## A Rush To Judgment Is No Judgment at All





#### **The Broad View**

- Although there's still a long way to go, counterfeit electronic component risk mitigation needs are starting to be met in the supply chain
- Bad actors are being identified and eliminated
- SOS of counterfeits are being identified and cut off
- Overall awareness is growing



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#### **Top Independent Distributor Action**

- Brought awareness to the supply chain regarding the risks
- Identified counterfeiting techniques
- Innovated new detection methods for more sophisticated counterfeiting techniques
- Working with government and industry to create new standards that protect the supply chain, military personnel and public



#### **Impact of NDAA 2012**

- Placed financial responsibility for counterfeit components on those delivering equipment.
- Obligated contractors report counterfeit electronics and suspect counterfeit electronics detected using the GIDEP system.





# **BUT...**

- Not all organizations have the processes, staff, expertise and education in place to correctly disposition parts when it comes to evaluation of electronic components.
- Not all reporting systems vet thoroughly incidents of supposed suspect or counterfeit parts.



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### A Prime Example of Rushing to Judgment

- A prime contractor ordered 25 pcs. PN: JM38510/05202BCA on 8/30/2011, for field use.
- The PO did not state any traceability requirement
- A test & inspection plan was agreed upon, and dictated on the PO. All the requirements of the PO were met and the parts accepted upon delivery 10/25/11.







#### **The Plan Included**

- Visual IDEA 1010B
- Marking Permanency Mil Std. 883
- Acetone IDEA 1010B
- Scrape test
- Dimensional measurements
- Decap & die inspection
- Solderability Testing
- XRF
- 100% 3 Temp Group A Functional Test







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#### Visual Inspection

#### Typical Top Surface



#### **Typical Bottom Surface**

# 8914

#### Typical Lead Condition



Comments: No anomalies detected to indicate parts are remarked or refurbished



Evidence of Sanding? NO Evidence of Blacktop? NO Pin 1 Indicator Blacktopped? NO Evidence of Re-marking? NO

2000 AST

#### Lead Condition:

Major corrosion on leads? NO Solder on leads? NO Evidence of Refurbishment? NO Leads are Re-Tinned? NO

Marking Permanency YES QTY: 3 Acetone for Blacktop YES QTY: 3 Physical Measurements YES QTY: 25



Visual

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Page

#### **Part Packaging and Tube Labels**



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# Scrape & Solvents

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Scrape Test For Blacktop

Applicable to Device Type? YES Blacktop Detected? NO

Pre-Scrape 3 Samples



Post-Scrape 3 Samples



Pre-Scrape 1 Sample



Post-Scrape 1 Sample





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Crestwood Technology Group 1 Odell Plaza Ste 139 Yonkers, NY 10701

#### XRF ANALYSIS

#### XL3t-61947

Reading No Mode Time Duration Units Sigma Value Sequence Alloy1 Result Flags SAMPLE HEAT LOT

BATCH MISC

NOTE

Electronics Metals 2012-05-08 15:03 20.00 % Final No Match : \*5.87 3mm

JM38510 05202BCA 8849

2368



atin: SnPb.





**XRF** 

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### Group A Functional





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### Where it Gets Interesting: Draft GIDEP 12/19/11

CTG has not disclosed from where they got these parts.

The part package finish is inconsistent between the top and bottom surfaces (see Enclosure 2 - Figures 1, 2, and 3 from REPORT NUMBER 091511-0449P).

OEM (TI/National Rep from block 11) could not confirm legitimacy of these parts (could not find record on lot build, top/bottom finish inconsistency, could not identify bottom marking, believes top part marking was reworked).

Part marking format is not consistent with another M38510/05202BCA National part had in inventory which closely matches the National part marking data sheet (see Enclosure 3 – National Semiconductor Part Marking Datasheet and Enclosure 4 – Part Marking Comparison).



11/17/2011





### **A Faulty Assumption**

Sent: Monday, November 07, 2011 6:13 PM Subject: Verify Part Marking and Dual Date Codes - URGENT

Can you please provide information as to what part we are talking about? M38510/05202BCA Can you provide a C of C associated with the part in question? Will send in separate attachment Can you provide the two markings in detail? Is in detail in the attached file Who did you procure the parts from? Crestwood Technology

Subject: Verify Part Marking and Dual Date Codes – URGENT

We procured some obsolete parts from a supplier and there is a question on if two date codes are normal part marking for NSC. I have reviewed MIL-PRF-38535, paragraph 3.6.6 and it specifies the date code should only be on top of the part. As you can see in the attached these parts also have a date code of 8914 on the bottom, as well. The parts were electrically tested and seemed to have pass the required tests, but we are concerned with the parts having two date codes.

Please validate if this was the process associated with NSC processes back in 1988, which is the date code on top of the parts. These parts are still being held in Receiving Inspection until I can determine if this was a proper NSC marking from 1988.





## **TI's Feedback – 11/8/11**

1. The C of C is not the original NSC Certificate. Doesn't buy you anything.

2. I could not find records on the lot build.

3. The Mark does match historical record on top mark instruction of the time period.

4. Top mark rework is allowed by both Mil Prf 38510 historically and presently Mil Prf 38535.

- 5. I have no clue what the underside mark "8914" is about.
- 6. This appears to be a part assembled in our Tucson plant which was closed in 1991 as indicated by the "Y"

first digit in the date code (line 3)

- 7. I would be curious to see what is under the top mark rework.
- 8. This product went last time buy in 1998 GIDEP# AH6-D098-01D

I do not know where this product has been all these years and I do not know who did the top mark rework.

I cannot legitimize this product.





# **Photos TI's Feedback Was Based on:** 3: 12! Y8D8849A Crestwood Technology Group The Distributor That Buyers Trust\*"

### BAD Information Led to Draft GIDEP 11/8/11

Sent: Tuesday, November 08, 2011 1:03 PM

Looking at the top surface it appears to have an ink have a body coating. Compare the appearance of the

bottom ceramic to the top surface ceramic. The top surface is a different color almost black.

The top mark has been reworked (body coated and remarked)

Sent: Tuesday, November 08, 2011 9:59 AM

Thank you for the information, but we have a question concerning items 4 and 7. Are you implying these parts have reworked?

Thanks, Product Definition Management





### **A Closer Look**

- "CTG has not disclosed where they bought the parts from." There was no communication or request of SOS.
- "The part package finish is inconsistent between the top and bottom surfaces."

Should an analysis like that be made solely from a photograph?

- "OEM (TI/NSC rep) could not confirm legitimacy of these parts (could not find record on lot build)," NOT surprising
- "could not identify bottom markings," The TI rep wasn't given the NSC tube label?
- "Believes top marking was reworked "- Can a responsible, professional evaluation be made from a photo?





#### **Apples & Oranges**

- "Part marking format is not consistent with another M38510/05202BCA National Part \_\_\_\_ has in inventory." (inventory part was an 0029 date code)
- It seems they skipped right over TI's initial feedback "The mark does match historical record on top mark instruction of the time period." Item #3 from their 11/8/11 email
- What research was done to verify whether the marking format is correct or if there were any revisions?







## **CTG Action**

 CTG had the parts sent out to 2 independent labs as well as CTI for non-bias evaluation of the part's markings and package finish evaluation





### ASI Results

Analysis #: 1112-4240-S	Device: <u>M38510/05202BCA</u>	Date Code: 8849A		Date Complete: 12/21/201	
Checklist for Analysis as/per Customer Request					
ſASK	SPECIFICATION	S/N(s) or QUANTITY	STATUS	INSPECTOR	DATE
1: Contract Review	AP-001		COMPLETE	AOviedo	12-21-2011
2: Receiving Inspection	AP-080		COMPLETE	AOviedo	12-21-2011
3: External Visual Inspection	IDEA-STD-1010	Qty In: 3 Qty Out: 3	PASS	RSpillers	12-21-2011
4: Resistance to Solvents	Honeywell ED1550 Resistance to Solvents	Qty In: 3 Qty Out: 3	PASS	RSpillers	12-21-2011
i: Data Review	AW-004 Internal ASI database checked and no previous work has been completed on PN:05202BCA all indications are that these are genuine National Semiconductor devices consistent with all device markings seen in this report.		PASS	AOviedo	12-21-201
6: X-Radiography	Honeywell ED1550 X-Ray, 0.15	Qty In: 3 Qty Out: 3	PASS	RSpillers	12-21-2011
7: Final Report	Generation		PASS	AOviedo	12-21-201

Detailed Specification: Crestwood Technology Group inspection counterfeit integrity criteria for Ceramic DIP PN: M38510/05202BCA

**General Comments:** 



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IAIAIAIAIAIAIAIAI

12 12 14

10 10

Figure 3: S/N: SN1-3

Caption:

Optical overview of the top side of these devices as they were received from the customer and removed from their packaging. No anomalies were observed.

Date Complete: 12/21/2011

#### Figure 4:

S/N: SN1-3 Caption:

aption:

Optical overview of the bottom side of these devices as they were received from the customer and removed from their packaging. No anomalies were observed.





#### BLACK-TOP TEST (Dynasolve Test)

**BBBB** 

27014

REPORT :122211-0209P

P/N: JM38510/05202BCA MFR.:NSC DATE CODE:8849 REPORT :122211-0209

05202BCA P.O.: 2011-M001-001727 849

202BCA

M38510

FIGURE: 1 SAMPLE: 1 MAG.: N/A SUBJECT: TOP VIEW OF DEVICE AS RECEIVED.

VIEW: PRE- DYNASOLVE ANALYSIS



NIMET

FIGURE: 2 SAMPLE: 1 MAG.: N/A SUBJECT: TOP VIEW OF DEVICE.

VIEW: POST- DYNASOLVE ANALYSIS IN ACCORDANCE WITH NJMET PROCESS NO:PP7750

NO ANOMALIES OBSERVED

LOT DISPOSITION: PASS





NJ Met

Report

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### **CTI Conclusion**

Examination of the top surface of the ceramic packages of this lot of parts shows it to be the native surface without any coatings.

This was proven with:

(1) A microscope reflectance test, showing the top ceramic surface to be matte finish on a microscopic scale. A coated surface would have been highly reflective.

(2) A streak test.

Uncoated ceramic surfaces, such as the brown ceramic lid on these devices, are slightly abrasive. Examination of these parts showed metallic streaks to be present from normal process handling which has occurred during manufacture, before these parts were received by CTG. These streaks are caused when the metal leads, being much softer that the ceramic, are abraded by the ceramic, leaving a trail of fine metal particles embedded in the ceramic surface, thus the marks... To verify this, the leads of a second device were used to gently mark an "X" on the right-side of one part from the lot concerned, as shown in the attached photograph. Should the top of the part have been coated, it would not have been possible to create the "X" by abrasion.

The streak marks on the top surfaces of these parts are strictly cosmetic, and not damaging to the devices in any way; electrical, chemical or mechanical.

Thus, no evidence of external damage, defects or reworking was found with these parts.





### **CTG Research to Verify Lot & Markings**



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#### **Second Lot with Identical Part Markings**





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#### **Third Lot with Government Trace Supplied by Arrow**



#### **Fourth Lot**

#### All Research And Formal Response Given To Customer On 1/12/12



## 3 Months Later: Customer Starts To Do Homework – 1/16/12

Sent: Monday, January 16, 2012 1:33 PM

Subject: CTG Reply to Draft Problem Advisory C6-P-12-01 (National M38510/05202BCA Lot Date Code 8849) - First Attachment

You have been helping with investigating concerns we have on the National M38510/05202BCA that we purchased from CTG. When you have a few minutes, would you review the attached files I will be sending you that we received from CTG on the subject Problem Advisory. They have a number of good points now in their reply. However, I still have a few concerns; the part marking format missing compliance indicator and test site information, marking on the bottom of parts, the marking on the parts being crooked, and that you were not able to find any record of this lot build.





#### **Photo Comparison**



#### **TI <u>Still</u> Insists Part Looks Blacktopped**





### **Tl's Changing Tune**

#### Sent: Monday, January 16, 2012 3:26 PM

- 1. the part marking format missing compliance indicator (compliance indecator was not a JM38510 requirement) This is a 38535 requirement
- 2. test site information (test site is Tucson Az as indecated by the Y in the date code)
- 3. marking on the bottom of parts (Back mark was utilized until the mid 1990's) {The back mark is the date code}
- 4. the marking on the parts being crooked (This is not uncommon by design of singulated unit marking machines)
- 5. not able to find any record of this lot build (only because of the age of the product)

The part with the H0B0029B date code is compliant to the 38535 with compliance indicator "QS".

It is also compliant to the mark layout change of 1994

The Y8D8849A is ink mark Tucson facility. The green ink dot usually indicates some rescreen activity The H0B0029B is laser mark in our Singapore facility.

#### This example appears to have had ink mark rework. Looks like this is is a black top ink over the ceramic surface.





## Customer Continues Making the Effort – 1/18/12

Sent: Wednesday, January 18, 2012 9:26 AM

**ADDITIONAL RESEARCH** 

National Semiconductor Logo Change - Data was found that indicated that National Semiconductor changed their logo marking in the early 1990s. That explains why there was a difference in the logos between the late 80s parts and the mid 90s and on parts.

Part Marking Format Verification - was able to find existing circuit card assemblies manufactured in the late 80s and early 90s that showed part marking format consistent with the CTG parts.





### **End Result: GIDEP Canceled**

Sent: Wednesday, January 18, 2012 9:26 AM

Below is the recent correspondence received from the TI/National representative that we have been dealing with on this issue. Based on this correspondence, the additional research results (below) and the testing/documentation that CTG provided in their 11 January 2012 reply to the draft GIDEP Problem Advisory C6-P-12-01, Component Engineering Group plans to cancel the release of the subject draft GIDEP Problem Advisory.

Additionally, I suggest that the National M38510/05202BCA microcircuits from CTG (lot date code 8849) that are currently being held in quarantine at \_\_\_ be released through the remainder of the receiving inspection processing steps so they can be used.

Please inform CTG of the cancellation of the GIDEP Problem Advisory and thank them for their assistance.





#### **Lessons Learned**

- SLOW DOWN!
- Communicate with your supplier FIRST!! NOT LAST
- There is NO ROOM for ASSUPMTIONS!
- Do the homework!
- Photos can be misleading, any conclusions to be drawn regarding part quality or authenticity from a visual inspection should only be done with parts in hand.







#### **Systemic Risks**

- Parts will be dispositioned and or reported as counterfeit or suspect counterfeit incorrectly.
- Assumptions and guess work being reported as clear cut science without vetting. All reporting services must be accountable for vetting accusations.
- A rush to judgment regarding parts and the supplier
- Irreversible damage to the IDs reputation, the OEM ID relationship is one founded in TRUST.



#### Finally... You CANNOT take everything OCMs say as fact, you must vet their feedback as well. M & As have left records and data regarding old lots difficult to obtain. Really?? As time passes knowledge is lost • You must identify bias as well as That says • red! Blue unfounded accusation, and eliminate it from the verification process. **Objective conclusion drawn from** data and facts is the goal.



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