chipsID
COUNTERFEIT ELECTRONIC PARTS MITIGATION STRATEGY GUIDE FOR AEROSPACE AND DEFENSE

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Revision A

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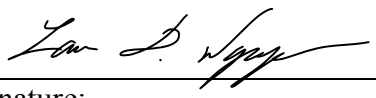
COUNTERFEIT ELECTRONIC PARTS MITIGATION STRATEGIES GUIDE FOR AEROSPACE AND DEFENSE

APPROVAL

Mr. Lam Nguyen *Staff Component/Reliability Engineer*	Signature: 	Date: January 15, 2025
Mr. Adam Hook *Sr. Principal Component Quality Engineer*	Signature: 	Date: January 15, 2025

Revision History

Revision	Date	Description
Rev. A	01/15/2025	Initial release

PROBLEM STATEMENT

Counterfeit Electronics Background

Counterfeit electronics pose a significant problem in today's global market. These fraudulent products, often indistinguishable from genuine ones, infiltrate supply chains and consumer markets, leading to numerous issues. Counterfeit parts and supplies pose a serious risk to the military. If counterfeit components find their way into critical systems, such as weapons, vehicles, or aircraft, they can compromise reliability, performance, and safety. Malfunctioning or substandard counterfeit equipment can lead to mission failures, accidents, and even loss of life. The problem of counterfeit electronics arises from Original Equipment Manufacturer (OEMs) having to purchase Integrated Circuits (ICs) from the open market, which can often be compromised with non-authorized suppliers with obsolete component stocks in addition to counterfeit ICs. Addressing this problem requires robust authentication measures, enhanced collaboration among stakeholders, deterrence programs, and stricter enforcement to safeguard the integrity of the electronics industry.

Limited Access to Golden Samples

A golden sample, also known as an exemplar, is a verified authentic electronic microcircuit obtained either directly from the Original Component Manufacturer (OCM) or authorized distributors, containing a Known Good Die (KGD). These samples are critical for identifying non-conforming counterfeit materials and preventing their integration into products. In counterfeit detection, exemplars serve as reference parts with confirmed authenticity, enabling comparison against a Device Under Test (DUT). To ensure precise assessments, golden samples must match the DUT in characteristics, including manufacturing details and markings, with any discrepancies documented during evaluation. Golden samples are integral to counteracting counterfeiting, as outlined in SAE AS6081 and SAE AS6171 standards, which emphasize the avoidance, detection, mitigation, and disposal of fraudulent or counterfeit electronic components.

Many businesses often underestimate the complexities of the supply chain, especially when faced with unexpected disruptions such as COVID-19, geopolitical tensions, or natural disasters. Operating reactively and relying heavily on just-in-time models, these businesses may struggle to provide golden samples needed for verification and validation, particularly for obsolete components. This situation heightens the risk of businesses procuring parts from the open market without any reference for authentication, solely to meet contractual delivery deadlines to the customers. A comprehensive database of golden samples will enable companies to establish a list of qualified suppliers and enable them to deter and enforce use of OCM that contain KGD. In addition, when use of open market stock is necessary, a golden sample database will enable CMs and OEMs to authenticate components prior to the manufacturing process.

Diminishing Manufacturing Sources and Material Shortages (DMSMS) and Obsolescence

Aerospace and defense contracts often require system support and sustainment for 20 to 30 years, which typically exceeds the lifecycle of many Commercial-off-the-Shelf (COTS) electronic components. Consequently, sourcing parts from the open market becomes a likely necessity to extend the system's operational lifespan. In such situations, OEMs must leverage all available resources to mitigate the risks associated with counterfeit electronic components.

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1. Scope

The scope of this document is to offer essential principles and practices based on chipsID's extensive expertise in Component Engineering, accumulated over a period of more than 20 years. When put into action, these guidelines will enhance the contractor's ability to prevent and/or detect the acquisition of counterfeit electronic components. The system's effectiveness aligns with the Fiscal Year (FY) 2012 National Defense Authorization Act (NDAA), Section 818, as well as complies with the Federal Acquisition Regulation (FAR), Defense Federal Acquisition Regulation Supplement (DFARS) rule, 48 CFR 252.246-7007, SD-26 Requirement No. 25a/25b (Contractor's parts management program and plan), SD-26 Requirement No. 29 (Measuring plan effectiveness in preventing counterfeit and tampering), and SAE International AS5553, Fraudulent/Counterfeit Electronic Parts; Avoidance, Detection, Mitigation, and Disposition.

2. Purpose

The purpose of this document is to inform the industries that a centralized and collaborative golden samples database now exclusively available through chipsID to serve all companies that have strong counterfeit mitigation policy and take meaningful measures to ensure the quality and authenticity of electronic components.

3. Reference Documents

Table 1 Reference Documents

Reference Document Title	Document Number	Source
Defense Industrial Base Assessment: Counterfeit Electronics	NA	DoC
Defense Federal Acquisition Regulation Supplement: Contractor Counterfeit Electronic Part Detection and Avoidance System	DFAR 252.246-2007	DoD
DMSMS and Parts Management Contracting Guide	SD-26	DSPO
Counterfeit Electrical, Electronics, and Electromechanical (EEE) Parts; Avoidance, Detection, Mitigation, and Disposition	AS5553	SAE
Fradulent/Counterfeit Electronic Parts; Avoidance, Detection, Mitigation, and Disposition - Distributors	AS6081	SAE
Test Methods Standard; General Requirements, Suspect/Counterfeit, Electrical, Electronic, and Electromechanical Parts	AS6171	SAE
Counterfeit Components Avoidance Program	CCAP-101	CTI Inc.
Counterfeit Parts Prevention Strategies Guide	TOR-2014-02200	National Systems Group
Counterfeit Electronic Parts Risk Management Plan	AEP 40-011	Crane Aerospace & Electronics

4. Terms and Definitions

The following terms and definitions apply to this document. Definitions are derived from multiple sources with strong counterfeit mitigation policy.

Table 2 Terms and Definitions

Term	Definition	Source
Electronic Part	An integrated circuit or microcircuit, an active electronic component. Note: chipsID currently focuses exclusively on integrated circuits, as they are a highly targeted commodity according to ERAI.	chipsID
Golden Sample Part / Reference Part / Exemplar	A golden sample, or exemplar, is an authentic electronic microcircuit sourced from authorized distributors or directly from the Original Component Manufacturer (OCM) that contains a Known Good Die (KGD).	chipsID
Suspect Counterfeit Part	An electronic part for which credible evidence (including, but not limited to, visual inspection or testing) provides reasonable doubt that the electronic part is authentic.	DFARS rule, 48 CFR 252.246-7007(a)
Reclaimed or Refurbished Part	Component that has been reclaimed, refurbished in an effort to restore them to a “like new” condition, e.g., leaded parts that have leads realigned, re-tinned, subjected to cleaning agents and chemical processing.	CCAP-101
Counterfeit Electronic Part	An unlawful or unauthorized reproduction, substitution, or alteration that has been knowingly mismarked, misidentified, or otherwise misrepresented to be an authentic, unmodified electronic part from the original manufacturer or current design activity, including an authorized aftermarket manufacturer. Unlawful or unauthorized substitution includes used electronic parts represented as new, or the false identification of grade, serial number, lot number, date code, or performance characteristics.	DFARS rule, 48 CFR 252.246-7007(a)
Obsolete Part	A component that has reached its End-of-Life (EOL) and is no longer being manufactured by the OCM.	chipsID
Original Component Manufacturer (OCM)	An organization that designs and/or engineers a part and is pursuing or has obtained the intellectual property rights to that part. (1) The part and/or its packaging are typically identified with the OCM’s trademark. (2) OCMs may contract out manufacturing and/or distribution of their product. (3) Different OCMs may supply product for the same application or to a common specification.	AS5553

Original Equipment Manufacturer (OEM)	A company that manufactures products that it has designed from purchased components and sells those products under the company's brand name.	AS5553
Aftermarket Manufacturer	Products that are no longer available through the OCM or an OCM authorized distributor may be available through authorized aftermarket manufacturers. Aftermarket manufacturers generally fall within the following categories: Authorized by the OCM or Intellectual Property (IP) holder to produce and sell parts, usually due to an OCM or IP holder's decision to discontinue production of a part, produces parts using semiconductor die or wafers, manufactured by and traceable to an OCM or IP holder, or produces parts through reverse-engineering that match the OCM or IP holder's specifications without violating the OCM or IP holder's intellectual property rights and with the OCM or IP holder's authorization. While authorized aftermarket manufacturers play a vital role continuing supply once manufacturers discontinue products and authorized distributor inventory is depleted, use of aftermarket manufacturers is not a guarantee of support for all products needed, nor is it a guarantee of infinite supply for products they do support.	AS5553 & Aerospace Guideline TOR-2014-02200
Franchised Distributor	A distributor that performs authorized distribution, which is defined as transactions conducted by an OCM-Authorized Distributor distributing product within the terms of an OCM contractual agreement. Contractual Agreement terms include, but are not limited to, distribution region, distribution products or lines, and warranty flow down from the OCM. Under this distribution, the distributor would be known as an Authorized Distributor. For the purposes in this document, Franchised Distribution is considered synonymous with Authorized Distribution.	AS5553 & Aerospace Guideline TOR-2014-02200
Independent Distributor or Broker	A distributor that purchases parts with the intention to sell and redistribute them back into the market. Purchased parts may be obtained from OEMs or Contract Manufacturers (typically from excess inventories), or from other Distributors (Franchised, Authorized, or Independent). Resale of the purchased parts (redistribution) may be to OEMs, Contract Manufacturers, or other Distributors. Independent Distributors do not normally have contractual	AS5553

	agreements or obligations with OCMs. See definition of Franchised Distributor. In the independent distribution market, Brokers are professionally referred to as Independent Distributors.	
Supply Chain Traceability	Documented evidence of a part's supply chain history. This refers to documentation of all supply chain intermediaries and significant handling transactions, such as from OCM to distributor, or from excess inventory to broker to distributor.	AS5553
Government-Industry Data Exchange Program (GIDEP)	GIDEP is a cooperative activity between government and industry participants seeking to reduce or eliminate expenditures of resources by making maximum use of existing information. The program provides a media to exchange technical information essential during research, design, development, production and operational phases of the life cycle of systems, facilities and equipment.	GIDEP
ERAI	ERAI, Inc. is a global information services organization that monitors, investigates, and reports issues affecting the global electronics supply chain. As the industry's leading source of risk assessment tools, ERAI provides exclusive services and in-depth information that enable its members to perform industry-specific risk mitigation on suspect counterfeit, high-risk, and non-conforming parts and identify problematic suppliers and customers.	ERAI

5. Requirements

The requirements outlined in this document are derived upon chipsID's accumulated insights and extensive knowledge in Component Engineering. They are designed to furnish contractors with a robust framework for counterfeit mitigation and prevention, emphasizing a proactive approach with a centralized golden samples database.

5.1 Traceability

All purchased electronic component parts shall require traceability to the OCM by means of a Certificate of Conformance (C of C). However, commercial parts do not normally require a C of C from the OCM which could potentially result in loss of traceability, therefore, providing redacted invoices to show chain of custody is also acceptable.

Note: Documents like certifications or Certificates of Conformance (C of C) can also be counterfeited. It is recommended to verify their authenticity with the OCM to minimize the risk of counterfeit parts.

When the contractor is authorized to purchase parts with lack of traceability strictly caused by shortages due to supply chain disruption or obsolescence, additional testing measures as described in this document shall be executed.

Traceability documents must include the following:

a. Name, address, and phone number of the authorized supplier
b. Contractor purchase order (PO) number
c. Part Number
d. Original Component Manufacturer (OCM)
e. Certificate of Conformance (CoC)
f. Date code and lot code
g. Quantity
h. Reliability and test certification
i. Signatures of supplier's Quality Assurance (QA) and inspector

5.2 Mandatory Golden Samples

The majority of current counterfeit inspection and testing procedures per existing standards are conducted without demanding reference to a known good sample or golden sample. The absence of access to a reference part substantially diminishes confidence in authenticating the Device Under Test (DUT). This could potentially result in the contractor subjecting a counterfeit component to rigorous testing, leading to a waste of resources and time.

It is highly recommended for the contractor to collaborate closely with chipsID in cataloging selected Commercial-Off-The-Shelf (COTS) microcircuits once the design is finalized. Documenting the part at this stage of the lifecycle primarily yields advantages in terms of availability, cost, and safeguard against supply chain disruption or obsolescence for potential future procurement of parts from the open market.

5.3 Use of Authorized Suppliers

All acquisitions of components intended for production must be conducted exclusively through authorized suppliers, extending this requirement to procurement activities at subcontractor facilities. In cases where the supplier is an authorized distributor, the authorization must specifically pertain to the parts being procured. If a particular part cannot be identified through an authorized channel, Component Engineering shall be consulted to explore the potential of identifying an alternative part or source before considering other procurement options.

To enhance confidence further, the contractor has the option to stipulate that the authorized supplier furnishes solely Original Component Manufacturer (OCM)-direct, never-returned products along with a Certificate of Conformance (CoC) signed by the OCM. Alternatively, the product may be directly shipped from the OCM.

5.4 Use of Brokers

All purchases from the brokers, including those made by subcontractors, must be governed by the contractor's Component Engineering with rigorous assessment process for evaluating and approving parts on a case by case basis to increase the confidence in the unauthorized supplier.

Contractor must maintain a list of approved brokers and test facilities. It is advisable to avoid engaging multiple brokers simultaneously in the pursuit of the same part, as this could potentially escalate costs when various sources are competing for the identical component.

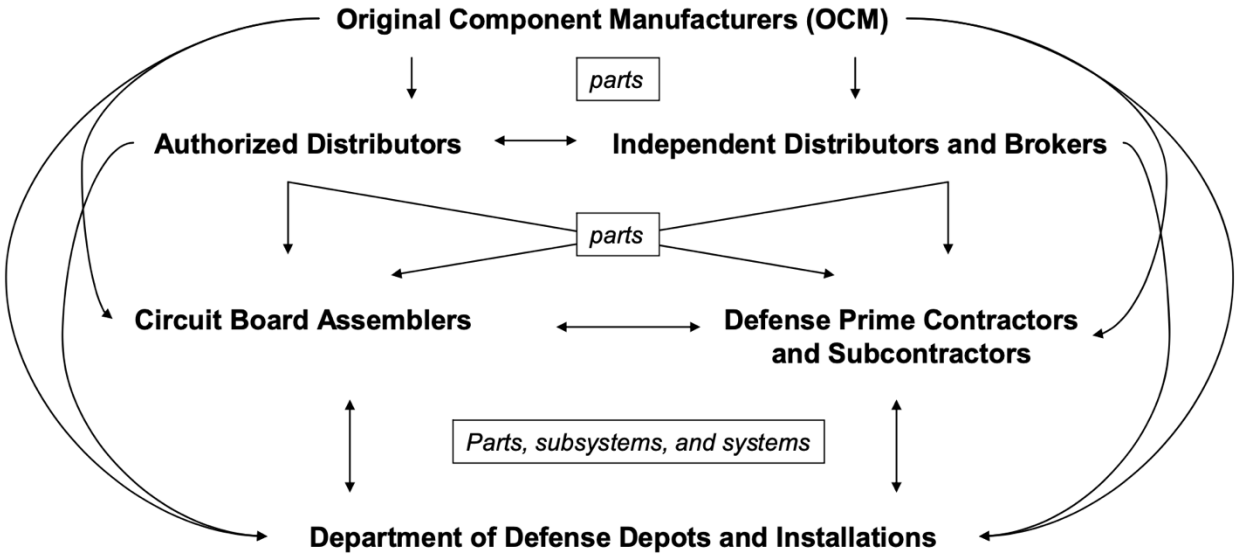
6. Current vs Proposed Defense Parts Flow in Supply Chain

6.1 Current Defense Parts Flow

The typical flow of parts in the defense supply chain (see **Figure 1**) deals with counterfeit mitigation through a reactive approach. This approach restricts various suppliers, including distributors, OEMs, CMs, and the Department of Defense, from accessing golden samples for comparison.

All suppliers and contractors lack a centralized repository for reference parts today. If such a repository existed, it was often restricted to specific parts and did not encompass all the components selected in the design. Consequently, many rely on SAE standards such as AS6081 or AS6171 to conduct inspections and electrical tests, aiming to bolster their confidence in authenticity. However, these standards fall short in mandating the utilization of a golden sample for comparison, prompting the question of the actual value added by these supplementary tests to the screening process.

Figure 1 Current U.S. Defense Electronic Parts Supply Chain



Source: U.S. Department of Commerce, Office of Technology Evaluation, Counterfeit Electronics Survey, November 2009.

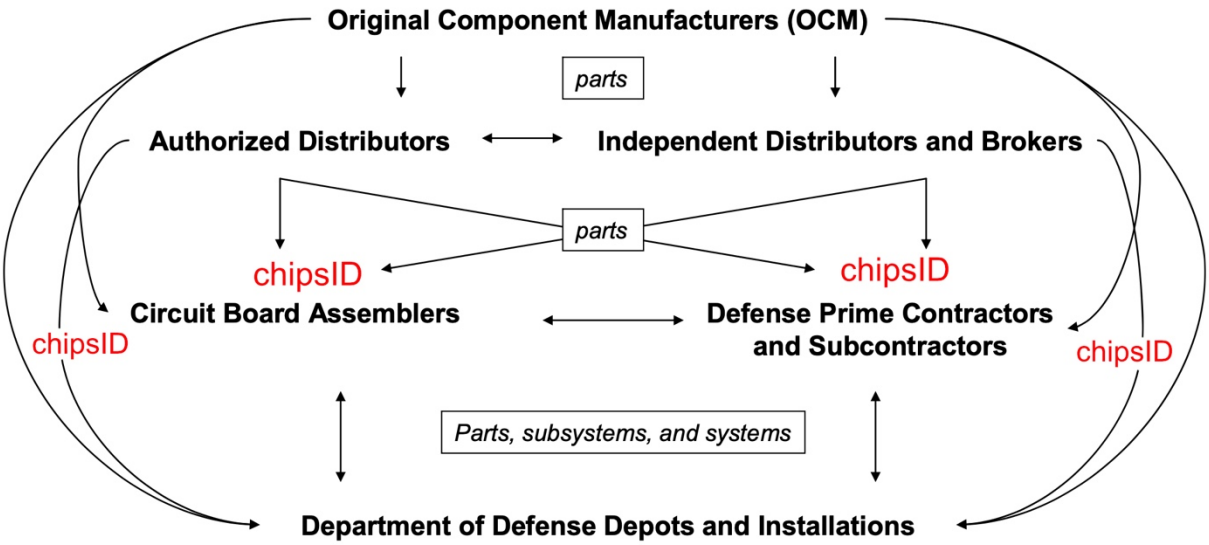
6.2 Proposed Aerospace and Defense Parts Flow

While each entity independently performs counterfeit mitigation through inspection and electrical testing, a common challenge across critical electronic industries is the lack of access to golden samples for both legacy systems and new designs.

The flow of parts within the supply chain is exceptionally complex. Moreover, counterfeiters have access to sophisticated equipment, enabling them to remark, repackage, and re-tin components, making them appear indistinguishable from genuine parts sourced directly from OCMs. The external visual characteristics are nearly identical to the original parts, often causing confusion even among trained inspectors.

While the supply chain may be intricate, adopting a collaborative mindset and leveraging chipsID's capabilities can simplify and reduce the counterfeit incidents within the industry. The proposed aerospace and defense parts flow (see **Figure 2**) highlights critical areas where components are used in final system deliverables. The chipsID database is designed to act as a centralized, collaborative tool for documenting golden samples of all integrated circuit components sourced from distributors lacking OCM traceability.

Figure 2 Proposed U.S. Aerospace and Defense Electronic Parts Supply Chain



6.2.1 Distributors to Circuit Board Assemblers

Circuit board assemblers typically acquire their manufacturing parts through two widely employed methods in the industry. The first approach involves the assembler obtaining parts listed on the contractor's Bill of Materials (BOMs) from the OCMs or distributors. Any deviation from the BOM requires approval from the contractor's Component Engineering team. In general, most contractors usually require parts being procured exclusively through OCM or authorized distribution channels.

The second method involves a consignment effort, wherein the prime/subcontractor provides the parts directly from their own stockroom to the board assembler. This approach grants the contractor greater control over their suppliers and the quality inspection process.

In both methods, it is not always feasible to procure parts from the OCMs or authorized distributors due to the dynamic nature of supply chains and the constant changes in parts availability. It forces the circuit board assembler to coordinate with the contractor/subcontractor and obtain parts through independent distributor or broker. This situation increases the risk of encountering counterfeit electronics.

Should the circuit board assembler be granted approval to utilize preferred independent distributors or brokers by the contractor/subcontractor, it is strongly advised to catalogue the golden samples in chipsID's database. This practice would offer ongoing assurance for comparison purposes during counterfeit mitigation efforts in the future.

6.2.2 Distributors to Contractors and Subcontractors

Contractors and subcontractors must adhere to contractual obligations, utilizing components either directly from OCMs or through authorized distributors, while ensuring traceability documents specified in Section 5.1 of this document, whenever possible.

It is critical that the contractor shall lead and implement with the utmost discipline to meet DFARS rule, 48 CFR 48 CFR 252.246-7007(c)(8) that requires the “Design, operation, and maintenance of systems to detect and avoid counterfeit electronic parts and suspect counterfeit electronic parts. The contractor may elect to use current government- or industry-recognized standards to meet this requirement.” Experience has shown reactive measures to be neither adequate nor cost effective.

The contractor is required to proactively uphold an updated database of golden samples for all COTS integrated circuits within chipsID's database. Furthermore, the subcontractor must demonstrate, as part of the requirements flow down, the existence of golden samples for all COTS microcircuits in their possession prior to the contract award. Adhering to this practice would exemplify a commitment to accountability and seriousness on the part of the contractor/subcontractor regarding the quality of the product.

6.2.3 Distributors to Department of Defense

The Department of Defense comprise of buy-items and make-items for their procurement.

6.2.3.1 Buy-Items

For buy-items, the aerospace and defense department would exert minimal control on the counterfeit mitigation process, primarily by flowing down requirements to their contractors, mandating the incorporation of golden samples as outlined in Section 6.2.2 of this document.

The foremost challenge currently faced is the support of legacy systems in the absence of golden samples. These legacy systems remain operational, but obtaining parts for spares and repairs is

challenging, often requiring the acquisition of components from the open market to sustain the longevity of the program.

6.2.3.2 Make-Items

For make-items, the aerospace and defense department shall implement and comply to DFARS rule, 48 CFR 48 CFR 252.246-7007(c)(8) along with cataloging parts to chipsID's database proactively.

7. chipsID Engineering Solutions

Mitigating counterfeits involves thorough detective work. Each inspection step serves as a progression to the next, aiming to attain the highest confidence level in the authenticity of parts procured from the open market. Unfortunately, numerous companies choose to bypass a critical procedure by forgoing the comparison to a golden sample and proceeding directly to the electrical test. If the die fails to align, there seems to be little incentive to invest further in the inspection process.

7.1 Addressing Material Shortage (MS) Issues

Unexpected disruptions in the supply chain leading to Material Shortage (MS) pose a significant challenge for various industries. Effectively preparing for supply shortages caused by geopolitical issues, natural disasters, pandemics, and other factors is highly challenging. The steps recommended by Component Engineering to address Material Shortage issues are as follows:

Table 3 Recommended Steps Addressing MS Issues

Recommended Steps Addressing Material Shortage	Customer's Approval
Locate inventory worldwide from every authorized distributor for availability.	No
Identify form, fit, function replacement if applicable.	No
Identify better than performance grade such as migrating from commercial grade to automotive grade or potentially military or space grade. If higher grade is the default, then evaluate with the Electrical Engineering (EE) Designer whether the application would tolerate lower grade.	No
Identify functional equivalent part with the same number of pinouts for 'dead-bug' solution with jumper wires (simple non-complex ICs). This would allow production to bridge the lead time gap and keep manufacturing moving.	No Yes – for major change overly complicated wiring
Redesign the circuit and re-spin the Printed Wiring Assembly (PWA) or bare board.	Yes
Locate inventory from independent distributors / brokers (high risk for counterfeits infiltration).	No

7.2 Addressing Diminishing Manufacturing Sources (DMS) / Obsolescence Issues

Existing tools such as BOM lifecycle analysis, Product Change Notices (PCNs), and Last Time Buy (LTB) opportunities from OCMs help address obsolescence challenges. However, obsolescence remains an ongoing issue for many OEMs, as effectively managing it requires a multi-faceted approach. This approach involves collaboration among manufacturers, policymakers, consumers, and environmental advocates. Key strategies include implementing sustainable design practices, extending product lifecycles, and adopting responsible disposal methods to mitigate the impact of obsolescence. The steps recommended by Component Engineering to address obsolescence issues are as follows:

Table 4 Recommended Steps Addressing DMS / Obsolescence Issues

Recommended Steps for Addressing DMS / Obsolescence	Customer's Approval
EE Designer should work closely with Component Engineer during part selection process.	NA
BOM lifecycle analysis must be performed prior to design release.	NA
Monitor PCNs for changes and take action accordingly.	No
Assess the availability of the LTB (Last Time Buy) offering, and conduct an analysis of projected demand to address the gap, providing sufficient time for redesign efforts.	No
Locate inventory worldwide from every authorized distributor for availability.	No
Identify form, fit, function replacement if applicable.	No
Identify better than performance grade such as migrating from commercial grade to automotive grade or potentially military or space grade. If higher grade is the default, then evaluate with the Electrical Engineering (EE) Designer whether the application would tolerate lower grade.	No
Identify functional equivalent part with the same number of pinouts for 'dead-bug' solution with jumper wires (simple non-complex ICs). This would allow production to bridge the lead time gap and keep manufacturing moving.	No Yes – for major change overly complicated wiring
Redesign the circuit and re-spin the PWA.	Yes
Locate inventory from independent distributors / brokers (high risk for counterfeits infiltration)	No

7.3 DMS and MS Common Issues

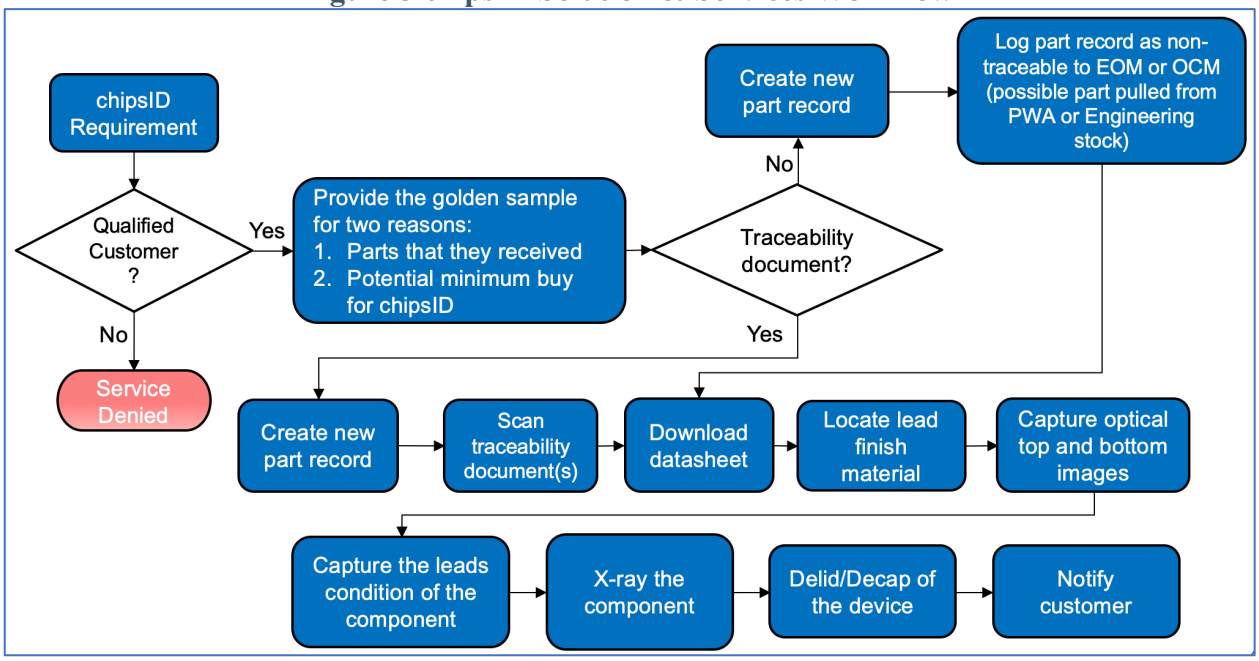
Common issues across both DMSMS are resource constraints. OEMs may face resource constraints, including financial limitations and a lack of manpower, which can hinder efforts to support and update older technologies. This is especially true for smaller businesses that may struggle to allocate resources to address obsolescence. Hence, as outlined in Section 7.1 and Section 7.2, the resolution of DMSMS issues typically involved sourcing parts from independent distributors. This approach seemed to be the most straightforward option, avoiding the need for

customer approval and system re-certification at first glance. However, inadequate inspection of parts from the open market in the absence of golden samples compromises quality, diminishes authentication confidence, and poses the risk of potential shipment delays. For aerospace customers, this situation may lead to costly fines, cancellation of multi-million-dollar contracts, and damage to reputation.

7.4 Solution & Services Workflow

Figure 3 below illustrates chipsID's process to document a golden sample into the database and inform the customer upon completion.

Figure 3 chipsID Solution & Services Workflow



7.4.1 chipsID Requirement

chipsID conducts thorough vetting of our customers and carefully chooses who we service. We exclusively engage with reputable companies that have robust counterfeit mitigation policies in place to ensure the highest quality standard of their end products upon system delivery to customers.

7.4.2 Golden Samples Collection

Upon becoming chipsID's customer, the OEM's component engineering team collaborates closely with chipsID's component engineer to identify all COTS microcircuits in use. This collaboration ensures that the search results achieve a 100% match with chipsID's golden samples database.

For the cataloging of physical parts, there are two possible approaches. In the first option, the OEM sends three pieces of each part number to chipsID. Alternatively, in the second option, the OEM

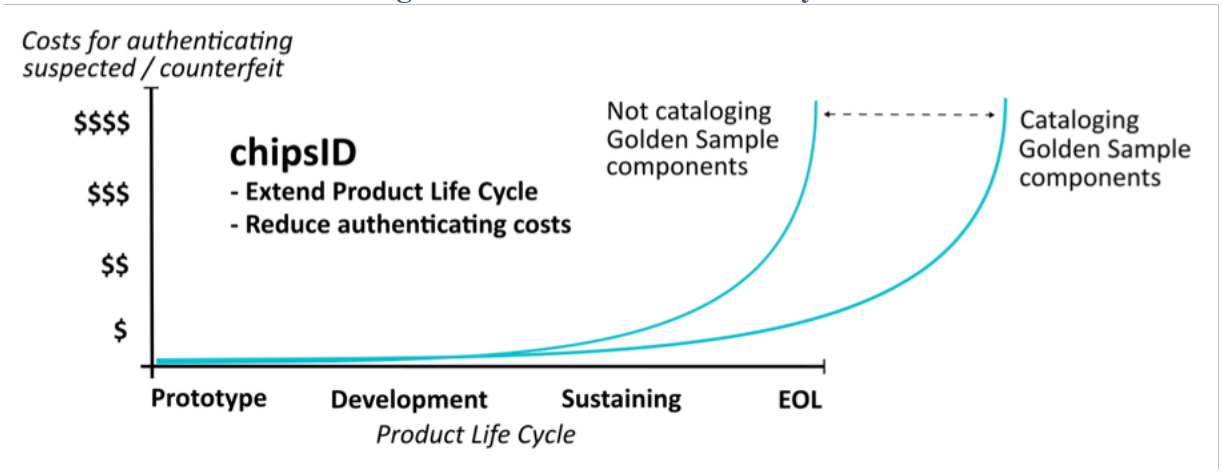
provides the BOM containing all the part numbers for the microcircuits, and chipsID procures three pieces of each part number.

Note: The second option could potentially incur additional cost for chipsID due to minimum order quantity (MOQ) requirement for certain part.

7.4.3 Proposed Proactive Golden Samples Cataloging Process

chipsID strongly encourages customers to use parts research and BOM lifecycle analysis tools like Accuris Parts Intelligence and BOM Intelligence to proactively and strategically catalog golden samples. For instance, once a designer finalizes part selection using Accuris Parts Intelligence, confirming the part's robust lifecycle and availability, the OEM can then inform chipsID to catalog that part. Another proactive approach is to leverage insights from the BOM lifecycle analysis report generated by Accuris BOM Intelligence. If a part is flagged as Not Recommended For New Design (NRFND), Obsolete, or Last Time Buy (LTB), the OEM should promptly notify chipsID to secure golden samples while they assess demand forecasts and consider transitioning to a new design if needed. By applying these proactive strategies, OEMs can gain valuable time for cost-saving decisions, extending product lifecycles through the broker market for their customers while new design is under development.

Figure 4 Extend Product Life Cycle



7.4.4 Traceability Documentation

All parts received from OEMs or procured by chipsID must originate from authorized sources or directly from the OCM, accompanied by traceability documentation as outlined in Section 5.1 of this document.

Exception: In order to support OEM's legacy systems, there will be occasions where chipsID would allow parts to be documented without traceability i.e. pulled from an existing circuit assembly or Engineering stock. These parts will be clearly identified in the database as no associated traceability. In chipsID's database, all DUTs shall be clearly marked with warning label for all images: 'WARNING: THIS PART IS A DEVICE UNDER TEST (DUT) AND NOT TO BE USED AS GOLDEN SAMPLE COMPARISON'.

7.4.5 Parts Catalog

chipsID's cataloging process follows AS6171 inspection test methods in order to provide all the information and images needed to validate DUTs or open market parts.

Cataloging Steps:

1. Record traceability document for chain of custody back to the OCM. This document is stored offline and available upon request.
2. Download datasheet for convenient access from the database.
3. Locate lead finish material usually disclose by the manufacturer under Quality section for Chemical Content or Material Composition Datasheet.

8. chipsID Database

Currently, there are two databases (ERAI and GIDEP) that catalog suspect counterfeit parts. However, there is no comprehensive database for gold sample references, except for chipsID. This lack of a unified reference point makes it challenging to distinguish between genuine and counterfeit parts. While chipsID could theoretically start a database of all known good devices, this approach is impractical and not valuable. If chipsID contains a million verified parts, but only 5% match the needs of a particular company, it becomes an ineffective tool. The key is not the quantity of parts in the chipsID database but its relevance to the specific needs of each company.

The database includes high-resolution images of the component's top, bottom, leads, X-ray, die (dark field) and die (bright field). It also features a popular 'Compare' function integrated within the system. Additionally, it offers a collaborative environment, enabling you and your subcontractors to view golden samples supplied by others who potentially use the same COTS parts.

Overview of chipsID database and its feature is available at the following links below:

chipsID Database Intro	https://video.wixstatic.com/video/cc96f6_4b27a0650b3149638ae8dfc3a1f36c30/1080p/mp4/file.mp4
chipsID Compare Feature	https://video.wixstatic.com/video/cc96f6_b94f76ee760949b48ed5f1077fd71e9b/720p/mp4/file.mp4

9. Subcontractor Requirements Flow Down

DMSMS and obsolescence impact everyone and not just the primes. Before awarding the contract to the subcontractor, it is strongly advised that the subcontractor must maintain a database of golden samples with chipsID. Instances have occurred where the subcontractor, in order to fulfill delivery obligations, seeks authorization from the prime to procure parts from the open market without comparing them to the golden samples. This creates a challenging scenario for the prime as there is no singular data point for them to validate or verify against, making acceptance of the test report extremely difficult.

10. Spares and Repairs

Spares and Repairs are particularly vulnerable to counterfeit infiltration. The market for spare parts and repair services is vast and constantly in demand. This high volume of transactions provides numerous opportunities for counterfeiters to infiltrate the supply chain. Companies and consumers

often seek to minimize repair and maintenance costs, which can make cheaper counterfeit parts appealing. Counterfeiters exploit this by offering lower-priced alternatives that can be difficult to distinguish from genuine parts. The supply chain for spare parts and repairs is often complex, involving multiple intermediaries. This complexity can obscure the origin of parts, making it easier for counterfeit items to be introduced and harder to trace their source. In many regions, the market for spare parts is less regulated than the market for new products. This lack of stringent regulation and oversight can create loopholes that counterfeiters exploit. The sheer variety of parts needed for different products and machines creates numerous opportunities for counterfeiters. It is challenging for any organization to monitor and verify the authenticity of every single part. Counterfeit parts can be sophisticated and visually similar to genuine parts, making detection difficult without specialized knowledge or equipment. This is especially true for internal components that are not visible once installed. Counterfeiters often target the aftermarket, where consumers and repair shops purchase parts outside of the OEM network. Aftermarket parts can be harder to regulate, and the market is often more price-sensitive. Repairs often need to be done quickly, leading to a preference for readily available parts. Counterfeiters can exploit this urgency by offering parts that are immediately available, even if they are of inferior quality. The globalization of trade means that parts and components can come from all over the world. This global network can make it difficult to ensure that all parts are genuine, especially when sourcing from regions with less stringent enforcement of intellectual property rights.

11. Defense Contract Management Agency (DCMA)/Quality/ISO Audits

Demonstrating compliance for counterfeit mitigation to auditors involves a comprehensive approach that combines documentation, processes, and proactive measures.

- Develop a comprehensive mitigation plan with clear policies and detailed procedures, including:
  - Supplier management
  - Inspection processes
  - Training programs

- Maintain thorough documentation of:
  - All processes
  - Training records
  - Inspections
  - Supplier evaluations

- Collaborate with chipsID to implement authentication technologies and catalog golden samples throughout the product lifecycle.
- Regularly conduct internal and third-party audits.

- Establish a corrective action process to:
  - Report counterfeit incidents
  - Address issues in alignment with industry standards like AS5553.

- Prepare for audits by:
  - Organizing documentation

- Validating that all open market purchases have cataloged golden samples for side-by-side comparison during audits.

- Conduct mock audits to ensure transparency and cooperation during the audit process.

After the audit, promptly address findings and continually monitor and improve mitigation strategies.

12. List of Acronyms

BOM	Bill of Materials
CM	Contract Manufacturer
CoC	Certificate of Conformance
COTS	Commercial-Off-The-Shelf
DCMA	Defense Contract Management Agency
DFARS	Defense Federal Acquisition Regulation Supplement
DMSMS	Diminish Manufacturing Sources and Material Shortages
DoC	Department of Commerce
DoD	Department of Defense
DSPO	Defense Standardization Program Office
DUT	Device Under Test
EE	Electrical Engineering
EEE	Electrical, Electronics, and Electromechanical
EOL	End of Life
ERAI	Electronic Resellers Association International
FAR	Federal Acquisition Regulation
GIDEP	Government- Industry Data Exchange Program
IC	Integrated Circuit
IP	Intellectual Property
ISO	International Organization for Standardization
KGD	Known Good Die
LTB	Last Time Buy
MS	Material Shortage
NA	Not Applicable
NDAA	National Defense Authorization Act
NRFND	Not Recommended For New Design
OCM	Original Component Manufacturer
OEM	Original Equipment Manufacturer
PCN	Product Change Notice
PO	Purchase Order
PWA	Printed Wiring Assembly
QA	Quality Assurance
SAE	Society of Automotive Engineers