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## TECHNICAL INFORMATION

### Forensic Optical Comparator

#### Catalog Nos. FX8B, FX8B220

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#### INTRODUCTION

The FX8B is an opaque projector capable of magnifying two separate items. The light source consists of high-intensity projection bulbs. The light is focused through a projection lens and is directed onto the object to be viewed. Light intensity may be varied by moving the light adjustment control on the side of the unit.

The light thus directed onto the object reflects up to the magnifying lens. The operator chooses one of the two powers of magnification, either six and one half times (6.5X) normal size or ten times (10X) normal size. The magnified image then reflects off a mirror and onto the Plexiglas® screen where it is viewed by the operator.

#### PRECAUTIONS

- Do not use metal ridge counters on surface of Plexiglas® screen without installing a clear plastic sheet over the screen as it is easily scratched.



- Unplug the unit before opening the re-lamping panels or attempting any repairs. *High voltages still exist inside the unit even though switches are OFF.*
- Do not attempt to replace lamps immediately after they are burned out. *Extreme heat of lamps can cause serious burns to the skin.* Allow sufficient cooling time. (We suggest running the cooling fan at least 10 to 15 minutes prior to re-lamping.)

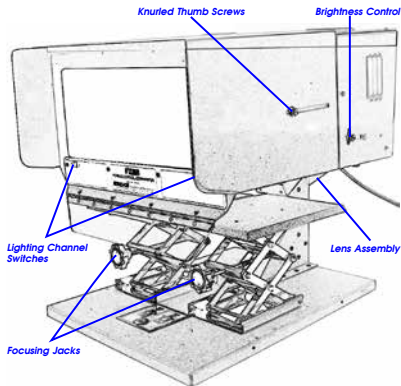
### UNPACKING THE FX8B

The FX8B is carefully packaged to prevent damage while in transit. The unit should be unpacked and inspected immediately upon receipt. If the unit is damaged, report this fact to the delivering carrier. Save all shipping cartons and packing materials for inspection by the carrier. Check the following inventory to be certain all components were received:

- 1 ea ....FX8B Projector with base platform and two focusing jacks
- 1 ea ....FX8B2 Screen Hood (Overhead Light Shield)
- 1 ea ....FX8B3 AC Power Cord, 3-conductor
- 1 ea ....FX8B4 Spare 6.25 amp fuse (120V); 3.4 amp fuse (220V)
- 8 ea ....FX8B5 Document-holding Magnets

### SETTING UP THE FX8B

1. Place the unit on a firm, sturdy supporting surface such as a table or desk.
2. The unit has a detachable power cable. Attach the female end of the cable to the receptacle on the rear of the unit. This is a three-conductor cable with polarized plugs. Check the positioning of the pins in the receptacle and the holes in the cable plug before inserting. If the positioning is reversed, the plug will not connect.
3. Connect the male end of the cable to a 110-120V AC, 50-60 Hz electrical outlet. *NOTE: If a 220-230V AC*



*model was ordered, special adaptors or cable plugs are required.* Contact an electrician for the device necessary to match existing receptacles.

With both Projection Lamps ON and the Cooling Fan running, the unit draws 625 watts. Therefore, it should be connected to a circuit protected by at least a 15amp circuit breaker. Electrical overload can be eliminated by dedicating a separate circuit to the FX8B.

4. Turn on both Lighting Channel Switches on the front panel. Operation of either ON/OFF switch will cause the cooling fan to run. *NOTE: For 220V models, either ON/OFF switch will control both channels.*
5. Determine that both Lighting Channels are operative and that the fan is running. If at any time the fan fails to operate, switch the unit OFF as overheating may occur. Refer to the section on “Field Troubleshooting and Repair” provided. The fan may run after the unit has been turned off, but will automatically cut off once the unit cools.
6. Despite all efforts by the factory, including the use of custom-made shipping cartons and packing materials, some rough handling may occur during shipment. The FX8B, while ruggedly constructed, is a delicate instrument, and rough handling may cause *misalignment* to Projection Lamps and Reflex Mirrors. To check both Lighting Channels, proceed as follows:
  - a. Turn on both channels.
  - b. Place both Brightness Controls in the uppermost positions.
  - c. The projected light from both channels should be equal.
  - d. Move both Brightness Controls to the lowermost positions. Again, both channels should provide equal amounts of illumination. If a considerable difference in brightness between channels is evident, refer to the section on “Field Troubleshooting and Repair.”
7. If both lighting channels appear to be operational, mount the Screen Hood (room light shield). Remove both Knurled Thumb Screws. Place the hood on the unit with the screw slots toward the rear. Replace the thumb screws. In brightly lit rooms, it will be necessary to position the hood in the full forward position.
8. The unit is now ready for service.

## OPERATION

The FX8B offers two powers of magnification, 6.5X and 10X. A single plain impression of one finger will just barely fill the screen in the 6.5 mode. 10X will permit an even closer look.

The enlarging lenses are mounted on a sliding turret (Fig. A). With the turrets in the full OUT position, magnification will be 6.5X. With the turrets in the full IN position, 10X magnification is available.

1. Turn on both illumination sources.
2. Place the objects to be magnified on the platforms of the Focusing Jacks. Center the area to be projected within the light beam.
3. Watching the Plexiglas® Screen, focus each object by moving the jack up and down. A good rule to remember is that low magnification (6.5X) will require a low jack setting. High magnification (10X) requires a higher jack setting (closer to lens).
4. Once the object's in focus, position as necessary under the lens.
5. The unit is equipped with a thermostatically controlled cooling fan. The fan will continue to run after the lamps are switched off. This permits more uniform cooling of the lamps and will extend the life of the lamps. *Do not unplug the unit until the fan shuts off.*

The FX8B Forensic Optical Comparator is not limited to examination of fingerprints. A variety of objects such as weapons, tools, projectiles, etc., may be magnified and examined. However, objects of considerable height may not come into focus, particularly in the 10X position.

### Photographing The Plexiglas® Screen

The Plexiglas® screen of the FX8B may be photographed using this simple



procedure. The camera settings given are only a guide. Test photos should be taken and the settings which give the best results should be recorded.

1. Set up the camera to be used on a sturdy tripod.
2. Project the images on the screen with one or two images showing at the same time.
3. Darken the room as much as possible.
4. Focus the camera.
5. Suggested camera settings are shown to the right. *Best results achieved when each side of the screen is photographed individually.*

FILM ISO	SHUTTER SPEED	APERTURE
400	1/30 second	f/4.7
100	1/8 second	f/4.7

## CARE AND MAINTENANCE

### Lubricating The Focusing Jacks

From time to time, it may be necessary to lubricate the Focusing Jacks. Apply a single drop of household oil on the Jack Screw at 2 or 3 points. A very small quantity of household oil may also be applied to the pivot points (see Figure B). Use a toothpick or similarly small object to apply the oil. Apply one drop of oil in each slide channel. After lubricating all of the above points, run the jack through its full range of travel several times.



### Cleaning The FX8B

Dust, dirt, fingerprints, etc. will accumulate over a period of time. Wipe all surfaces with a soft, damp cloth. Stubborn stains and fingerprints should be removed with a mild soap solution used sparingly.

## FIELD TROUBLESHOOTING AND REPAIR

While factory service is readily available should the need arise, this guide is offered to eliminate the inconvenience of having to ship the entire unit back to the factory. Virtually any repair to the FX8B

can be made in the field using ordinary hand tools and carefully following the ensuing instructions.

**WARNING:** Do not open the re-lamping panels or attempt any service inside the unit until the AC power cable is disconnected. *High voltages still exist inside the unit even though switches are OFF.*

### REPAIRS

**WARNING:** Unplug the unit before attempting any repairs. Our service records indicate that most requests for repairs occur immediately after receipt of the unit. This is due to rough handling by the delivering carrier. These repairs can be made quite simply and the need to ship the entire unit back to the factory is eliminated.

**CAUTION:** If a lamp is to be replaced immediately after it burns out, the lamp will be *extremely hot* and can cause a serious burn to the skin. Allow sufficient time for the lamp to cool prior to replacement. Run the cooling fan at least 15-20 minutes prior to opening the re-lamping panel.

#### 1. Lamp Replacement (Figure C):

- a. Remove the 4 Thumb Screws securing the re-lamping panel (rear of the unit).
- b. To remove the lamp from its socket, lift UP on the Release Lever

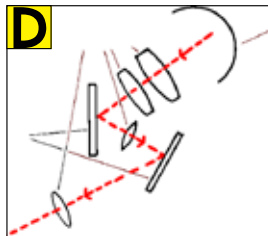
TROUBLESHOOTING	CHECK FOR
1. Neither projection lamp comes on. Fan does not run.	AC power problem. Circuit breaker may be tripped. One end or the other of power cable not plugged in. Power cord may be defective. Check for pinched or torn covering. Check fuse on rear of unit. Replace with 5.25 amp, slo-blo fuse if needed. Unit will not operate with either re-lamping door open.
2. Neither lamp comes on. Fan is running	Lamps may be loose in sockets or burned out. Check for tightness in sockets. Replace lamps if necessary.
3. One lighting channel is brighter than the other.	Check brightness controls. Brightness mirror may be damaged or loose. Reflex mirrors may be broken or loose. Contact a qualified service rep.
4. Illumination is working, but no image appears on screen.	Slowly run the focusing jack through its full range. If no image appears, one of the two reflex mirrors may have broken loose. Contact a qualified service rep.
5. Unusually short lamp life.	Lamps may have been installed improperly. See <i>Lamp Replacement</i> section.



while grasping the lamp. It is recommended that a cloth be used when holding and installing lamps. The lamp will slide out to the side.

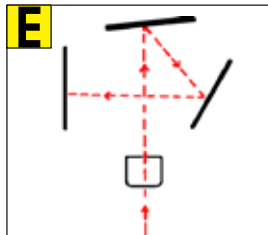
- c. To install a Replacement Lamp, be certain the Release Lever is in the full DOWN position. Slide the lamp into the socket. *Handle lamps by the outer shell only. Do not touch the bulb.*
  - d. Re-install the Re-lamping Panel with the 4 Thumb Screws. **NOTE:** *The Re-lamping Doors are equipped with interlock switches and the lamp will not illuminate until the panel is secured.*
2. Lighting Channel Repairs (Figure D):

As noted earlier, rough handling during shipment may have caused damage to the lighting channels. Note in *Figure D* the light path from the lamp to the object to be illuminated. There are 2 mirrors in each Lighting Channel. These mirrors are mounted with a double-faced adhesive strip. This strip adequately anchors the mirrors and provides a shock mount. Should a mirror break loose, this adhesive strip should be replaced. If this material is not available locally, please contact the factory. If the mirror has broken loose and shattered, a new mirror and mounting adhesive strip should be ordered from the factory. *Use extreme caution when replacing any mirrors in the unit.* For access, remove re-lamping panel.

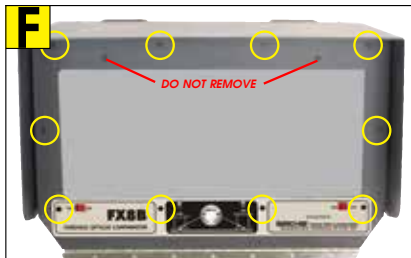


3. Magnification Channel Repair (Figure E):

The Magnification Channel is equipped with two mirrors, either one of which may have jarred loose. Mounting is achieved through the use of double-faced adhesive strips. The usual indication that a mirror is out of position is the fact that no image appears on the screen even though the Illumination Channel is operative. For access, remove re-lamping panel.



4. Plexiglas® Screen Replacement (Figure F):
- Remove the 10 Mounting Screws that secure the front plate.
  - Remove nuts securing Screen Clips. Remove Screen Clips.
  - Carefully remove broken glass and install new screen. Replace Screen Clips and nuts, securing screen.
  - Place the front plate in position and secure with the 10 Mounting Screws.



*To remove from panel, remove ONLY the indicated mounting screws.*