SYMETRICS INDUSTRIES
1615 W. NASA BOULEVARD
MELBOURNE, FL 32901
www.symetrics.com

Suspect / Counterfeit Electronic Components and Risk Mitigation

By: Rick Stanton

Definition of a Counterfeit Electronic Part

A counterfeit electronic part is one whose identity has been deliberately misrepresented by the supplier.

Identity would be defined as;

- **Manufacturer**
- **Manufacturer's Logo**
- **Cage Code**
- **Part Number**
- **Date Code**
- **Lot code**
- **Reliability Level**
- **Testing**
- **Inspection**
- **Documentation**
- **Country of Origin**

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Suspect-Counterfeit Electronic Components and Their Detection

The IMPACT of Fake Components Entering a Supply Chain

Fake Parts are being discovered in Military Aircraft Maintenance Depots. The number of counterfeit aircraft parts being fastened into U.S. military weapon systems after supply depots discovered their infiltration is staggering and unknown. The risk mitigation is driving up maintenance costs by the millions and millions of dollars annually.

The inventory of counterfeit parts is so high that some aircraft contain extensive numbers of parts ranging from microprocessors to fasteners. Counterfeit components are leading a 5 Percent to 15 percent annual decrease in weapon system reliability according to the pentagon.

Some of the Industry and Government Initiatives, ongoing information researched availability.

January 2006: Government Electronics and Information Technology Association (GEIA) G-12 Solid State Devices Committee establishes a task group to develop guidance to DoD and the aerospace/defense industry to mitigate the risk of receiving counterfeit parts.
June 2006: Semiconductor Industry Association (SIA) establishes the Anti-Counterfeiting Task Force (ACTF) consisting of semiconductor manufacturing company members involved in the investigation of counterfeiting and coordination with law enforcement.
September 2006: ODUSD (IP) includes the counterfeit component issue in DoD Trusted Integrated Circuit Strategy.
October 2006: Independent Distributors of Electronic Association (IDEA) issues…IDEA-STD-1010, "Acceptability of Electronic Components Distributed in the Open Market"…the first industry standard to discuss supplier evaluation criteria to apply to Independent Distributors and to include inspection criteria intended to intercept potential counterfeit parts.
January 2007: Government Industry Data Exchange Program (GIDEP) issues new guidance to members on reporting counterfeit cases.
March 2007: Subject matter experts brief the NASA quality assurance community on the counterfeit parts problem (NASA Quality Leadership Forum, 28-29 March 2007).

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Electronic components being scraped off a circuit board assemblies using molten solder. In China thousands of men, women and children make a living from processing electronic waste form North America and Japan every day.

Using a wok type coal burning furnace, electronic scrap assemblies are heated, until solder becomes molten, components are pulled/scraped off then cleaned in a nearby river for re-claim-re-sell processing in China.

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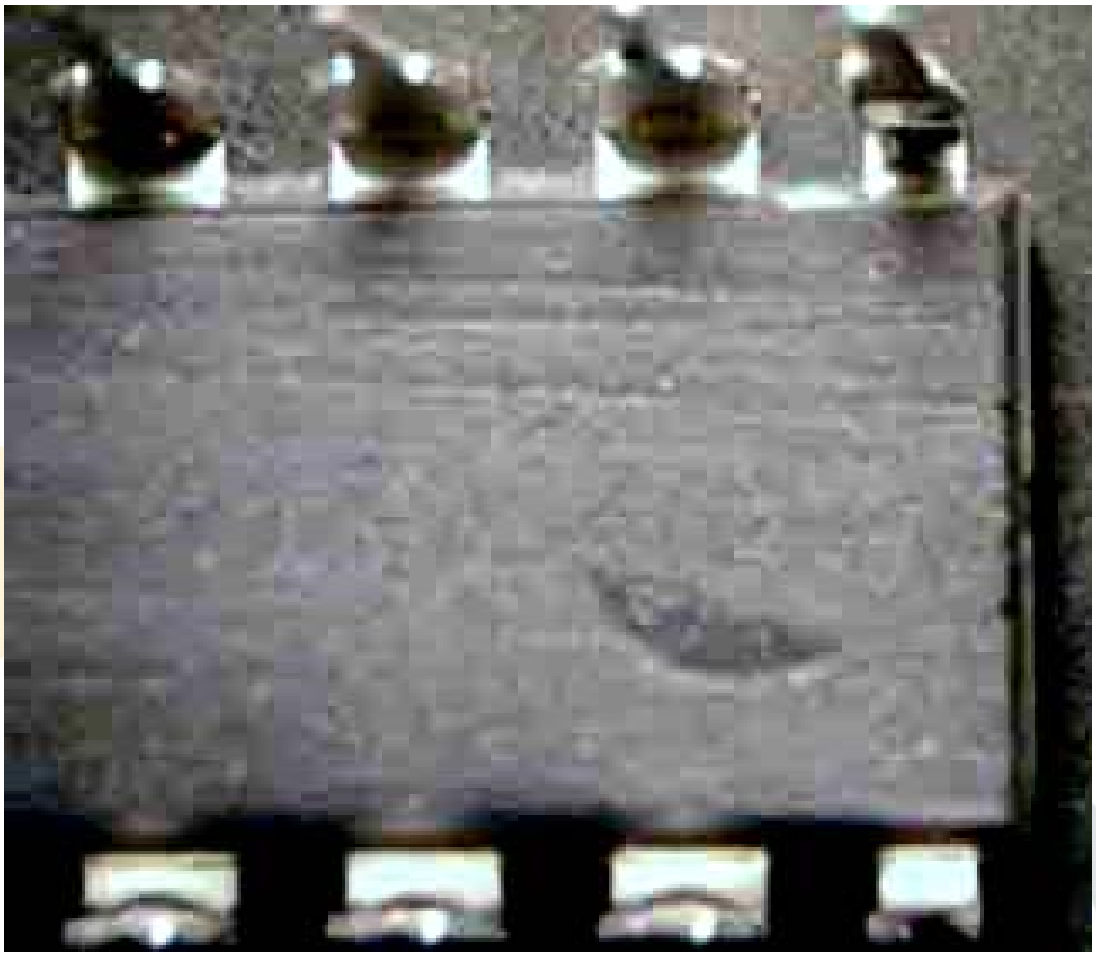

PART HAS BEEN SANDED, PARTIAL MARKING IS THAT OF COUNTRY OF ORIGIN.

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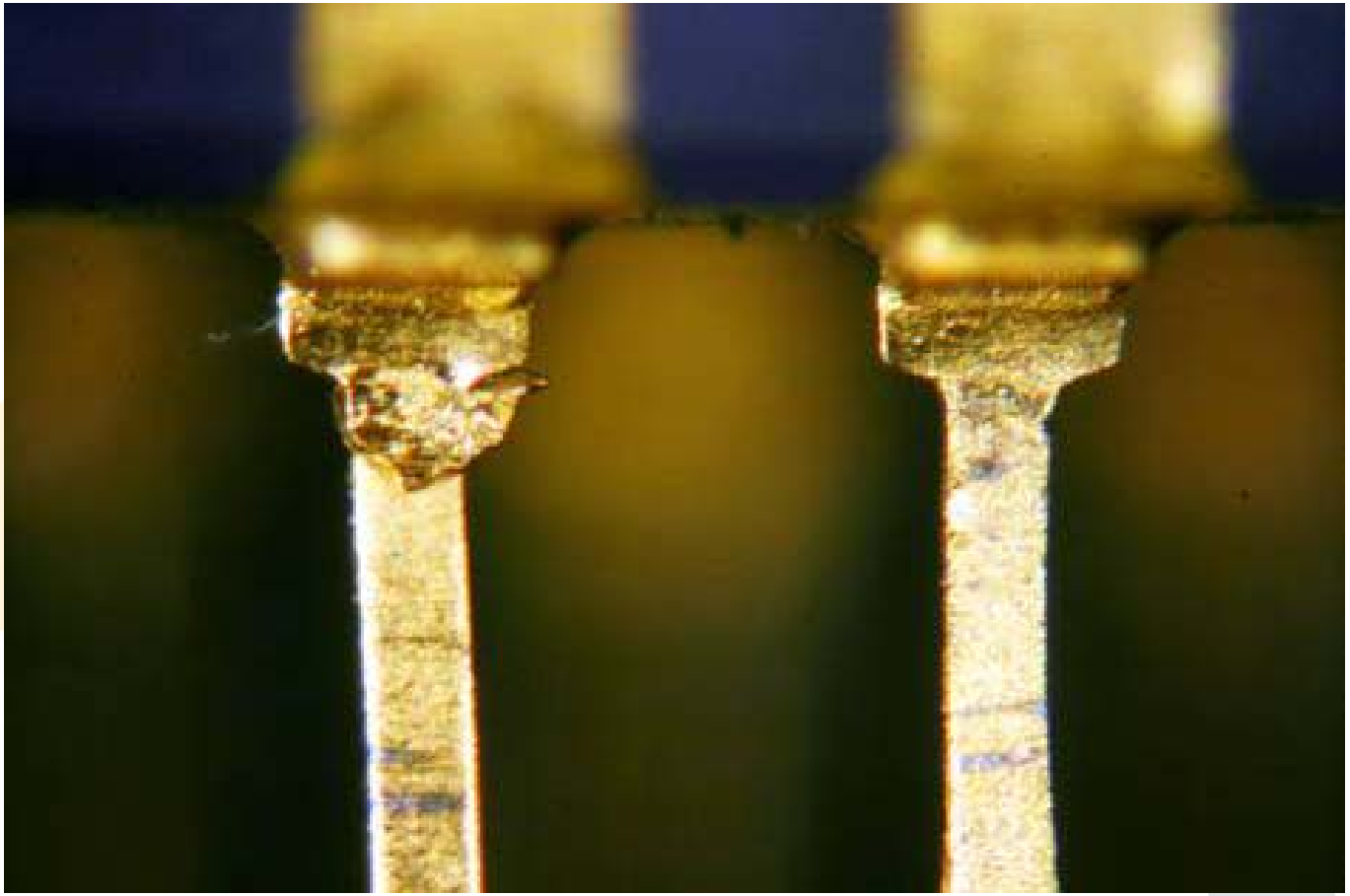

GOLD LEADS RE-ATTACHED/RESOLDERED – GOLD PLATED

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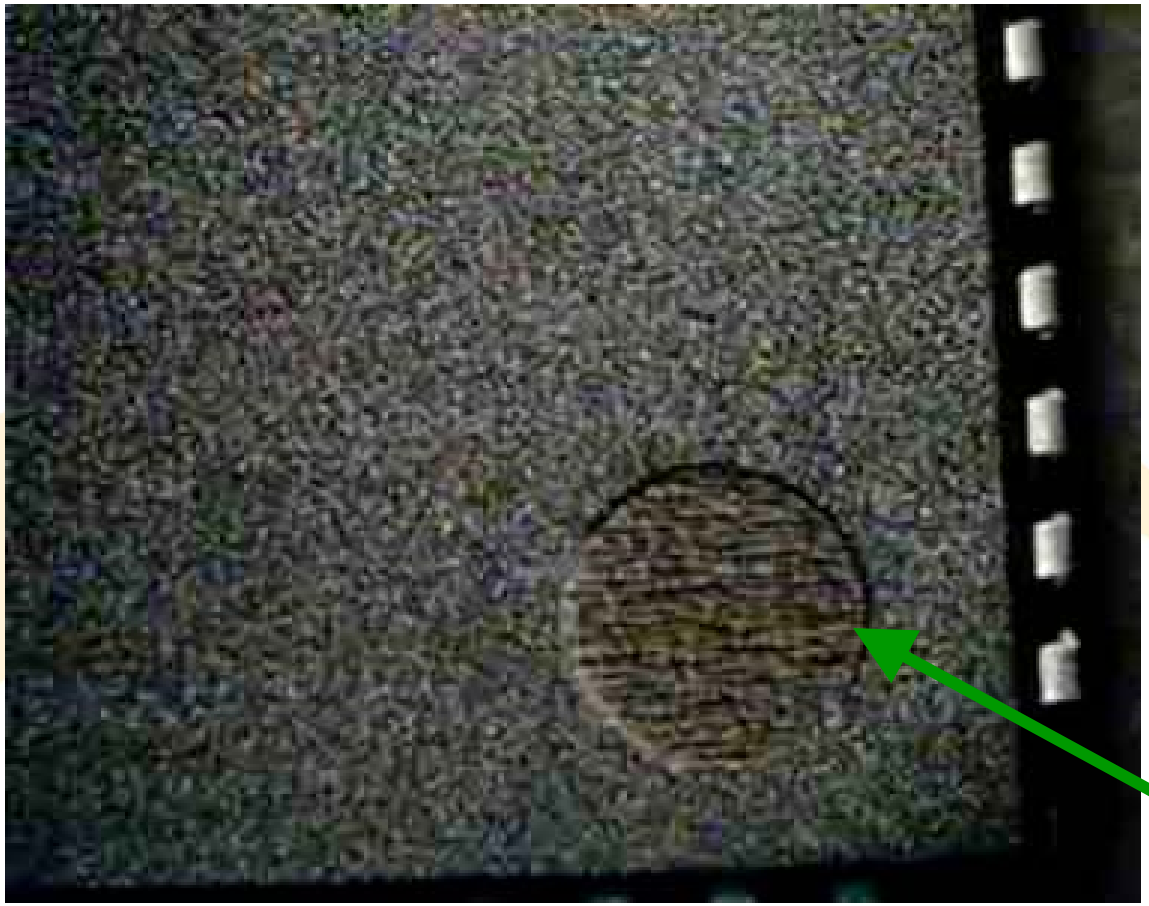

A component that lacks the proper indents/mold pin. This counterfeiter attempted to create one through various etching techniques. This can easily be detected if the indent/mold pin surface shows lines or other signs of an etching process. The base of a mold pin/indent is normally smooth.

Mold Pin/ Indent has etch marks, sanded part.

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OEMs are particularly careful with their standards during manufacturing. Paint in the indent or mold indent cavity is not the intent therefore making this a suspect counterfeit.

This part is from the exact same lot code as the adjacent part. Differences in the indents are evident. One is much larger and the other is non existent. This validates a suspect counterfeit

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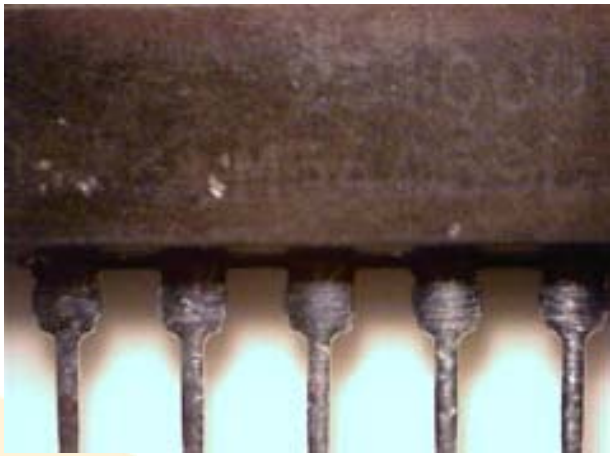
Part failed marking permanency test per, MIL-STD-883, using 3 parts mineral spirits and one part alcohol this easily removed the markings.



Part failed marking permanency test per MIL-STD-883. Maxim parts after 2002 are not paint marked, they are etch marked. If you receive Maxim parts painted with a date code newer than 2002 you have a suspect counterfeit component.

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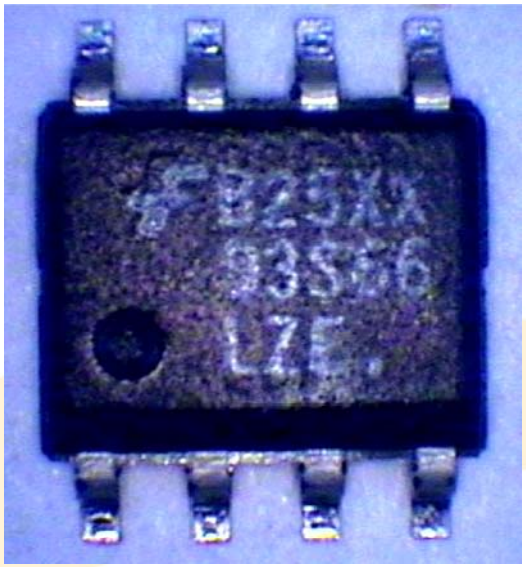
Blacktopping



Part has been blacktopped and painted/printed over with a new part number. Etching is still evident.

Part has been blacktopped, Polarity Mold Cavity/Indent is not zeroed or aligned properly. Note abnormal shine on the top of component, another suspect indication.

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COUNTERFEIT Component-Module

OEM had cut leads and scrapped part due to major revision change. Counterfeiter re-attached leads on this $800. module. The detection was easy, the counterfeiter attached wrong diameter leads, all six (6) of them.

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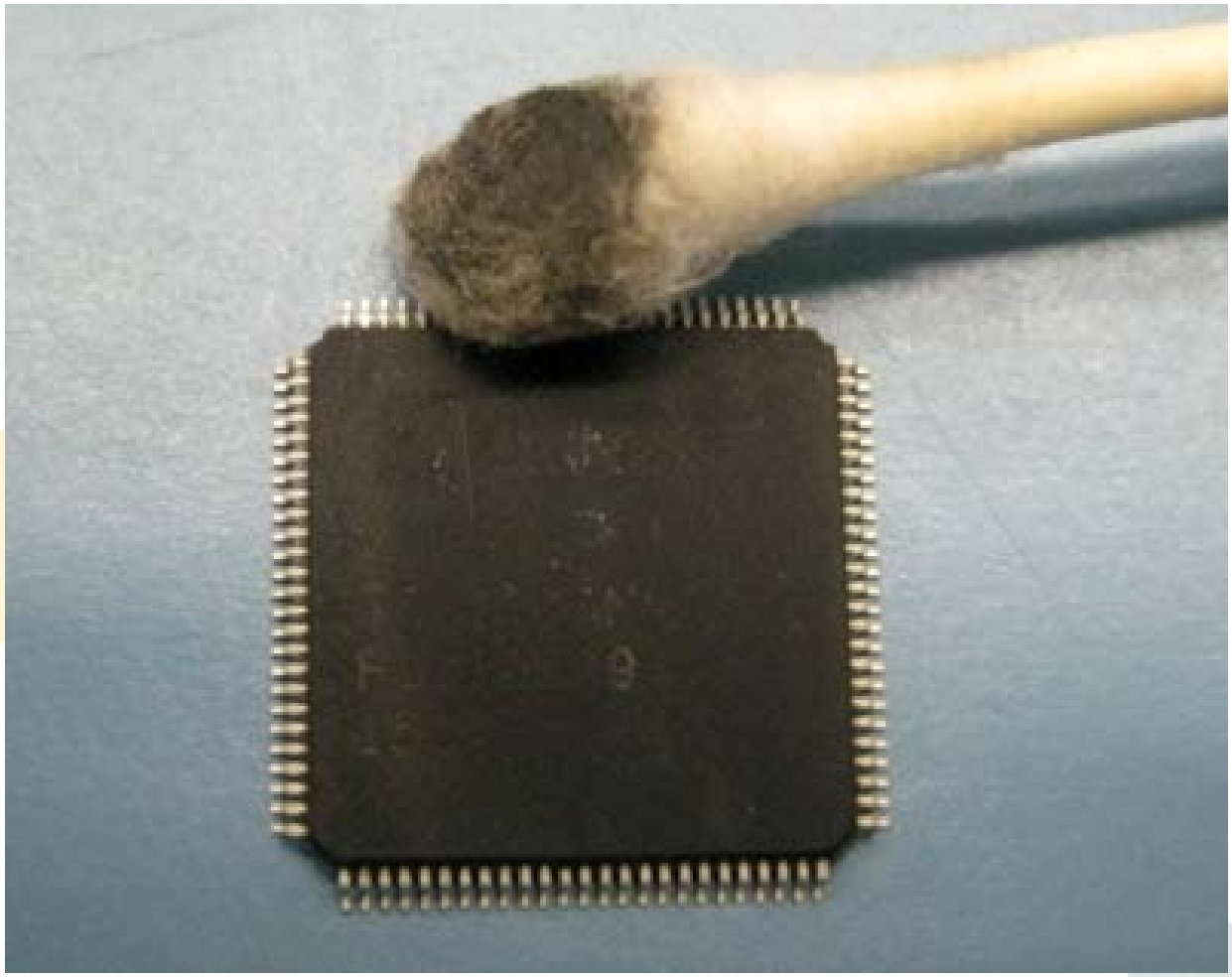

FAILED PART MARKING PERMANENCY TEST

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NOPE…IT'S NOT LASAGNA, IT'S A THREE DIMENSIONAL TOPOGRAPHICAL MAPPING SHOWING MAJOR DIFFERENCES IN TEXTURE AFTER A MARKING PERMANENCY TEST / CHEMICAL WASH, NOTE THE DIFFERENCES IN DEPTH OF THE DIGITS.

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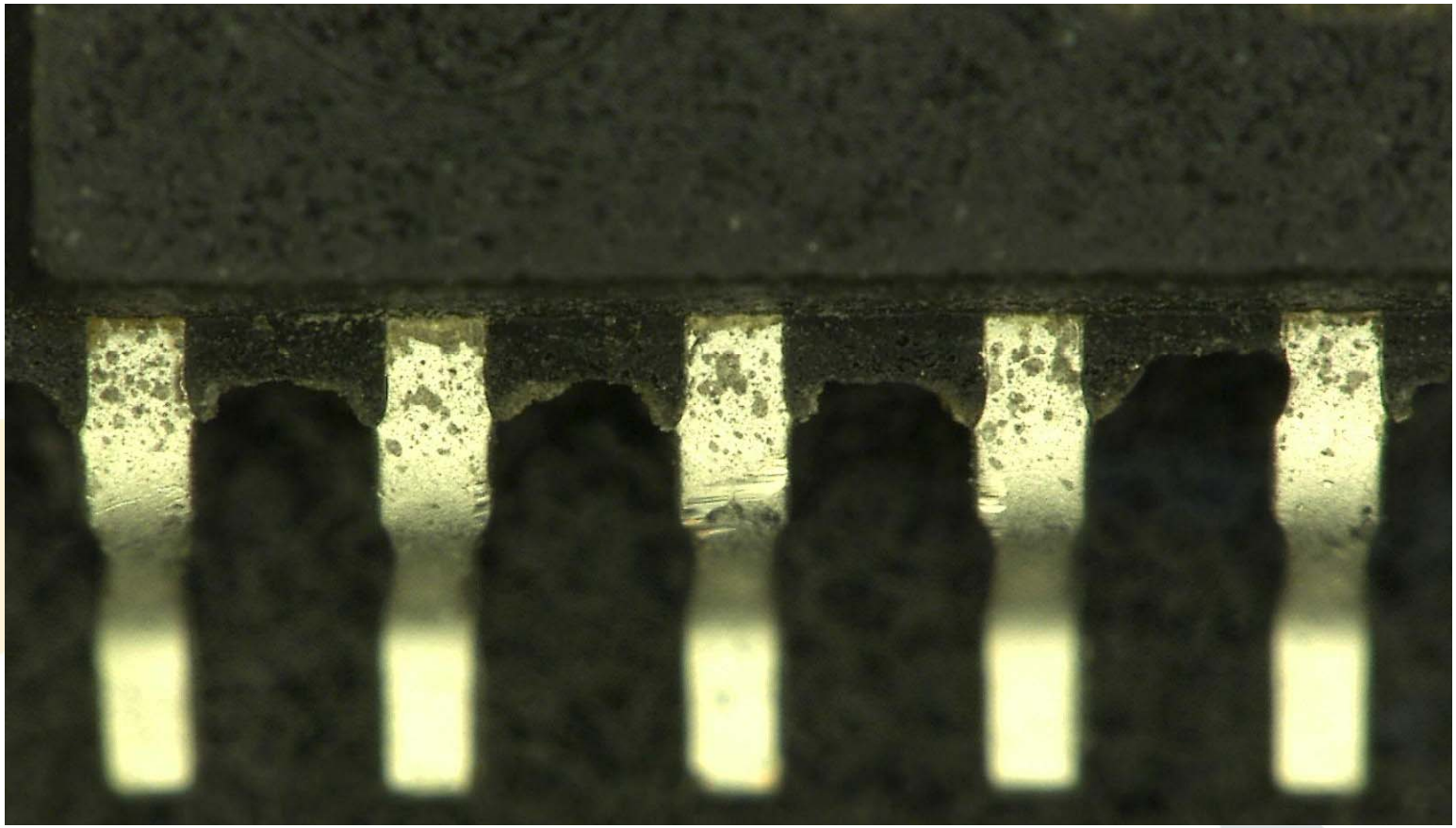

LEADS ARE CONTAMINATED WITH PAINT OVERSPRAY, AN EFFECT FROM CARELESS BLACKTOPPING

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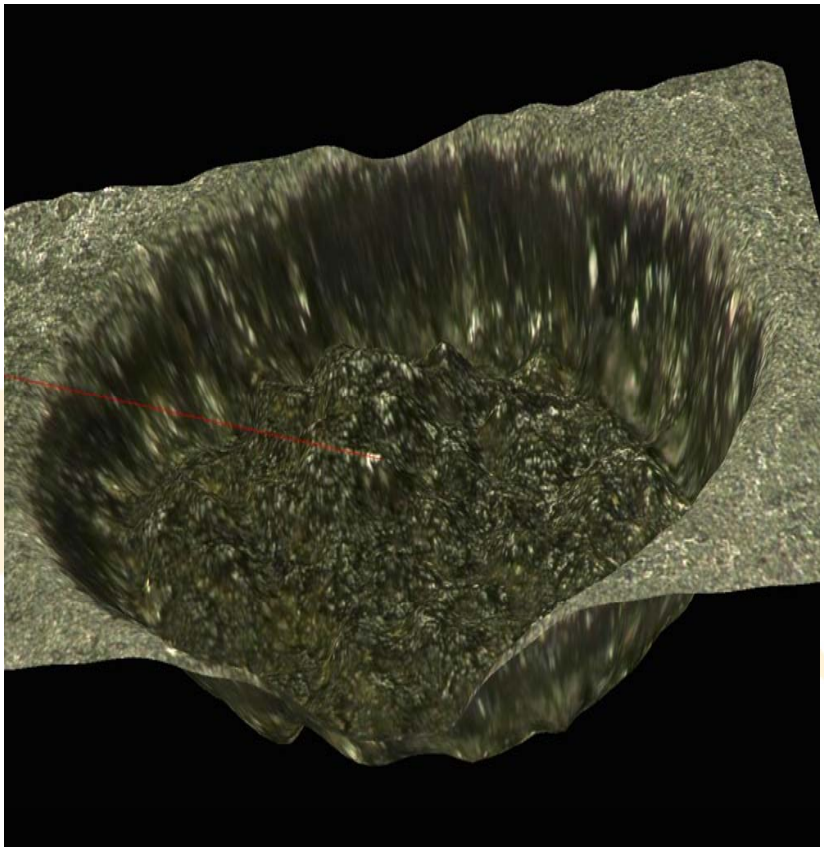

THREE DIMENSIONAL INSPECTION OF PIN 1 MOLD INDENT SHOWS EVIDENCE OF SANDING AROUND EDGE, NOTE BLACKTOPPING FILL PILED IN THE CENTER OF INDENT, THIS AREA SHOULD BE SMOOTH.

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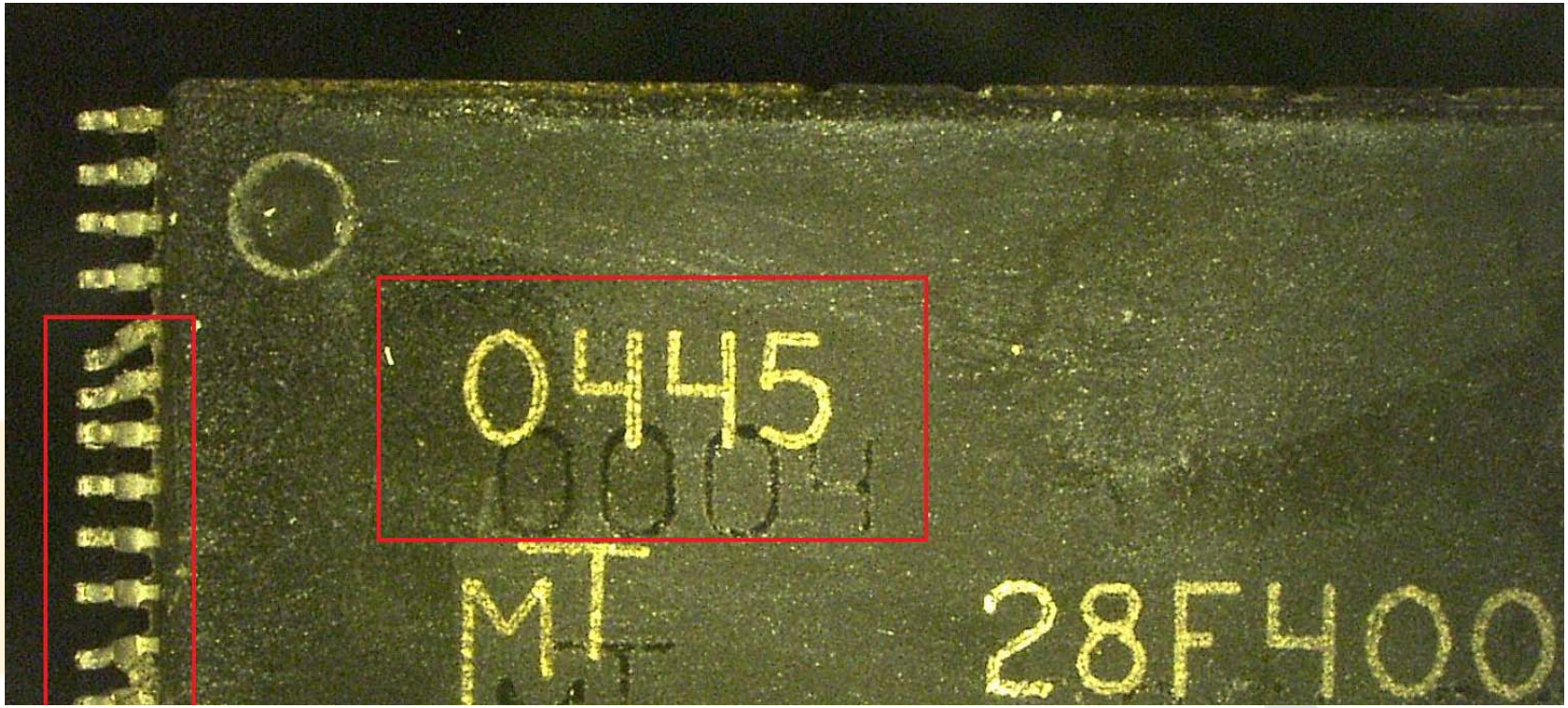

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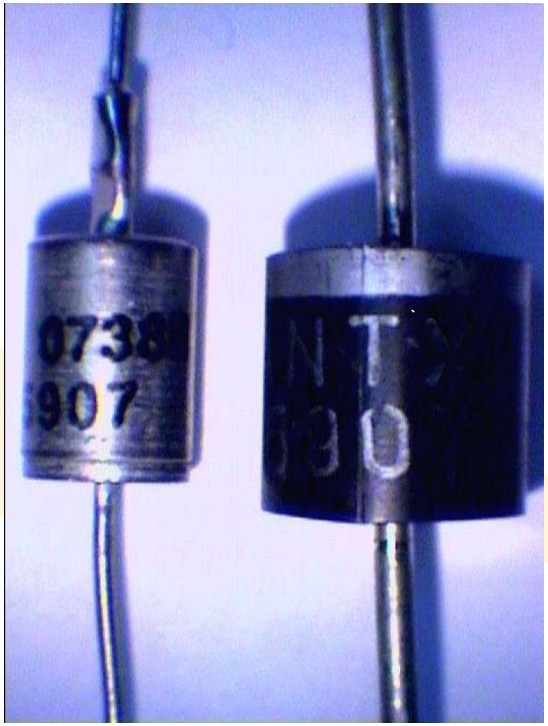
SUSPECT / COUNTERFEIT / FRAUD



MAJOR FRAUD, COUNTERFEITERS MARKED THIS COMMERCIAL PART (right) AS A MILITARY JNTX PART (Left) , THE DATASHEET CLEARLY STATES MILITARY GRADE SHALL BE ENCLOSED IN A METAL CASE, THE COMMERCIAL PART IS ENCLOSED IN A MOLDED PLASTIC, WRONG DIMENSIONS ARE EVIDENT.

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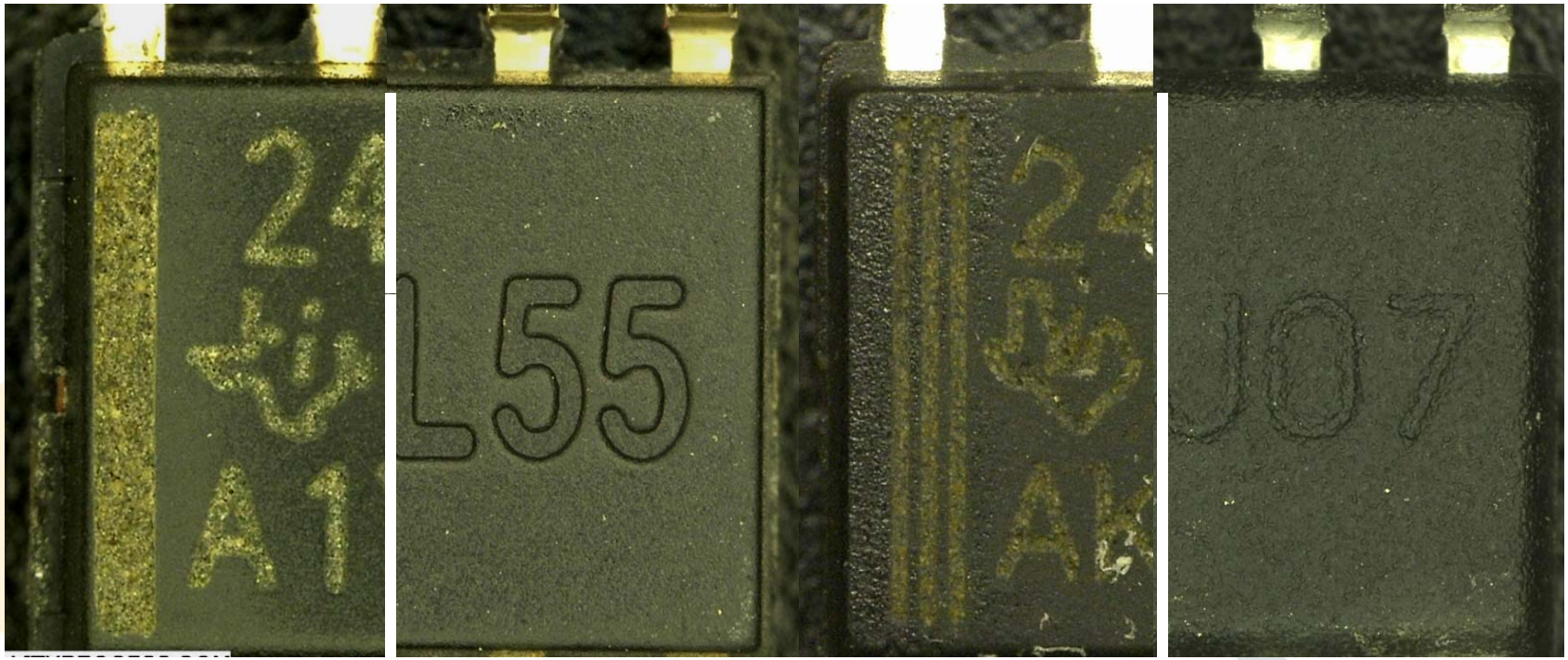
TOP SIDE | BOTTOM SIDE | TOP SIDE | BOTTOM SIDE



GOOD PART-NOT REMARKED AUTHENTIC OEM LOGO, BOTTOM SIDE SHOWS DIGITS AND LETTERS CLEAN AND WELL DEFINED.

SUSPECT/COUNTERFEIT PART OEM LOGO IS DISTORTED, CHARACTERS ON BOTTOM OF PART SHOW ROUGH EDGES,

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Authentic Part

Counterfeit Part

The authentic part on the left is part marked with the acronym BeO. This symbol represents Beryllium Oxide, letting the consumer know the composition of the internal die contains this disease causing material, an Osha requirement . The manufacturer is required to Part Mark/Stamp this symbol on the outside of the part. The part on the right is void of it, resulting in a counterfeit part.

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Symetrics Industries, LLC and I hope you have enjoyed this slide program, and will be of use to you going forward. It is just a small sample of what is happening in the world regarding military electronic components, the infrastructure of our military supply chains are becoming compromised daily, we all need to take part in the combat against this fraudulent 10 Billion dollar a year counterfeit electronic component business. No longer should companies feel it can not happen to them, or ignore the subject because of it's sensitivity, this is a mission critical matter. No Military EMS business is immune!

Symetrics is a small DOD Contract Manufacturer, in Melbourne, FL who takes this topic extremely serious, and due diligence is always practiced. Symetrics Industries, LLC. is a company that is a model example of best practices when addressing this topic.

Thank you,

Rick Stanton
Supply Quality Engineer
Symetrics Industries LLC
1615 W. Nasa Blvd.
Melbourne, FL 32901-2613
rstanton@symetrics.com
321-254-1500-ext. 203

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