

SMT Card-Edge Solutions Using Solderfree Press-Fit Technology Part 2: Specifications & Design Considerations

This is the second in a series of Tech Bulletins focusing on SMT Card-Edge solutions. The first bulletin in this series addressed the evolution of various SMT-to-Press-fit application requirements. This Tech Bulletin provides more detail on interconnect specifications and design considerations for using SMT Card-Edge press-fit solutions.

Integrating the Advantages of SMT and Press-Fit Interface Technologies

The key to successful implementation of SMT card-edge interconnects is that both the SMT side and the Press-Fit side must be designed using best-practice techniques from each discipline.

For example, the card-edge interconnect shown in Figure 1 combines a specially designed SMD solder interface with the strength of integrated through-hole features on one end. The other end incorporates a tested and proven 0.64mm Press-Fit solderless compliant interconnect.

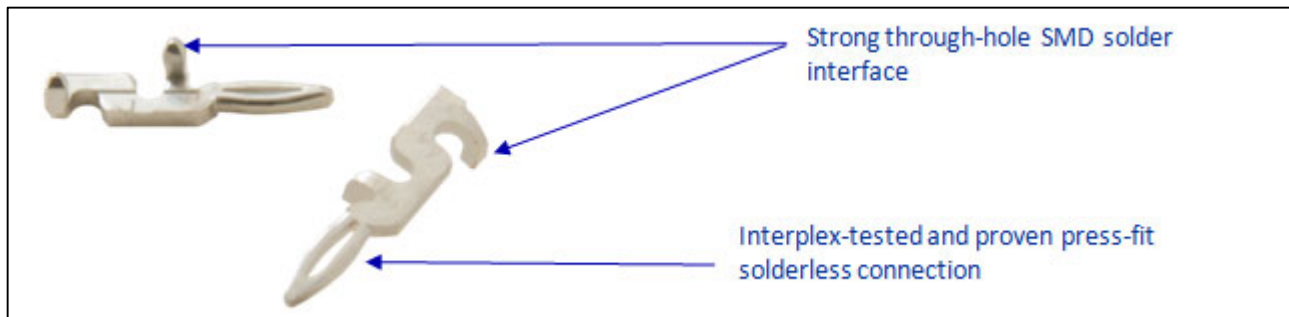


Figure 1 - SMT Card-Edge “End-to-End” Design Features

Mechanical strength is a key factor for two reasons. First, because the solder joints must be able to handle insertion forces when assembling the PCBs together; and secondly because the final assemblies need to withstand inter-board flex and/or expansion forces over the life of the product, often within operating environments having wide temperature variations. Retention force in the compliant press-fit interface is also critical to maintain integrity of the electrical connection.

The card-edge connector shown in Figure 1 has been tested to the following specifications:

- Maximum operating temperature: 125°C
- High conductivity material for up to 15 amps per contact
- Contact resistance: 1 mΩ max press-fit Interface
- 30N minimum retention force per each press-fit contact

Designing for Optimal SMT Solderflow and Joint Formation

As shown in Figure 2, each card-edge interconnect is designed with integrated recessed channels on the pin-in-paste through-hole interface, which seamlessly improve the solder distribution during reflow and assure high mechanical strength at the point of connection.

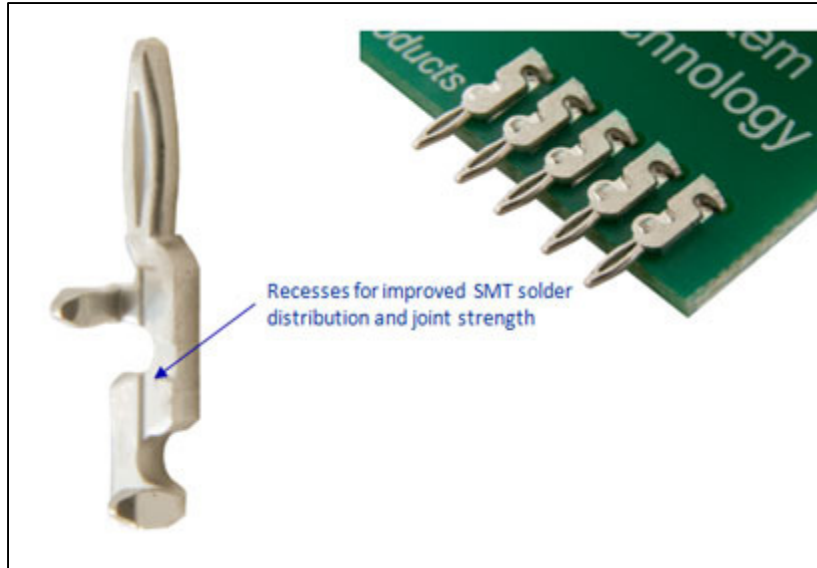


Figure 2 - Optimizing Solder Flow & Joint Strength

The SMT card-edge system is designed for standard 1.6 mm (0.062") thick printed circuit boards (PCB's) but is compatible with additional PCB thicknesses. The center minimum PCB spacing is 3.2 mm (0.126"). Detailed dimensions of the SMT-to-Press-Fit card-edge interconnect are illustrated in Figure 3, along with the PCB layout parameters that should be followed to achieve optimal results.

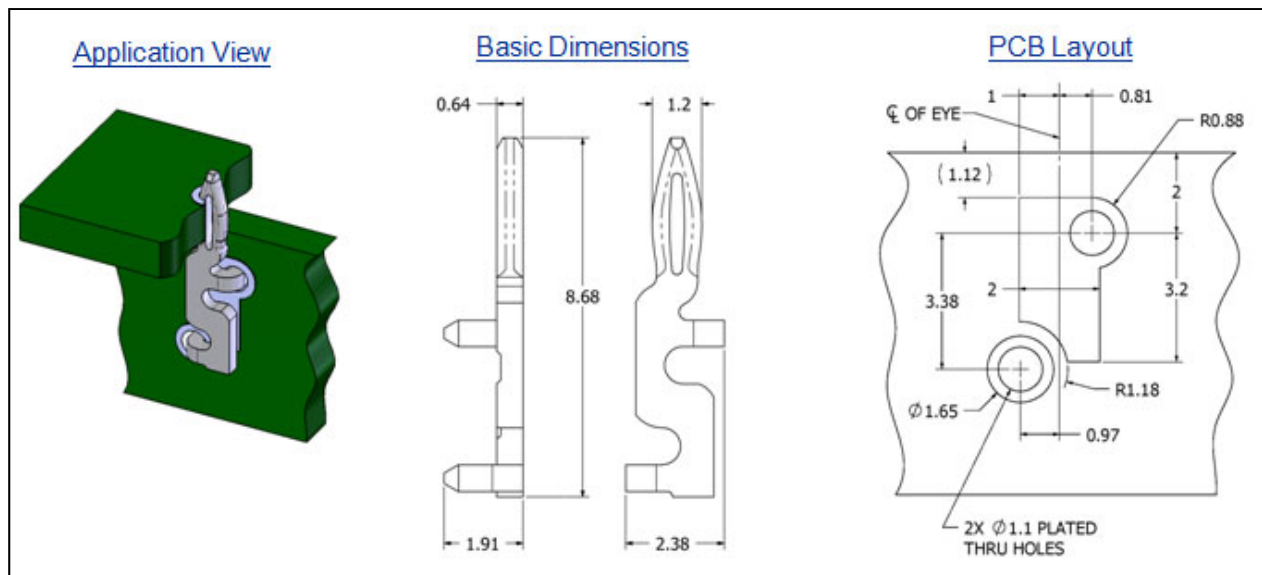


Figure 3 – SMT Card-Edge Interconnect Dimensions and PCB Layout Parameters

Leveraging Standards-Based, High-Speed, Automated Processes

To provide compatibility with standard high-speed surface mount pick-and-place equipment, the individual SMT-to-Press-Fit discrete components are packaged in 16 mm x 4 mm pitch EIA tape on a 13" diameter plastic reel. Depending on the specific assembly requirements, there also is an option for the discrete interconnects to be manufactured as continuously reeled metal stampings on 15" reels.



Figure 4 – Automation-Ready Packaging Alternatives

Summary

Combining the special advantages of both highly-automated SMT processing and proven solder-free press-fit technologies enables creation of cost-effective, production-ready solutions for streamlining the overall design and production of mother-board/daughter-board assemblies.

After being fully assembled and tested, the mother-board can now be mated up to the daughter-board without any exposure to additional heat cycles because the daughter card has a press-fit interconnect on the SMT card edge connector. Compliant press-fit technology provides a highly reliable method for interconnecting the daughter-board(s) that is completely solderless and eliminates labor-intensive secondary operations or special handling.

As outlined in this Tech Bulletin series, the fundamental key to success for integrating these two technologies is to leverage best-practice disciplines on the SMT and the Press-Fit ends of the interconnect and to maximize the mechanical, electrical and manufacturability aspects of both.

The bottom line is a reliable and highly adaptable solution that cost-effectively meets the industry's evolving requirements for design-friendly and automation-ready integration of multi-board assemblies.

More information regarding Press-Fit technologies and products can be found on the web by visiting www.interplex.com/pressfit or by calling (718) 961-6212.