Golden Samples for Counterfeit Mitigation

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ABSTRACT

An electronic golden sample refers to an authentic electronic microcircuit obtained from authorized distributors or directly from the Original Component Manufacturer (OCM) that contains a Known Good Die (KGD) internally. The golden sample plays a crucial role in combating counterfeiting in accordance to the SAE AS6081 and SAE AS6171 standards, which focus on avoiding, detecting, mitigating, and disposing of fraudulent or counterfeit electronic parts.

However, many businesses tend to underestimate the complexities associated with the supply chain due to unexpected events such as COVID-19, geopolitical issues, and natural disasters. These businesses often operate reactively and rely on just-in-time business models. Consequently, when a golden sample is required for verification and validation purposes, it is no longer accessible. 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.

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. Furthermore, there are cloned parts with functional die emulation exhibited better performance than authentic parts [1]. This emphasizes the need for us to stay ahead of counterfeiters by implementing stringent measures for counterfeit prevention. This can be achieved by requiring the inclusion of golden samples in a centralized database for verification prior to system delivery to the customer.

"Counterfeit integrated circuits pose a significant threat to the global electronics component supply chain and are becoming more difficult to detect as counterfeiters increase their level of sophistication." – Counterfeit IC Detection and Challenges Ahead pub. 2013 [2].

If we persist in functioning without access to a reference component in times of need, the difficulties will accumulate, making it increasingly challenging to support obsolescence, prevent counterfeit infiltration for legacy systems, and manage chips shortage effectively. I will present on a novel proactive and preventative approach utilizing a golden samples database from chipsID that could effectively and significantly reduce counterfeit occurrences of electronic components for all phases of product lifecycle.

"We do not want a $12 million missile defense interceptor's reliability compromised by a $2 counterfeit part" – General Patrick O'Reilly (Sandia Labs) [3]

Key words: COVID-19, Circuit Design, Obsolescence, Blacktopping, Sanding, Counterfeit, Components, Integrated Circuits, Reliability, Inspection, Strategic Supply Chain, Critical Electronics, Medical, Military, Defense, Space, Automotive, Global Risk, OEM

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BIOGRAPHY

Lam Nguyen is the Founder and CEO of chipsID, a technology startup that provides exceptional engineering services in preventing and mitigating counterfeit electronic components throughout the entire process of part selection, and also aims to create a collaborative golden samples database for all companies. This will enable them to maintain inspection control down to the die level and ensure the quality and authenticity of their components.

Lam has amassed over 18 years of experience in the defense industry, specifically in Reliability/Component Engineering, working on both shipboard and airborne platforms. Throughout his career, Lam has fulfilled the role of a reliability engineer, undertaking various responsibilities such as conducting Failure Modes Effects and Criticality Analysis (FMECA), calculating Maintainability and Reliability Prediction, developing the Reliability, Maintainability, and Availability (RMA) Program Plan, and maintaining the Failure Reporting and Corrective Action System (FRACAS) database.

Additionally, in his capacity as a Component Engineer, Lam engages in a wide range of tasks, including documentation for part creation, conducting lifecycle analysis of Bill of Materials (BOM), investigating component-related issues, identifying secondary sources or alternatives for parts affected by obsolescence driven by Diminishing Manufacturing Sources and Material Shortages (DMSMS), and assessing and reviewing inspection test reports for counterfeit mitigation to address supply shortages.

Lam's guiding principle is to contribute in every possible way to national security. He holds a Bachelor of Science degree in Electrical Engineering and possesses a strong passion for utilizing technology to tackle complex problems.