Special Report: Dissecting the Counterfeit Electronic Component Problem

The First in a Series, by Tom Valliere
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Lead in toys, exploding cell phone batteries, faulty circuit breakers, poisonous dog food, defective microprocessors. It seems whenever you turn on the news or pick up a newspaper there is another serious issue with products from China.

For the past 18 months, Design Chain Associates (DCA) has been working with clients and the United States Patent and Trademark office (USPTO) to raise awareness in the electronics industry of this significant and growing problem. DCA has participated in a series of seminars USPTO has sponsored across the country. Through study, participation, and discussions with experts including Chinese trade and embassy officials, US Department of Commerce representatives, and experienced lawyers in China and North America, as well as our own experience, we have gained significant insight and a unique perspective into the problem and the legal, cultural and economic issues that are driving it.

This will be the first in a series of special newsletter articles that will cover this problem in depth. We will examine the origins of the problem, causes, and preventative actions. We will discuss supply chain hardening and other strategies to minimize the chances of your company becoming a victim. Additionally, we have invited legal and industry experts to join us to discuss Chinese laws and what you need to know to insure you are protected before, during and after technology transfers. Special attention will be given to protection through proper execution of patents, trademarks and copyrights under Chinese law and how that differs from US law, and we will discuss what remedies are available under Chinese civil and criminal law.

We will also be expanding our resource page.

The Problem

There are many definitions of counterfeiting, Let us start off by defining counterfeit components for purposes of this report:

> ***"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."***

While most of the media attention has been given to counterfeit finished goods, DCA has focused on counterfeit components that go into otherwise legitimate products. These are invariably supply chain failures, deliberate or otherwise, and are not likely to be caught by customs inspectors or normal quality conformance procedures at a product level. Detection is usually accomplished at failure analysis after a significant factory yield problem or – even worse – a field or customer problem is noted. This is the insidious nature of counterfeit components; like identity theft, remedy is always after the fact, reactionary, and oftentimes difficult if not impossible. All component classes from resistors to complex microprocessors have been counterfeited and have made their way into finished goods. Sometimes they are detected, but most times not. We can safely state that almost 100% of electronic product manufacturers have been victims of counterfeit components. The counterfeiting problem is that pervasive. If you have not been a victim yet, you most certainly will be. Size is no protection. All of the major multi-billion dollar electronic product companies have been victimized. A simple web search will turn up many pages on this topic and many specific recalls and examples.

How Big is the Counterfeiting Problem?

The United States Patent and Trademark Office estimates the economic damage done to US trademark and patent holders to be in excess of $250 Billion annually. It is more if copyright holders are included. The Alliance for Gray Markets and Counterfeit Abatement (AGMA), an industry group that consists of Hewlett Packard, Cisco and other top tier electronics OEM companies, estimates the loss to electronics manufacturers alone at more than $100B and that does not take into account the money spent on reworking, recalling and warranty support for counterfeit parts that breach their supply chains and get into factories or products. Studies show that a simple passive component costing less than a dollar can cost more than 20 times that amount to rework if caught in the factory. If the problem escapes into the field and causes a channel recall or worse, a customer recall or field engineering visit, that cost escalates dramatically. Indirect losses from product image, customer satisfaction, and product safety are not quantifiable but can be even more significant.

While many debate the actual numbers, the inescapable fact is they are large and represent not only dollar losses, but also the loss of employment as revenue is siphoned off to these illegitimate channels.

Why China?

Few Westerners understand how traumatic the social upheavals of the cultural revolution of the 1960s were to China. It was during this time that the entirety of the traditional Chinese legal systems and educational systems were dismantled and the intelligentsia dispersed. The legal systems in place in China today date from the early 1980s. It wasn't until then that the law schools were back in operation and graduating their first classes of lawyers.

We tend to view China through our western lenses clarified by more than two centuries of rule of law. This is a set of laws that has evolved constantly throughout the industrial revolution and the information age. China has not had the privilege of this legacy. Further, we judge China harshly sometimes forgetting our own history and evolution was highly dependant upon industrial espionage and IP theft. Our textile and other industries that launched us as an industrial power were built upon IP theft from England and other countries. While not excusable, this is understandable behavior for an emerging nation. As China evolves and develops internal IP capital, her laws and enforcement will, of necessity, improve.

Overall and put into the proper context, China has done a remarkable job of reinventing herself and entering the global economy. Shortcomings certainly exist, but what is more remarkable is that the laws exist at all and are actually enforced. Lawyers in the know agree that the laws themselves are basically sound. Chinese patent law for example is based upon German law. Penalties are weak by western standards and China seemingly lacks the ability, and to some extent the will, to insure level enforcement across her vast provinces and territories. That is not to say there is no enforcement or that remedy is not available. There are many avenues of relief. However, enforcement and remedy are often complicated by the fact that many western companies do not understand Chinese IP laws and do not take the proper steps to protect themselves. While Chinese law for trademarks, copyright and patents are similar to US laws, significant differences do exist and can create pitfalls for the unwary. This also will be discussed in subsequent newsletters.

Here are some specific drivers for the problems we see today:

- In 2004 China surpassed the US for the first time in terms of foreign investment $
- China is annually graduating several times as many engineers as the US
- The ability and desire to directly compete in terms of standards development, design, and reverse engineering has been demonstrated
- The concept of Intellectual Property ownership is new to China

- Enforcement of laws is ineffective
- Electronics Manufacturing and Design are moving quickly to China

Contributing Factors

While there are many causes, there are also many contributing factors. China is not the sole problem; we all share in creating what can only be termed a “perfect storm”. Consider the following:

- Fragmented supply chain – Many OEMs have outsourced large portions of their material operations to their Electronics Manufacturing Services (EMS) providers, to distributors and logistics providers, or a combination of these. This has resulted in less end-to-end supply chain visibility and creates more entry points for errant material.
- Aggregation by EMS providers – EMS providers have internal material objectives that may not parallel those of the design center. Rather than require strict adherence to an Approved Supplier Listing (ASL) many OEM’s have allowed their EMS partners wide latitude for some classes of components. This contributes to the unpredictable demand and visibility issues that causes supply imbalance as well as undermining source discipline mentality that contributes to unauthorized substitutions at all levels. Indeed, certain EMS providers in China have been known to apply this latitude to other component classes as well.
- Rise of internet trading – Nowadays anybody can be a parts broker or non-franchised distributor simply by creating a website. While the shortest and most direct supply route is always preferred, non-franchised distributors and brokers provide essential services managing scarce materials and excess inventory. Therefore they are a part of everyone’s business plans. However they also provide a major entry point for counterfeit material. The key is to know who you are dealing with. Survey and pre-qualify these distributors before you need them. Check out the Independent Distributors of Electronics Association for a listing of independent distributors that adhere to a strict code of ethics.
- Longer product lifecycles – If the average automobile of today has several processor driven electronic elements and provides a ten year warranty, how is this supported when the average component lifecycle is considerably less than this? Either they take a wild guess on how much End of Life (EOL) inventory to sock away, with its attendant costs and risks, have alternative designs, or they go after the obsolete material in non-franchised and broker markets. Ergo risk.
- Economic Pressures – always faster, better, cheaper – encourage risk taking and corner cutting. Who can resist a bargain? Just make sure it really is.
- OEMs lack resources – Quality and source inspectors common in the 1980’s are not available. Many OEMs reduced their quality staffs in the ship-to-stock environment we enjoyed in the US and Europe. However, those relationships and that culture of quality did not export along with the board designs. We are back to the wild west (or east) and cannot rely upon an ingrained quality ethic. Trust yes – but verify always! Do not expect the overworked US customs agents to replace the source inspectors you laid off.
- Evolving environmental regulations - The material restrictions and patchwork exemptions imposed by European Union’s Restriction of Hazardous Substances (RoHS) regulations created a huge supply imbalance as component manufacturers and customers both tried to manage their inventories and production to meet the lead-free deadlines. Confusion reigned supreme as producers and customers alike struggled with part number changes, Bill of Material (BOM) changes, and component and product manufacturing changeovers. All of this conspired to create huge demand uncertainty. Adding to this, exemptions for military, infrastructure and other product categories left those industries scrambling in the non-franchised channel to find increasingly rare tin-lead components. This remains a major entry point and area of high concern.

Next Installments

Next issue, we will look at:

- Origins of counterfeit components – Where do they come from? Why?
- Detection – How to detect counterfeits before you have a customer or field problem?
- Identification – How can you tell if a part is bogus? What assistance can you expect from the component manufacturers? (you might be surprised) Can the US customs agents assist?
- Strategies you can take to protect yourself.

Then in February/March, we will hear from Bill "Skip" Fisher an attorney with Schwabe, Williamson & Wyatt in Seattle. Skip specializes in Chinese Intellectual Property law and has spent several years practicing in China. Skip will give you an overview of Chinese law and the steps you need to take to protect yourselves.

Finally we will discuss what the US and other governments are doing to address this problem, where they can assist, what you can expect from them, and an overview of governmental resources available to you.

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.