# Correct-A-Chip Adapters Broaden Design Possibilities

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A lot has changed in the past 25 years. Technological feats thought to be impossible in the 1980s have been overcome, while other problems and challenges arose in their place. Changing design requirements, technology and applications are nothing new in the world of electronic components.

**The Never-ending Cycle of Necessary Innovations**
Improving electronic components often means getting smaller. In the semiconductor industry, pin pitches for BGA devices continue their downward trend, reaching as low as 0.3 mm. While saving space, the smaller pitch devices also conflict with the low-cost, traditional board pitches of 1.27 mm, 1.0 mm and 0.8 mm that are so readily available in today's market. Integrated circuits have evolved, and replacement components don't always match up with the PCB being used. Package styles are as diverse as crayon colors, creating integration and design change problems.

Changes in safety regulations are a continually developing process as well. Restricting the use of hazardous materials, such as lead, was meant to cause less harm, but these new regulations inevitably led to other issues. Specifically, RoHS compliance has created situations where non-RoHS applications (such as military applications that are exempt from compliance) require a new component, but since the component is not available in a compatible form, costs are driven up. With so many changes to technology, a costly and unexpected redesign of an entire board is suddenly the only option.

**Innovative Problem Solving**
Quick, creative thinking can be essential for fixing problems that arise from changing standards.  The best solution isn't necessarily a completely new design. Adapting new technology to existing designs can save money, resources and time that would otherwise be spent developing entirely new designs, especially when the new designs require the additional cost of testing and reevaluation (not to mention the new manufacturing costs).

The “Correct-A-Chip” adapter concept, introduced back in the late 1980s by Aries Electronics, continues to be a cost-effective and time-saving solution for retrofitting a board that would otherwise require costly re-spinning.  For example, Switch-A-Pitch adapters can now adapt new 0.4 mm pitch devices so they can be used on older, larger pitch applications.  Prior to this capability, an entire new design would have been required.

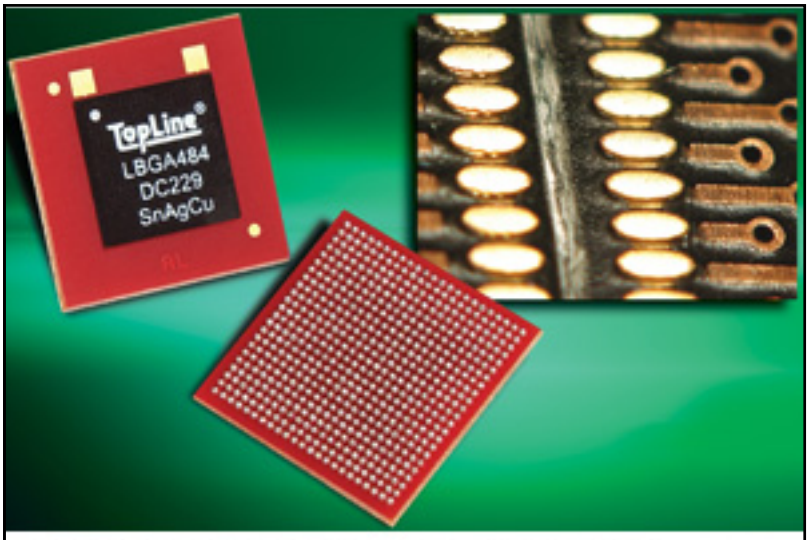


**Figure 1: Adapters that truly adapt to components currently in use, such as Switch-A-Pitch (left) and Fine Pitch Bump (right) adapters, eliminate potential design or safety regulation issues and can save time and money.**

Whatever the reason for a replacement (availability, obsolescence, need for better performance, etc.), adapter technology eliminates the need for a new PCB. The adapters allow the use of different termination styles or pitches on existing boards designed for an alternative style or pitch and can be fitted with either active or passive components for added functionality.

Over the years, adapter technologies for virtually any package style have been developed to convert almost any other package style. The “standard” list of conversions includes SOWIC to DIP, DIP to SOIC, SOJ to DIP, DIP to JEDEC TO, PLCC to DIP, QFP to PGA, SSOP to DIP, VQFP to PGA, TSOP to DIP, TQFP to QFP and many more combinations in RoHS and non-RoHS compliant forms. Newest in the Aries Correct-A-Chip lineup are Switch-A-Pitch adapters that convert to different, smaller pitches and Fine Pitch Bump adapters that convert to fine pitch footprints, including TSSOPs and QFPs.

The advent of RoHS compliance has brought a new set of technological challenges into being. Certain adapters can accommodate RoHS balls with tin/lead balls, and vice-versa, to utilize components currently in use that do not need to be replaced, yet might conflict with newer components being added. Specific problems can also be addressed with a custom adapter designed for a particular application.

No longer does evolving technology have to mean wasting usable components that may have otherwise become obsolete. Using adapter technologies, such as Correct-A-Chip, can broaden design possibilities that may not be an option without changing the entire PCB layout. For example, many times the original chip designed for a military application is no longer available. The only option left without corrective adapters is to respin the board for a new component. Designers can instead use adapter technologies in place of the original chip and avoid the time and costly approvals that accompany respinning a board.

**Continually Evolving into the Future**

While there are many more possibilities available to designers when using adapters, technology will continue to change and connector manufacturers will continue to evolve with this technology, just as the Correct-A-Chip adapter series has evolved over the past 25 years. More problems are being solved by incorporating the latest adapter advancements into reliable connector designs.

The semiconductor industry will continue to see technological innovations in the future and manufacturers will need to continually expand the options available for designers faced with other costly and less desirable alternatives.

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