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Invisible bar codes:

The next generation of product identification?

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Electronic manufacturers have long battled counterfeit goods where billions of dollars are lost each year to fake and substandard products. One solution on the horizon to help manufacturers combat this growing problem — whether in the supply chain or during the products' natural lifetime — is based on a trace amount of an inert silica microparticle material that will enable anyone to verify and authenticate the product for the rest of its useful life, changing the way manufacturers look at product identification.

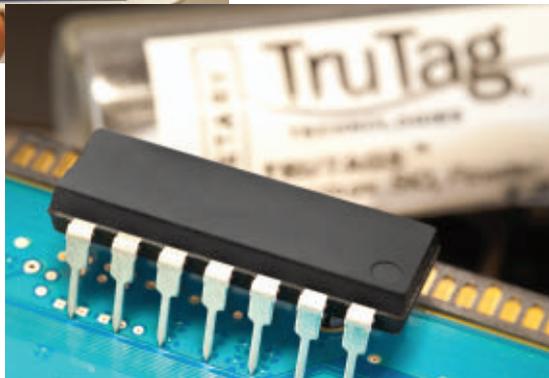
Since standard, printed bar codes were first introduced in 1974 on a pack of Wrigley's chewing gum, the printed bar code has become pervasive on just about every product currently sold in the world. Each day, there are billions of printed bar codes scanned at retail stores across the world. Even today, printed 2D and QR codes litter packaging and advertising as a quick reference to understanding more about the product through a relational database retrieval.

Taking the bar code further, for instance, TruTag Technologies recently introduced an "invisible bar code" technology based on covert micro-



particles which — without the use of a specialized scanning device — are virtually invisible to the naked eye. Since the tag's base material is pure silicon dioxide, it is also edible, safe for the environment,

has an infinite shelf life, and can withstand even the harshest of environmental conditions including temperatures up to 1000°C. Once applied and integrated into the product itself, invisible bar cards are impossible to remove, and even if the product is destroyed, tags can be forensically recovered afterwards.



Fake products compromising entire industries

Although covert micro-bar codes can find use in virtually any product, electronic components are especially suitable for this technology because they not only encounter high heat and harsh environments, but are subject to counterfeiting and compromise. Invisible barcode solutions are already protecting patented gearing assemblies in printing and toner cartridges worldwide.

When examining the industries most affected by counterfeits, more than \$300 billion in fake products enter the supply chain each year in the industrial/electronic and pharmaceutical segments alone. That is a staggering figure. Most of the products affected have believable packaging that, to any consumer, looks like the real thing — but packaging has become an unreliable measure for product authenticity. In many cases, even the brand companies themselves can't tell the difference.

Counterfeiters look for high value, high volume products and can often set up highly sophisticated manufacturing and printing operations to produce fake goods and their related packaging. Often, counterfeit goods make their way to the consumer market resulting in substandard product performance, errors in operation of components, health issues, and overall erosion of value by the consumer for the brands that manufacturers have invested millions and sometimes billions building up over several years.

The future of the invisible bar code

Invisible bar codes are produced using some of the most advanced computerized nano-porous silica production equipment in the world. Measured batches of silica powder are uniquely coded with a serialized spectral pattern that can later be decoded to determine the product model, dosage, product number, and even the factory of manufacture. Changing the spectral code is done in a quick setting prior to each production run. Many engineered taggants (most of which are not edible or inert) take months to engineer just one signature to be detected later. Some manufacturing processes, however, allow this code change to be done variably and 'on the fly.'

Will 2014 be the year of the invisible barcode in the electronics market? High-profile brands are testing the microparticle materials in component production facilities. At some point in the near future, it is feasible that every high value component could carry an invisible bar code. Time will tell, but the future looks bright.

As the branded world works hard to verify real products, counterfeiters work even harder to put fake goods into the system and make ill-gotten profits. But for electronics manufacturers and other key markets, this emerging technology is one to keep an eye on for the near future. **ECN**