SOME METHODS FOR ELECTRONIC COMPONENT AUTHENTICITY ASSESSMENT

Tomas Bata University in Zlín
Faculty of Applied Informatics

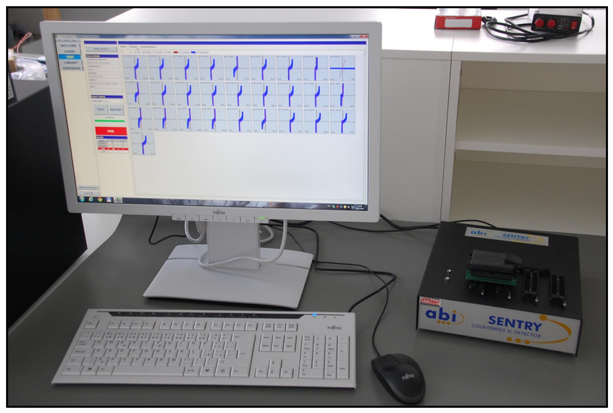
Neumann Petr, Houser Josef, Pospíšilík Martin, Skočík Petr, Adámek Milan,

Tomas Bata University in Zlín,
Faculty of Applied Informatics, Department of Electronics and Measurements,
Nad Stráněmi 4511, 760 05 Zlín, Czech Republic
neumann@fai.utb.cz, houser@ft.utb.cz, pospisilik@fai.utb.cz, skocik@fai.utb.cz, adamek@fai.utb.cz,

INTRODUCTION

The electronic component authenticity verification represents a very important act especially for any company producing application specific assemblies nowadays. The problem of disingenuous electronic components represents an increasing worldwide problem in course of about last twelve years. These components are presented as original products by OCMs (Original Component Manufacturers) according to their labels, logos, etc. The sources for component counterfeiting are quite varied ones. It could be a discarded batch originating from the component original manufacturer, or it could be a refurbished component from a trash of electronic modules which were not recycled properly. The reason which attracts those who are counterfeiting electronic component is a same one as at other illegal or criminal activities, gain interesting amount of money and invest less than in legal activities. The components counterfeited types are also varied ones and demand dependent. Smaller customers may quite frequently experience situation when they need to look for required components supply from alternative sources. Especially the odd and unproven supplier represents an extremely high risk in spite of its attractive prices and very short delivery times.

OUR LABORATORY FOR DIAGNOSTICS

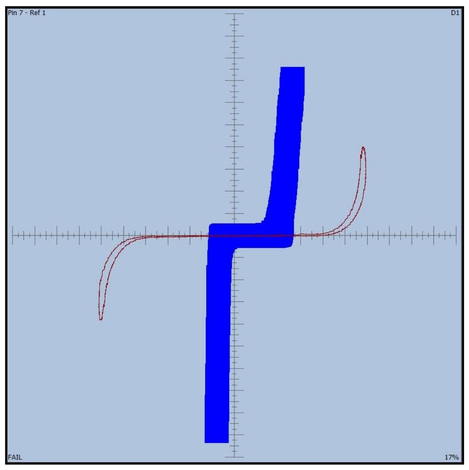


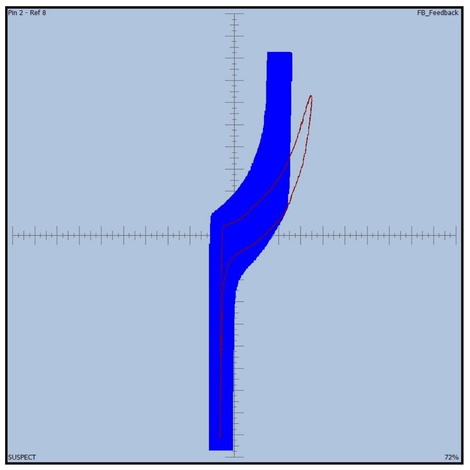
The 256 channels I-V characteristic comparative analyser.

The fiber laser for component package decapsulation.

I-V characteristics comparative analysis offers an interesting preventive method for relatively quick, simple and accessible new source component evaluation. Moreover, that methods is still applicable for a standard diagnostics studies of technological and mistreatment consequences for a component with a model I-V characteristics recorded in advance. Fiber laser offers flexibility for a selective decapsulation.

I-V CHARACTERISTICS COMPARISON

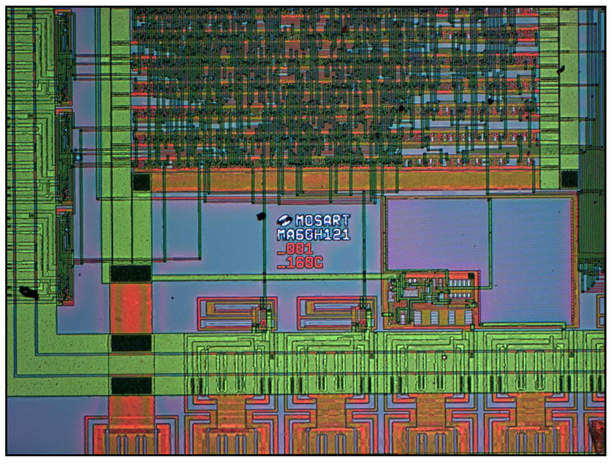


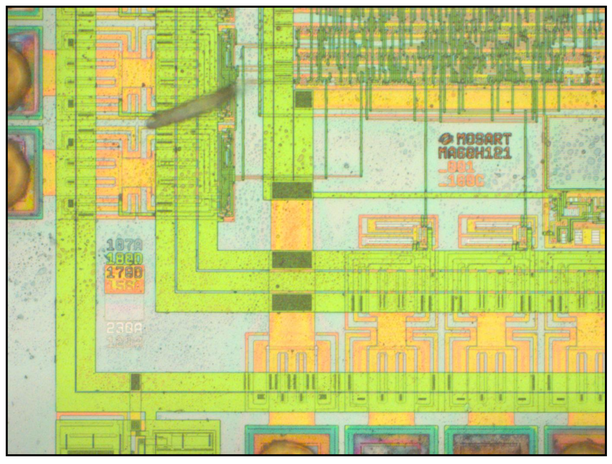


Analysed pin-prints are plotted in red colour, blue tolerance range represents related genuine component.

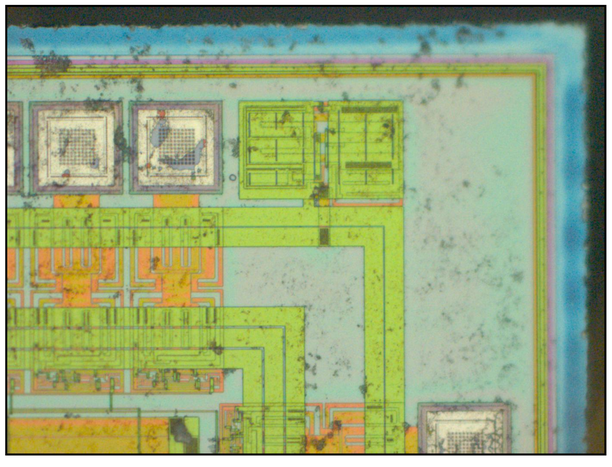
I-V characteristic AKA pin-print comparison method is a very nifty tool for a suspicious component assessment. Any test procedure can be prepared in advance by qualified personnel and it can be used by any instructed operator later on. Component pin-prints related to the genuine component one may reveal also the level of component assembly technology.

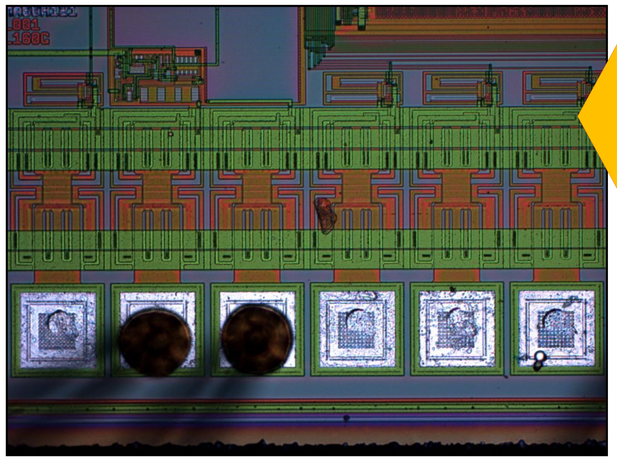
COMBINED FIBER LASER &. MINIMIZED ETCHING DECAPSULATION RESULTS





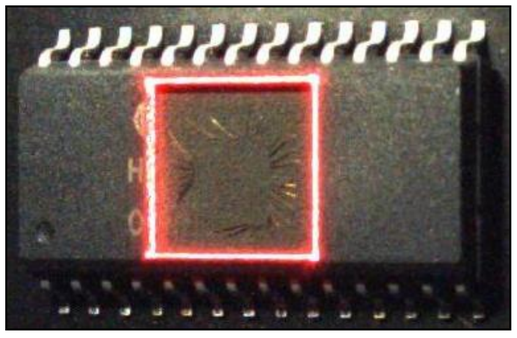
The chip identification label revealed by our modified final etching process (optical microscope with a magnification of 200 digital picture).

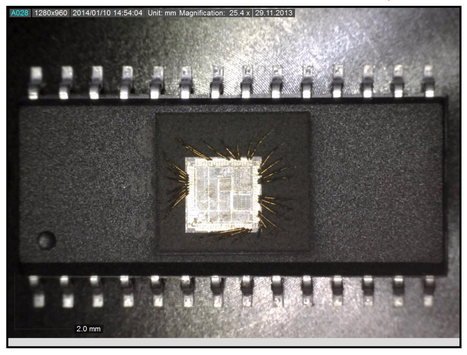


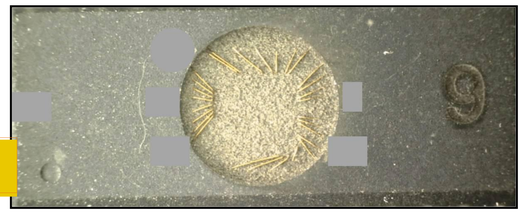


Other structures and bonding wires on revealed chip (optical microscope with a magnification of 200 digital picture).

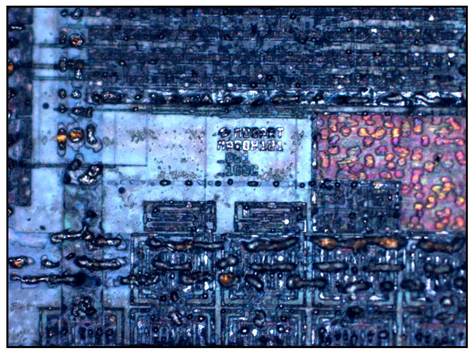
FIBER LASER APPLICATION FOR DECAPSULATION







Decapsulation procedure completely performed by laser is very likely to damage the system on chip. That is why a combination of a safe partial decapsulation by laser and final decapsulation by a wet etch process is recommended. The package plastic material filling particles like glass globules also influence the laser decapsulation process. However, the system on chip origin identification can be sufficient in many cases.



Fiber laser selective decapsulation examples.

CONCLUSION

We have established our laboratory and experimental testing activities about three years ago. Thanks to our decision to cooperate with companies in early stage of our project, we have been collecting the precious experience and process feedback since then. Our closest goal is to incorporate a special X-ray device as well.