Counterfeit Parts Awareness
Intermediate

PRESENTED BY
CARLO ABESAMIS

NASA/JPL WESTERN REGION TRAINING CENTER
Introduction

- **Course Objectives**
  - Augment the JPL Awareness Training Class - Basic
  - Counterfeit Mitigation: Awareness, Avoidance, Detection

- **Class background**
  - Training Material: Primarily on Electronic Parts
  - Instructor(s): Electrical Engineering – Safety and Mission Assurance
  - Attendees
    - Work function, course expectation, experience with counterfeit goods

- **Review of Basic Awareness**
  - What is E-Waste?
  - What is the difference between suspect and counterfeit?
  - Name different types of counterfeits?
  - What role does supplier selection play in counterfeit parts mitigation?
  - What are some differences between an authorized and independent distributor?
  - What if you cannot avoid procuring obsolete parts?
Agenda/Topics

- Counterfeit Risk Mitigation and Prevention: KNOW YOUR SUPPLIERS
  - Supplier Management and Selection
    - Component Suppliers
    - Contract Manufacturers
    - Test House
- Obsolescence Management
  - Authorized Distributors
  - Uprating
  - PARS Tool
- Counterfeit Risk Mitigation and Prevention: KNOW YOUR PARTS
  - Authenticity Testing
- Reporting
- Legislation
- Hands-On Section
Supplier Management
Types of Suppliers

- Component Suppliers
  - OCM/Manufacturer
  - Authorized Distributors
    - Example: [http://www.arrow.com/about_arrow/](http://www.arrow.com/about_arrow/)
    - Distribution Agreement template
  - Independent Distributors:

- Contract Manufacturers
  - Parts Procurement
  - Assembly Process
    - Electrostatic Discharge Certification

- Testing House
  - Equipment, Capabilities, Experience
Supplier Selection
Points to Consider

• Methods to determine if a supplier is authorized distributor include:
  – Manufacturer’s website lists their authorized suppliers
  – Electronic Components Industry Association (ECIA)
    - Example: Analog Devices 5962-8754001

• What to look for: experience with counterfeit parts, capability of detecting, awareness of counterfeit parts issue (view audit checklist example), requirements implementation
  – Example: SMT Corp assessment

• Traceability (Example)
  – Certificate of Conformance (CofC): Commercial compared to Military
  – Documentation: Packing Slip/Shipping, CofC
  – Unbroken chain of traceability involves more work for drop shipments

• Returns Process at an OCM and Authorized Distributor
  – Minimum expectations
  – Procuring only brand new, non returned goods....how would you do this? How would this be possible?

• Creation and maintenance of an Approved Supplier List
Obsolescence Management

- **Part Lifecycle (EOL, Last time Buy)**

  ![Graph](https://www.partminer.com)

  **Issue notifications when a part(s) is ‘end of life’**.
  - Includes instructions for making a ‘last-time-buy’ – often a window of 6 to 12 months is given for the customer to place an order before parts are no longer available.
  - Orders are generally ‘non-cancelable, non-returnable (NCNR)’
  - Authorized distributors may return product to the OCM
  - Replacement parts, if any, are listed
  - Large distributors can advise regarding lifetime buy decisions.

Graphic credit: www.partminer.com
Obsolescence Management

• What if your design contains an obsolete part with no drop-in replacement?
  – Re-design may be the best option, albeit expensive
    - Selecting a new part can mean
      – Changes to board layout
      – Functional design changes
      – Part up-screening/qualifying
      – Revising schematics and parts lists (Engineering Change Requests)
      – Software changes
      – Convening review boards to approve
      – Modifying test procedures

• Authorized Distributors may also be of help

• Uprate a commercial part
These two are essentially the same part
Both Analog Device’s AD585 Amplifier

- Meets Requirements of DSCC specification 5962-87540
- Military Grade Quality Assurance Level
- Rated over a wider temperature range than commercial or industrial parts
- Costs more than Industrial Grade

- Industrial Grade Quality Assurance Level
- Costs less than Military Grade
**Obsolescence Management**

**Uprating Option Example: AD 585 Data Sheet**

<table>
<thead>
<tr>
<th>ANALOG INPUT CHARACTERISTICS</th>
<th>Offset Voltage</th>
<th>Offset Voltage, $T_{MIN}$ to $T_{MAX}$</th>
<th>Bias Current</th>
<th>Bias Current, $T_{MIN}$ to $T_{MAX}$</th>
<th>Input Capacitance, $f = 1$ MHz</th>
<th>Input Resistance, Sample or Hold</th>
<th>20 V p-p Input, $A = +1$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5</td>
<td>2</td>
<td>2</td>
<td>5</td>
<td>10</td>
<td>10</td>
<td>$10^{12}$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>DIGITAL INPUT CHARACTERISTICS</th>
<th>TTL Reference Output</th>
<th>Logic Input High Voltage, $T_{MIN}$ to $T_{MAX}$</th>
<th>Logic Input Low Voltage, $T_{MIN}$ to $T_{MAX}$</th>
<th>Logic Input Current (Either Input)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1.2</td>
<td>1.2</td>
<td>0.8</td>
<td>$50$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>POWER SUPPLY CHARACTERISTICS</th>
<th>Operating Voltage Range</th>
<th>Supply Current, $R_{L} = 0$</th>
<th>Power Supply Rejection, Sample Mode</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$+5, -10.8$</td>
<td>$6$</td>
<td>$70$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>TEMPERATURE RANGE</th>
<th>Specified Performance</th>
<th>$+25$</th>
<th>$+85$</th>
<th>$-55$</th>
<th>$+125$</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PACKAGE OPTIONS</th>
<th>Cerdip (Q-14)</th>
<th>LCC (E-20A)</th>
<th>PLCC (P-20A)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AD585AQ</td>
<td>AD585SQ</td>
<td>AD585JP</td>
</tr>
</tbody>
</table>

**NOTES**
1. Maximum input signal is the minimum supply minus a headroom voltage of 2.5 V.
2. Not tested at $-55 \, ^\circ C$.
3. EL = Leadless Ceramic Chip Carrier; P = Plastic Ledged Chip Carrier; Q = Cerdip.
4. For AD585/885B specifications, refer to Analog Devices Military Products Databook.

Specifications subject to change without notice.
Specifications shown in boldface are tested on all production units at final electrical test. Results from these tests are used to calculate outgoing quality levels. All min and max specifications are guaranteed, although only those shown in boldface are tested on all production units.

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Obsolescence Management
Uprating Option Example: AD5962-87540 Drawing

1. SCOPE

1.1 Scope. This drawing describes device requirements for MIL-STD-883 compliant, non-JAN class level B microcircuits in accordance with MIL-PRF-38535, appendix A.

1.2 Part or Identifying Number (PIN). The complete PIN is as shown in the following example:

- **5962-87540**
- **01**
- **C**
- **X**

  - Drawing number
  - Device type (see 1.2.1)
  - Case outline (see 1.2.2)
  - Lead finish (see 1.2.3)

1.2.1 Device type(s). The device type(s) identify the circuit function as follows:

<table>
<thead>
<tr>
<th>Device type</th>
<th>Generic number</th>
<th>Circuit function</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td><strong>AD585</strong></td>
<td>High speed, sample and hold amplifier</td>
</tr>
</tbody>
</table>

1.2.2 Case outline(s). The case outline(s) are as designated in MIL-STD-1835 and as follows:

<table>
<thead>
<tr>
<th>Outline letter</th>
<th>Descriptive designator</th>
<th>Terminals</th>
<th>Package style</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>GDIP1-T14 or CDIP2-T14</td>
<td>14</td>
<td>Dual in line</td>
</tr>
<tr>
<td>2</td>
<td>CQCC1-N20</td>
<td>20</td>
<td>Square leadless chip carrier</td>
</tr>
</tbody>
</table>

1.2.3 Lead finish. The lead finish is as specified in MIL-PRF-38535, appendix A.

1.3 Absolute maximum ratings.

1.4 Recommended operating conditions.

- Positive supply voltage (+V<sub>S</sub>) ........................................... +5 V dc to +18 V dc
- Negative supply voltage (-V<sub>S</sub>) ........................................... -12 V dc to -18 V dc
- Ambient operating temperature range (T<sub>A</sub>) ......................... -55°C to +125°C
Obsolescence Management
Uprating Option Example - Analog Devices Website

Western Region Manufacturing Technology Transfer Center
Obsolescence Management

- PARS – JPL uses a part approval and acquisition tracking database.
  - Within PARS a Preferred Parts List is being created that will contain parts obsolescence info.
  - Other 3rd party tools exist for monitoring parts lists for obsolescence – using algorithms to predict part lifecycle.

<table>
<thead>
<tr>
<th>PIN</th>
<th>Generic Part No.</th>
<th>Part Description</th>
<th>Descriptor</th>
<th>Package Type</th>
<th>Manufacturer</th>
<th>Flight Num</th>
<th>RollUp</th>
<th>Parts/Eng</th>
<th>Special Handling Identified</th>
<th>SEL/SEGR/SEB</th>
<th>SEU</th>
<th>SET</th>
<th>SEFI</th>
<th>TID/ELDRS</th>
<th>DD</th>
</tr>
</thead>
<tbody>
<tr>
<td>31</td>
<td>UT69RH051-WPC</td>
<td>MICROCIRCUIT, DIGITAL, RADIATION HARDENED, 8-BIT MICROCONTROLLER, MONOLITHIC SILICON</td>
<td>U</td>
<td>QFP-44</td>
<td>QPL</td>
<td>S962R9563801VVC</td>
<td>A</td>
<td>A</td>
<td>No</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>33</td>
<td>UT9Q512</td>
<td>SRAM, 512K X 8-BIT, 25 NS ACCESS TIME, RAD HARD</td>
<td>U</td>
<td>TBD</td>
<td>QPL</td>
<td>S96210053601TUC</td>
<td>AA</td>
<td>A</td>
<td>No</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
<tr>
<td>34</td>
<td>BU-61585V</td>
<td>1553 ACE TERMINAL</td>
<td>U</td>
<td>TBD</td>
<td>DDC</td>
<td>BU-6382SF2-131W</td>
<td>A</td>
<td>A</td>
<td>Yes Soldering Restrictions, Fragile Parts, Special Handling Details: max lead soldering temperature 10 sec per lead, 300C; max case temp 150C (unpowered). Handle glass seals carefully. gb110513.</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
<td>A</td>
</tr>
</tbody>
</table>
Authenticity Verification

- Sample Inspection Checklist (based on IDEA STD-1010)
- Authentication Matrix (from Integra Test)
- Sample Component Analysis (from SMT Corporation)
Reporting

- GIDEP - The Government-Industry Data Exchange Program (GIDEP) is a Department of Defense program established to promote and facilitate the sharing of technical information between government agencies and industry partners to increase systems safety, reliability, and readiness and to reduce systems development, production, and ownership costs. GIDEP has been designated by OMB Policy Letter 91-3 as the provider of the government’s central database for receiving and disseminating information about nonconforming products and materials. Similarly, DoD has designated GIDEP as DoD’s Diminishing Manufacturing Sources and Material Shortages (DMSMS) centralized database for sharing DMSMS information among DoD and Industry groups. Funded by the U.S. and Canadian governments, GIDEP membership is open and free to U.S./Canadian government agencies and their industry partners.

Recent Legislation

• Section 818 of the National Defense Authorization Act for Fiscal Year 2012 (Public Law 112-81) requires the Department of Defense (DOD) to:
  – adopt comprehensive guidance and processes for the detection and avoidance of counterfeit parts.
  – Requires DOD to: (1) revise acquisition rules to ensure that the cost of replacement and rework required by the use of suspect counterfeit parts is paid for by the contractor responsible;
  – (2) ensure that DOD and its suppliers purchase electronic parts from manufacturers and their authorized dealers or from qualified, trusted suppliers;
  – (3) require DOD officials and contractors who become aware of counterfeit parts in the supply chain to provide appropriate written notification of the problem; and
  – (4) ensure that DOD and its largest contractors establish effective systems and procedures to detect and avoid counterfeit parts.
  – Section 818 amended 18 U.S.C. § 2320 to add a criminal offense for trafficking in military goods or service known to be counterfeit where use, malfunction or failure is likely to cause serious injury or death, impairment of combat operations or other significant harm to national security.

• The implementation plan is being discussed at DMSMS.

- **SEC. 816. CONTRACTOR RESPONSIBILITIES IN REGULATIONS RELATING TO DETECTION AND AVOIDANCE OF COUNTERFEIT ELECTRONIC PARTS.**
- Section 818(c)(2)(B) of the National Defense Authorization Act for Fiscal Year 2012 (Public Law 112-81; 125 Stat. 1493; 10 U.S.C. 2302 note) is amended to read as follows:
- `(B) the cost of counterfeit electronic parts and suspect counterfeit electronic parts and the cost of rework or corrective action that may be required to remedy the use or inclusion of such parts are not allowable costs under Department contracts, unless–
- `(i) the covered contractor has an operational system to detect and avoid counterfeit parts and suspect counterfeit electronic parts that has been reviewed and approved by the Department of Defense pursuant to subsection (e)(2)(B);
- `(ii) the counterfeit electronic parts or suspect counterfeit electronic parts were–
  - `(I) procured from a trusted supplier in accordance with regulations described in paragraph (3); or
  - `(II) provided to the contractor as Government property in accordance with part 45 of the Federal Acquisition Regulation; and
- `(iii) the covered contractor provides timely notice to the Government pursuant to paragraph (4).`
DLA Update

- **QTSL Program (Qualified Testing Suppliers List)**
  
The purpose of the Qualified Testing Suppliers List (QTSL) Program is to establish and maintain a list of pre-qualified sources for certain electronic components that are purchased and managed by the Defense Logistics Agency Land and Maritime. QTSL products are provided by suppliers that combine accepted counterfeit mitigation practices and quality assurance procedures that are consistent with industry and international quality standards. This program is applicable to selected Federal Stock Class (FSCs) 5961 and 5962 items where a streamlined acquisition process is desired to improve the quality and services provided to our customer; the United States soldier, sailor, airman and marine. The publication below has been developed to outline and discuss the elements needed to successfully qualify for listing on the QTSL.

- **DNA Marking – DLA solicitations and contracts for microcircuits now have a DNA marking requirement.** Suppliers, who provide DLA FSC 5962 items, will be required to provide items marked with a unique botanical SigNature® DNA mark supplied by Applied DNA Sciences or its authorized licensees, if any. The DNA mark used shall be unique to the supplier of the part. Suppliers can apply a covert (invisible) DNA mark on the part. The contractor's ink utilized for part marking can be infused with the SigNature® DNA material and applied overtly.
Conclusion

PREVENTION IS KEY, PROCURE FROM AUTHORIZED DISTRIBUTION IF POSSIBLE AND ALWAYS KNOW YOUR SOURCE OF SUPPLY! KNOW YOUR SUPPLIER, KNOW YOUR PARTS!
• Suggestions, comments or questions pertaining to the material presented should be directed to:

Carlo Abesamis – Procurement Quality Assurance  
(818) 354-0211  
abesamis@jpl.nasa.gov

• Counterfeit Parts Working Group Website:  
http://atpo.jpl.nasa.gov/counterfeit_parts.html  
– Assurance Technology Program Office
Appendix
### Authenticity Verification

#### Detection Methods

<table>
<thead>
<tr>
<th>Counterfeit Type</th>
<th>Non Functioning Devices</th>
<th>Functioning Devices</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No Die</td>
<td>Failed Real Parts</td>
</tr>
<tr>
<td></td>
<td>Wrong Die Re-Marked</td>
<td>Speed up-marking</td>
</tr>
<tr>
<td></td>
<td>Board Pulls</td>
<td>Spec up-marking</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Temp up-range</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pb Free Re-marked</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Lesser part (Knock-off)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>External Visual &amp; Phys Dim</th>
<th>XRF Analysis</th>
<th>Mark Perm</th>
<th>Internal Visual</th>
<th>Basic DC Test</th>
<th>Min Func Test 25C</th>
<th>Full Spec Extended Temps</th>
<th>Test &amp; Qual</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Die</td>
<td>Possible</td>
<td>No</td>
<td>Possible</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Wrong Die Re-Marked</td>
<td>Possible</td>
<td>No</td>
<td>Possible</td>
<td>Likely</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Board Pulls</td>
<td>Possible</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Possible</td>
<td>Likely</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Failed Real Parts</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Possible</td>
<td>Likely</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Speed up-marking</td>
<td>Possible</td>
<td>No</td>
<td>Possible</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Possible</td>
<td>Yes</td>
</tr>
<tr>
<td>Spec up-marking</td>
<td>Possible</td>
<td>No</td>
<td>Possible</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Possible</td>
<td>Yes</td>
</tr>
<tr>
<td>Temp up-range</td>
<td>Possible</td>
<td>No</td>
<td>Possible</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
<td>Pb Free Re-marked</td>
<td>Possible</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Lesser part</td>
<td>Possible</td>
<td>No</td>
<td>Possible</td>
<td>Possible</td>
<td>Possible</td>
<td>Possible</td>
<td>Likely</td>
<td>Yes</td>
</tr>
</tbody>
</table>

[Back to main presentation]
Risk Mitigation- AS5553
Counterfeit Electronic Parts; Avoidance, Detection, Mitigation, and Disposition

• This standardizes practices to:
  – a. maximize availability of authentic parts,
  – b. procure parts from reliable sources,
  – c. assure authenticity and conformance of procured parts,
  – d. control parts identified as counterfeit,
  – e. and report counterfeit parts to other potential users and Government investigative authorities.

• Requirements
  – 4.1 Counterfeit Electronic Parts Control Plan
    - The organization shall develop and implement a counterfeit electronic parts control plan that documents its processes used for risk mitigation, disposition, and reporting of counterfeit parts. The control plan shall include the processes described in paragraphs 4.1.1 through 4.1.7 below.
  – 4.1.1 Parts Availability
    - The processes shall maximize availability of authentic, originally designed and/or qualified parts throughout the product’s life cycle, including management of parts obsolescence.
Risk Mitigation- AS5553
Counterfeit Electronic Parts; Avoidance, Detection, Mitigation, and Disposition

4.1.2 Purchasing

- Assess potential sources of supply (including electronic parts, assembly, and equipment suppliers) to determine the risk of receiving counterfeit parts. Assessment actions may include surveys, audits, review of product alerts (e.g., GIDEP, ERAI), and review of supplier quality data to determine past performance.

- Maintain a register of approved suppliers including the scope of the approval, to minimize the risk of counterfeit parts supply. Specify a preference to procure directly from OCMs or authorized suppliers on the approved supplier list.

- Assure that approved/ongoing sources of supply are maintaining effective processes for mitigating the risks of supplying counterfeit electronic parts. Assurance actions may include surveys, audits, review of product alerts, and review of supplier quality data to determine past performance.

- Assess and mitigate risks of procuring counterfeit parts from sources other than OCMs or authorized suppliers. This shall be accomplished and documented for every application when it is necessary to procure from other than the OCM or an authorized supplier.

- Specify supply chain traceability to the OCM or aftermarket manufacturer that identifies the name and location of all of the supply chain intermediaries from the part manufacturer to the direct source of the product for the seller. If this traceability is unavailable or the documentation is suspected of being falsified, a documented risk assessment is required.

- Specify flow down of applicable requirements of this document to applicable contractors and their sub-contractors. In the event that one or more supply chain intermediaries do not have a counterfeit part control plan compliant to this document, a risk analysis shall be required for every application of the part.
4.1.3 Purchasing Information
- The documented process shall specify contract/purchase order quality requirements to minimize the risk of being provided counterfeit parts.

4.1.4 Verification of Purchased Product
- The documented processes shall assure detection of counterfeit parts prior to formal product acceptance. The rigor of the verification process shall be commensurate with product risk. Product risk is determined by the criticality of the part and the assessed likelihood of receiving a counterfeit part. Examples of verification actions include: review of data deliverables, visual inspection, measurements, non-destructive evaluation and destructive testing (e.g., marking permanency, x-ray, destructive physical analysis, thermal cycling, hermeticity, burn-in).

4.1.5 In Process Investigation
- The documented processes shall address the detection, verification, and control of in-process (post acceptance) and in-service suspect counterfeit parts.
Risk Mitigation- AS5553
Counterfeit Electronic Parts; Avoidance, Detection, Mitigation, and Disposition

- 4.1.6 Material Control
  - The documented processes shall specify methods to:
    - a. Control excess and nonconforming parts to prevent them from entering the supply chain under fraudulent circumstances.
    - B. Control suspect or confirmed counterfeit parts to preclude their use or reentry into the supply chain.

- 4.1.7 Reporting
  - The documented processes shall assure that all occurrences of counterfeit parts are reported, as appropriate, to internal organizations, customers, government reporting organizations (e.g., GIDEP), industry supported reporting programs (e.g., ERAI), and criminal investigative authorities.
IDT 71028 Example X-Ray

- Compare die size, shape, lead frame construction, wire bond gauge and routing
Risk Mitigation
AS5553 and NPD 8730.2 Key Elements

1. Develop a Counterfeit Electronic Parts Control Plan
2. Contents of the Plan
   - Parts Availability
     - parts obsolescence management
   - Purchasing
     - Assess sources of supply.
       » surveys, audits, review of product alerts (e.g., GIDEP, ERAI), review of supplier quality data
     - Maintain an Approved Suppliers List
     - Procure directly from OCMs or authorized suppliers
     - Suppliers have processes for mitigating the risks of supplying counterfeit electronic parts (example 1, 2, 3)
     - Mitigate risk if procuring from sources other than OCMs or authorized suppliers. (assessment1, assessment2, exemption example)
     - Supply chain traceability that includes every intermediary in the supply chain. (example 1, 2)
Contents of the Plan (continued)

- **Purchase Order Requirements Flowdown**
  - specify contract/purchase order quality requirements to minimize the risk of being provided counterfeit parts.

- **Verification of Purchased Product**
  - detection of counterfeit parts prior to formal product acceptance.
  - The rigor of the verification process shall be commensurate with product risk *(inspection checklist).*

- **In Process Investigation**
  - The documented processes shall address the detection, verification, and control of in-process (post acceptance) and in-service suspect counterfeit parts.

- **Material Control**
  - Control excess and nonconforming parts to prevent them from entering the supply chain under fraudulent circumstances.
  - Control suspect or confirmed counterfeit parts to preclude their use or reentry into the supply chain.

- **Reporting**
  - all occurrences of counterfeit parts are reported, as appropriate, to internal organizations, customers, government reporting organizations (e.g., GIDEP), industry supported reporting programs (e.g., ERAI), and criminal investigative authorities.
References

- SAE Aerospace Standard AS5553: Counterfeit Electronic Components; Avoidance, Detection, Mitigation, and Disposition
- SAE Aerospace Standard AS6174: Counterfeit Materiel; Assuring Acquisition of Authentic and Conforming Materiel
- DTEK - Covisus Corporation
- IDEA-STD-1010-A: Acceptability of Electronic Components Distributed in the Open Market
- SMT Corp – Miscellaneous charts and images on sample counterfeit parts
- IDEA-STD-1010-A: Acceptability of Electronic Components Distributed in the Open Market
- [http://www.aeri.com/counterfeits.html](http://www.aeri.com/counterfeits.html)
- Lead Photo courtesy of Custom Analytical Services, Inc.
- Tautec Electronics website
- [http://counterfeitparts.wordpress.com](http://counterfeitparts.wordpress.com)
- [http://brandwatchtech.com/](http://brandwatchtech.com/)
- [http://www.arrow.com/supplyassurance/](http://www.arrow.com/supplyassurance/)