



# PSMC Fall Conference

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## Missile Defense Agency Counterfeit Component Efforts



3 November 2009

Missile Defense Agency  
Parts and Materials Advisory Group



# MDA Counterfeit Component Efforts

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- **Presentation Outline**
  - **Parts, Materials and Processes Mission Assurance Plan (PMAP)**
  - **Summary of Counterfeit Component Risks**
  - **MDA Proactive Anti-Counterfeit Efforts**
  - **MDA Policy Memo on Purchasing Electronic Parts**
  - **Independent Distributor Assessments**
  - **Lessons Learned**



# Integrated Ballistic Missile Defense System



## Sensors



Defense Support Program



Space Tracking And Surveillance System



Sea-Based Radars



Forward-Based Radar



Early Warning Radar



Airborne Laser



Kinetic Energy Interceptor



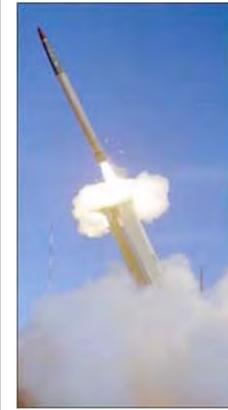
Aegis Ballistic Missile Defense / Standard Missile-3



Multiple Kill Vehicle



Ground-Based Midcourse Defense



Terminal High Altitude Area Defense



Patriot Advanced Capability-3

## Command, Control, Battle Management & Communications



NMCC USSTRATCOM USNORTHCOM USPACOM EUCOM CENTCOM



## Definition of Counterfeit Item

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**From AS5553, a counterfeit component is a part that is a copy or substitute without legal right or authority to do so or one whose material, performance, or characteristics are knowingly misrepresented.**

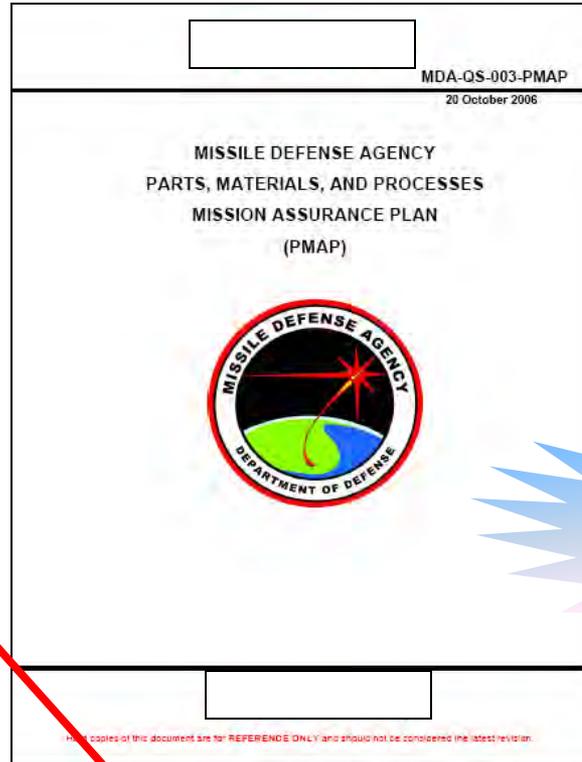
- Used product sold as new
- Commercial product sold as military grade
- Product stolen from the manufacturer’s production line, or built as unauthorized product
- Pure tin-plated product sold as containing lead
- Product which does not contain the correct die.

**MDA-QS PMAG considers unauthorized remarked product to be counterfeit, even if the internal die is the correct product.**



# MDA PMAP Contents

- **Applicable Documents**
  - Government and Commercial
- **PMP Management Structure, Roles, and Responsibilities**
  - PMP Board, PMP Control Board, PMAG
- **PMP Requirement examples**
  - EEE Parts Quality Requirements
  - Materials
  - Corrosion Prevention
  - Prohibited Parts and Materials
  - PMP Quality Requirements
  - PMP Procurement Management
  - Radiation Hardness Assurance
  - PMP Qualification
  - COTS Management
  - Failure Analysis
  - Environmental Controls
  - Handling
  - Preservation, Packaging and Storage



## • Appendices

- Derating
- PEM
- COTS
- Radiation Hardness Assurance
- Prohibited PMP
- PMAP Data Items
- Corrosion Prevention



The Missile Defense Agency has a Director Approved Parts and Materials Requirements Document with Stringent Part Procurement Requirements



# PMAP Part Purchase Requirements

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- **Parts and materials shall not be purchased through independent (non-franchised) distributors without Government notification via a Program Office Parts Review Board**
  - **In order to buy from an independent distributor, a report is required:**
    1. **Reason why and verification that OEM or Franchised Distributor is not available**
    2. **Product Verification plan and results (e.g. Destructive Physical Analysis, X-ray, Electrical Test, etc.)**
    3. **Product Certificate of Conformance with traceability to OEM if available**



# MDA Challenges

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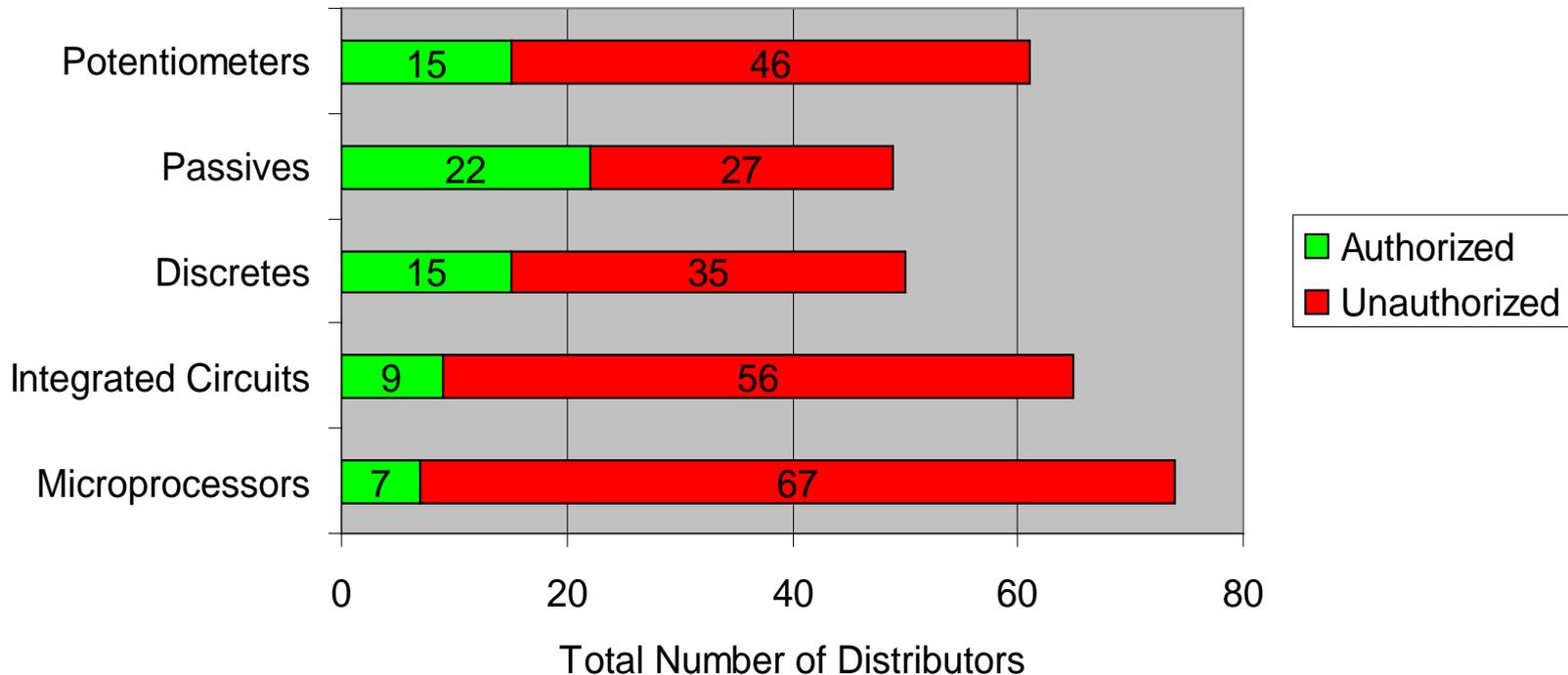
- **Some MDA Contracts were awarded prior to PMAP approval**
- **Part Procurement and Supplier Selection requirements were not always flowed down to lowest level of Supply Chain**
- **Parts Obsolescence forces procurement from independent distributors**
- **Government mandates (small business, disadvantaged, etc.) can be misinterpreted to skew purchases toward independent distributors**



# Authorized vs. Unauthorized Distributors

Research indicates that unauthorized distributors outnumber authorized distributors for several critical part types:

Authorized Vs. Unauthorized Distributors  
Data Source: Electronics Source Book

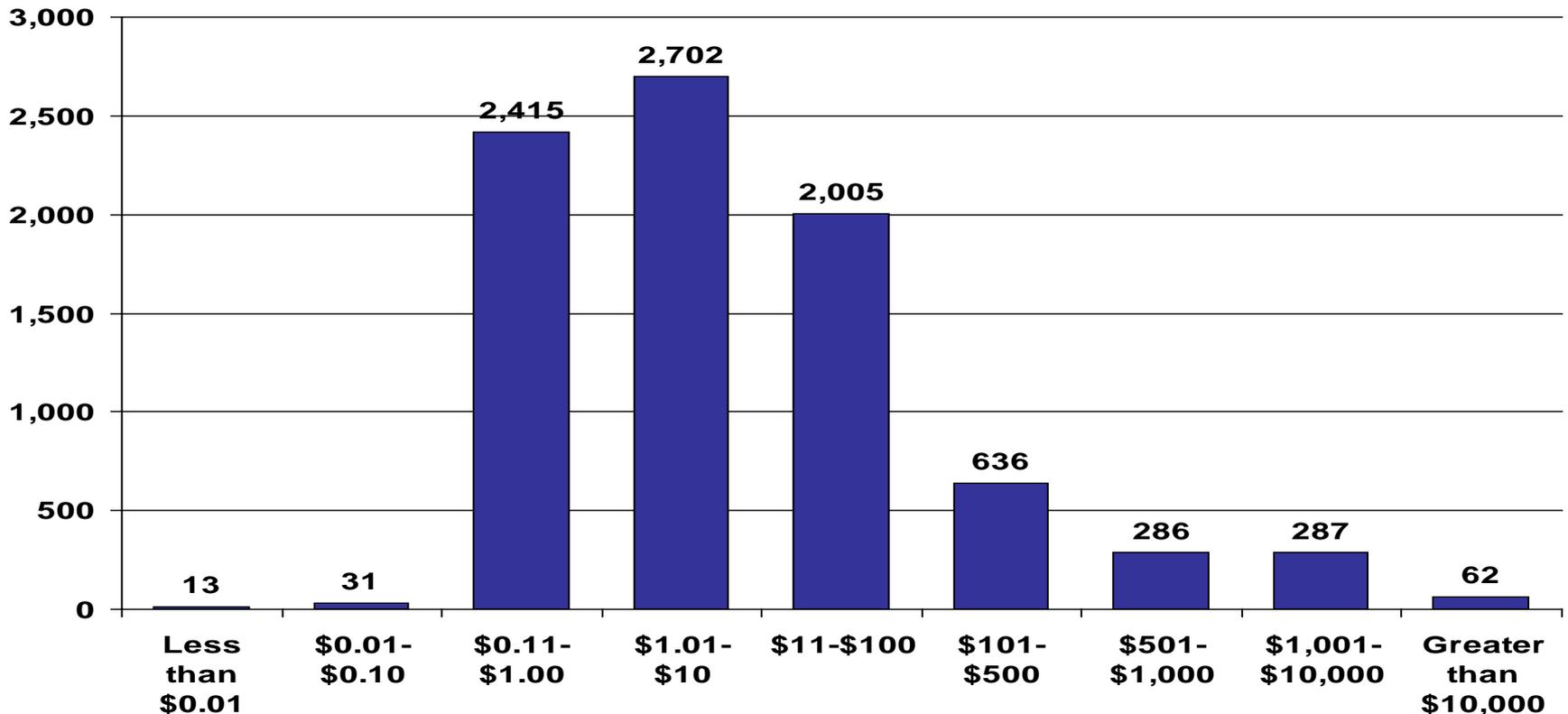


**88% of listed IC distributors are unauthorized**



# Selling Price of Counterfeit Parts

Counterfeit Incidents by Product Resale Value: Overall (2007) - DoC Survey



**61% of counterfeit component incidents reported above had a component selling price of \$10 or less.**



# Big Sales, Small Business



**...is one of the fastest growing electronic distributors in the United States.**

**...over 100 million dollars of available inventory**

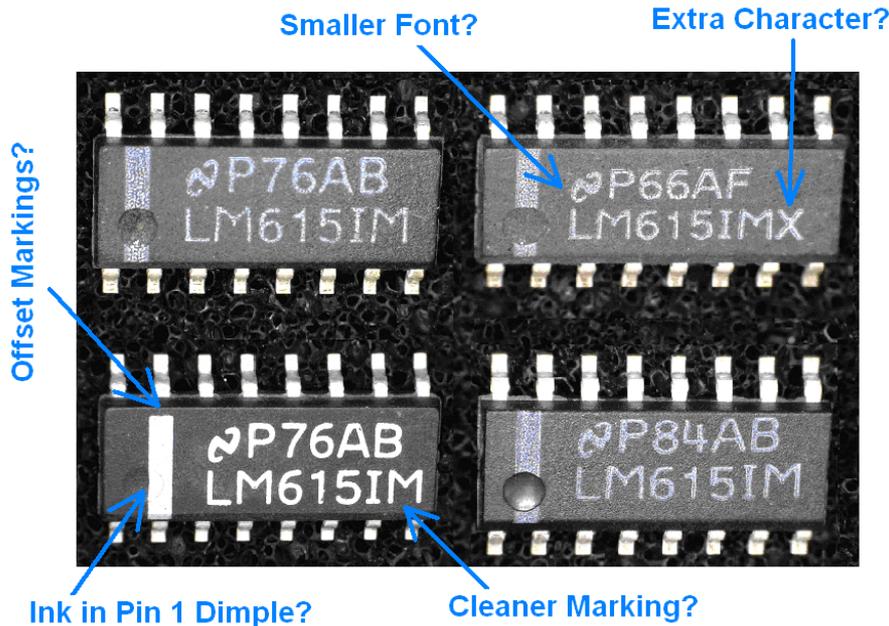




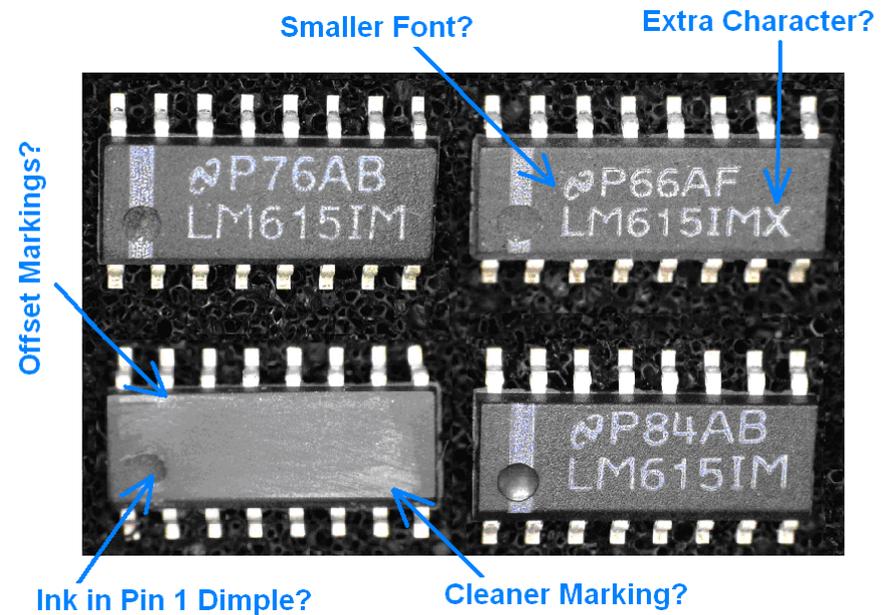
# Counterfeit Component Example

Parts from four reels of one shipment (independent distributor).  
All four parts had the correct die.

As Received



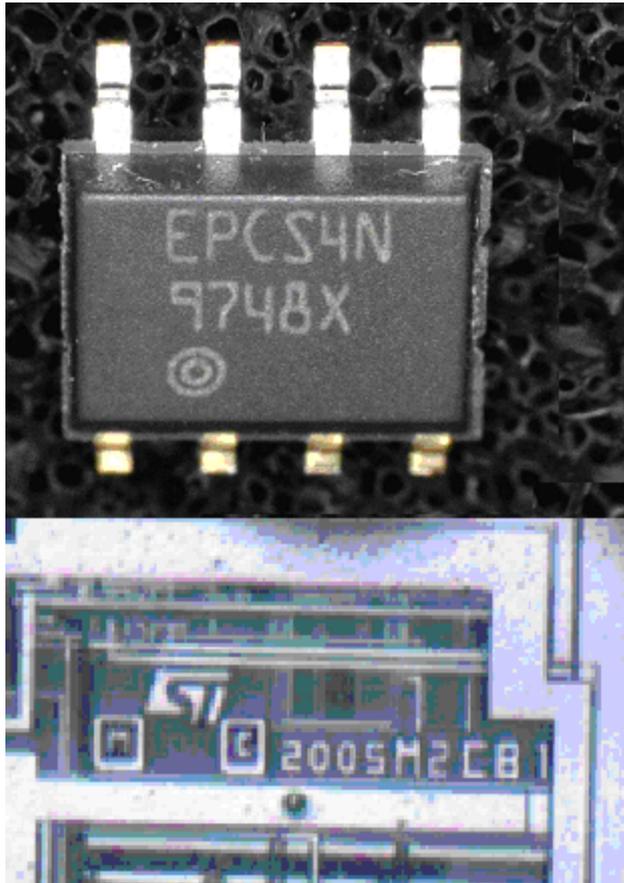
After Acetone Swab



Photos provided courtesy of SMT Corporation



# Authentic Component Example



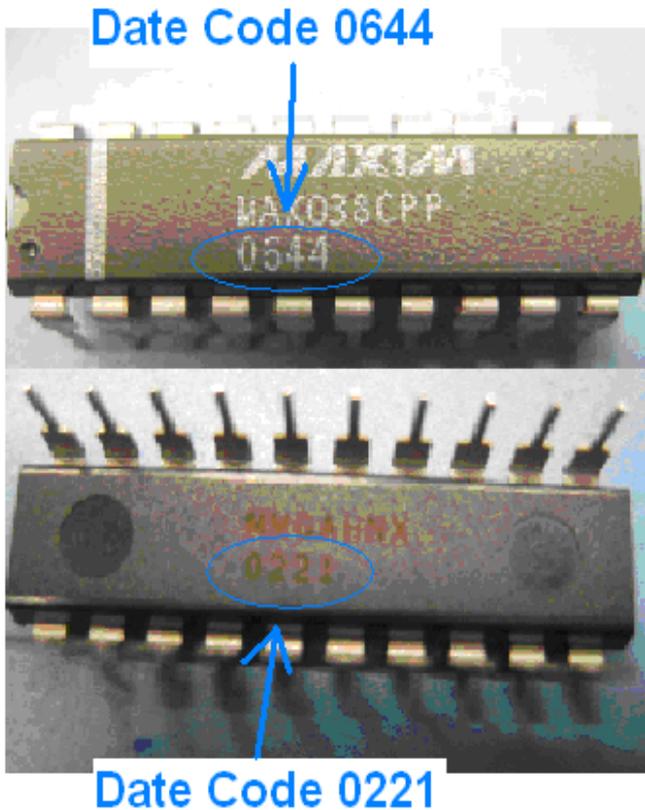
Die photo

- Q. Is this a counterfeit part -- 2005 ST Micro die in a 1997 Altera part?
- A. No. It's an authentic part -- ST Micro die (unknown vintage) in a 2007 Altera part.

**Lesson Learned -- Original Component Manufacturers (OCMs) do use other OCMs' die. Don't assume the date code.**



# Authentic Component Example



Top

Bottom

- Q. Is this a counterfeit part – 0644 top-side date code and 0221 bottom-side date code (part failed acetone swab test)?
- A. No. It's an authentic part – an older part was retested by the OCM to a newer data sheet spec, and subsequently remarked.

**Lesson Learned – OCMs do remark product occasionally. If it's done with no intent to deceive, it is not counterfeiting.**



# OCM Assistance

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Support for assessing counterfeit parts may depend on the Original Component Manufacturer (OCM). Among the reasons given for limited support:

- **Independent distributor products undercut OCM or franchised distributor profits.**
- **The OCM has no obligation to assist independent distributors. Assessing a part inaccurately may expose the OCM to unnecessary liability.**

Buying from an independent distributor will almost certainly void the OCM warranty.

An OCM is more likely to assist a government agency or contractor than an independent distributor.



# MDA Proactive Anti-Counterfeit Efforts

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- 1. Member of G-19 Committee that created AS5553 (2007-2009)**
  - Detection, avoidance, and mitigation document for organizations purchasing electronic components, driven by NASA.
- 2. Support for NASA at FAR Revision Meeting (Dec 2008)**
  - Seeks to limit electronics purchases to authorized sources (when possible).
- 3. MDA Counterfeit Part Focus Day (Jan 26, 2009)**
  - Attended by MDA prime contractors.
  - Devoted a full day to counterfeit component risks, including OEM, independent distributor, Dept of Commerce, DLA, and Counter Intelligence briefs.
- 4. Independent Distributor Assessment and Site Visits (Dec 2008 to present)**



# MDA Proactive Anti-Counterfeit Efforts

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- 5. Pre-Flight Risk Assessments (2009 to present)**
  - Detailed review of all independent distributor procurements prior to flight.
  - Verify paperwork, test history.
  - Conduct further test and analysis if necessary.
- 6. MDA Contractor Audits (Apr 2009 to present)**
  - Developed contractor questionnaire for assessing purchasing policies for independent distributors.
    - Procedures, sign-off, contract requirements
    - Distributor assessment and approval, inspection and test requirements.
- 7. MDA Policy Memo on Purchasing Electronic Parts (Jun 2009)**
  - Expands PMAP requirement to new buys of existing hardware.



# MDA Proactive Anti-Counterfeit Efforts

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## 8. Member of G-19 Subcommittee (Oct 2009)

- Development of counterfeit certification standard for distributors.

## 9. IDEA-ICE-3000 Certification (Nov 2009)

- MDA PMAG member certified to inspect product per IDEA-STD-1010A.

## 10. Inter-Agency Cooperation (Ongoing)

- NASA partnership on ID site visit assessments and ratings.
- NAVSEA (Apr 2009), DLA (May 2009), offered assistance for counterfeit plan development.



# MDA Part Procurement Policy Memo



DEPARTMENT OF DEFENSE  
MISSILE DEFENSE AGENCY  
7100 DEFENSE PENTAGON  
WASHINGTON, DC 20301-7100

JUN 29 2009

QS

POLICY MEMORANDUM NO. 50

MEMORANDUM FOR DEPUTIES AND STAFF DIRECTORS, MDA

SUBJECT: Missile Defense Agency (MDA) Policy on Purchasing Electronic Parts

MDA has experienced the presence of counterfeit parts in critical hardware. It is essential to implement immediate measures to mitigate this issue. This memorandum identifies specific procurement procedures that shall be implemented by all companies that purchase electronic piece parts for mission and safety critical hardware used in heritage and new design MDA weapon systems. Implementing the following procedures will minimize the risk of placing counterfeit electronic components into MDA systems.

The following minimum set of procedures from MDA Parts, Materials, and Processes Mission Assurance Plan (MDA-QS-003-PMAP-REV A) paragraphs 3.6.7, and 3.7.1, shall be implemented immediately on all MDA mission and safety critical hardware contracts and flowed down to all MDA subcontractors:

a. Procurement of electronic piece parts from non-authorized/non-franchised independent distributors shall only occur when there is not an original equipment manufacturer (OEM) or an OEM-authorized/franchised source available.

b. The Prime Contractor and MDA Program Office shall be notified in all cases when a non-authorized independent distributor is required for procurement of electronic piece parts. This notification shall include documented evidence that an OEM-authorized/franchised source was not available and identification of testing performed to validate part authenticity. Deviations from this policy must be approved by the Program Office Parts, Materials, and Processes Control Board.

These requirements apply to current Parts, Materials and Processes Mission Assurance Plan (PMAP) requirements on procurement of electronic piece parts for mission and safety critical hardware on current heritage designs.

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All Program Managers for Programs that are required to have the PMAP on contract are directed to immediately implement the requirements of this policy memorandum via Contract Change Order. Should a contractor believe that this Change Order requirement will result in additional cost or schedule outside the scope of their current contract, they shall submit a "Certified Request for Equitable Adjustment" in accordance with DFARS Clause 252.243-7002.

My point of contact for this matter is Mr. Barry Birdsong at 256-955-1300 or email [Barry.Birdsong@mda.mil](mailto:Barry.Birdsong@mda.mil).

PATRICK J. O'REILLY  
Lieutenant General, USA  
Director



# MDA Policy Memo on Part Procurements

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- **DPA and broker part data package requirement can be limited to semi-conductors and microcircuits**
  - **95% of counterfeit incidences are in semiconductors and microcircuits**
- **Policy Memo does not apply to internal COTS assembly parts or internal discrete parts of a hybrid devices**
- **Broker Part Data Package requirements**
  1. **Evidence that an OEM or Franchised Distributor could not provide the part (e-mail records or written statement from Purchasing Department)**
  2. **Results of Authenticity Tests**
    - **Marking Permanency Test**
    - **X-Ray**
    - **Electrical Tests at ambient**
    - **Destructive Physical Analysis (DPA / Decapsulation)**
  3. **Part Certificate of Conformance traceable to OEM (if possible)**



# Independent Distributor Assessments

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- **Initiated in December 2008. Goals were to:**
  - Visit MDA contractor-approved and other independent distributors (2 hours)
  - Assess independent distributor knowledge of counterfeit components and suitability to sell product for MDA programs
  - Provide data to MDA contractors
  - Obtained NASA cooperation in March 2009, currently a partnership which now includes additional military/aerospace contractors and NASA/JPL.
- **Have visited 30 independent distributors in CA, CT, FL, NJ, and PA.**
  - Should be a member of IDEA and/or ERAI
  - Should already be selling to military/aerospace
  - Should have a functioning website
  - Should be operating out of a commercial business



# Independent Distributor Findings

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- **Supplier Selection and Qualification**
  - There is much buying and selling within ID community, it can be difficult to trace product.
  - Good and bad sources are identified through often inexact means.
  - The use of an Approved Vendor List (AVL) is critical. Software can be used to block unwanted sources.
- **Part Search**
  - Much ID-sold product is being bought from franchised sources. This product could've been found by the customer without going through an independent distributor.
  - The same open market search engines are available to most IDs. Some are much more likely to list counterfeit product than others.



# Independent Distributor Findings

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- **Inspection and Test**

- Almost all IDs perform visual inspection, and many use acetone to look for blacktopping.
- Many only perform additional test (acetone swab, x-ray, die analysis, etc.) at customer request. Often the customer does not request it.
- There were concerns about some third-party inspection/test facilities.

- **General Comments**

- Most contractors/subcontractors do not visit their approved independent distributors.
- Most facilities are not certified to an ESD handling standard.
- The majority of suspect and counterfeit components are returned for refund.



# Lessons Learned

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**Contractors/subcontractors MUST NOT be allowed to purchase from independent distributors unless there is no option!!**

## **Acceptable Reasons**

- Parts not available from authorized sources, or schedule emergency.

## **Unacceptable Reasons**

- Cheaper, quicker, good past history.

## **Reduce the risk by:**

- Always buying from authorized sources if they're available.
- Finding (visiting) the better independent distributors.
  - Are diligent about identifying good sources
  - Automatically block bad sources
  - Perform significant authenticity testing without waiting for customer request
  - Are fully aware of the size of the counterfeit parts problem
- Requiring a basic suite of inspection and test, either by the independent distributor, an agreed-upon test facility, or the contractor/subcontractor.



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# Questions?