

Next Generation High Density SMT Solderless Edge Card Connector System

An Interplex Press-fit Product

This Tech Bulletin provides an overview of evolving market requirements for interconnecting more compact PCB-to-PCB designs and introduces new smaller solderless SMT Press-Fit solutions designed for these high-density applications.

Topics addressed in this Tech Bulletin include:

- SMT Press-Fit Edge Card Application Requirements
- Integrating Advantages of SMT and Press-Fit Technologies
- Existing 0.64mm SMT Press-Fit Interconnects
- New High Density 0.40mm SMT Press-Fit Interconnects with 1.8mm Centerlines
- Maximizing Mechanical Strength of SMT-to-PCB Connection

SMT Press-Fit Application Requirements

During recent years, the evolution of PCB-to-PCB interconnection requirements between daughter-boards and mother-boards has driven the growing usage of SMT Card-Edge solutions employing solderless “eye-of-the-needle” press-fit technology.

In most cases, the main PCB or mother-board is a densely populated, mixed-technology SMT board representing the bulk of the material and assembly cost within multiple board product designs. Various daughter-boards are then used to integrate special functions or to provide configuration flexibility, such as LED status indicators, power conversion, memory arrays, etc.

SMT press-fit interconnects have proven to be an excellent solution by combining a standards-based SMT interface on one end and a proven eye-of-the-needle press-fit on the other. These interconnects enable both assembly efficiency and robust interconnection eliminating the need for expensive card edge connectors.



**New High Density
SMT Press-Fit**

Emerging requirements for interconnecting multiple, small PCBs in miniaturized applications, such as mobile handsets, tablets, wearables, Internet of Things (IoT) etc., have now led to the development of new smaller SMT press-fit interconnects to provide higher interconnect density with the same proven technologies. These new smaller SMT Press-fit interconnects are ideal for joining together miniature PCBs at right angles or in custom configurations.

Integrating the Advantages of SMT and Press-Fit Technologies

Combining the advantages of highly-automated SMT processing and proven solder free press-fit technologies (eye-of-the-needle) offers a cost-effective solution to the growing needs for efficient, design-friendly and automation-ready integration of multi-board assemblies.

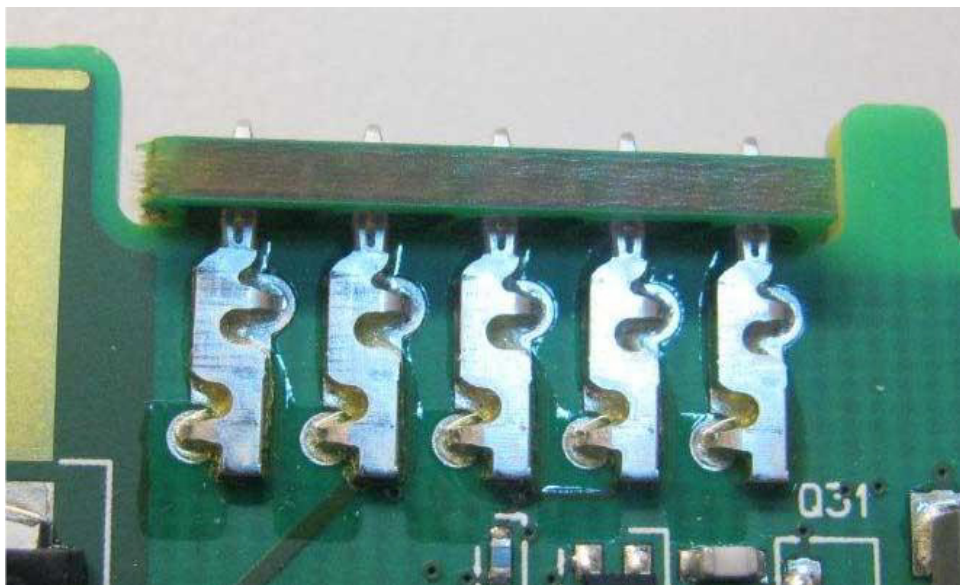
Both the existing 0.64mm interconnects and the new smaller 0.40mm SMT Press-Fit connectors are packaged in EIA standard Tape & Reel can be placed along with other SMT components on the first PCB and are compatible with all SMT soldering processes.

With eye-of-the-needle press-fit contacts to connect the second PCB, this approach eliminates the need for secondary soldering operations and the risks associated with re-heating either of the assembled PCBs.

Existing 0.64mm SMT Press-Fit Interconnects

The existing family of 0.64mm SMT Press-Fit interconnects was introduced over two years ago, to address the challenges of traditional mother-board to daughter-board interfaces. The design combines a specially designed SMD solder interface with the strength of integrated through-hole features on one end. The other end incorporates a 0.64mm Press-Fit solderless compliant interconnect.

Designed for maximum design flexibility, the 0.64mm interconnects are provided as discrete parts in either standard EIA Standard Tape & Reel or continuously stamped reels. The use of discrete SMT Press-Fit pins enables optimal use of every connector position for each application's requirements, without the wasted positions typical with conventional connectors.

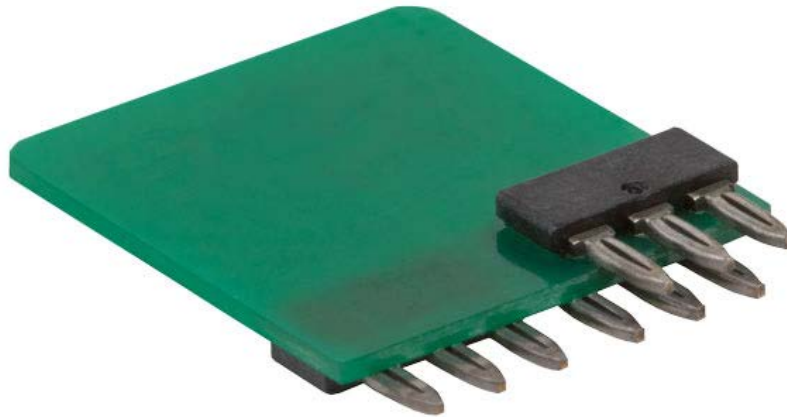


0.64mm SMT Card Edge Connectors

New High Density 0.40mm SMT Press-Fit Interconnects with 1.8mm Centerlines

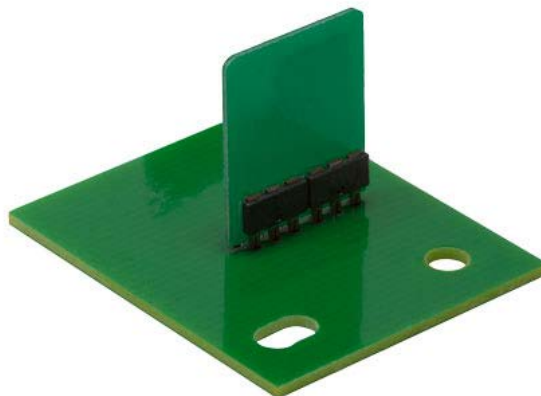
The new 0.40mm SMT Press-Fit interconnects are designed specifically to accommodate smaller and denser PCB-to-PCB right-angle interface applications necessary for more compact mobile and miniaturized devices. In these applications, where PCB space is very limited, the ability to minimize interconnect footprints on both PCBs can be a critical factor.

The 0.40mm SMT Press-Fit interconnects can be provided as either discrete parts or in custom multi-connector formats, such as the 3-connector pieces shown below. This flexibility allows designers to create a variety of custom configurations that can be optimized for unique assembly, logistics and application requirements.



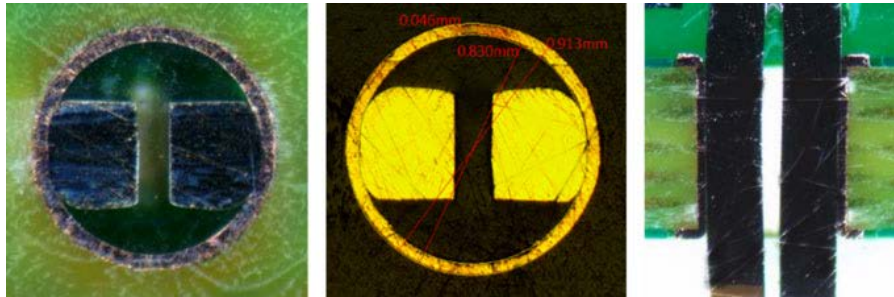
0.40mm SMT Card Edge Connectors

The new 0.40mm SMT Press-Fit Card Edge interconnects are ideal for joining together small PCBs at a right angle while optimizing both mechanical and electrical robustness of the connection and simultaneously reducing the complexity and cost of assembly.



Right Angle Interconnection of PCBs

On the press-fit side, the interconnects provide a proven high-conductivity interface with the target PCB via through-hole connections that require no solder and provide high-retention force.



Press-Fit Compliant Pin Cross Section

Maximizing Mechanical Strength of SMT-to-PCB Connection

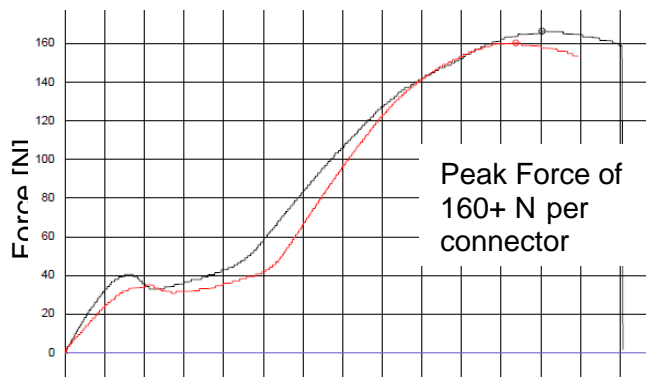
Mechanical strength is a key factor for two reasons. First, because the solder joints must be able to handle insertion forces when assembling the PCBs together; and second, because the final assemblies need to withstand inter-board flex and/or expansion forces over the life of the product, often within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

0.4 SMT Press-Fit connectors have been designed to the following specifications:

- Maximum operating temperature: 125°C
- High conductivity material for up to 8 amps per contact
- Contact resistance: 0.5 mΩ max at press-fit Interface
- 20N minimum retention force per each press-fit contact

The new 0.40mm SMT Press-Fit interconnects have also been tested to assure a strong SMT interface with the first PCB. As shown below, peel strength testing of a 0.40mm three-pin connector withstood 160N+ of force without any breakage of the robust solder joint.

Peel Strength of Soldered 3-pin Connectors (axial direction)



160N+ Pad to PCB strength for a 3-position connector.
Solder joint still intact after testing.



Peel-Strength Test Results for 0.40mm SMT Press-Fit Card Edge Connectors

Summary

With the expansion of the proven SMT Press-Fit card edge connector family to include smaller, higher density 0.40mm configurations, designers have a wider range of options to address right-angle PCB-to-PCB interconnect requirements in new compact multi-PCB products. The flexibility to use either discrete parts or custom defined multi-pin connector arrays also expands the designer's options to tailor each solution to specific assembly needs while minimizing costs.

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.