

PCB REVERSE ENGINEERING USING
NONDESTRUCTIVE X-RAY TOMOGRAPHY AND
ADVANCED IMAGE PROCESSING

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ABSTRACT

- Reverse engineering (RE) of electronic systems is performed for many different reasons, including, but not limited to, failure analysis and fault isolation, obsolescence management, proof of IP rights infringement, security assessment, development of attacks, and counterfeiting. Regardless of the goal.
- It is imperative that the community understands the requirements, complexities, and limitations of RE.
- Traditional RE is based on a destructive process of serial sectioning followed by imaging, which is time-consuming, expensive, and error-prone. However, with the advent of advanced characterization tools and imaging software, this is starting to change.



EXISTING SYSTEM

- Electronics are the driving force of critical systems in transportation, energy, communication, health, defense, and more applications.
- A failure could have catastrophic and, in some cases, even life threatening consequences. Globalization of integrated circuit (IC) and printed circuit board (PCB) industries has resulted in well-documented concerns such as counterfeiting, piracy, and hardware Trojan insertion.
- For such instances, RE represents an important tool for validating the performance, quality, authenticity, and integrity of electronics.



PROPOSED SYSTEM

- A nondestructive approach for printed circuit board (PCB) RE based on X-ray tomography.
- The imaging parameters for a successful tomography are explained in detail and combined with advanced 3-D image processing and analysis to automate RE, thereby lowering the associated time and cost.
- We demonstrate our proposed process on two PCBs, a four-layer custom designed board, and a more complex commercial board.
- Lessons learned from this effort can be used to both develop advanced counter-measures and establish a more efficient workflow for instances where RE is unavoidable.



HARDWARE REQUIRMENT

- Processor - Intel
- Speed - 1.1 Ghz
- RAM - 256 MB(min)
- Hard Disk - 20 GB
- Monitor - SVGA

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SOFTWARE REQUIRMENT

- Tool - MATLAB R2012
- Operating system - Windows Xp, 7

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