Counterfeit Electronic Parts

NEPP Electronics Technology Workshop
June 22-24, 2010

Brian Hughitt, NASA Headquarters
Office of Safety and Mission Assurance
NASA Satellites Get 'Counterfeit' Parts; Taxpayers Pay
Agency Chief Says Suppliers Sometimes Skip Safety Tests

By NED POTTER
March 7, 2009

Maybe it was something he didn’t mean to say. Or maybe NASA has a problem.

At a House subcommittee hearing on NASA’s cost overruns, the agency’s acting administrator, Christopher Scolese, was
Counterfeit Electronic Parts

1. Definitions and Examples
2. Scope, Magnitude, and Trend
3. Sources
4. Product and Mission Impact
5. Solutions
6. Resources
7. The Way Forward
8. Help from Above
What are Counterfeit Parts?

Electronics Manufacturing Industry

• Substitutes or unauthorized copies
• A part in which the materials used or its performance has changed without notice
• A substandard component misrepresented by the supplier

Electronics Distributor Industry

• Items that are produced or distributed in violation of intellectual property rights, copyrights, or trademark laws
• Items that are deliberately altered in such a way as to misrepresent the actual quality of the item with intent to defraud or deceive the purchaser.
  – Any information omitted or means taken to mislead the purchaser to believe that such items are authentic or lawful

US Department of Energy / SAE AS5553

• A copy or substitute without legal right or authority to do so, or one whose material, performance, or characteristics are knowingly misrepresented

EIA/G-12 Committee

• An item whose identity or pedigree has been deliberately altered or misrepresented by its supplier
Counterfeit Electronic Parts

- Parts re-topped &/or remarked to disguise parts differing from those offered by the original part manufacturer
- Defective parts scrapped by the original part manufacture
- Previously used parts salvaged from scrapped assemblies
- Devices which have been refurbished, but represented as new product.

**Re-topping**

**Remarking**

Device lead condition shows parts were used

Marking indicates an Op Amp from ADI...

... but contains die for a Voltage Reference from PMI

Part number indicates a CLCC package, but this package is a CDP...

Evidence of prior marking for a part with inferior performance ...

... accompanied by bogus test report
Counterfeit Part Examples

New versus Refurbished leads

Dual Markings

National Semiconductor does not use “:” in part numbers

Blacktop peeling away. Sand marks evident

Acetone Swipe

Missing Serial Number
Counterfeit Part Examples

Package Marking
Is Phillips

Die Marking
Is Intel
Counterfeit Part Examples

X-Ray showing die pattern of known good part

X-Ray showing die pattern of counterfeit
Which Device is Counterfeit?

Counterfeit

Known Good Part
Blacktopping and Remarking

**REMARKED.** Used in medical product. Markings sanded off. Blacktopped. Allegro logo illegally tampered. Blacktop peeled away with normal process handling, taking markings with it. SEM photo at right shows detail of differences in texture - coating (top) and sanded surface (bottom). Striations in the sanded surface were made by abrasive grains (450x).
Innovative / Hi-Tech Re-Marking

We of course run a lab and we could see that the surface had been etched, how???. This unfortunately is not the first time we have seen this type of damage.

**IT IS A FORM OF PLASMA ETCH!!!**

We do not have any detail of how, use your imagination, at any rate these parts have had the marking etched away, this way it saves them from sanding, then blacktopping, and finally remarking. They simply etch and remark.

Yes these are the same surfaces
Innovative / Hi-Tech Re-Marking

Exemplar Top Surface

Suspect Top Surface

Pure Acetone / 7 Day Soak - No Affect

New Blacktop Material Can Only Be Removed With an X-acto Knife
Bogus Test Reports

25 companies, 19% of those employing testing contractors, had problems with U.S.-based firms concerning faulty or forged testing.

– The parts were cleared by the testing house, but were later found to be counterfeit by the customer.

“This is an area that deserves further analysis.”
Counterfeiting Trend

GIDEP

Alert Quantity

Calender Year

2001 2002 2003 2004 2005 2006 2007 2008 2009 2010

0 3 5 8 14 16 31 13 25 35
Counterfeiting Trend and Magnitude

Total Counterfeit Incidents:

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of Incidents</th>
</tr>
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<tbody>
<tr>
<td>2005</td>
<td>3,868</td>
</tr>
<tr>
<td>2006</td>
<td>8,139</td>
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<tr>
<td>2007</td>
<td>8,600</td>
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<tr>
<td>2008 (est.)</td>
<td>9,356</td>
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U.S. Customs Notifications

<table>
<thead>
<tr>
<th>Year</th>
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<tbody>
<tr>
<td>2005</td>
<td>1</td>
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<td>2006</td>
<td>29</td>
</tr>
<tr>
<td>2007</td>
<td>169</td>
</tr>
<tr>
<td>2008</td>
<td>604</td>
</tr>
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</table>
In June 2006, the Semiconductor Industry Association (SIA) established the Anti-Counterfeiting Task Force (ACTF) consisting of semiconductor manufacturing company members involved in the investigation of counterfeiting and coordination with law enforcement.

Semiconductor Manufacturer disclosures ...
- Company A: Over 100 part numbers have been counterfeited in last 3 years.
- Company B: 19 cases reported involving 97,000 units.
- Company C: Since June 2006, there have been 4 seizures of counterfeits of our products by U.S. Customs; units seized ranged from 6000 to 60,000.
- Company D: “We estimate that 2-3 percent of purchases of our brand are counterfeit”
- Company E: A broker website indicated 40,000 or our devices available, but our company had only made less than 200 units of that device with the specified date code. If all 40K were available it would result in a $34 million loss.
Sources of Counterfeiting

“Most broker organizations are very small and do not have established quality control procedures in place. We have more than 10,000 brokers in our database. Of those only 200 have more than 10 employees and quality control procedures for their staff. That leaves us 9,800 to fall victim to. Many brokers are working out of their home. All someone needs is a phone, fax and e-mail address and they are in business.”

American Electronic Resource, Inc.
Sources of Counterfeiting

Broker with Cage Code in California

Address is a private home

Is this Broker selling genuine product?
Is he maintaining the product under proper conditions?
Do you Really Know this Supplier???

Multiple Alias's

Bogus Qualifications

NASA
Sources of Counterfeiting

More than a Backyard Industry!

- Millions of Scrap Boards
- Component Removal
- Sorted by size, similarity and lead count
- Re-processed
Workers extract plastics from discarded electronics in Guiyu, a few hours' drive northeast of Hong Kong. The city has 5,500 family workshops handling e-waste.
© 2006 The Seattle Times Company

Laborer de-soldering circuit boards over a coal-fired grill. Rock in the box is where boards are hit to remove solder. Pliers are used to pluck off chips which go into various buckets. The boards are then tossed into a pile for open burning. © BAN
Components on river bank drying

Slide courtesy of

0402 Case Size Capacitors ($0.005 ea from Fran. Disty)
http://www.businessweek.com/magazine/content/08_41/b4103034193886.htm?chan=top+news_top+news+index+-+temp_top+story

http://www.businessweek.com/technology/special_reports/20100302ceo_guide_to_counterfeit_tech.htm
**Product Impact**

**GIDEP Counterfeit Case Summaries**

<table>
<thead>
<tr>
<th>Case Number</th>
<th>Description</th>
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<tbody>
<tr>
<td>EE-A-06-01</td>
<td>Test failures at a defense contractor were found to be microcircuits containing many different chips</td>
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<tr>
<td>EE-A-06-03</td>
<td>Supplier of military hardware found suspect counterfeit microcircuits having dual part number markings</td>
</tr>
<tr>
<td>EE-A-06-04</td>
<td>Microcircuits that failed product testing were found to have chips from another source</td>
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<tr>
<td>M9-A-07-01</td>
<td>During manufacturing of a military product, suspect counterfeit transistors were functional failures</td>
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<tr>
<td>6E-P-07-01</td>
<td>Memory device supplier confirmed parts marked with their name did not contain their chips</td>
</tr>
<tr>
<td>UY7-P-07-01</td>
<td>Microcircuits, that failed electrical testing, were found to contain chips from another manufacturer</td>
</tr>
<tr>
<td>NB4-P-07-01</td>
<td>Suspect counterfeit microcircuits, from an unauthorized distributor, found during testing at an aerospace supplier</td>
</tr>
<tr>
<td>J5-A-07-01</td>
<td>Independent distributor supplied suspect counterfeit parts (not available from original supplier) to defense plant</td>
</tr>
<tr>
<td>J5-A-07-02</td>
<td>Microcircuits, supplied by an independent distributor, were suspect counterfeit (device markings not authentic)</td>
</tr>
<tr>
<td>A2W-A-07-01</td>
<td>Suspect counterfeit transistors failed electrical tests; found to have many different chips</td>
</tr>
<tr>
<td>J5-A-07-06</td>
<td>Programmable logic devices found to be suspect counterfeit (lot code was after manufacturer discontinued parts)</td>
</tr>
<tr>
<td>J5-A-07-09</td>
<td>Microcircuits found to be suspect counterfeit as the lot date code was after the manufacturer stopped production</td>
</tr>
<tr>
<td>UE-A-07-01</td>
<td>Suspect counterfeit microcircuits failed electrical tests; contained chips from another manufacturer</td>
</tr>
<tr>
<td>AAN-U-08-052</td>
<td>A government entity reported counterfeit circuit breakers in nuclear power plants</td>
</tr>
<tr>
<td>CE9-P-08-02</td>
<td>Military parts manufacturer reported U. S. authorities have recently intercepted many counterfeit parts shipments</td>
</tr>
<tr>
<td>UL-P-08-01</td>
<td>Distributor unable to provide test reports on suspect counterfeit microcircuits that failed during factory testing</td>
</tr>
<tr>
<td>D4-A-09-01</td>
<td>Military hardware manufacturer found suspect counterfeit programmable devices showed part remarking</td>
</tr>
</tbody>
</table>
How Companies Are Uncovering Counterfeits

- Returned as Defective: 1261
- Discovered Defective Parts/Poor Performance: 1116
- Markings, Appearance, Condition of Parts: 929
- Notification by OCM: 835
- Testing: 776
- Customer Suspected Part Was Counterfeit: 693
- Notification by US Customs: 604
- Self-Initiated Investigations: 341
- Notification by OEM: 180
- Returned as Wrong Merchandise: 50
- Absence of Original Documentation: 15
- Returned as Excess Inventory: 8
- Notification by GIDEP: 6
- Notification by DLA: 6
- Notification by Other US Government Agencies: 3
- Notification by Non-US Government Agency: 3
- Other: 2
- Unauthorized Overrun by Contract Manufacturers: 0
Product Impact
What “failed parts” mean to NASA

Schedule slippage
Cost Increase
Reduced performance
Poor reliability
Product failure
  • Personnel Safety
  • Mission Success
Decline in mission readiness
Resources

Work Groups/Committees/Associations

- US Chamber of Commerce Coalition Against Counterfeiting and Piracy (CACP)
- Semiconductor Industry Association (SIA) Anticounterfeiting Task Force (ACTF)
- SAE G-19 Counterfeit Electronic Parts Technical Committee
- Center for Advanced Lifecycle Engineering (CALCE)
- Surface Mount Technology Association (SMTA)
- TechAmerica G-12 Counterfeit Task Group
- Aerospace Industries Association (AIA) Counterfeit Parts Integrated Process Team
- International Microelectronics and Packaging Society (IMAPS)
- Components Technology Institute (CTI)
- NASA Quality Leadership Forum (QLF)
- Independent Distributors of Electronics Association (IDEA)
- ERAI
- SEMI
- DoD trusted Defense Systems Workshop
- DoD Trusted Foundry Program
- Defense Logistics Agency (DLA) Counterfeit Parts Integrated Process Team (IPT)
COUNTERFEIT PARTS PRESENTATIONS

- **Fraud Detection Awareness** – Roger Moerman, Technical Services Associates & Thomas Williams, Department of Energy
- **Legal Issues Surrounding Fraud** – Monica Aquino-Thieman, NASA Office of General Counsel
- **Suspected Unapproved Parts Program** – Beverly Sharkey, Federal Aviation Administration (FAA)
- **EEE Parts Quality Concerns – Counterfeiting, Lead-Free Solder, Tin Whiskers** – Phil Zueleta, JPL
- **ERAI Role in Prevention of Counterfeit Parts** – Mark Snider, ERAI
- **Counterfeit Parts Standard** – Phil Zueleta, JPL
- **Using a Supplier for Protection of Counterfeit Parts** – Robb Hammond, AERI
- **Counterfeit Components Avoidance** – Leon Hamiter, CTI
- **Counterfeit Electrical, Electronic, and Electromechanical (EEE) Parts Panel** – Michael Sampson, Goddard Space Flight Center (GSFC);
  John O’Boyle, QP Semiconductor, Inc.;
  Henry Livingston, BAE SYSTEMS;
  David Meshel, Aerospace Corporation;
  Charlie Whitmeyer, Orbital Sciences Corporation;
  Debra Eggeman, Independent Distributors of Electronics Association (IDEA)
Training Opportunities

IDEA-ICE-3000
Professional Inspector’s Certification Exam

Available to Employees of:
- IDEA Member Companies
- OEMs
- CM/EMS

The IDEA Professional Inspector’s Certification Exam is designed to demonstrate inspection competency for the benefit of all stakeholders. Successful examination provides the employee and the employer with a heightened degree of confidence in the basic working knowledge and resource-ability of the inspector.

When personnel who conduct visual inspection of product from the excess market have been certified, the company’s stakeholders are provided objective evidence of inspection competency and therefore reason for increased confidence that customer satisfaction will be achieved and further offer increased marketability of products and services.

Upon successfully passing the IDEA Professional Inspector’s Exam (IDEA-ICE-3000) the candidate will be awarded a certificate stating that the individual has passed the exam and their name will be maintained on record at IDEA as having met this achievement.
Counterfeit Parts Avoidance Training

Counterfeit Parts in the News

- In 2009, Acting Administrator Christopher Scolese disclosed to Congress that counterfeit parts are a significant cause of budget over-runs for NASA.
  - Estimated cost to NASA - unknown
- In late 2007, the US Patent and Trademark Office estimated that counterfeiting and piracy drain about $250 billion out of the US economy each year along with 750,000 jobs.
- Counterfeit EEE parts comprise about 10% of the parts in the supply chain.
- In December 2006, four executives at Western Titanium, Inc. were indicted for fraud.

Class Date and Time

- The QLF class is scheduled for September 29 2009, 1:00 – 5:00 p.m.
- Enrollment requests should be submitted to Diana Shellman.

Class Details

Class Objectives

- To learn about counterfeit parts and why they are a significant risk.
- To learn inspection methods to be used for the detection and avoidance of counterfeit parts.
- To mitigate the risks of acquiring counterfeit parts and to eliminate the risk of introducing counterfeit parts into flight hardware.
- To apply inspection techniques during an individual hands-on examination of counterfeit EEE parts, with microscopes.

4-hour class is for anyone who works with EEE parts and includes the following:

- Terms and Definitions Overview
- Counterfeit Parts in the Industry
- JPL’s Counterfeit Parts Mitigation Strategy
- Best Industry Practices
- Case Studies of Counterfeit Investigations
- Hands-On Training and Written Exam

Please contact Katherine Whittington
Katherine.Whittington@nasa.gov
or 818.354.8749
for information about the class content or related questions.
Welcome to the world’s premier AUTHORIZED source directory. Our authorized distributors provide guaranteed assurance that products are fully traceable and certified by the manufacturer. In today’s electronics marketplace, selecting an authorized distributor is more important than ever before. With accelerating inventories of questionable quality, including counterfeit and sub-standard product sold through surplus dealers, customers need a directory of reputable and authorized distributors.

This directory has been created through the endorsement and efforts of the SIA Ant-Counterfeit Task Force. Through a network of corporate CEOs and working committees, SIA shapes public policy on issues critical to the industry and provides a spectrum of services to aid members in growing their businesses.

For your printed copy of the ERSD click here!
Welcome to the DMSMS & Standardization Conference 2009

The theme for this year’s conference is: New Directions and Challenges. The focus areas are: Strategic Partnerships, Visibility into Total Ownership Costs, Opportunities for Partnering, and Standardization Enablers.

A Message from the Chairman
As this year’s Chairman, I would like to invite you to participate in the DMSMS and Standardization 2009 Conference. With a new administration taking the helm of the federal government, there will be change. The theme of this year’s conference - “New Directions and Challenges” - will focus on what changes to expect and how these changes will affect the DMSMS and standardization communities.

The target audiences for this conference are DMSMS and standardization professionals who wish to hone their skills and be a part of shaping the future of DoD acquisition and sustainment policies. In addition to a full day of tutorials taught by some of the top experts in government and industry and hands-on experience with some of the latest automated information tools, this conference gives attendees access to the new incoming DoD acquisition and sustainment leadership and a chance to hear first-hand about their goals, objectives, and direction.

After the incoming DoD leadership has set the stage for our new directions and challenges, there will be workshops and discussion panels to allow audience participation and input into future DMSMS and standardization policies, procedures, guidance, and automated tools. We have also invited an outstanding array of experts to share their experiences through technical presentations on how they have successfully addressed the challenges of obsolescence, countering, standardization, parts management, lead-free, and many other related technical issues.

Diminishing Manufacturing Sources and Material Shortages (DMSMS) Guidebook

Office of the Under Secretary of Defense Acquisition, Technology, & Logistics
November 1, 2006

SDMP
Resources (cont)

The Independent Distributors of Electronics Association's
IDEA
IDEA-STD-1010-A
Acceptability of Electronic Components
Distributed in the Open Market

INSPECTION OF ELECTRONIC COMPONENTS
IN THE INDEPENDENT DISTRIBUTION SUPPLY CHANNEL

Quality
Qualität Calidad
質量 Qualité
Resources (cont)

---

**Comment Date:**

**Complaint Type:** Counterfeit Parts

<table>
<thead>
<tr>
<th>Company</th>
<th>Additional Information</th>
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</thead>
<tbody>
<tr>
<td>For Lik Shun Electronics Technology Limited</td>
<td>Bank Name:</td>
</tr>
<tr>
<td>Phone: 86-755-8935-8937</td>
<td>Stanford Chartered Bank,</td>
</tr>
<tr>
<td>Fax: 86-755-8935-8657</td>
<td>Shenzhen Futian Central</td>
</tr>
<tr>
<td>Email: <a href="mailto:kelixin88@hotmail.com">kelixin88@hotmail.com</a></td>
<td>Sub-Branch</td>
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<tr>
<td>Address: R2008 North #2 Unit Jing Gang Mingyuan</td>
<td>Account:</td>
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<tr>
<td>Shenzhen China</td>
<td>9841360411</td>
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<tr>
<td>Last Updated: 08/28/2007</td>
<td>FOR LIK SHUN ELECTRONICS TECHNOLOGY COMPANY LIMITED</td>
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<td></td>
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<tr>
<td>Scheduled Release: 08/22/2012</td>
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**Details:**

In June 2007, a Member placed an order with For Lik Shun Electronics for 1,100 pieces of part number PEF20534410V2 totaling $16,200.00. The order was dated June 26, 2007 and the order was facilitated through an escrow service with a 5-day inspection period.

The parts were sent to an independent test facility for testing prior to being sent to the Customer. The test results dated July 10, 2007 state:

"...showed evidence of remarking and resurfacing. The die shows LSI Logic as the manufacturer with HS083F as a mask code in an Infineon marked part. The product is remarked and therefore counterfeit."

According to the Reporting Member, they contacted For Lik Shun the same day the test results were received, July 10th, for an RMA and refund and this and all other subsequent attempts to contact For Lik Shun Electronics have been ignored. ERAI has not received a response from For Lik Shun Electronics regarding this matter, leaving it unresolved as of this date.
Resources (cont)

- Pre-qualified distributors
- Semiconductors and Microcircuits
- Distributors with demonstrated quality assurance practices
- Qualification based on JESD31 QMS requirements, e.g.:
  - Traceability
  - Certificate of Compliance
  - Handling and storage
US Chamber of Commerce
Coalition Against Counterfeiting and Piracy (CACP)

To fight the growing threat of counterfeiting and piracy to the economy, jobs, and consumer health and safety, the business community, led by the U.S. Chamber of Commerce's Global Intellectual Property Center, organized itself through a broad-based business coalition, the Coalition Against Counterfeiting and Piracy (CACP).

Formed in 2004, the CACP has grown to more than 600 members, making it the largest business coalition of its kind. The coalition is committed to increasing the understanding of the negative impact of counterfeiting and piracy and to finding real solutions by working with governments, industry, opinion leaders, the media, and consumers. This year, the CACP is focusing on a few primary goals, which we believe will make a measurable impact in the fight against counterfeiting and piracy.

2009 Goals:

- Pass, fund and implement all components of the Campaign to Protect America. (Learn more)
- Strengthen state and local anti-counterfeiting and piracy enforcement efforts. (Learn more)
- Conclude a strong and enforceable ACTA and improve existing trade policy tools. (Learn more)
- Promote industry-led, market-based, technological solutions to intellectual property protection by all industries involved in the manufacture, distribution and marketing of IP-based products and services.

Upcoming Events

October CACP Meeting
October 9, 2009
Briefing Center
U.S. Chamber of Commerce
Click here for more information or to register

6th Annual Global Intellectual Property Center Summit
September 30, 2009
Hall of Flags
U.S. Chamber of Commerce
Click here for more information
Semiconductor Industry Association (SIA)
Anticounterfeiting Task Force (ACTF)

- Goal is to stop counterfeit IC’s from entering the global marketplace through education, awareness and enforcement
- Aligns with the China RECS program
- Aligns with the China QBPC
- Partnered with and trained US Customs in detection of counterfeit IC’s
- Partnered with DoD, NASA, NCIS, FBI criminal investigators
- Actively Seeking cooperative efforts with United States, China and European Union officials.
- Partnered with the DOJ/DHS National IPR Coordinating Center to investigate and prosecute importers of counterfeit semiconductors
- Working with outside counsel to gather and collate industry data for case development and presentation to law enforcement and IPR Ctr
Solutions
RATIONAL.

This standard was created in response to a significant and increasing volume of counterfeit electronic parts entering the aerospace supply chain, posing significant performance, reliability, and safety risks.

This standard was created to provide uniform requirements, practices and methods to mitigate the risks of receiving and installing counterfeit electronic parts.

FOREWORD

To assure customer satisfaction, aerospace industry organizations must produce, and continually improve, safe, reliable products that meet or exceed customer and regulatory authority requirements. The globalization of the aerospace industry and the resulting diversity of regional/national requirements and expectations has complicated this objective. End-product organizations face the challenge of assuring the quality and integration of product purchased from suppliers throughout the world and at all levels within the supply chain. Aerospace suppliers and processors face the challenge of delivering product to multiple customers having varying quality expectations and requirements.

This document standardizes requirements, practices, and methods related to: parts management, supplier management, procurement, inspection, test/evaluation, and response strategies when suspect or confirmed counterfeit parts are discovered.
SAE G-19 Members

Representation from NASA, Aerospace Industry, Military, & Commercial

US Government Members ...
- DSCC
- GIDEP
- MDA
- NASA
- US AF / NRO (Aerospace Corp.)
- US Army - AMRDEC
- US Navy - NAVAIR
- US Navy - NSWC
- US Navy - NCIS
- US Customs and Border Protection

Industry Members ...
- Arrow Zeus Electronics
- BAE Systems
- Boeing
- General Dynamics
- Jabil Circuits
- Lockheed Martin
- Maxim Integrated Products
- Northrop Grumman
- Orbital Sciences
- QP Semiconductor
- Raytheon

Industry Associations ...
- Aerospace Industries Association (AIA)
- Best Manufacturing Practices Center of Excellence (BMPCOE)
- ERAI, Inc.
- Government Electronics & Information Technology Association (GEIA)
- Independent Distributors of Electronics Association (IDEA)
SAE AS5553 Requirements

Counterfeit Parts Control Plan
Parts Availability
Purchasing
Verification of Purchased Product
Purchasing Information
Reporting
In Process Investigation
Material Control
Appendixes for Guidance
Organizations Adopting SAE AS5553

• NASA Policy Directive

• Missile Defense Agency Policy Memorandum

• DOD adopts SAE AS5553 August 2009

• Private Industry Organizations with counterfeit avoidance plans:
  • BAE Systems
  • Orbital Sciences Corp.
  • Lockheed
  • L3 Communications
The Way Forward
SAE G-19 Technical Standards

1. Buyers
   SAE AS5553

2. Distributors
   SAE AS6081

3. Test Laboratories
   SAE ASxxxx
SAE G-19 Test & Inspection Matrix Subcommittee

Standardize Test & Inspection Requirements Across Industry

Test Matrix – testing performed by certified test laboratories (Asxxxx)

Type of Part

Testing Technique

Testing Tier

Sampling Plan

Risk Based Recommendations

Application

Part

Supplier

System intended to create standardized testing methodology throughout industry
Testing Level Based on Risk

Level 0
- External Visual Inspection
- Marking permanency
- Internal Die De-cap and inspection
- Optional: (X-RAY, XRF, Hermeticity, SAM, Solderability & others...)

Level 1
- 25C limited DC testing at room temp
  - (Device pin DC characteristics)

Level 2
- DC parametric testing at 2 room temp
  - (Selected key DC datasheet parameters)

Level 3
- DC parametric testing & functionality at room temp
  - (Key DC datasheet parameters & basic device functionality)

Level 4
- DC parametric testing & AC parameters at room temp
  - (Key DC & AC datasheet parameters including device functionality)
## Inspection & Test Matrix

<table>
<thead>
<tr>
<th>Technique Category</th>
<th>Technique</th>
<th>External Visual exam</th>
<th>Physical dimensions</th>
<th>Real-time X-ray</th>
<th>XRF Analysis</th>
<th>Mark Perm</th>
<th>Resistance to Solvents (for evidence of re-marking)</th>
<th>Internal Visual Exam</th>
<th>DPA</th>
<th>Basic DC Test</th>
<th>Min Func Test 25C</th>
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<td>Authenticity validation</td>
<td>yes - 100%</td>
<td>yes - sample</td>
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<td></td>
<td>yes - sample</td>
<td>yes - 100%</td>
<td>yes - 100%</td>
</tr>
</tbody>
</table>

### Component Type
- Resistors - fixed value
- Resistors network - array
- Variable resistors
- Heating element/Resistance wire
- Thermistors
- Veristor
- Capacitor - fixed capacitance
- Capacitor network - array
- Variable capacitor
- Varicap diode
- Inductor, coil, choke
- Variable inductor/Saturable Inductor
Authentication Service Provider Model

SEMI T20 System Architecture for Preventing/Detecting Semiconductor Counterfeit Products

1. Manufacturer asks for encrypted number
2. Secure server provides number
3. Product ships to places unknown
4. Buyer validates number before use
NEWS

For Immediate Release:
September 22, 2009

USTR, U.S. Commerce Department, U.S. Customs and Border Protection and International Customs Experts Hold First Meeting to Address Semiconductor Counterfeiting

JEJU, KOREA – Today staff from the Office of the United States Trade Representative, U.S. Commerce Department and U.S. Customs and Border Protection concluded the first-ever meeting with customs authorities from all six major semiconductor producing economies to discuss the problems posed by trade in counterfeit semiconductor products. Customs experts from China, Chinese Taipei, the European Union, Japan, Korea and the United States convened in Korea before the launch of the annual Governments/Authorities Meeting on Semiconductors (GAMS), with representatives of their respective industries and trade ministry officials. The two-day meeting was an important opportunity for the participants to discuss counterfeiting of semiconductor products.
Help from Above
FOR IMMEDIATE RELEASE October 13, 2008

U.S. Chamber Celebrates Enactment of Intellectual Property Law

Donohue hails victory for America’s innovation economy

WASHINGTON, D.C.—The U.S. Chamber of Commerce today hailed the PRO-IP Act becoming law, a major step toward improving the federal government’s capacity to protect intellectual property (IP).

“For nearly eight years, this Administration has devoted considerable resources and energy to protect American innovation and intellectual property,” said Tom Donohue, president and CEO of the U.S. Chamber of Commerce, following President Bush signing the Prioritizing Resources and Organization for Intellectual Property Act. “By becoming law, the PRO-IP Act sends the message to IP criminals everywhere that the U.S. will go the extra mile to protect American innovation. Congress and President Bush have done their part to support America’s innovators, workers and consumers, who all depend on intellectual property.”

The PRO-IP Act toughens civil and criminal laws against counterfeiting and piracy, provides enhanced IP enforcement and prosecutorial resources, and improves IP coordination within the executive branch. S. 3325 was introduced in July 2008 by Senators Patrick Leahy (D-VT) and Arlen Specter (R-PA), and passed the Senate by unanimous consent. The U.S. House of Representatives, which earlier passed a similar bill championed by Judiciary Chairman John Conyers (D-MI) and Ranking Member Lamar Smith (R-TX), approved the bill in September.

“The PRO-IP Act marks a signature achievement in protecting intellectual property,” added Donohue. “We look forward to working with the next Congress and Administration to fully implement this law.”

Intellectual property in the U.S. is worth more than $5 trillion, accounts for more than half of all U.S. exports, and helps drive 40% of U.S. economic growth. Intellectual property-intensive industries employ an estimated 18 million Americans.
DEPARTMENT OF DEFENSE

GENERAL SERVICES ADMINISTRATION

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

48 CFR Parts 2, 4, 12, 39, 52

[FAR Case 2008-019; Docket 2008-XXXX; Sequence X]

RIN: 9000-XXXX

Federal Acquisition Regulation; FAR Case 2008-019;
Authentic Information Technology Products

AGENCIES: Department of Defense (DoD), General Services Administration (GSA), and National Aeronautics and Space Administration (NASA).

ACTION: Advance notice of proposed rulemaking; public meeting.

SUMMARY: The Civilian Agency Acquisition Council and the Defense Acquisition Regulations Council (the Councils) are seeking comments from both government and industry on whether the Federal Acquisition Regulation should be revised to include a requirement that contractors selling information technology (IT) products (including computer hardware and software) represent that such products are authentic. The Councils are also interested in comments regarding contractors' liability if IT products sold to the Government, by contractors, are not authentic.

Additionally, the Councils are seeking comments on whether
“All procurements for electrical, electronic, or electromechanical (EEE) parts that will be used in critical applications shall evaluate the risk of obtaining counterfeit parts and shall utilize an appropriate acquisition strategy to manage that risk. That strategy may include direct procurement of parts from OEMs or authorized suppliers; Government performed or approved tests and inspections to assure the authenticity of parts; and/or an evaluation factor or criterion that assesses each non-authorized offeror’s ability and practices to assure authenticity of parts. A non-authorized offeror's ability to assure authenticity of EEE parts includes the offeror's clear representation and demonstration that parts originate from an OEM and are not counterfeit. Representation is fulfilled in a supplier certificate of conformance, and demonstration is fulfilled by a copy of one or more of the following: 1) the OEM’s original certificate of conformance, 2) records providing unbroken supply chain traceability to the OEM, 3) test and inspection records demonstrating authenticity of the parts.”
Title 18, United States Code  
- Proposed Legislation -

SEC. ___ PREVENTION OF COUNTERFEITING OF ELECTRONIC COMPONENTS.

(a) AUTHORITY IN TITLE 18, UNITED STATES CODE.—

(1) IN GENERAL.—Chapter 25 of title 18, United States Code, is amended by inserting after section 514 the following new sections:

“§ 515. Counterfeit Electronic Parts Causing Loss of Life

“(a) Whoever knowingly delivers an end item, component, or part containing or consisting of a counterfeit electronic part to the Department of Defense or National Aeronautics and Space Administration for use in any national security system, weapons system, vessel, or vehicle, which after delivery causes the system, vessel, or vehicle to fail, or causes a disruption of performance, and that failure or disruption results in the loss of life, shall be punished as follows:
Draft OMB Circular
Mandatory GIDEP Reporting

CIRCULAR NO. A-XYZ

August 03, 2009

MEMORANDUM FOR HEADS OF EXECUTIVE DEPARTMENTS AND AGENCIES

SUBJECT: Federal Government Reporting of Nonconforming Products and Processes, Suspect Counterfeit Parts and Obsolescence Information


Background. The Federal Acquisition Regulation (FAR) contracting officers reject nonconforming products that compromise national security, reliability, durability, performance, interchangeability, or safety. Nonconforming products, if not detected, can compromise national security missions, result in unanticipated replacement, repairs, and jeopardize public safety and health. Nonconforming products also can cause failure of suppliers to adequately control quality, mission readiness, and intent.

Over the last 20 years, the federal government has developed an off-the-shelf parts inventory in many complex systems that are often maintained for extended timeframes to keep them operational. When manufacturing shortages and production delays occur on the production line of a particular part, they often issue a notice to known customers. This notice of discontinuance, sometimes referred to as a DMSMS (Diminishing Manufacturing Sources and Material Shortages) notice, may not come to the attention of all Federal Supply System managers or their industry counterparts in a timely manner. If this occurs, supply managers may not be able to procure parts needed to support federal systems for their contracted lifespan. When this occurs, extremely costly redesigns may be necessary. The status of a part pending manufacturing discontinuance is also known as obsolescence information. Also, this is the point in the part procurement world in which persons or organizations with criminal intent look for to provide nonconforming, used, or counterfeit parts to the Federal Supply chain.

Purpose. This Office of Management and Budget (OMB) Circular A-XYZ replaces Office of Federal Procurement Policy Letter 91-3 dated April 9, 1991, subject “Reporting Nonconforming Products”, and establishes comprehensive federal policy on...

“Agencies shall assess their programs for identifying, preventing and reporting the acquisition of nonconforming and suspect counterfeit products. GIDEP will serve as the central data management system for receiving and disseminating information.”
SEC. 347. NATIONAL INTELLIGENCE ESTIMATE ON GLOBAL SUPPLY CHAIN VULNERABILITIES.

(a) REPORT.—Not later than one year after the date of the enactment of this Act, the Director of National Intelligence shall submit to Congress a National Intelligence Estimate or National Intelligence Assessment on the global supply chain to determine whether such supply chain poses a risk to defense and intelligence systems due to counterfeit components that may be defective or deliberately manipulated by a foreign government or a criminal organization.
Union Calendar No.

112th CONGRESS
2d SESSION

H.R. 5136

[Report No. 111-]

To authorize appropriations for fiscal year 2011 for the Department of Defense, to prescribe military policy for such fiscal year, and for other purposes.

IN THE HOUSE OF REPRESENTATIVES

April 20, 2010

Mr. BISHOP (for himself and Mr. MCKINNIS) offered the following bill, which was referred to the Committee on

May 7, 2010

Reported with amendments, committee to the Committee on and ordered to be referred to the Committee on

May 7, 2010

Strikes out all after the enacting clause and insert the part next

The text of introduced bill, see copy of bill as introduced on Ap
This is to notify you that, at the request of Representative John F. Tierney, the US Government Accountability Office is initiating a review of parts quality control...
Back-up Slides
Purchasing Process:

Source of Supply
- Determine risk of receiving counterfeit part...
- Actions may include surveys, audits, review...
- Specify a preference to procure directly from OCMs...

Approved Suppliers
- Maintain a register of approved suppliers
- Guidance on source selection and approval process
- Assure sources of supply are maintaining processes for counterfeit risk mitigation

Risk Mitigation
- Mitigate the risks of procuring counterfeit parts from sources other than OCMs...
- Specify supply chain traceability to the OCM...
- Specify flow down of applicable requirements to contractors and sub-contractors...
The documented process shall specify contract/purchase order quality requirements...

...The documented process shall assure detection of counterfeit parts prior to formal product acceptance...
Procurement Clauses

D.3.1 Test and Inspection Requirements

“The seller shall establish and implement test and inspection activities necessary to assure the authenticity of purchased products. These activities shall include:

- Traceability and documentation verification
- Visual examination

-[see Appendix E of this Aerospace Standard for additional inspection activities]

Tests and inspections shall be performed in accordance with clearly delineated 
accept/reject criteria provided or approved by <BUYER>. The seller shall prepare and 
provide to the <BUYER> records evidencing tests and inspections performed and 
conformance of the product to specified acceptance criteria.

Tests and inspections shall be performed by persons that have been trained and qualified 
concerning types and means of electronic parts counterfeiting and how to conduct 
effective product authentication.”

‘‘…The seller shall establish and implement test and inspection activities necessary to assure the authenticity …’’
The seller shall maintain a method of item traceability that ensures tracking of the supply chain back to the manufacturer.
...The seller shall approve, retain, and provide copies of Electrical, Electronic, and Electromechanical (EEE) part Manufacturer Certificate of Conformance (CoC)....
In Process Investigation

Shall address the detection, verification, and control of ... counterfeit parts.

Material Control

Shall control ... nonconforming parts from entering supply chain

Shall control counterfeit parts to preclude their use ...

Reporting

Shall assure that all occurrences of counterfeit parts are reported...
## SAE AS5553 Guidance

### Risk Charts

<table>
<thead>
<tr>
<th>Supplier with GIDEP/ERAI Alerts</th>
<th>Small %</th>
<th>1X Visual Inspection</th>
<th>In Business &lt; 1 Year &amp; Unknown Financials</th>
<th>Life Dependent</th>
<th>Source of Supply</th>
<th>Test / Inspect Population</th>
<th>Level of Test &amp; Inspection</th>
<th>Supplier Assessment</th>
<th>Product &amp; Application</th>
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### Highest Risk

- Supplier with GIDEP/ERAI Alerts
- Small %
- 1X Visual Inspection
- In Business < 1 Year & Unknown Financials
- Life Dependent

### Lowest Risk

- OCM
- Test / Inspect Population
- Level of Test & Inspection
- Supplier Audited & Approved
- Product & Application
- Non-Critical

Life Dependent
- Supplier Audited & Approved
- Non-Critical