

# **COAXIAL LIGHT GUIDE & ILLUMINATOR**

**USER GUIDE**

**#A-6061**



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## **Coaxial Light Guide and Illuminator**

The coaxial light guide and illuminator are designed to aid the investigator in the visualization and photography of impression evidence on reflective surfaces using standard photographic equipment and techniques.

The device is non destructive to any evidence encountered, and can be considered a first step in the examination of evidence, which will in no way compromise further processes the investigator may choose to employ for additional examinations.

Following is a description of the system and operating instructions.

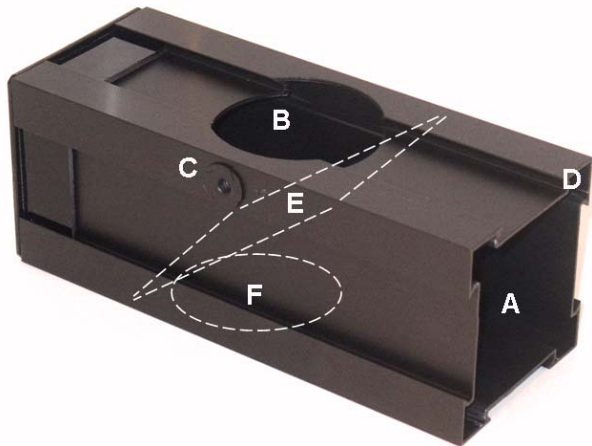
## System Components

### The Light Guide

The light guide is an extruded aluminum enclosure housing a beam splitter. The beam splitter serves two purposes:

- Directs subject lighting in a coaxial manner
- Allows viewing of exhibit within the coaxial light path
- Allows camera placement within the coaxial light path

A tripod mounting socket on the light guide allows various positioning options.



- A) Light Input Port
- B) Viewing/Photography Port
- C) Tripod Mount
- D) Mounting Keyway
- E) Beam Splitter
- F) Light Output Port

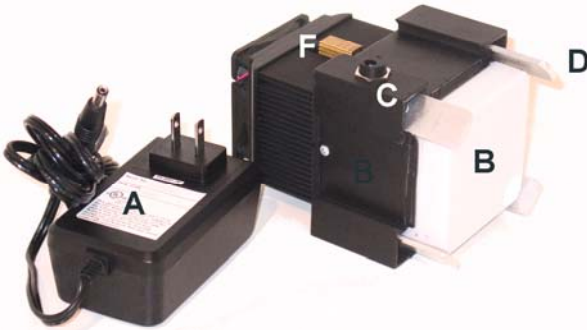
## The Illuminator

The illuminator is housed in the same extruded aluminum and is designed to mate with the light guide securely without the use of tools.

LEDs provide fifteen watts of diffuse light suitable for coaxial illumination of impression evidence. Power is provided by a plug in AC adapter.

LED lifespan will be in the neighborhood of 100,000 hours.

The gold colored cube (F) will become warm/hot during prolonged operation of the light source. This is a normal condition.



- A) AC Adapter 120 – 240 VAC input
- B) Translucent Dome
- C) AC Adapter Input
- D) Mounting Tab



## **The Unit Assembled for Use**

To attach the Illuminator to the Light Guide, slide the four mounting tabs protruding from the light source into the corresponding keyways on the Light Guide. Friction will hold the two units together.

Do not obstruct the fan on the light source during operation. Prolonged use in this state will decrease the output and the life of the light source.

## Maintenance

The components of the unit will require minimum maintenance.

The beam splitter within the light guide should be kept clean. Dust can be removed with a soft brush, and if necessary, the beam splitter surfaces can be cleaned using household glass cleaner on a soft, lint-free cloth.

The white translucent dome on the light source must be kept clean and scratch-free.

In most cases, a soft cloth moistened with household glass cleaner will remove debris. For oily or other stubborn marks, lighter fluid used sparingly is acceptable. Under no circumstances attempt to use acetone or other aggressive solvents to clean the dome.

Should the dome become scratched, commercial polishes such as Silvo® or Novus® can be used sparingly to restore a uniform surface.

There are no other user serviceable parts within the light source.

## Using the Coaxial Light Guide

The light guide can be used for the examination and photography of evidence on all reflective surfaces. These surfaces include glass, mirrors, polished metal and plastics. Impressions on varnished wood and glossy paper surfaces can also be successfully recovered using the device.

Several important points to keep in mind while using the light guide:

- The technique is non-destructive. This makes it an ideal first choice for screening exhibits since using it will have no effect on future examinations.
- The technique relies on uniform reflection of directed light to visualize evidence. For this reason, the surface under examination must be as smooth as possible. Wrinkled paper must be flat, but cannot be placed under glass or plastic for examination.
- In most cases, visualized images will be of low to medium contrast. When using film as a recording medium, the technician should select a medium/high contrast film for photography. Digital recordings can be contrast-enhanced through a suitable graphics program if necessary.

## Screening of Exhibits

To perform rapid screening of surfaces, the light source should be attached to the light guide and activated. All external lighting should be extinguished. If working within a crime scene where it is not possible to examine under these conditions, it will be necessary to darken the area or wait until nightfall.

In the darkened examination area, direct the light exiting the output port (F) onto the area of interest while viewing the area through the viewing port (B). The optimum distance between the output port and the subject varies, however, three inches is a good starting distance. When viewing reflective subjects, a square area of reflected light will be visible through the viewing port. Any foreign substances, such as finger impressions present on the surface, will disturb the reflected light, and will appear darker within the reflection.

Effectiveness of the light guide will improve as the distance from the output port to the subject is increased, however, the size of the examination area will decrease in size.

**If the output port is positioned too close to the subject, the light guide will lose all effectiveness. To avoid this, it is recommended that this distance not be less than one inch.**

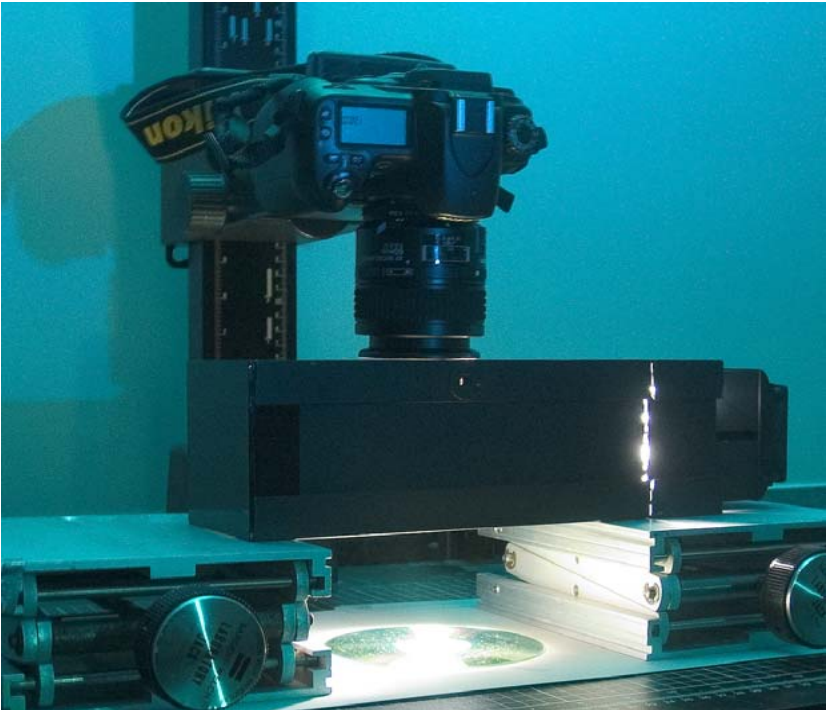
Any evidence visualized during the screening process should be marked to simplify rediscovery once the photographic phase begins. It would be best to keep markings as unobtrusive as possible, since further



development processes used on the exhibit could develop additional evidence.

## Photography of Visualized Evidence

Whenever possible, it is recommended that photography be performed on a copy stand to reduce the possibility of camera movement during exposure. If this is not possible due to exhibit location or size, tripod mounting of the camera and light guide should be considered.



Remember to extinguish all extraneous light sources when performing photographic set up and recording.

The exhibit and light guide should be set up in the same configuration as was used when the evidence was visualized in the screening process. Work until the area of interest is visualized to its highest resolution, through adjustments made to the wave guide/subject distance and orientation. The camera can now be positioned directly above the viewing port and adjusted for maximum image size and best focus.

Many auto focus cameras will focus through the beam splitter, but some may have to be manually focused. A scale should always be included on the subject plane to aid in both focusing and sizing the recorded image. Auto exposure has provided good results in all cases to date, although different cameras may require some adjustments.

In certain cases, it will be beneficial to employ a more intense, focused light source in order to improve image contrast. This can be accomplished by detaching the light source and directing light from another source onto the prism through the input port.



## EXAMPLES

The following are examples of fingerprints visualized and photographed using the Coaxial Light Guide. These photographs were taken using a simple Canon Powershot G2 in macro mode, auto focus, auto exposure and tripod mounted

All of the following impressions were photographed in their "as found" state. No processing prior to photography.

### Fingerprints on Mirror



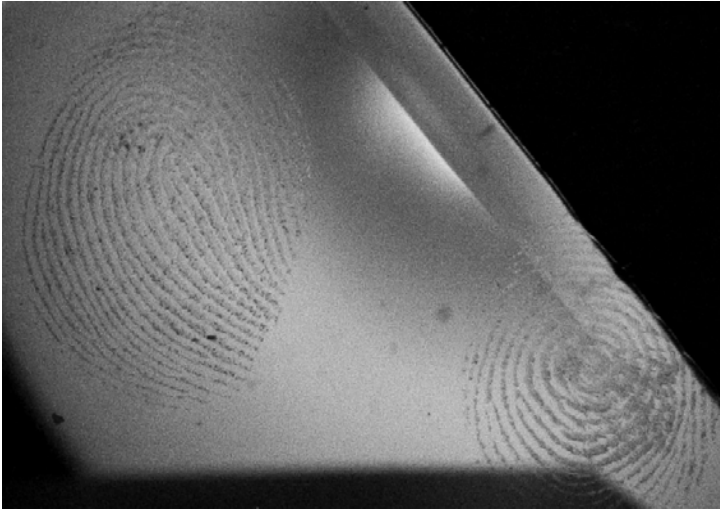
This image demonstrates the value of coaxial lighting in visualizing a fingerprint on the surface of a **mirror**. The fingerprint is in its "as found" state. No forms of development have been employed.

The coaxial path followed by the light has resulted in a uniform bright field reflection directed along the lens axis and onto the imaging plane. The only interruption of the bright field is in the form of the ridge detail present on the surface of the mirror. Since the ridge detail prevents a direct reflection of the coaxial light onto the film, it appears dark to the camera.

The resulting image is that of a dark fingerprint on a light background. The use of coaxial lighting allows the location of the camera directly above the mirror, minimizing the problem of offset ridge reflections

This subject is very similar to the silver plates used with iodine fuming when examining cadavers for fingerprints.

## Fingerprint on Black “Plexiglas”



An unprocessed article. The difference in reflective qualities between the fingerprint and the substrate allow for the impression to be visualized.

As demonstrated, even the jet black substrate appears white due to its highly reflective surface texture.

### Limited Warranty

This product is warranted against defects in materials and workmanship for a period of one year from date of purchase.

Should repairs be required, contact the vendor.



**ARROWHEAD FORENSICS**

11030 Strang Line Road | Lenexa, Kansas 66215

PHONE 913.894.8388 FAX 913.894.8399

[www.arrowheadforensics.com](http://www.arrowheadforensics.com)