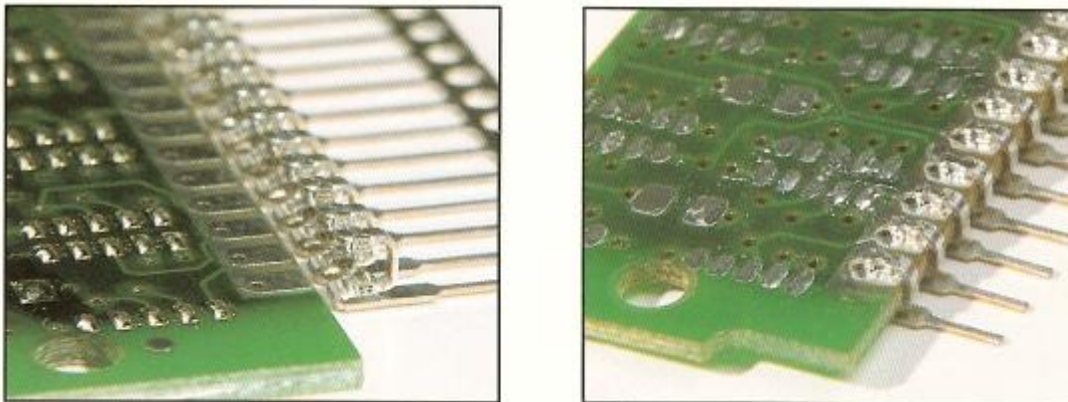
Edge Clip Attachment:

During assembly, the direct contact between the edge clip solder preforms and the conductor pads produces a beneficial wiping action as the clips are attached, thereby improving the conductivity between the parts. This initial assembly step can be done either manually or by using an automated lead attachment machine.

Reflow Process:

The tight interference fit between the clips and pads holds the parts firmly in position during subsequent assembly steps and throughout the reflow process.

All of the top and bottom solder preforms are reflowed in one operation using any method to raise the temperatures to reflow levels. This enables claw edge clips to be easily integrated with existing production processes and conform with standard SMT reflow parameters.



Consistent Results and Lower Costs:

Because the claw shape enables a precise amount of the right solder to be held in the exact position required, solder flow is tightly controlled and perfect solder joints formed, without need for solder stops or other measures. This assures optimal mechanical bonding and electrical characteristics with no unwanted wicking or bridging.

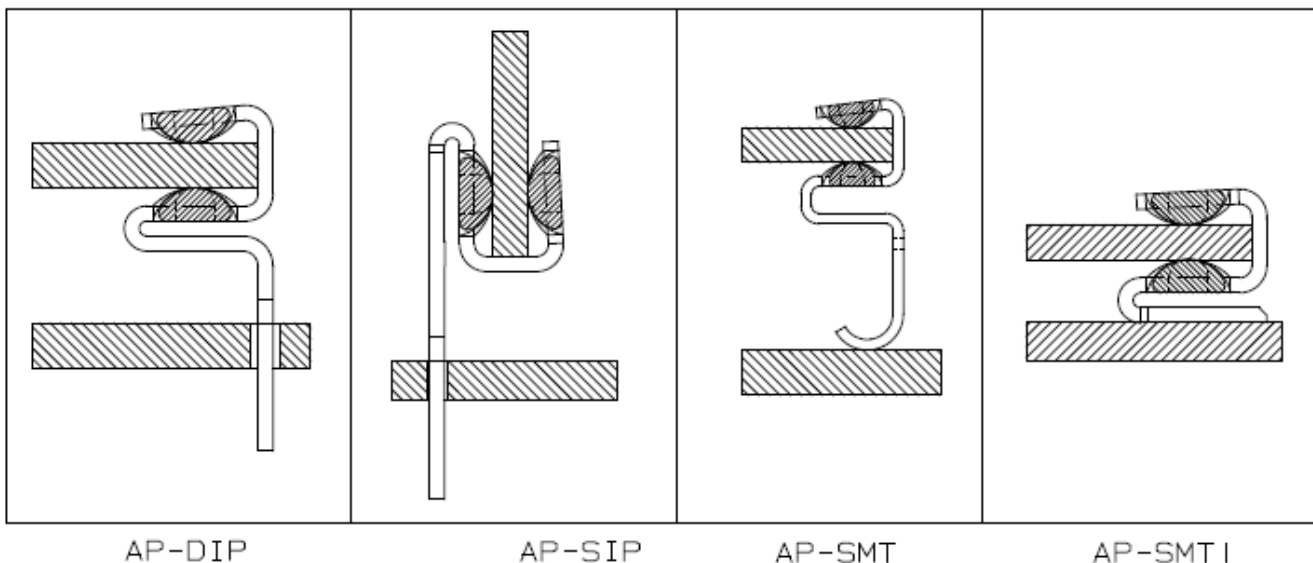
Most or all of the costly inspection procedures necessary with other methods can also be eliminated. The overall result is a simplified and far less costly circuits assembly process with more reliable higher quality product outputs.

Claw Edge Clip Configurations and Application Scenarios

Since its initial introduction, the claw edge clip approach has been adapted into a wide range of configurations to address many different application scenarios. For example, claw edge clips are now available for both through-hole and surface mounting of SIP, DIP, Quad and multi-chip devices.

As shown below, the claw edge clip design can be implemented to meet a variety of board-to-board interconnect requirements in both perpendicular and parallel board assembly product designs. The parts can be designed with straight, S-shaped, J-shaped or low-profile configurations and with centerline spacing of .100, .075, .050, or .025 inches.

In addition to through-hole and SMT interfaces, claw edge clips can be combined with compliant press-fit zone interfaces. The “J” shaped designs with surface mount or compliant-pin configurations are particularly helpful in compensating for the problem of thermal mismatch between boards.



Summary: Solderability Results and Yield Advantages

Over the course of decades of development, refinement and applications-specific deployments, the claw-shaped edge clip design has been shown to deliver 100 percent solderability results, while reducing the cost and complexity of secondary operations. The bottom line outcome has been a significant increase in production yields and product reliability.

In addition, with flexible manufacturing capabilities for adapting the claw design into a widening range of configurations, these yield advantages can be cost-effectively deployed across a broad spectrum of application requirements. The availability of semi-automatic and high-speed SIP, DIP and Quad lead attachment equipment also enables integration of the technology into virtually any set of production requirements, from relatively low-volume flexible-configuration assembly to high-volume automated production environments.

More information regarding Solder Bearing Lead Technologies and products can also be found on the web by visiting <http://www.interplex.com/nas> or by calling (201) 367-1300.