

# IRDMark - Implementation of Dinamic Infraredesign® (IRD) technology

## Infrared protection with digital printers



Patent protected: P20130110A, EP2165844, P20100451A

www.infraredesign.net • vilko@ziljak.hr • tel: +385 91 1812 946

Vilko Žiljak, Jana Žiljak Vujić, Klaudio Pap, Ivana Žiljak Stanimirović

**FOTOSOFT**  
10000 Zagreb  
Bednjanska 12  
Croatia

IRDMark is a new protection method with digital printing against photocopying and scanning of any kind. We produce a security system for printing documents with an algorithm incorporated into the depths of the printer driver, in order to produce the visual and infrared print. The printer becomes a system that produces security documents. The software is on the computer and ensures that each print carries a dual infrared image. Control of print is with an IR camera which comes complete with IRDMark driver for printer. The method not use special colors, but only those colors that are standard for a given conventional printer.



Dynamic printing from color printer with built IRDMark tag

Software extracts the IR properties of dyes located in the printer. Z-color procedure manages the deployment

of toner or ink particles in such a way that it creates a double image. Since algorithm is installed in the printer driver, on each document is printed IRDMark without the user's knowledge. This double image is made up of two pieces of information. One is visible to the naked eye, the other with IR camera that is an integral part of the computer system.



Detection of hidden image in the near-infrared (NIR) of the output from printer with NIR apparatus (part of the system)

Photocopier equated visual and infrared condition of IRDMark print removing the security feature. After photocopying or scanning of the printed document, security graphic has no longer a hidden message under near infrared detection.

IRDMark is method of joining two independent images of arbitrary design. Visual image is in color, and can be a logo, a picture of nature, a portrait, computer graphics, a text,

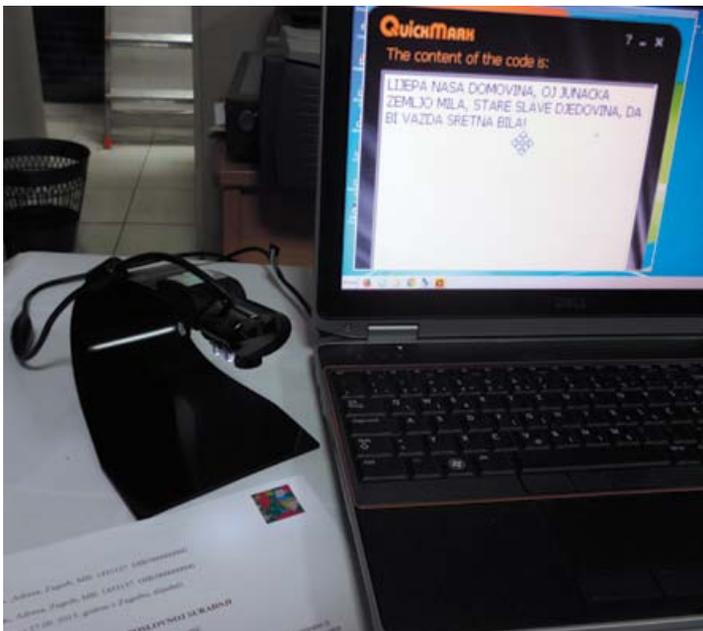
an algorithmically generated drawing created with pseudo-random security procedures. The infrared image is monochrome, it will be hidden from our eyes and may be any form of bar code system. The application is to protect corporate print documents, financial reports at all levels, printed accounts, certificates, printing of citizenship certificate, printing of diplomas, print ID cards, lottery, notarial documents, certificates that accompany certain goods and services, and many other features arising from it.

The security graphic is beyond the control of the user, and it is integrated itself automatically during the printing process. As a security tag in the driver to drive the printer, it is printed on each page of user content from any application using the computer's operating system. IRDMark graphic is an integral part of the printer driver performed as a bit map in machine language for a particular printer. Solution of embedding of Infradesign® feature on the print media is based on

a dynamic embedding of IRDMark graphic when the print file is forwarded to the RIP (Raster Image Processor).

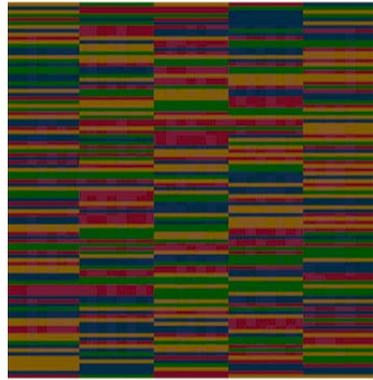
Visual and hidden graphics can be designed at the request of the client. Detection system displays image hidden in the NIR (near infrared) spectrum. The specificity of this system is the ability to display micro protection from IRDMark graphics, and his focus is set for a small distance.

IRDMark protection of one document can be with a hidden QR code in the NIR spectrum. In the visible spectrum is seen a picture, and in the NIR spectrum is embedded QR code. For this purpose it is created IRD QR detection system that quickly and easily read the unseen QR code that was embedded in the dynamic print of color printer over IRDMark graphics. At the time of placing of the IRDMark tag below our IRD QR detector, attached QR reader on the computer automatically reads the encrypted text. In this way, without any influence of man the document is authenticated as the original.

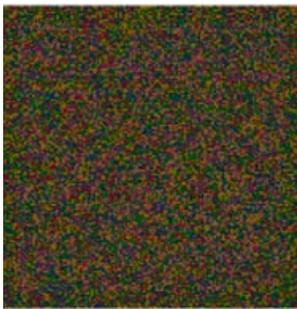


This form of protection is the original method. In this technology all is happening at the time of printing so it can be used as a standalone or hybrid techniques with the existing ones without disturbing previous habits or printing chains. The method produce unlimited size of the IRD protection regardless of whether it is a vector or pixel graphics.

The software is based on CMYKIR theory. Two images are printed simultaneously with the IRDMark technology. Our Z (NIR) camera does not allow visual input V range 400-700 nm. The Z camera registers all forms of NIR light sources, as well as the solar NIR component. Therefore, it can be used in daylight conditions. During the day we shoot the NIR absorption because the V range is filtered. Night vision requires an external stimulus NIR (surveillance cameras). The center of the Z camera is at 1000 nm (reads the Z value).



Workflow of IRDMark protection of the document with printer and automatic reading QR codes hidden in the NIR spectrum

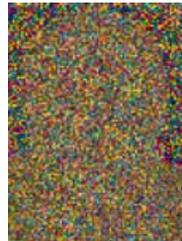
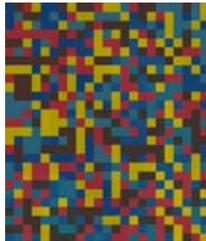


## IRDMark – different modes of use of hidden information

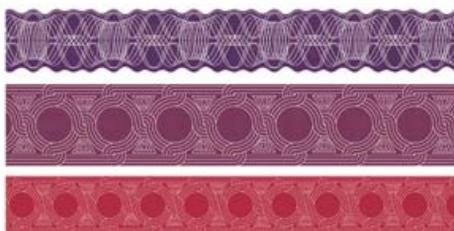
IRDMark graphic that is installed to automatically print, can have different combinations of visible and hidden information. In the following examples, you can see different modes of application: IRDMark with hidden text and numerical

information, IRDMark with hidden portraits and images, IRDMark in the form of friezes with hidden messages, IRDMark in the security rosettes, IRDMark with hidden QR codes.

Fotosoft, Zagreb, Croatia



IRDMark with hidden portraits and images



IRDMark in the form of friezes with hidden messages