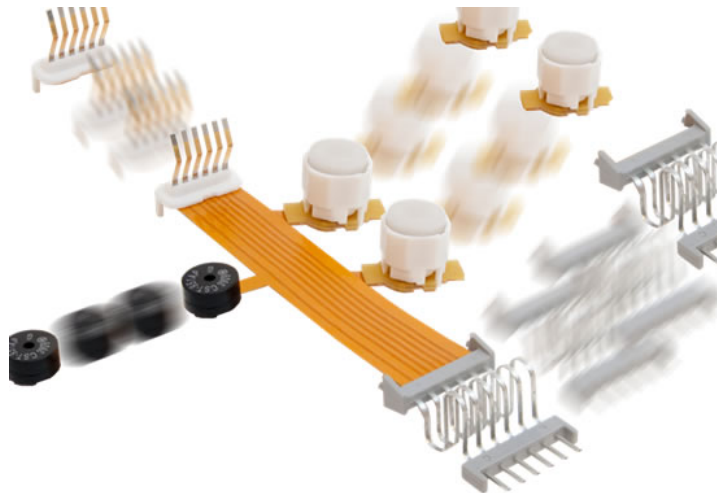


## ***Solder-Bearing Flex Circuit Contacts Enable Precise Temperature Control, Increased Yields, Streamlined Production and Higher Quality Results***

This Tech Bulletin describes the benefits of combining solder-bearing technology in flex circuit contacts to simplify assembly methods while improving quality yields through better control of soldering temperatures and precision solder joint formation. Solder-bearing flex circuit contacts also provide significant cost savings as compared to conventional approaches.

### **Proliferation of Flex Circuit Applications**

The usage of flex circuits continues to accelerate throughout a widening range of electronics applications and industry segments. Flexible circuits offer clear advantages in terms of higher circuit density combined with significant savings in weight, space and cost as compared to traditional PCB connectors, cabling, wire harnesses, etc. Flex circuits can offer 75% space savings compared with wiring harnesses and can support a variety of termination options, including insulation displacement (IDC), FFC, PCB connectors and many more. The low mass of flex circuits vs discrete wiring also makes flex circuits ideal for high shock, high vibration applications.



The ability of flex circuits to follow unique geometries while providing complex interconnections offers a key technology enabler for a broad range of products including:

- Smartphones, tablets and other consumer electronics
- Automotive electronics (e.g. instrument clusters, sensors, LED lighting, etc.)
- Military, aerospace and industrial
- Medical applications

## Challenges of Flex Circuit Assembly

While flex circuits can deliver significant advantages, there are also challenges that primarily involve how to efficiently and reliably terminate the flex interconnects at each end of the circuit. Creating robust electrical and mechanical interfaces between the flex circuits and the associated rigid assemblies is a critical factor for success.

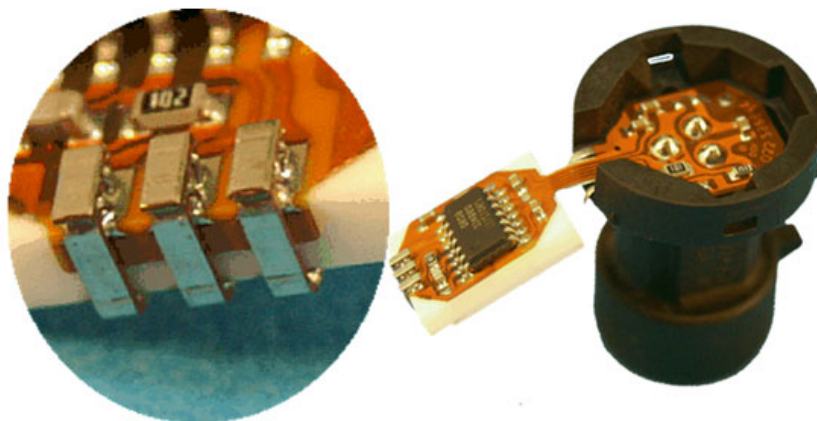
Non-solder approaches such as Zero Insertion Force (ZIF) connectors can pose challenges in terms of space, cost and reliability. For most applications that involve shock and vibration issues, such as automotive, military/aerospace, or consumer electronics, standard ZIF sockets are not robust enough. Therefore, ZIF sockets often require adding on snap-down mechanisms that drive up both costs and complexity. In some cases, gold plating also has to be added to the flex circuit in order to achieve required electrical connectivity with the ZIF, which can add even more cost.

While solder-based interconnects can help overcome these issues, traditional soldering approaches pose other challenges in terms of process-control, secondary operations and yield concerns. With flex circuits, conventional application of solder and flux can be particularly problematic because of the inherently tight pitch, precision positioning requirements and variety of substrates involved. The tendency is to compensate for inconsistencies in solder/flux application by boosting the oven or thermode temperatures in an attempt to widen the process window. However, in practice, raising the soldering temperatures cannot compensate for missing or misapplied solder and flux. All it really does is increase the risk of damage to the flex circuits and/or surrounding components.

## Advantages of Solder-Bearing Flex Circuit Contacts

Solder-bearing flex circuit contacts pre-integrate the precise amount of solder needed in exactly the right position for optimal joint formation. This enables better control of processing temperatures to avoid any risk of thermal damage to flex circuits or other components. Soldering processes can be tailored to the specific melting point of the solder alloy being used and to the specific oven/thermode parameters rather than having to overheat as a compensation technique.

Precise temperature control and pre-integrated solder is especially important to achieve consistent solder joints with ceramic substrates and/or complex geometries. For example the solder-bearing edge-clips shown below provide robust connections between the flex circuit and the underside of the ceramic substrate, while delivering 100 percent solderability using standard processing methods.

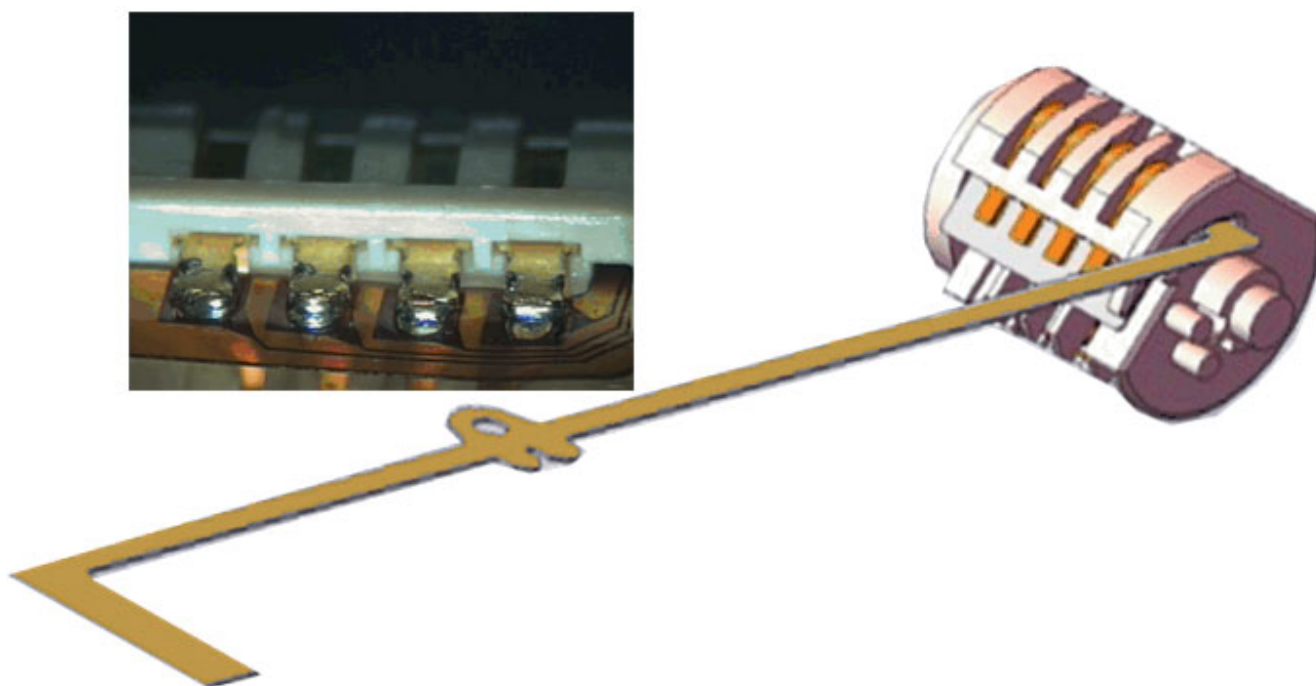


## Summary: Solderability Improvements, Yield and Cost Advantages

The pre-integration of solder and flux into the flex circuit contact enhances process repeatability, reduces inspection costs, eliminates secondary operations, reduces rework requirements and boosts overall production yields.

*This enables designs with flex circuits to be implemented at a fraction of the costs associated with either ZIF sockets or conventional soldering methodologies.*

Solder-bearing flex circuit contacts not only enable significant cost savings; they also open up a wider range of new design possibilities. Product engineers can maximize the configuration and form-factor advantages of flex circuits using custom designed solder-bearing contacts, without being hampered by the space constraints and process limitations of either ZIF connectors or traditional soldering methodologies.



The bottom line is both increased design flexibility and reduced production costs. In effect, the use of solder-bearing technology expands both the design-window and the production process-window for flex circuit implementation and enables a much broader range of new product possibilities.

---

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.