DCS® 5 APPLICATIONS

Infrared Imaging
Visualising Fingerprints on Banknotes using fpNATURAL 1

Application Note
ISSUE 2
May 2015
Equipped with a custom modified camera and Vis-IR sensitive lens, the DCS 5 fingerprint imaging workstation enables examiners to search for evidence beyond the limits of human vision, detecting and visualising latent fingerprints within the visible and IR wavebands.

The complex and irregular backgrounds found on many banknotes can prove to be exceptionally challenging for fingerprint examiners.

However, when using IR imaging technology in combination with fpNatural 1 fingerprint powder it is possible to suppress patterened backgrounds and to induce bright IR fluorescence in the powdered prints.

Developed using a substance extracted from naturally occurring algae, fpNatural 1 fluoresces brightly in the infrared when stimulated with blue or red illumination.

Fingerprints on both paper and polymer banknotes can be dusted with fpNatural 1, and once illuminated with red or blue light, and viewed in the IR waveband, show excellent high-contrast fingerprint with little or no interference from the notes printed background.

**DCS 5 Required Hardware**

In order to accommodate the differing requirements of fingerprint laboratories worldwide, DCS 5 is a modular system that can be expanded through the addition of application specific modules.

In order to perform Infrared Imaging of fpNatural 1 IR fluorescent fingerprint powder, the DCS 5 core imaging system must be equipped with the additional **Infrared Imaging Package**.

### DCS 5 core imaging system

A turnkey system operated via a Windows PC, the DCS 5 Core Imaging System includes all components required to image and enhance fingerprints in the visible spectrum.

**Image Capture**
Nikon D810 DSLR camera
105mm Vis-IR Macro Lens
Visible Imaging Filter Set

**Illumination**
Crime-lite 8x4MK2 multi-wavelength ring light
Halogen Light Source Package

**System Essentials**
Copy Stand & Accessories
Computer Hardware
DCS 5 Software Package

**Infrared Imaging Package**

Additional light source and filters essential for infrared imaging.

**Crime-lite 8x4MK3**
IR Imaging Ring Light
Provides Blue, Red and IR illumination

**Forensic Light Source (FLS)**
Powerful 100W halogen lamp with 400-1000nm continuous bandpass filter

**IR Imaging Filter Set**
715nm, 780nm, 850nm, 1000nm
+ Step-ring

**fpNatural 1 IR Fluorescent Powder**
Natural 1 20g

**APPLICATION IMAGES**

Page 3
Australian polymer banknote
Nicaraguan polymer banknote

Page 4
Russian paper banknote
Chinese paper banknote
Trinidadian polymer banknote

Page 5
Euro paper banknote
Latvian paper banknote
S.African polymer banknote

Page 6
Euro paper banknote with IR fluorescent security feature
Australia Polymer Banknote

Illumination: Halogen Visible
Lens: 105mm AF
Filter: 780nm

Illumination: Red 600-660nm
Lens: 105mm AF
Filter: 780nm

Nicaragua Polymer Banknote

Illumination: Halogen Visible
Lens: 105mm AF
Filter: 850nm

Illumination: Red 600-660nm
Lens: 105mm AF
Filter: 850nm
Russia Paper Banknote

China Paper Banknote

Trinidad Polymer Banknote
DCS5: Infrared Imaging, Visualising Fingerprints on Banknotes using \textit{fpNATURAL}

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**Euro Paper Banknote**

- **Illumination**: Halogen Visible
- **Lens**: 105mm AF
- **Filter**: Vis Pass

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**Lithuania Paper Banknote**

- **Illumination**: Red 600-660nm
- **Lens**: 105mm AF
- **Filter**: 780nm

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**S.Africa Paper Banknote**

- **Illumination**: Halogen Visible
- **Lens**: 105mm AF
- **Filter**: Vis Pass

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IR Fluorescent Backgrounds

Some banknotes include security features that fluoresce at the same wavelength as Natural 1.

In this situation, the IR fluorescence of the security feature may prevent the examiner from obtaining a clear print.

Here we demonstrate a simple technique that can be used to reveal fingerprints in this situation.