

## Special Report: Dissecting the Counterfeit Electronic Component Problem

Second part of a series by Tom Valliere  
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In our [December report](#), we discussed the scope of the problem with counterfeit electronic components, the geographic and financial drivers, and the contributing factors that make our industry vulnerable to unscrupulous operators and purveyors of bogus parts.

In this second part of the series, we will look at the origins of these components.

Let us start by revisiting our definition of a counterfeit component:

***“Counterfeiting is the unauthorized making of a copy or imitation of an article, product or component with the intent to misrepresent its source, contents, or quality”***

Within this rather broad classification, there are many possible levels of misrepresentation all designed to deceive the buyer or user of the component. Generally we can divide these into four groupings:

### **Counterfeit Component Classes**

1. Reverse engineered copies
2. Reclaimed scrap from legitimate manufacturing
3. Remarketed or re-branded legitimate parts
4. “Bonus lots”

#### **1.0 Reverse Engineered Copies**

This is what most people think of when the term counterfeit is used. These are the copycat (and generally inferior) products that are found at flea-markets and on-line auction sites that purport to be the real things. How many of us have bought a pair of sneakers or clothing purporting to be Izod, Nike or some other brand only to have them shrink, fade, rip or otherwise not perform as well as the legitimate item? Who has traveled to the Far East and not been offered a “Genuine” Rolex watch for a bargain price of \$20? Only to have it malfunction a few weeks after staining your wrist green.

It is not only individual consumers that succumb to these temptations or become victims of these types of misrepresentations, companies as large as Wal-Mart have been victimized by these “knock-off” copies of legitimate brands.

❖ ***“During this litigation, Fendi provided us information that the 12 types of bags and wallets specifically listed in its complaint were not genuine,” said Doug McMillon, president and CEO of Sam’s Club. “We accept this information.”***

***Sam’s Club said it has removed all Fendi-labeled bags, wallets and scarves from its shelves. Customers who bought bags, wallets, or scarves with a Fendi label at a Sam’s Club can return the item for a full refund, the company said.<sup>1</sup>***

In electronics, this type of counterfeiting appears to be more prevalent in subassemblies than components. The secondary market for cell phone, PDA's or other personal electronics devices are rife with counterfeit batteries and other accessories. More insidious are electrical safety items such as circuit breakers and electrical appliances that carry counterfeit UL markings and are clearly hazardous. The dangers presented by these products have been well-reported in the media as reports of exploding cell phone batteries make the evening news and warnings of dangers and recalls hit the print media and internet sites. Consider the following:

❖ ***“Connecticut Electric Recalls Counterfeit Square D Circuit Breakers Due To Fire Hazard***

***WASHINGTON, D.C. - The U.S. Consumer Product Safety Commission, in cooperation with the firm named below, today announced a voluntary recall of the following consumer product. Consumers should stop using recalled products immediately unless otherwise instructed.***

***Name of Product: Counterfeit "Square D" Circuit Breakers<sup>ii</sup>***

❖ ***"CPSC is receiving more and more reports of incidents involving cell phones, and we're very concerned of the potential for more serious injuries or more fires," said agency spokesman Scott Wolfson.***

***U.S. phone makers and carriers say most fires and explosions are caused by counterfeit batteries<sup>iii</sup>***

Less frequently, we see individual electronics circuit elements represented in this class. Generally these are relatively low technology – easily manufactured parts such as resistors, capacitors and electromechanical devices. The equipment for manufacturing these devices is readily available as are the skills required. Many existing manufacturing operations may be easily modified to produce these reverse-engineered or “knock-off” parts. Were it not for razor thin margins and the need for extremely high volumes to generate usable profits, we would see much more activity in these areas. Certainly if we enter a period of supply constraint like we saw with tantalum capacitors and other parts in the late 1990's we may expect the market to be flooded with this class of fakes as the high prices and ease of entry through brokers will encourage this activity.

## **2.0 Reclaimed scrap from legitimate manufacturing**

In North America, most companies have stringent rules regarding control and scrapping of defective materials. This is due in part to stringent government oversight regarding tax credits and reuse regulations. However in China any presumption that these types of controls exist or are adhered to is pure folly. Even where legitimate manufacturers attempt oversight of their subcontractors, it is difficult to have a 24 x 7 presence. As these genuine but defective parts are easily passed as prime material, the temptation to recycle this scrap is great. If the part is critically deficient, the buyer is fortunate as the deception will manifest itself early in the production cycle. Where the parts were culled for parametric or other less fatal flaws, the buyer risks serious downstream issues as the performance degradation becomes apparent in the hands of their customers resulting in warranty and customer satisfaction issues.

## **3.0 Remarketed or re-branded legitimate parts**

Probably more common than generally recognized, these are parts that are legitimate but have been intentionally misrepresented to deceive the buyer. Typically these parts are misrepresented as being of a:

- Higher electrical performance (i.e. faster speed, tighter tolerance),
- Different mechanical characteristic (i.e. RoHS compliance), and/or
- Different manufacturing origin (i.e. Texas Instruments versus Fairchild Semiconductor)

### **3.1 Higher electrical performance:**

Many components such as memories or microprocessors are speed graded during testing with the higher speed parts commanding a higher price. Other parts like voltage regulators are selected or trimmed for accuracy. As the only perceptible physical difference in these parts is the marking, slow or less accurate parts are easily re-marked and sold at higher prices. These may or may not show up in the factory or at the customer site depending on usage conditions, design margins, or other factors.

### **3.2 Different mechanical characteristics**

Restrictions of Hazardous Substances regulation banning six substances including lead, has brought additional opportunities to counterfeiters. There are no marking standards associated with the identification of lead free or fully conforming (it is about more than just lead) RoHS components. Some companies use a “G” suffix in their part number, others use an asterisk or other mark, and some do not mark at all, preferring to control by date codes. What could be more welcoming to a counterfeiter? Want lead free parts? Ok, let me get my little G stamp out and presto – there you go. It is exactly that simple.

Should you actually receive and use tin/lead parts, the damage to your process and products could be enormous as, particularly in a through-hole soldering situation, the lead contaminates the solder process and everything manufactured on that line.

Other areas targeted by counterfeiters are wiring and electrical cords, mechanical hardware, and even product labels – all of these have been found to be bogus and non-conforming to RoHS requirements.

### **3.3 Different manufacturing origin.**

Most companies control the source for many of their electrical components. These typically have been qualified or tested for usage in their products and have met their performance and quality standards. Where similar products exist from another company and the only discernable difference is the manufacturer, there is of course a temptation to deviate from the qualified source and substitute a more available or cheaper part. So we see Kemet capacitors relabeled as AVX, Texas Instrument logic gates re-branded as Fairchild, etc. The combinations are endless. And yes, it is happening every day and even as you read this.

## **4.0 Bonus Lots**

Every manufacturer starts more products than required by contract to deliver. This compensates for parts lost or damaged in the manufacturing process or parts that do not meet final quality or performance requirements. Depending on yield, a manufacture may find themselves with many perfect overrun parts that are identical to the contracted device and represent a strong temptation to sell as legitimate parts. (These overruns may be deliberate with the intent to defraud the IP owner).

For all intents, these are legitimate parts, just produced outside of the business contract. These parts represent the least risk to the purchaser but do economic damage to the original manufacture (think pirated DVD). Even though these parts in themselves may represent little risk, the risks associated with dealing with a dishonest merchant channel should never be discounted.



## **What can I do?**

***“The best protection against counterfeit parts is to take aggressive preventive actions.”***

It is relatively safe to say that every manufacturer of electronic products has been victimized by counterfeit components. The electronics industry’s own numbers identify this problem as costing them more than \$100 Billion dollars annually. If huge companies such as Hewlett-Packard and Cisco with all of their resources acknowledge the problem and have been victimized, then prevention is seemingly a formidable, if not impossible, task for smaller companies – and it is. However much can be done to mitigate the risks.

This will be the topic of our next installment.

## **The Design Chain Associates Mission Statement**

Design Chain Associates, LLC (DCA) provides services that help Electronics OEMs and other product manufacturers increase engineering, procurement, and production efficiency, product and operational environmental performance, and corporate profitability by ensuring that the right decisions about supply base and the environment are made during the earliest stages of the product lifecycle, and are built-in to corporate strategies and tactics.

Contact Tom Valliere at +1-866-DCA-7676 x5, or email him at tom (at) designchainassociates.com to find out more about how we can help you increase the integrity of your supply chain.

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<sup>i</sup> [http://www.usatoday.com/money/industries/retail/2007-06-07-walmart-fendi\\_N.htm](http://www.usatoday.com/money/industries/retail/2007-06-07-walmart-fendi_N.htm)

<sup>ii</sup> <http://www.cpsc.gov/cpscpub/prerel/prhtml08/08054.html>

<sup>iii</sup> <http://www.foxnews.com/story/0,2933,139412,00.html>