

# BOGUS ELECTRONIC PARTS

**Beware of fakes!**

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<http://sound.westhost.com/counterfeit.htm>

The forgery of expensive brand-name products is an easy way to make some money quickly. Lots of products, anything from T-shirts to watches that strongly resemble the original are offered for sale, particularly in Asia, for ridiculously low prices. In recent years, even

electronic components are being copied. From the outside they are indistinguishable from the original, but on the inside they are pure fake. This can have nasty consequences when you solder one in your circuit!



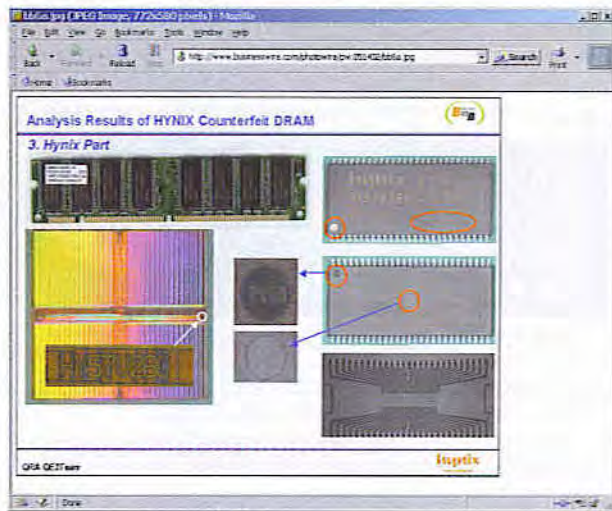
Forgery of brand-name products has been a phenomenon for a long time. Everyone will have heard the holiday stories where you can buy a 'real' Rolex on the beach for just 5 pounds! It is too good to be true... But it is not only with clothing, handbags and watches that shady factories and slippery individuals try to make easy money at the expense of someone else's reputable name. These days, counterfeiters go much further. Everything that can earn money is a potential target for the forgery industry.

A very serious problem in the area of copied parts is fake parts for aircraft, so-called bogus parts. Aircraft parts have to comply with very stringent quality demands and are quite expensive as a consequence. A very attractive market for forgers, who will refurbish old parts or will attach other brand names to cheap parts in order to sell them on for a lot of money. But such fake parts can cause serious problems if they are used in or on an aeroplane. Experts have attributed several accidents in recent years to such 'bogus parts'. The counterfeit parts turn up in all sorts of areas: clothing, watches, bank notes, pharmaceuticals, foods, toys, sunglasses, automotive parts, computer software and electronic components.

This problem is not just something that started in recent years, but has existed at least since the seventies. In 1981 a scandal was uncovered where millions of fake contraceptive pills were distributed, with all the consequences resulting from that. Now you can only smile about these things. Much more serious are fake aorta pumps for open-heart surgery, your life is then really hanging by a thread!

Even the space organisation NASA can't avoid the problem. They started legal proceedings last year against a company for supplying fake connectors. In the electronics area you may remember the issue with fake capacitors on PC motherboards, a few years ago [1]. Even motherboards from reputable brands were fitted with electrolytic capacitors of very poor quality (but with the label of a well known manufacturer) that gave up the ghost after a very short time by exploding or by leaking the corrosive internal fluid all over the PCB. Recently there was a problem with fake batteries for GSM mobile phones, which reportedly had a risk of exploding. This did not only involve batteries from unknown brands, but also fake batteries on which the labelling would indicate that they came from the 'official' manufacturers.

Experts suspect that most of these counterfeit parts originate in Asia, or China in particular. The damage caused by this is estimated to be several billion pounds (just for the electronic components). Because of the strongly growing industry and the increase of chip manufacturing facilities in China this is likely to increase significantly in the future. A good overview of recent counterfeit products can be found on the website for Designchain Associates [2]. There are a number of organisations worldwide that occupy themselves with fighting the 'counterfeit terror',

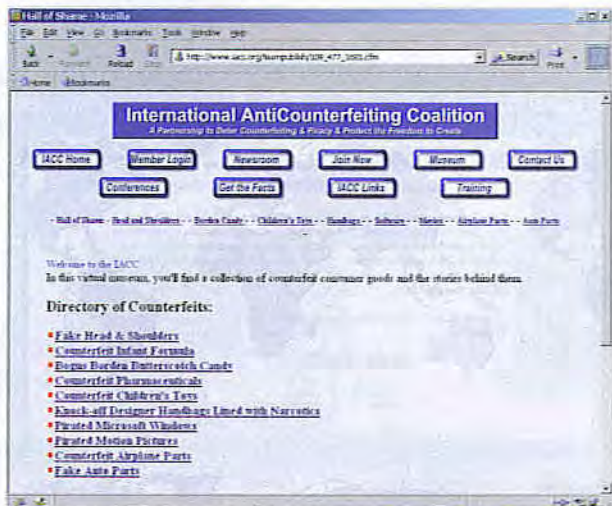


such as the IACC (International AntiCounterfeiting Coalition) [3].

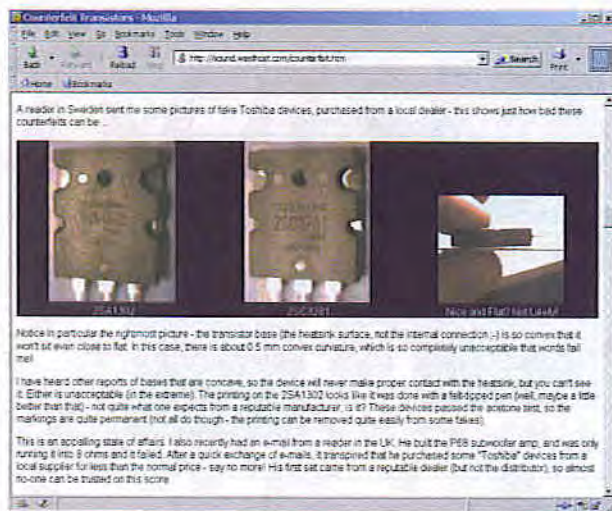
### Serious problem

With electronic components it is not so easy to check if a part meets the specifications of the manufacturer. You could perhaps run a few logic tests on a digital IC, but it is much harder with an analogue component. It is a big problem for manufacturers of equipment to determine in time (that is, before assembly) if all parts originate from a trusted supplier.

Most semiconductor manufacturers have recognised how serious this threat is for them and will warn their customers as much as is possible when counterfeit components have surfaced somewhere. These are often accompanied by detailed descriptions so users can determine the differences between authentic and fake for them.







selves. Various famous brands such as NEC, LG, Hynix, Agilent, Vishay, Altera, Atmel, Hitachi, Motorola and Toshiba have already had to deal with counterfeit copies of their products.

## Quality

The quality of fake parts appears to vary enormously. There are (often passive) components that are so well made that it is very hard to tell that they are not from the original manufacturer. But in most cases the quality is significantly lower. Power transistors are a favourite subject for forgers. Here the packages are carefully copied, so that they look as much as possible as the original, but on the inside is a chip with much poorer characteristics. Usually the chip is also much smaller (i.e., cheaper!) than the original, so that the transistor will fail in a very short time. Several examples are already known from Toshiba and Motorola.

But it can be even worse. In one case, a company bought a batch of ICs (LT1040) that were desperately required, for a considerable amount of money because they were scarce on the semiconductor market. After inspection it was realised that there were no chips inside the packages!

Another phenomenon that has appeared in recent years, is offering microcontrollers with OTP memory. These can be programmed only once (One Time Programmable). Already programmed parts are sold as new and the new owner is then stuck with a batch of useless parts!

## The moral of the story: Be alert!

There is no single way to provide 100% protection from fake parts. Semiconductor manufacturers recommend their customers to obtain their components only from the official distributors or trusted suppliers, but it has already transpired that even these channels can be corrupted with forgeries.

It is, in any case, a good start to buy from known suppliers and to check on the manufacturer's website if there are warnings for specific parts.

A number of companies have put together lists of fake components [9], with short descriptions of visible discrepancies with respect to the original parts. A glance at such a list is also recommended. In addition there is a special website for fake power semiconductors [10]. Everyone who builds or services audio amplifiers should certainly pay a visit there.

And finally the simplest advice: *caveat emptor*, be on your guard for deals that just look too good to be true.

After all, you get nothing for nothing! Readers with experience of fake parts are invited to contact the editor, because we are keen to find out how big this problem is in Europe. We can then also warn our other readers!

(045060-1)



## Internet addresses

- [1] Leaking capacitors muck up motherboards:  
[www.spectrum.ieee.org/WEBONLY/resource/feb03/ncap.html#f1](http://www.spectrum.ieee.org/WEBONLY/resource/feb03/ncap.html#f1)
- [2] Designchain Associates:  
[www.designchainassociates.com/counterfeit.html](http://www.designchainassociates.com/counterfeit.html)
- [3] IACC: [www.iacc.org](http://www.iacc.org)
- [4] Maxim: <http://pdfserv.maxim-ic.com/orpdf/alert1.pdf>
- [4] Kamaka: Counterfeit parts listing:  
[www.kamaka.de/deutsch/service/counterfeit-parts-listing.htm](http://www.kamaka.de/deutsch/service/counterfeit-parts-listing.htm)
- [5] ESP: Counterfeit semiconductors:  
<http://sound.westhost.com/counterfeit.htm>