

# FORGERIES IN SILICON

Exposing the Deceptions of Component Counterfeiters

## Meeting the **COUNTERFEITING CHALLENGE** A LETTER FROM THE EDITOR



While most people are familiar with the trafficking of DVDs, pharmaceutical drugs, and brand-name purses, few are aware of the tremendous counterfeiting business that has arisen in the electronics industry. According to Fremont, California-based Alliance for Grey Market and Counterfeit Abatement (AGMA) ([www.agmaglobal.org](http://www.agmaglobal.org)), up to 10% of technology products sold worldwide are counterfeit, amounting to on the order of \$100 billion in sales revenues.

Robin Gray, executive vice president of the National Electronics Distributors Association (NEDA), says its members are concerned that "counterfeiting may become the number one industry issue in the coming years." Counterfeiting electronics components has become especially prevalent as contract manufacturing increases because, to put it literally, it is much harder to spot a fake processor than it is a fake purse. Unfortunately, while a fake purse may make you look bad if others recognize it, counterfeit electronics components can result in equipment failure that exposes OEMs to substantial business losses.

Counterfeiting used to be more challenging before the rise of outsourced contract manufacturing. In order to avoid inventory taxes, many OEMs have relinquished even the procurement of components, instead "buying" components from the manufacturer or supplier and owning them for perhaps seconds before selling them to a procurement company or factory taking on this task.

When you outsource production and procurement, quality control is managed by the contract manufacturer. Many of these manufacturers have nothing to lose, except perhaps your next job. And when they are outside the jurisdiction of the United States court system, protecting yourself becomes quite a different problem. Contract enforcement in China and India is difficult, and many companies simply don't have the resources to wage an overseas legal battle. As Gray puts it, "Counterfeiting is going to impact the outsourcing movement that has occurred over the past decade and may well result in OEMs revisiting that philosophy." As counterfeiting becomes more prevalent, and as its associated risks and losses continue to increase, the promised returns of outsourcing become significantly less attractive.

Certainly it is exciting when a contract manufacturer offers up its own sources, especially when you consider the lower BOM. However, if these savings are based on the use of counterfeit components, they may come at a high cost, measured in terms of product returns, increased liability risk, and brand damage.

It is important to note that counterfeiting is not isolated to the electronics industry. This means that legitimate players will not find themselves without a voice. In fact, manufacturers across diverse industries are working together to develop technology, regulations, and awareness of the impact of counterfeiting on consumers.

Part of meeting the counterfeiting challenge is understanding that you may find yourself working with counterfeiters even when you think all of your sources are reliable. The key to protecting yourself, then, is being aware of the different forms counterfeiting can take, understanding the risks involved as pertains to your particular application, and being willing to take the steps available to you to mitigate these risks. ■

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## The **HIGH COST** of COUNTERFEITING

**O**verseas contract manufacturers often have their own sources for components, many of them legitimate. After all, these factories want your business over the long term. They offer price savings to be competitive as well as to attract you in the first place, citing 10-20% savings even from authorized suppliers, which can be attributed to lower overhead costs. But if the savings are too low, such as

processors at half market price, it's time to become suspicious. After all, if it seems too good to be true, the factory needs to be able to explain why that's the case. If may be worth your while to follow the paper trail for the most likely candidates for counterfeiting (i.e., those with the highest return) to confirm that your procurement agent is being honest with you.

When you outsource procurement through contract manufacturing, you increase the possibility of counterfeit components ending up in your product. Be sure to weigh the risks.

While BOM savings make it tempting to ignore the issue of counterfeiting, you need to take the total cost of ownership into account. For

example, if you discover that the product you purchased is counterfeit and will not work for you, you may not be able to return it unless you purchased it from an authorized source which offers full warranty protection. In addition, the product may be seized without compensation pending potential legal ramifications for trafficking in counterfeit goods.

Depending upon your application, liability caused by counter-

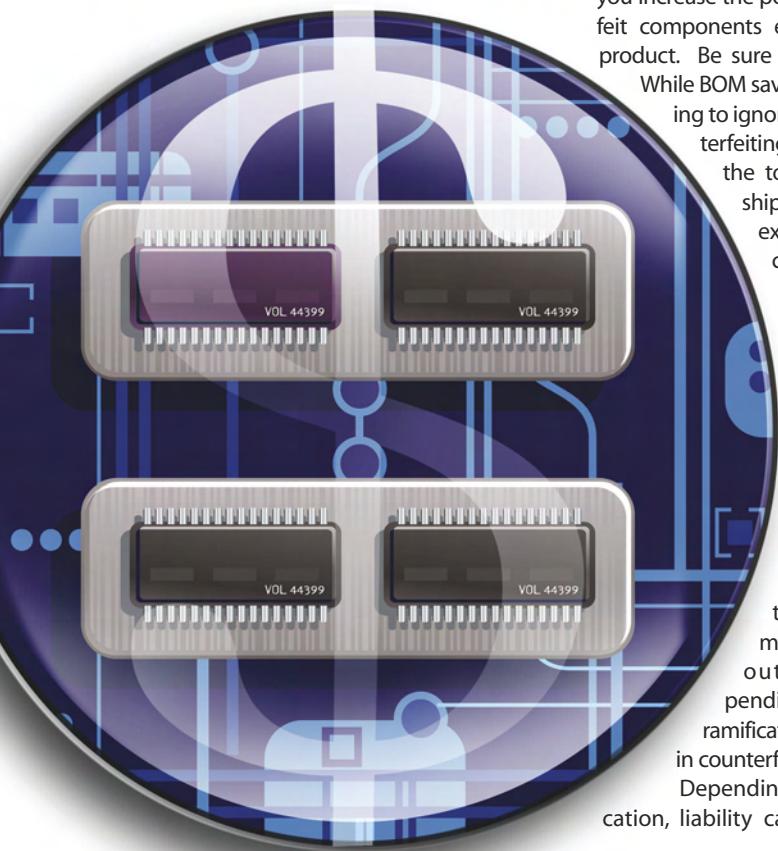
feits can also be a major issue. A failed pacemaker, for example, results in a person's death, so there is no tolerance for counterfeit components there. But even in cases where safety is not an issue, counterfeiting can have tremendous negative impact on returns and/or brand reputation. Consider a resistor causing the failure of a high-ticket item, like a digital TV or media player and forcing a recall. Increasing the number of less-than-robust components in a system increases the chance of failures, and you could see all of your saving evaporate in handling returns. Additionally, each return has the potential of generating negative word-of-mouth, leading to long-term brand erosion.

### ROGUES GALLERY

Counterfeits can take a number of different forms, each of which exposes your company to different risks:

**Outright fakes.** The most commonly recognized type of counterfeiting, fake components are marked as if they were produced by the appropriate manufacturer but in fact have been manufactured by another source (see Figure 1). They bear the trademarks and logos of the original manufacturer and may even perform to spec. The obvious problem with using fakes is that they don't come with the same guarantees that genuine parts do.

**Remarkd.** Remarkd refers to components whose markings have been



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altered in some way. These components may be genuine parts, but their part number or other identifying markings have been modified to match that of a more expensive version of the component. For example, a 1.2 GHz processor may be remarked so as to appear to be a 1.8 GHz part or to have a higher memory capacity than it actually has.

**Non-compliant.** Many OEMs need to maintain compliance with any number of government regulatory bodies, and counterfeiting can jeopardize later certification of products. For example, lead-free components are more expensive to manufacture than those made using lead. However, the two types of components look the same, making it tempting for unscrupulous distributors to sell components as lead-free when in fact they aren't. Use of such components will result in compliance failure, causing substantial delays as well as subject the company to fines, penalties, and even the possibility of having to remove a product from the marketplace.

**Recycled.** The cost of labor in China and India makes it a profitable endeavor to ship obsolete equipment to these countries for disposal and recycling. However, components may be removed and then sold as new or returned parts without any mention being made of their true source. Even if recycled components are genuine, their quality can vary tremendously. Often acid is used to remove components and delicate leads can be damaged when components are ripped off of boards, resulting in only partial functionality or the higher risk of a later failure.

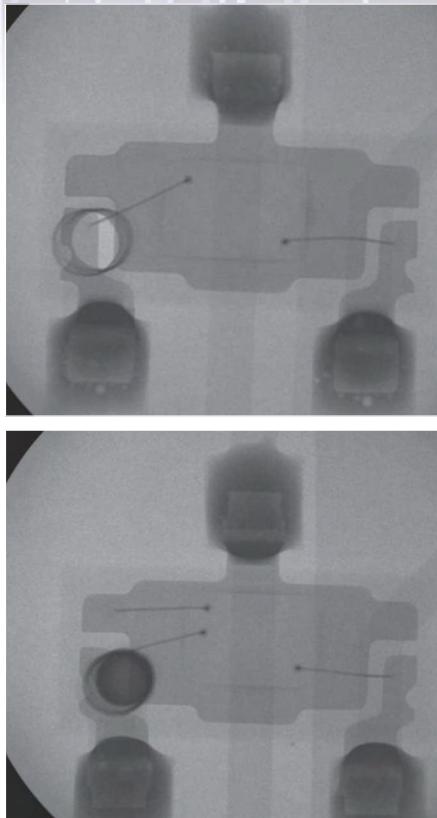


Figure 1: Counterfeit vs. Functioning Component.

Source: Association of Franchised Distributors of Electronic Components, United Kingdom

**Less robust.** While these components may perform to spec in most ways, the lower cost techniques used to manufacture them may reduce, for example, operating temperature, input voltage ranges, and functionality.

## DELAYED FAILURE

One of the extremely debilitating difficulties with counterfeit components is that problems may not arise until equipment has been deployed in the field. Many processors, for example, are spec'd at a variety of clocking speeds. Through a process

called binning, components are tested and those which do not pass the most rigorous tests are rated at a lower clock speed. When components are remarked to a higher clock speed, they may only perform to spec for a short time before failing.

While testing components may not help you determine whether you have genuine components or not, it can verify component reliability (see Figure 2). Testing, however, can be expensive and time consuming, requiring thousands of dollars, depending upon which lab you use and how much testing you have to do. To verify specs, for example, you may decide to test a small sample of the components you receive. The size of the sample and whether you test each shipment of components you receive depends upon the complexity of your system, how many components you have to test overall, and how critical the component is.

Counterfeiters, however, are onto this defense, and may intersperse genuine components in among the counterfeit components in the hopes that you'll select a reliable part for testing and be none the wiser. Additionally, since genuine parts can fail, testing assumes a certain number of failures which can mask the presence of counterfeits. Testing for issues such as whether a component is truly lead-free are even more cost prohibitive. However, if being lead-free is important, your customer may test your completed product when it is too late to change out components.

## UNAVOIDABLE EXPOSURE

Typically, the most reliable source for components is a manufacturer-

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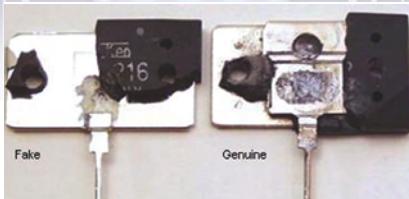


Figure 2: Counterfeit vs. Genuine Sanken Transistor.

Source: Association of Franchised Distributors of Electronic Components, United Kingdom

authorized supplier which provides full warranty protection as well as product support. Sometimes components are in short supply, however, and you may find that you aren't as high on your supplier's priority list as you thought. If you don't want to slow down your assembly line, you may find yourself having to second source components through the grey market (i.e., unauthorized distributors, brokers, and third parties). To limit your risk in such cases, work with a company that you've done business with in the past or that has a solid reputation.

Many suppliers offer guarantees on components that they provide; be sure they have the financial solvency to back them. If you go through a broker offering no guarantees, you may find yourself stuck with a very expensive bargain. While many manufacturers don't take returns on overstocked inventory, some do offer scrap allowances. This is where the manufacturer pays you to scrap the components rather than return or resell them.

Verification is required for scrapping, and you can even outsource scrapping. Verification of scrapping is not simple, and many "scrapped" components may find their way onto the grey market. Scrapped components can present a real problem for OEMs. While these

may be genuine components, they officially don't exist and a manufacturer won't guarantee them.

Even the most careful buyers can find themselves stuck with counterfeit components. For example, it is possible to acquire counterfeit components from authorized suppliers who accept returns. Consider the case where a company has sourced parts from an authorized supplier and grey market source. Some of the grey market components may be returned as well, introducing potential counterfeits into the supply. Certainly, authorized suppliers are expected to guarantee these components, but you may still encounter undesirable returns, liability, and brand damage in the meantime. It's a good idea to be aware of any supplier's return policies as well as the limits of their guarantees.

To mitigate their own liability, suppliers will attempt to verify that they are getting back the actual

components they sold you, using techniques such as requiring original packaging and using date coding to confirm that the components returned are the ones originally shipped. These measures are not foolproof, but they offer a certain level of assurance, and distributors can implement them without adding unreasonable overhead. Ideally, if you acquire a component from multiple sources, it is best to keep them separated or have some way of separating them if you need to so you can return them to their original sources. This is a challenging decision to make, given the already thin margins contract manufacturers operate under since co-mingling components is far more cost effective than managing multiple bins. However, it may make sense to separate out critical, expensive, or at-risk components while co-mingling the rest. ■

## Want to learn more?

- ...What are 5 ways to mitigate the impact of counterfeiting on your business?
- ...What's being done, by companies such as Avnet, Mouser, TTI, and NEDA, to address the issue of counterfeit parts and this growing economic threat?
- ...What does the Deputy Under Secretary of Commerce for Intellectual Property and Deputy Director of the U.S. Patent and Trademark Office have to say about counterfeiting and the effect on IP rights in electronics?

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