
TECHNICAL INFORMATION

Tactical MAX Forensic Light Kit


Catalog No. TMX100

INTRODUCTION

Using only conventional lighting in the forensic examination of a crime scene can not reveal all the evidence that may be present. In fact, the type of evidence and what it consists of, as well as the surface containing it, can prohibit its view under conventional light. Alternate Light Sources (ALS), however, are known to cause fluorescence in certain materials and surfaces. ALSs operating in the visible light spectrum, such as the lights in the Tactical MAX Forensic Light Kit, produce strong light that overpowers any weak fluorescence. In order to see this fluorescence, it is necessary to view it through barrier filters such as orange and red goggles. The TMX100 Kit provides all the light needed to conduct an on-scene forensic investigation: White, 395nm UV, and 455nm Blue.

Each flashlight is constructed of tough black anodized aluminum and contains an extremely bright 1-watt LED. The TMX100 Kit was built for field use, contained in a heavy duty ballistic nylon case and includes a flexible mini tripod that can be used as a third hand. A light diffuser is provided to facilitate a softer light beam as required in certain photographic situations.



<p>Specifications</p>	<p>UV & Visible Light Sources (395nm, 455nm, White)</p> <ul style="list-style-type: none"> • Dimensions: 6.25" x 1.25"dia. (15.9cm x 3.2cm dia.) • Weight w/batteries: 5.1 oz. (144.6g) • Construction: Machine Knurled Black Anodized Aluminum • Switch: Push-button ON/OFF • LED: One 1-watt LED; +50,000 hrs. life • Batteries: (2) CR123 Lithiums per light <p>Light Diffuser</p> <ul style="list-style-type: none"> • Dimensions: 1.5"L x 1.5" dia. (3.8cm x 3.8cm dia.) • Weight: .74 oz (21g) • Construction: Delrin <p>No. TMXFT1 Flexible Mini Tripod</p> <ul style="list-style-type: none"> • Dimensions: 9"H (22.9cm) • Weight: less than 4 oz. • Load Capacity: 16 oz.* • Head Type: ball head • Quick release: four position plate with 1/4"-20 screw • Construction: 3 triangular segmented aluminum core legs w/non-slip thermoplastic elastomer coverings; Multi-directional ball head and quick release plate w/mounting clip <p><i>*Load Capacity determined by how tripod is used.</i></p>
<p>TMX100 Contents</p>	<ul style="list-style-type: none"> 1- Longwave UV Light (395nm) 2- Visible TMX Lights (455nm, White) 6- CR123 Lithium Batteries 1- Light Diffuser 1- No. TMXFT1 Flexible Mini Tripod 1- BMS300 Orange Goggles 1- Heavy-Duty, Ballistic Nylon Case w/carrying straps and zipper closure; Dimensions: 11" x 9" x 4" (27.9cm x 22.9cm x 10.2cm); Weight: 39.2 oz. (1.1kg) 

Hazards/Safety Info	<p>Warning! The intensity of the 395nm UV light can be damaging to the eyes. Avoid staring directly into the light source.</p> <p>Caution! Due to the high-intensity of the lights, do not look directly into any of the lights during use.</p> <p>Notice: When returning lights to the kit, do not place the ON/OFF button directly under the retaining strap—face them to the side to prevent them from accidentally turning on when the kit is closed.</p>
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Background on ALS Technology

Alternate light sources can aid the criminal investigator in their assessment of the crime scene, allowing them to see evidence that before may have gone unnoticed. Alternate light sources can be used in two ways to identify evidence, through fluorescence and in combining fluorescence with filtration. Fluorescence is when an object absorbs light energy and then re-emits that energy at a different, usually higher, wavelength. Pure fluorescence can be observed when a UV light source is used to examine bone fragments or bodily fluids and they are seen as having a bluish glow versus their surroundings, due to the energy being emitted at the higher wavelength (450nm blue vs. 400nm UV). Using wavelengths in the visible light region (410nm to 700nm) usually requires filtration to remove background colors and clearly show the desired evidence. A good example is the use of fluorescent powder, such as SIRCHIE REDESCENT™ No. LL701. A print that is identified on a multicolored surface would be difficult to photograph. Using the fluorescent powder, the fingerprint can be dusted, and then viewed with an alternate light source. Please refer to the usage chart below for examples of how the TMX lights can be used at the crime scene.

TMX LIGHT	USAGE
White	Survey the scene, oblique light for footprints
395nm UV	Bodily fluids, bone fragments
455nm Blue	Eliminate backgrounds—view bodily fluids, fluorescent fingerprint powders

TMX100 USAGE SHOTS



Normal, overhead lighting.



Oblique white light.

White Light

Use the Tactical MAX White Light to scan the crime scene for normally overlooked evidence such as dust prints. The photo (left) shows a tile floor under normal overhead room lighting, while the photo (right) shows the same floor with the room darkened and the floor obliquely lit with white light. Dust prints can now be clearly seen and lifted.



Normal, overhead lighting.



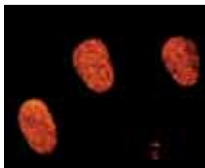
395nm UV light.

395nm UV Light

The photo (left) shows a dark-colored sheet lit with normal room lighting. The photo (right) shows the same sheet with the room darkened and lit with the Tactical MAX 395nm UV Light. Suspected physiological fluid stains will fluoresce, making it possible to locate and verify with laboratory testing.



Normal, overhead lighting.



455nm blue light viewed through an orange filter.

455nm Blue Light

The photo (left) shows a formica countertop with a medium gray, speckled finish. Using the 455nm Tactical MAX Blue Light and the included orange goggles, prints can be dusted using red fluorescent powder and photographed in a darkened room to eliminate this problem background—resulting in excellent contrast and sharp ridge detail.

TMX100 Components

Two Visible Light Sources



The two (2) TMX Visible Light Sources are identical in size and shape. Measuring 6.25" in length with a barrel diameter of only 0.9", these hand-held lights each weigh a mere 5.1 oz. with batteries. Each one is fitted with a single, very high intensity, 1-watt Light Emitting Diode (LED) constructed to provide visible light at its specific frequency. The power for the lights is supplied by two CR123 Lithium batteries.

TMX UV Light

In the preliminary examination and location of physical evidence, an ultraviolet light source should always be employed. The 395nm longwave UV light is identical in size and shape to the three visible light sources. It features a 1-watt UV LED and is also powered by two CR123 Lithium batteries.



TMX Light Diffuser

Due to the intensity of these lights, certain applications may require a less intense, softer light, such as photography of latent prints. To provide softer light, eliminate "hot spots", a simple snap on diffuser is provided.

TMX Flexible Mini Tripod

There are times you may need to have both hands free to process an area or item of forensic interest. With this in mind, the TMX100 Kit has been supplied with the No. TMXFT1 Flexible Mini Tripod. This flexible mini tripod can be used in the traditional upright position, but its unique attribute comes from its specially designed non-slip thermoplastic elastomer legs—they grip tightly around most smooth, dry surfaces and will not slip (see left inset). A true ball head design is incorporated to facilitate any number of





angles needed for the positioning of the light source. No assembly is required—simply snap the light into the clip at the top of the tripod (shown to the right) and position the light as desired. The TMXF1 is also compatible with our popular MMX100 and MMX300 series forensic lights as shown to the right.



The TMXF1 Tactical MAX Flexible Mini Tripod is compatible with our popular MMX100 and MMX300 series forensic lights.

Barrier Filters and Goggles

To eliminate backgrounds, the blue (455nm) light source can be used in conjunction with the orange barrier goggles, revealing the fluorescing objects and materials, while blocking all others. *NOTE:*



BMS300

To photograph the resultant fluorescence, orange camera barrier filters will be required.

Operation

Battery Installation

Prior to using the lights in your TMX100 Kit for the first time, you will need to install the batteries. Each light operates off two CR123 Lithium batteries. Remove the end cap from the light.

1. Install two CR123 Lithium batteries and observe polarity as shown here.
2. Screw the end cap back on firmly.



Battery Life: Typical—6 hours of continuous use. After 6 hours—50% intensity. 8 hour—20% intensity.

NOTE: It is good practice to remove the batteries from each light after use if the kit is to be stored for any period of time in order to prevent corrosion and prolong battery life.

Troubleshooting		
Problem	Possible Causes	Solution
Light does not operate	Batteries not installed	Install 2 CR123 Lithium batteries
	Batteries installed incorrectly	Check polarities
	Batteries dead	Install 2 CR123 Lithium batteries
	Power switch isn't ON	Push switch in to turn ON
	Problem with internal circuitry	Return to factory for repair. NOTE: Do not attempt repairs, disassemble beyond battery replacement or alter light as this will void your warranty.
No fluorescence visible	No fluorescent material present	Check against known standard
	Wrong wavelength used	Try other wavelengths; refer to usage chart
	Wrong barrier filter used	Try other barrier filters; refer to usage chart

MAINTENANCE

The only field maintenance required is to clean the light sources with a damp cloth. Do not use chemicals or solvents as this may cause damage to external surfaces and may damage o-ring seals.

Battery Replacement

Use only CR123 Lithium batteries and be careful to observe polarity (refer to Battery Installation instructions). If the light source will not be used for a period exceeding 3 months, remove the batteries to prevent them from losing charge and corroding.

Lamp Replacement

LEDs have an estimated life of +50,000 hours and should never need to be replaced. Unlike other forensic light sources, there are no fragile filaments to break if the light is dropped while it is turned on. If for some reason the light does not illuminate when turned on and the batteries have been replaced, check the polarity of the batteries. If the problem persists, contact the factory for assistance at (919) 554-2244.

NOTE: Do not attempt repairs, disassemble beyond battery replacement or alter lights as this will void your warranty.

REFERENCES

1. Enotes.com Inc. **World of Forensic Science/Alternate Light Source Analysis**, <<http://www.enotes.com/forensic-science/alternate-light-source-analysis>>.
2. Forensic Magazine. **New LEDs Enable Innovations in Forensic Alternative Light Sources**, <<http://www.forensicmag.com/articles.asp?pid=44>> Daniel McGraw, PhD, June/July 2005.
3. OPPapers.com. **Forensic, Alternate Light Sources—Essay #420247365**, <<http://www.oppapers.com/essays/Forensic-Alternate-Light-Sources/113295>> April 18, 2007.
4. Stollovic, Mulutin and Dr. Chris Lennard, **The Application of Light in Forensic Science & A Modern Approach to Fingerprint Detection and Enhancement, 3rd Edition**. Australian Federal Police Workshop Manual, AFP Forensic Services, Canberra, Australia, 2006.