Fraunhofer
SIT

FRAUNHOFER INSTITUTE FOR
SECURE INFORMATION TECHNOLOGY

Fraunhofer Institute for Secure
Information Technology SIT

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PRODUCT PROTECTION
TECHNICAL MEASURES TO COMBAT PIRACY AND REVERSE ENGINEERING

Counterfeiting and piracy of products, components, and designs by unscrupulous competitors causes considerable harm to innovative companies and indeed whole national economies. In addition to lost sales, product piracy can also lead to reputational damage if customers notice quality deficiencies in the counterfeit articles. Human lives could even be at risk, for example if inferior airbags or brake parts are installed in a car. The same applies to the brands, technologies, and processes employed in industrial engineering – like sensitive measuring and control instruments.

Optimal protection

In an effort to eliminate product piracy and reverse engineering (the reproduction of systems and designs using stolen technology), Fraunhofer SIT's developers have evolved highly efficient and subtly differentiated security techniques for electronic components and software on behalf of partners in the capital goods industry. These systems, which are offered in answer to practical needs, afford optimal protection by concealing a product's functionality and thus rendering reverse engineering virtually impossible. A scrambler designed by Fraunhofer SIT, for instance, hides digital signal streams to facilitate continuous authentication between electronic components and firmware. This makes it much more difficult to analyze functionalities or reproduce products. In contrast to complex encryption procedures it is very easy to use and takes up comparatively few resources.

Wherever standardized mechanisms – such as property rights or commercially available security concepts – are inadequate, the Fraunhofer SIT team develops made-to-measure solutions that inextricably link the product design and the services or service processes together to yield a unit that cannot be copied. At the same time, the protective measures integrate seamlessly into existing business and manufacturing processes, thus also cutting costs.

Solution kit

The broad spectrum of security measures and encryption techniques available on the market form the basis for solutions in all price categories. These range from protective hardware memory chips and matching software – whether in the form of field programmable gate arrays (FPGA) or as mechanisms for microcontrollers – to special methods for marking the materials used. The technical protection measures developed by Fraunhofer SIT are specifically tailored to the needs of the engineering and automotive industries.

Fraunhofer SIT has the capability to test embedded systems for weaknesses and robustness against piracy. Complete system checks can be carried out as well as analyses of selected components. Proprietary test tools are used alongside commercially available products. For instance, in order to evaluate the effectiveness of security measures, SIT has developed software for testing executable binary codes. Among other things, it assesses the degree to which a program code has been complicated by obfuscators and obfuscation techniques.

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