

Counterfeit Component Analysis

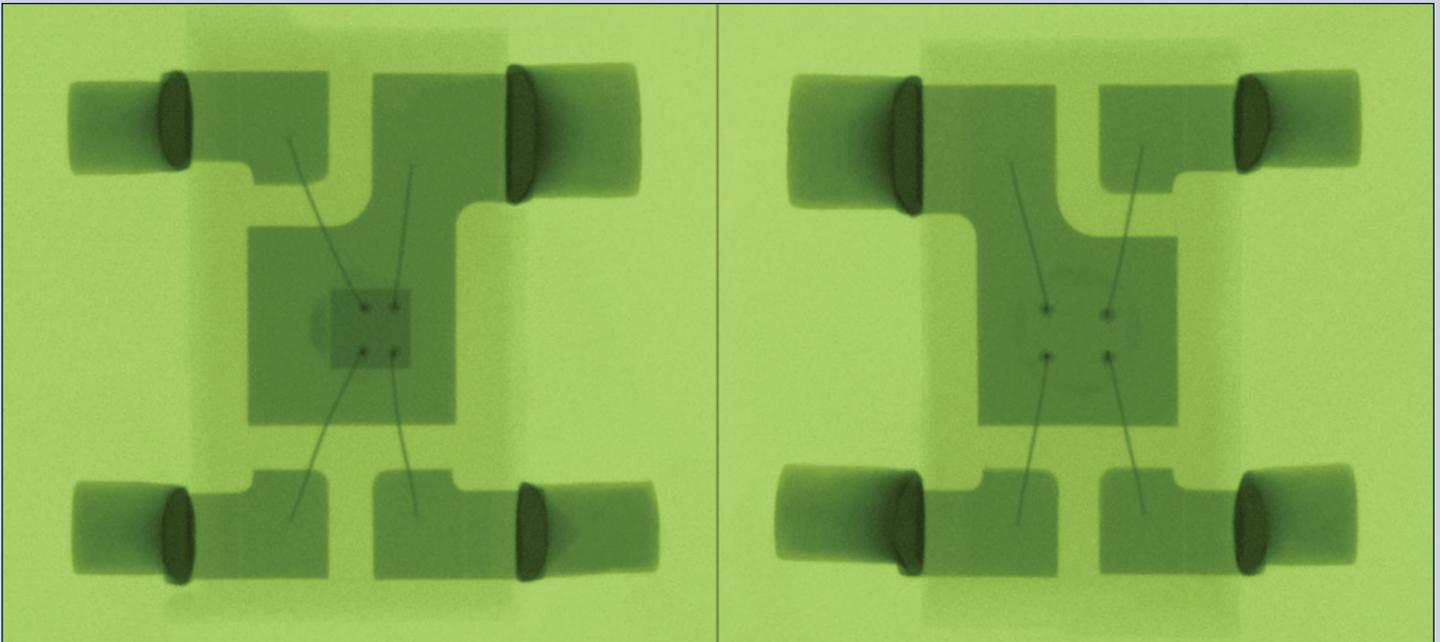


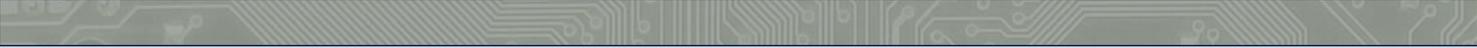
Figure 1: A common example of counterfeiting, revealed using x-ray analysis. The image on the left shows a properly packaged die while the image on the right shows a package with a missing die.

A customer contacted the Helpline with the concern that parts being used in their assembly may possibly be counterfeit components.

The counterfeiting of electronics components is a world-wide problem, and the threat today is even more evident than ever before. Any company, large or small, that manufactures assemblies using electronics components is equally susceptible to using counterfeit devices in their assemblies. In most cases, counterfeit components aren't discovered until after the component has already been placed on a printed circuit board (PCB), usually during first article electrical test. At this point, the only recourse is to debug the circuit to determine the faulty component and rework each PCB already in production to replace the faulty component. As one might easily surmise, this is a rather costly process; world-wide, counterfeit components account for over \$15B loss in sales annually!

The root cause of counterfeit components could vary from negligence during manufacturing of components, to improperly recycling of components from discarded assemblies, or even blatant deception by the manufacturer to substitute a component with a lesser device. Regardless of the cause, ACI Technologies has the arsenal of tools necessary for identifying and reporting any seemingly counterfeit component. Figure 1 illustrates a common example of counterfeiting, revealed using x-ray analysis. The image on the left shows a properly packaged die. The image on the right, however, shows a package with a missing die.

Common tools used for counterfeit component analysis are x-ray, x-ray fluorescence (XRF), decapsulation, and the ORAFEC-09 detector. While decapsulation is a destructive method of removing the protective layers of a packaged component in order to view devices



and wire-bonds, all the other techniques are non-destructive means of counterfeit component analysis. XRF can be used for detecting lead in supposed lead-free components, as well as a component's material composition. X-ray is best used for packaged components to provide high-resolution, high-contrast images of the component and its packaging.

The ORAFEC-09 detector allows for extremely fast counterfeit analysis of components. The component simply plugs into the ORAFEC-09 unit which applies electrical signals to the pins. The recording of the electrical characteristics of those pins is called a PinPrint and can be used to compare a known genuine component to a suspect one. The voltage range, low and high peak voltage, source resistance, and the frequency can all be adjusted. This highly accurate means of counterfeit analysis could significantly save in cost and schedule.

To see a demonstration of the ORAFEC-09 at ACI Technologies, for more information on its capabilities, or for counterfeit component analysis, please contact the Helpline at 610.362.1320, or email helpline@aciusa.org. Classes for counterfeit analysis are also available. For training information, please contact the registrar at 610.362.1295 or email registrar@aciusa.org.

ACI Technologies, Inc.



ACI Technologies, Inc. 1 International Plaza, Suite 600 Philadelphia, PA 19113 *phone:* 610.362.1200 *web:* www.aciusa.org

Training Center *phone:* 610.362.1295 *email:* registrar@aciusa.org

Helpline *phone:* 610.362.1320 *email:* helpline@aciusa.org