

Prevent counterfeit electronics

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Abstract—Today’s tech industry is struggling with a growing problem, counterfeiting of components. In the semiconductor industry, an estimated \$3 billion worth of components are counterfeit worldwide [1]. But lost revenue is not all. Counterfeit components may compromise the performance and safety of electronics. If a component is not what it claims to be, this can result in unreliable and dangerous systems.

I. INTRODUCTION

The problem with counterfeit components is known in the tech industry, but the solution is not obvious. Finding counterfeit components is a difficult task. They appear in many different shapes and ways. Old components sold as new, components relabeled to a higher grade, or components scrapped from the original manufacturer are just some examples.

Today, big corporations and semiconductor manufacturers works with authentication and standardizations to fight the problem. That means extra work which takes time and requires money, money that not every company can spend. Especially these days where a multitude of small hardware companies are making their way into the market. They don’t have the resources to motivate additional development of anti-counterfeit techniques. And it does not exist any pre-defined methods or standards of how to handle the problem.

With the increasing number of hardware start-ups in the industry comes a growing number of smaller factories and component distributors. This results in larger and more complex supply chains which means a greater risk of counterfeit.

While it is hard to motivate implementation of additional anti-counterfeit methods for a new company, it is still desired to deliver working products without malfunctioning or counterfeit components. Minut is one of those hardware start-ups making a connected home monitoring product called Point. They want to ensure that every shipped unit works as supposed and contains no counterfeit components.

II. HOW TO HANDLE THE PROBLEM

Simply, by testing. Point uses a variety of sensors to sense the ambient environment. By developing a custom test system that validates the performance and quality of all sensors on every produced Point, it is possible to tell if the unit works and is ready to be shipped to customer. All tests will be designed to validate that the output of the sensors conforms to their specifications. If a sensor performs within specified accuracy, it is assumed to be working and not to be counterfeit. Also the power consumption of every Point is measured to assure that none of the components consumes

more current than expected. The combination of all these tests ensures the functionality of every unit.

III. RESULT

The test system makes it possible to validate the performance of all the critical components on Point. Test results from the system shows that malfunctioning components can be distinguished during production. This assures that no defect units leaves the factory and hence fulfills one purpose of the test system. The other purpose is to find counterfeit components. This is a more complex task. The work points out that it is hard to binary determine if a component is counterfeit or not. However, by the use of data logging and statistics, the solution is one step closer. By storing the results from all the tested units, Minut can gather statistics over the quality of every single component. If the statistics shows high failure rate or poor performance within specific component batches, it could be counterfeit components. With these statistics it is possible for a company to put pressure on the supply chain and component manufacturer.

The work shows that is it possible for small hardware companies to test and quality validate their products. The test system built also introduces simple ways to keep statistics of the testing and production. With every produced unit tested, the risk of delivering a product containing a counterfeit or malfunctioning component is reduced. With more companies testing their products, it is more difficult for counterfeit components to reach consumers and the overall safety of delivered products is increased.

More about the methods on how this results is acquired and more discussion about the subject is available in [2].

REFERENCES

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