

TENNESSEE BUREAU OF INVESTIGATION

Forensic Services Division



Latent Print Standard Operating Procedures

1.2 Reflective Ultra-Violet Imaging System

1.2.1 Scope

Reflective Ultraviolet Imaging System (RUVIS) technology is non-destructive and may be used prior to processing to locate and photograph latent prints. This is achieved by viewing the reflectance of ultraviolet (UV) light through an imaging system. Shortwave UV light (254 nm) is used since the residues associated with fingerprints (i.e. fats, oils) are highly reflective to light in this wavelength.

The Sirchie Crimesite Imager (KSI) is a scope that utilizes RUVIS technology. It is typically attached to a tripod, but can be hand-held to visualize latent prints. A camera attachment is used to capture latent print images.

The Sirchie Scan-N-Find also utilizes RUVIS technology and is useful for scanning large areas to locate latent prints. The Scan-N-Find is a small device with a variable focus wide-angle 30mm UV lens.

The Full Spectrum Imaging System (FSIS) is a camera incorporated with RUVIS technology that can be used to detect latent prints and capture latent print images.

1.2.2 Evidence

Evidence includes non-porous surfaces such as metal, plastic, finished wood, or glass. Non-porous evidence with areas of blood may also be visualized with the KSI using the blood filter.

1.2.3 Safety Precautions

Shortwave UV light can cause burns to the skin and the eyes to develop “arc eye” or “welders flash.” When using any UV light source, safety goggles and/or face shield and protective clothing (i.e. latex gloves, long sleeves, long pants, etc.) shall be worn to protect both the eyes and the skin.

Extra caution shall be used when using any UV light source on reflective surfaces (i.e. metal, windows, flat wall surfaces). Keep it on a stable surface, warn others of the dangers, and never point it at anyone while it is on.

TENNESSEE BUREAU OF INVESTIGATION
Forensic Services Division



Latent Print Standard Operating Procedures
1.2 Reflective Ultra-Violet Imaging System

1.2.4 Instruments/Equipment

Sirchie Krimesite Imager
Bandpass (ultraviolet) filter
RUVIS Companion Illuminator (254nm)
Puissant Short-wave Ultraviolet Lamp (254nm)
Camera
UV reflective rulers
Tripod
Protective Clothing (lab coat, long sleeves, gloves)
Protective Eye Wear (safety goggles, face shield)
Sirchie Scan-N-Find
UV Panther AC/DC Shortwave Light (254nm)
UV Mini Light Source (254nm)
Full Spectrum Imaging System (FSIS)
Spectroline UV light source (254 nm)

1.2.5 Performance Check

A successful performance check must be performed prior to using the Imaging systems to view evidence. This performance check must be documented in the examiner's notes.

One or more latent prints are placed on a non-evidence item (i.e. glass slide). The item is viewed with the Krimesite Imager, Scan-N-Find, or FSIS to determine if adequate results are achieved.

A positive result occurs when friction ridges are visible. This indicates proper functioning.

A negative result occurs when no friction ridges are visible. This indicates improper functioning. When a Krimesite Imager, Scan-N-Find, or FSIS is improperly functioning, it will be taken out of service and not used to examine evidence until modifications can be made and proper functioning is achieved.

1.2.6 Procedure

Use the following procedure when using the KSI

1. The Krimesite Imager, with the ultraviolet (Bandpass) filter selected, is placed to the eye and directed at the evidence. The filter is properly inserted when the mirrored side is to the lens. Turn the KSI and UV light source on.

TENNESSEE BUREAU OF INVESTIGATION

Forensic Services Division



Latent Print Standard Operating Procedures

1.2 Reflective Ultra-Violet Imaging System

2. Both coarse and fine tune adjustments are used to focus the image. (The coarse adjustment is the barrel focus; the fine tune adjustment is the eyepiece). Aperture should be set at f3.5. Aperture can be adjusted as needed.
3. Observe for the presence of latent prints under the UV light.
4. If a latent print needs to be photographed, remove the eyepiece and attach the camera via the adapter. The Krimesite Imager should be connected to a tripod for stabilization in order to acquire higher quality photographs.

Use the following procedure when using the FSIS

1. Turn on the computer, mouse, and keyboard.
2. Login to the computer – press control, command, command. Use your desktop login information (your DH# and password)
3. Start the FSIS program.
4. Place the 254 nm filter in the filter tray, and slide this filter under the camera.
5. Choose the *Fast Scan* option in the Camera Control panel
6. Turn on the UV light source and direct the UV light onto the evidence by holding the light or utilizing the light stand.
7. Illuminate the item of evidence with the UV light, and view the image on the screen. Adjustments to the F-stop, exposure, gain, and gamma may be necessary to obtain the best image. Consult the user manual for further information on these settings.
8. If a latent print needs to be photographed, locate the print in *Fast Scan* mode and focus the camera. Switch to *Full Resolution* in the Camera Control panel. Make lighting adjustments as necessary to optimize photograph quality. Use either the foot pedal or *Save* button in the Camera Control panel to capture the image. Refer to 2.5.2 and 2.5.5 of the Forensic Imaging Standard Operating Procedures Manual for further instruction.



TENNESSEE BUREAU OF INVESTIGATION

Forensic Services Division

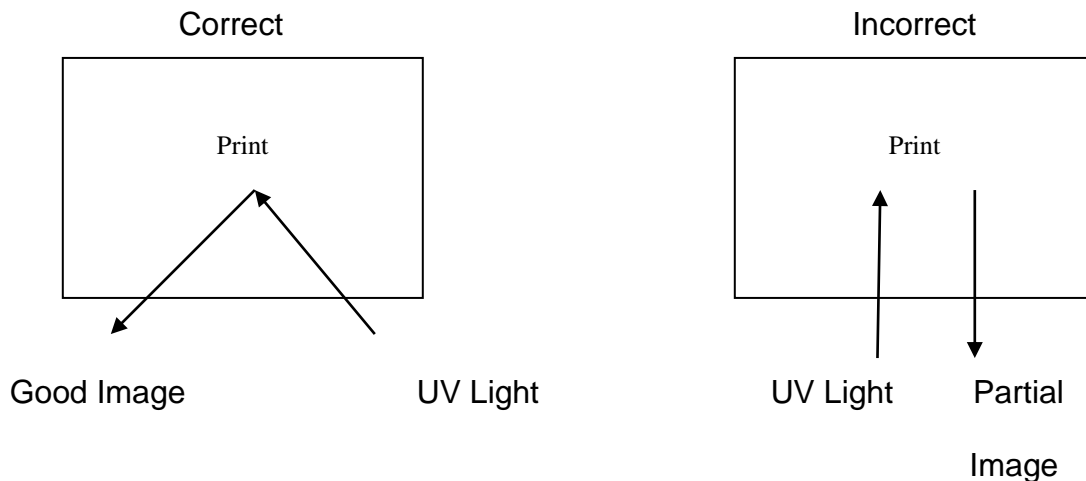
Latent Print Standard Operating Procedures 1.2 Reflective Ultra-Violet Imaging System

9. When finished, turn off the UV light and close the FSIS program.

Integration: For difficult (uneven, curved, etc.) surfaces, integration may be utilized to capture the best image of a latent print. Integration combines many images of the print, viewed at different light angles, into one consolidated image. Integration can be performed in both *Fast Scan* and *Full Resolution* modes, with the latter being utilized for comparison photography. To begin the integration process, ensure the print is in focus, and set the F-stop to 16. Press the *Start Integration* button, and slowly move the flashlight to illuminate the surface. Once a satisfactory image has been obtained, press the *Pause Integration* button, and save the image. You may also restart the integration process at this time to re-capture the image.

1.2.6.1 Recommendations

The angles and distances of the Imaging system and the UV light are very important in achieving good results.



1.2.6.2 Focusing the Krimesite Imager

1. Place an item, such as a coin, under the Krimesite Imager.
2. Use blood filter (clear). (No UV light is needed)
3. Turn Krimesite Imager on.
4. Position the focus barrel until it is fully extended and turn the eyepiece until it stops (everything should be out of focus).
5. By using the focus barrel first and then the eyepiece, bring the coin into focus and enlarge it as much as possible.

Note: After step 5 has been accomplished, always use the focus barrel to focus the image. Repeat steps 1 through 5 when needed.



TENNESSEE BUREAU OF INVESTIGATION

Forensic Services Division

Latent Print Standard Operating Procedures

1.2 Reflective Ultra-Violet Imaging System

1.2.6.3 Photography with the Krimesite Imager

1. Ensure that the UV light is on.
2. A ruler and identification label must be within the picture. Whenever possible, place the print left to right with the ruler (cm side) close to the edge of the print and fill up the frame.

Note: The use black UV reflective rulers is recommended.

3. Focus the image using the focus barrel before attaching the camera.
4. Turn camera on and then set the following features:
 - a. Macro – on (optional)
 - b. Flash – off
 - c. Auto timer – on
 - d. RAW+JPEG
 - e. Manual setting and 80 ISO
 - f. Place a secure digital (SD) card in the camera
 - g. Attach the camera
 - h. Zoom in until print and ID label fill the frame
5. Take the photo.

The procedure may be repeated after the evidence is processed with cyanoacrylate (superglue). Superglue is often times more reflective and may give better results.

1.2.7 Interpretation of Results

Latent prints of comparable value shall be marked and photographed with a ruler included and label containing the lab number, examiners initials, and area being photographed.

1.2.8 Equipment Maintenance Log

A log will be maintained on each piece of equipment in the Latent Print Unit. This log will include the following information, when applicable:

Equipment Item
State ID Number
Model Type
Serial Number
Model Number

TENNESSEE BUREAU OF INVESTIGATION
Forensic Services Division



Latent Print Standard Operating Procedures
1.2 Reflective Ultra-Violet Imaging System

Year Purchased
Operating Status
Purchase Price

Service or maintenance performed on a piece of equipment by an external vendor will be documented in the equipment maintenance log.

1.2.9 Operating Manuals

Operating manuals and warranty information provided by the manufacturer should be maintained near its respective equipment within the Latent Print Unit.

1.2.10 References

Sirchie Finger Print Laboratories, Inc. 2002, Krimesite Imager User's Manual. Sirchie Finger Print Laboratories, Inc., Youngsville, NC. pp. 1-35.

Sirchie, 2011, Scan-N-Find Pocket Imager User's Manual. pp. 1-20.

Arrowhead Forensics. July 2017. LatentMaster 16MP Workstation with 16MP Full Spectrum Imaging System (FSIS) User's Manual. FSIS Version 1.6.5, LatentMaster Version 2.6.6.